Article

Diversifying Indigenous Vulnerability and Adaptation: An Intersectional Reading of Māori Women's Experiences of Health, Wellbeing, and Climate Change

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Abstract: Despite evidence that Indigenous peoples' multiple subjectivities engender diverse lived experiences both between and within Indigenous groups, the influence of multiple subjectivities on Indigenous peoples' vulnerability and adaptation to climate change is largely un-explored. Drawing on ethnographic research with Indigenous Māori women in Aotearoa New Zealand, this paper provides empirical evidence that subjectivity-mediated power dynamics operating within Indigenous societies (at the individual and household scale) are important determinants of vulnerability and adaptation which should be considered in both scholarship and policy. Using an intersectional framework, I demonstrate how different Māori women and their whānau (families) live, cope with, and adapt to the embodied physical and emotional health effects of climate change in radically different ways because of their subject positionings, even though they belong to the same community, hapū (sub-tribe), or iwi (tribe). In underlining these heterogenous experiences, I provide an avenue for reconsidering how climate adaptation scholarship, policies, and practices might better engage with the complex, amorphous realities within Māori and other Indigenous communities. I argue it is possible to develop more inclusive, tailored, and sustainable adaptation that considers divergent vulnerabilities and adaptive capacities within Indigenous communities, groups, and societies and supports customised vulnerability-reduction strategies.

Keywords: Indigenous peoples; Māori; climate adaptation; vulnerability; maladaptation; intersectionality; multiple subjectivities; health; wellbeing

1. Introduction

Over the last three decades, a vast array of scholarship critiqued the scientific framing of climate vulnerability in narrow technical terms associated with biophysical impacts [1,2]. A plethora of research demonstrates that climate vulnerability is created through complex interactions between biophysical phenomena, power structures, and socio-economic conditions [3–5]. Groups that are disempowered, poor, and/or subject to 'multiple stresses' associated with ongoing institutionalised racism, disadvantage, or precarious resource-dependent livelihoods lack access to the resources needed to reduce harm and adapt to the impact of hazards, and may live in more hazardous locations [6–14]. A substantial body of work indicates that Indigenous peoples experience heightened vulnerability to the impacts of climate change because of the social, economic, political, and cultural marginalisation they continue to experience through their encounters with colonial states [15–21]. Despite evidence for internalised power dynamics within Indigenous societies that flow from interacting categories of difference (subjectivities) such as gender, sexuality, age, and class [22–24], very few studies examine how intersections of subjectivity may influence Indigenous peoples' experiences of climate vulnerability and adaptation, especially in settler colonial societies including Canada, the United States, Scandinavia, Australia,

and Aotearoa (New Zealand) [25,26]. Accordingly, in this paper, I address this large gap within the Indigenous climate adaptation scholarship and draw on intersectionality to extend understandings of Indigenous women's experiences of and vulnerability to climate change. Following Nightingale [27] and Kipp et al. [28], I use the concept of subjectivities rather than identity to convey the emergent, interactive, and amorphous (as opposed to fixed) nature of social difference. This paper is the result of collaboration between all the authors, however we have made the choice to use 'I' (referring to the first author, Danielle Johnson) throughout, as opposed to 'we' (all co-authors). The use of "I" ensures consistency throughout the paper and reflects the first-person, ethnographic style of writing used to narrate and analyse the results, which are drawn directly from the first author's doctoral fieldwork and based on the first author's analysis. Please see the 'author contributions' section for a more detailed breakdown of the respective authors' roles in the paper.

In this paper, I utilise an intersectional framework to examine how Indigenous Māori women in one area of Aotearoa are differentially vulnerable to the impacts of climate change. Rather than being a homogenous social group, Māori women hold multiple subjectivities constituting dynamics of privilege and marginalisation [29,30], which shape their diverse experiences of climate change and its implications on their health (both in terms of them as individuals and as part of wider family and tribal groups). Bringing an intersectional perspective to the study of Māori women, their everyday lives, and how climate change is (or could) impact(ing) their health and wellbeing, I highlight the diverse ways Māori women experience climate vulnerability and adaptive capacity. I argue that intersectionality, drawing on decolonial theory and critical race studies, provides an important heuristic device [31] to encourage reflection, critique of, and a new way forward for Indigenous climate adaptation scholarship and policy. At present, much of the existing literature and policy (both internationally and within Aotearoa) fails to fully consider Indigenous climate vulnerability and adaptive capacity, especially at the individual and household scale, and how this is shaped by structures (socio-economic, political, and cultural) and subjectivities, with power unevenly distributed amongst individuals, households, communities, institutions, and other social groups [32–34].

In attending to the interactions of race/Indigeneity, gender, class, age, and other subjectivities, my intersectional readings of Māori women, health, and climate change downscale existing discussions of Māori vulnerability and adaptation [35,36] from the iwi (tribal)- or hapū (sub-tribal)-scale to the whānau (family)- and individual-scale. Doing so provides a more intimate and specific picture of climate vulnerability and responses as they are lived and felt at the micro-scale. I demonstrate how particular constellations of subjectivity enmesh Māori women in power structures and mechanisms that translate to greater or lesser harm from climate hazards and influence the degree to which Māori women can (or do already) adapt to the embodied physical and emotional health effects of environmental changes.

In underlining these heterogenous experiences, I provide an avenue for reconsidering how climate adaptation scholarship, policies, and practices might better engage with the complex, amorphous realities within Māori and other Indigenous communities [37,38]. I argue that it is possible to develop more inclusive, tailored, and sustainable adaptation that considers varied levels of vulnerability and adaptive capacity and supports customised vulnerability-reduction strategies. While this paper may focus on one Indigenous people (Māori) in one small island nation at the bottom of the Pacific Ocean (Aotearoa), the study makes an important intellectual contribution to the global Indigenous climate adaptation scholarship by demonstrating that climate change is not experienced in the same way by each Indigenous person or community [39–41]. Rather, multiple subjectivities and power structures shape Indigenous people's everyday lives and their embodied experiences of (ill)health [42–44], which includes the multitude of ways climate change is (or will potentially in the future) impacting their physical and emotional health and wellbeing [45–48]. The structure of the paper is as follows. First, I briefly review the emergent literature on intersectional approaches to climate vulnerability and Māori climate change adapta-

tion (Sections 2.1 and 2.2). Following this, I provide an overview of Māori subjectivities, introduce the research area (southern Te Tai Tokerau/Northland) and methodology (Sections 3 and 4.1–4.3). Lastly, I present the results, which take the form of three vignettes (Sections 5.1–5.3) that provide different stories of how Māori women experience climate variability and stresses in their daily lives. These include their (in)capacities to access food and water supplies and ways they seek to reduce vulnerability and actively adapt to shocks and disruptions (which include but are not limited to biophysical hazards).

2. Literature Review

2.1. Intersectionality, Climate Adaptation, and Vulnerability

Climate scholars increasingly engage intersectionality as an analytical tool [49,50] to enhance theories of social vulnerability that treat whole social groups (such as the poor or people of colour) as vulnerable to climate change [6,7,12,51,52] and to challenge assumptions that women are universally vulnerable to (or highly adept at mitigating) climate change [53–56]. While still a novel approach in the climate literature [57–59], an expanding body of intersectional work—mostly situated within agrarian communities of the global south and drawing on feminist political ecology [60–69]—provides more robust and dynamic conceptualisation of climate vulnerability by 'unmasking' the multiple and intersecting socio-political, subjectivity-mediated drivers of vulnerability [49,70–73].

Instead of treating specific social groups as uniformly vulnerable to and/or capable of adapting to the impacts of climate change, emergent intersectional climate scholarship examines how peoples' subjectivities affect how they experience the world, including their vulnerability to climate hazards, and mediate their access to resources, knowledge, networks and other assets needed to adapt [74–77]. As Kaijser and Kronsell [78] (p. 421) observe, "from an intersectional understanding, how individuals relate to climate change depends on their positions in context-specific power structures based on social categorisations" that might emerge at the interstices of race, Indigeneity, gender and sexual identity, class, caste, socio-economic status (SES), occupation, and so on. For example, the vulnerability of female farmers from the Dagaaba ethnic group (west Ghana) is determined by the interaction of age, marital and educational status [79]. Married women are able to maintain food security with climate variability as they access land, agricultural inputs, and knowledge through their husbands, whereas younger, single women have the least access to land and resources. Young, literate, and educated women respond to climate variability by seeking off-farm work, yet those who are illiterate have very few adaptive options. At present, however, intersectional studies of climate vulnerability are limited in the Global North context [26,80–82].

Some scholars propose that integrating intersectionality into the study of climate change and health presents an avenue to better understand how interlocking inequalities produce particular impacts, exposures, risks, and opportunities to adapt amongst certain people [83,84]. While it is not common for intersectional climate research to be overtly framed in terms of health, a range of studies do, however, advance understanding about the heterogenous nature of health-related climate vulnerabilities. These include discussions of drought-related food insecurity and under-nutrition [79,85,86], illness linked to lack of sanitation, water scarcity, and flood control measures [87–89], risk of injury, assault, increased physical exposure and burden, loss of shelter or death during extreme events or through state-led responses [50,59,64,90,91] and stress from unpredictable weather and household-level adaptation [92] that emerge through intersections of race, ethnicity, nationality, location, gender, sexual identity, age, SES, caste, social capital, land and housing tenure, religion, family size and composition, health and educational status. Research by Walker et al. [93] detailing the heterogeneous impacts of wildfire amongst Indigenous and non-Indigenous residents of northern Saskatchewan (Canada) is one of the few studies that apply an intersectional framework to analyse vulnerability and adaptation to the health impacts of climate change.

2.2. Māori Climate Adaptation and Vulnerability

Māori climate change adaptation research, including the impacts of climate change, vulnerability to, and adaptation options for Māori, is a relatively new development [94–99]. Much of the published research specifically investigates the creation of contextually appropriate adaptation strategies for Māori iwi (tribes), hapū (sub-tribes), organisations, and businesses designed to safeguard and strengthen the health and wellbeing of current and future generations and the local environment to specific climate risks (such as flooding, sea-level rise, saltwater intrusion, soil and coastal erosion and drought) [32,33,35,36,100–103].

These studies situate the insights of iwi and hapū alongside climate science and other disciplines, creating a holistic framework that facilitates adaptation decision making by mana whenua (the tribal group who holds primary authority over an area of land) that is tailored to their rohe (ancestral lands and waters) and reflective of their particular, emplaced expertise and aspirations. For instance, the Climate Resilient Māori Land project explores pathways for Māori landowners of Ngāti Porou iwi to offset increased soil erosion in the Waiapu Catchment (Gisborne region) while realising their goal to enhance the economic wellbeing of their descendants and restore the mauri (vitality/spiritual essence) of wāhi tapu (sacred sites), mahinga kai (food gathering areas), and culturally important plants and waterways in their rohe [35]. The project—led by a Ngāti Porou researcher—used economic and climate modelling to develop a series of land investment scenarios based on reafforesting the catchment with native trees that are high in both cultural and monetary value [104]. Landowners then used wānanga (workshops) and hui (gatherings) to conduct a kaupapa Māori (Māori-focussed) assessment of the scenarios where each was considered in light of key values including kaitiakitanga (guardianship and enhancement of cultural and environmental resources) and whakatipu rawa (growing the asset base into the future through full-time employment and equitable distribution of benefits to those connected with the land) [35]. This enabled landowners to make appropriate, climate-sensitive land-use decisions.

Another example is a series of research projects undertaken by Professor Huhana Smith with her own hapū (Ngāti Tukorehe) and her kaīnga (village) of Kuku, located on the southwest coast of the North Island [33,36,103]. The research was conducted by a transdisciplinary team of Māori and non-Māori scientists, artists, architects, and economists who drew on multiple knowledge sources (including mātauranga Māori, climate science and economics) and research methods (including climate modelling, Māori walking interviews (hīkoi) and creative art practices) to investigate the potential impacts of sea-level rise, flooding and coastal erosion on the Kuku village, tribal meeting complex (marae), and whānau-run (family-run) dairy farms [105]. One of the outputs of the research was the creation of an adaptation toolkit comprising several stages to provide hapū with a flexible decision-making process for the future [33]. The stages (similar to steps in an adaptation pathway) are designed to allow the landowning hapū to enact their kaitiakitanga responsibilities to care for their ancestral land, river, and sea through efforts to restore and protect sand dunes and wetlands, move infrastructure to higher ground, and maintain their economic livelihoods by diversifying livelihood opportunities through the creation of harakeke (New Zealand flax) plantations and a flax fabric processing factory [33,36].

Smith et al.'s [33] and Awatere et al.'s [35] projects (above) both sought to contribute to the revitalisation of Māori sovereignty, health, and wellbeing, and the realisation of Māori social, political, economic, and cultural self-determination, all of which have been curtailed since European settlement in the 1800s (as discussed further in section three) [106]. These themes are consistent with the international literature on Indigenous peoples and climate adaptation, which advocates for equitable and sustainable climate solutions [107–110] that respond to the structural drivers of Indigenous peoples' climate vulnerability and forefront Indigenous ontologies, epistemologies, values, and desires for political, territorial, social, cultural, spiritual, and economic self-determination [25,111–113]. These projects, when viewed from an international Indigenous climate adaptation perspective, are both progressive and even radical in nature due to the emphasis on recognising and empowering Māori

knowledge, self-determination rights (through acknowledging the Te Tiriti o Waitangi (Treaty of Waitangi) principle of rangatiratanga), and the emphasis on local level (iwi or hapū) decision-making processes. However, there remain some key oversights within the current scholarship. Most notably, limited attention is paid to the social and contextual drivers of, and differential distribution of vulnerability between Māori individuals, whanau, and/or households (be it within or between hapū, iwi, or different communities that Māori are part of). Indeed, the focus on hapū-level adaptation (while important) means potential nuances that exist at the individual and household scale are homogenised, which calls into question the sustainability and efficacy of current or planned adaptation policies and strategies designed to reduce Māori vulnerability and enhance Māori resilience.

Existing literature exploring how and why Māori are vulnerable to the impacts of climate change is largely framed through a biophysical lens [36,100] rather than exploring the social or contextual nature of vulnerability [12,52,114]. Such scholarship ties Māori vulnerability to their occupation of places and their exposure to specific hazards, for example, the magnitude and/or frequency with which tribal lands are likely to be affected by future climatic hazards such as flooding, drought, or coastal inundation [32,36,100,115]. For instance, in developing the adaptation toolkit for Kuku (above) the research team conducted a risk assessment focussed on geomorphology and spatial mapping to identify areas susceptible to coastal erosion and sea-level rise to determine appropriate locations for preferred adaptation options [36]. Socio-structural factors influencing the vulnerability of the hapū to climate impacts (including historical wetland drainage and lack of cohesive and inclusive river management) are noted only briefly, and there is no attempt to explore if, how, or why individuals or whānau may have different experiences or vulnerabilities to the same climate hazard. A handful of scholars connect Māori climate vulnerability to factors such as the seizure, conversion, and modification of tribal lands under British colonial rule, the continued exclusion of Māori from decision-making fora (including those pertaining to their tribal lands and peoples) and the significant and ongoing socio-economic disparities for Māori as opposed to non-Māori [39,116–121]. These socio-political dynamics receive only passing mention [35,102] in the majority of scholarship, if they are acknowledged at all.

In addition, the emphasis on hapū-level climate adaptation further precludes engagement with household and individual vulnerabilities and adaptive capacities within much of the existing Māori-focussed climate adaptation research. Existing research conceptualises diversity within Māori society at the scale of the hapū, highlighting the distinctive traditions, values, and priorities of each hapū as it relates to climate adaptation [100,102,103]. Reflecting on work with hapū of Tangoio marae (Hawke's Bay region), Blackett et al. [100] (p. 4) observe, "each Indigenous group are unique as too are their aspirations and decisions in relation to adapting to climate change and environmental hazards, and maintaining sovereignty over their knowledges and decisions. Essentialised and general notions of Indigenous do not work." Although such research states the inclusion of Māori women, men, elders, and youth [36,100], their narratives and perspectives are presented as simply part of the wider hapū. Little is known of how racial heritage, social class, socio-economic status, gender, age, family composition, occupation, education, and other subjectivities might interact to increase the exposure and sensitivity of some Māori individuals and whānau to climate hazards and/or enhance or constrain their capacity to cope and adapt to change. Adaptation strategies developed through the existing body of research may reflect the specific aspirations, knowledge, assets, and other adaptive capacities of hapū as a whole, but it is less clear if they respond to the needs or abilities of individuals and households or guarantee their wellbeing with future change.

The focus on iwi- and hapū-level adaptation is unsurprising, given that iwi and hapū groups are privileged over other forms of tribal organisation in Aotearoa. Since the 1980s, for instance, Māori have sought redress of wide-ranging historical injustices through the Waitangi Tribunal, which investigates how the Crown (New Zealand government) breached Te Tiriti o Waitangi rights for Māori [122]. The treaty settlements process, as it has become

known, has empowered iwi and amalgamations of hapū as treaty claimants through its insistence that negotiations take place between the Crown and 'Large Natural Groupings' (of iwi and hapū collectives) rather than individual hapū or whānau [123,124]. Iwi groupings were much more fluid in pre-colonial times but are now the normative structures through which Māori/government relations take place [125]. Central and local government and government-funded research bodies require consultation with and approval from iwi and hapū groups, but not whānau and non-iwi organisations. Those who do not engage with (or know) their iwi or hapū are excluded from these negotiations and opportunities.

The oversight of individual and household-level climate vulnerability and adaptation is not simply a problem for Māori climate scholarship. International literature on Indigenous peoples and climate change has also been critiqued for assuming a homogenous social landscape presides within Indigenous groups and for failing to attend to diverse experiences of change [25,126]. There is a small but growing movement that seeks to advance the study of Indigenous vulnerability and adaptation by placing Indigenous peoples' multiple subjectivities at the forefront of enquiry [34,41]. Studies seek to better understand how intersecting subjectivities (including Indigeneity with factors such as gender, age, and class) can enmesh Indigenous peoples in power dynamics that increase or decrease their vulnerability and/or afford them unique capacities for adaptation [40,93]. These approaches offer considerable scope for attending to and providing for Indigenous peoples' diverse experiences of change in both climate scholarship and policy.

Additionally, the conceptualisation of Māori vulnerability and adaptation in current climate policy and planning requires further research to build in nuance and reflect diverse lived realities. In accordance with legislation such as the Climate Change Response (Zero Carbon) Amendment Act [127] and the Resource Management Act [128], the government of Aotearoa has begun to assess how climate change will impact society [129,130] and develop guidance to enable regional and local decision makers to plan for climate adaptation [131,132]. The National Climate Change Risk Assessment [129], or NCCRA, is integral to this process and has identified 43 major risks from climate change that will form the basis of Aotearoa's forthcoming National Adaptation Plan (NAP).

The NCCRA identifies Māori as a particularly vulnerable social group who are likely to experience impacts on their social, cultural, spiritual, emotional, mental, economic and physical health, wellbeing, and safety with increasing climate variability and change [129]. The relationship between heightened climate vulnerability and socio-political inequality is a major theme in the NCCRA, which states [129] (p. 64) that "those marginalised by age, race, ethnicity, socio-economic status, gender, literacy or health" may be more deeply affected and less able to cope, respond, and adapt to change. Inequalities in health outcomes, income, living conditions, and community infrastructure undergird many of the climate-related risks for Māori that are discussed in the NCCRA [129,133]. Māori are, for instance, said to be more sensitive to physical health risks associated with water and food-borne disease not only due to their social, cultural, and spiritual relationship with traditional wild foods and waterways, but because of their high disease burden (compared with non-Māori) and greater likelihood of living in deprived circumstances [133].

While these types of inequalities do and will continue to shape Māori vulnerability to climate change [116,134], the discussion of risks for Māori in the NCCRA is generalised and fails to explore how inequalities connected to gender, age, ability, education, and other subjectivities may influence risk and vulnerability, even if these other variables are identified as relevant to the risk in question. For example, Māori are categorised as vulnerable to the mental health consequences of climate change because of their deep spiritual connection to the landscape and high rates of existing mental health difficulties [133]. Women, youth, and those living in socio-economically deprived and remote locations are also identified as vulnerable to mental health impacts [133], yet there is no attempt to explore the interaction of these subjectivities (for instance, the effect on Māori women or rangatahi (youth) living in remote areas). Reducing the drivers of Māori climate vulnerability to a particular and defined set of health and socio-economic disparities narrows the opportunities to explore,

understand, and respond to heterogenous experiences of risk and vulnerability that may emerge at the nexus of diverse subjectivities. This reduction also perpetuates disempowering narratives of Indigenous peoples as climate victims who will continue to face risk and vulnerabilities because of their disparities [135,136], and overlooks potential expressions of Indigenous/Māori agency and adaptability that may exist alongside and in spite of structurally mediated vulnerabilities.

The NCCRA does, however, acknowledge the need for more research to bridge gaps in knowledge about the drivers and patterns of social vulnerability, especially for Māori and in relation to physical, mental, and spiritual health and wellbeing [129,133], which has received only limited consideration in Aotearoa to date [137–140]. Overcoming these deficits is key to creating appropriate, timely, legitimate, and evidence-based adaptation [130,133] and avoiding the risk of entrenching or creating new inequalities by delaying adaptive action or even pursuing maladaptive policies [129,133]. At this point, with the limitations of both the Māori climate adaptation scholarship and NCCRA there are significant opportunities to influence and enhance adaptation policy and action by exploring the relationship between Māori subjectivities, vulnerability, and adaptation to the (health) impacts of climate change.

3. Research Context: Amorphous Subjectivities, Inequality, and Agency Amongst Māori

Before exploring the relationship between Māori subjectivities and climate change, it is important to briefly unpack the somewhat amorphous nature of Māori subjectivities and outline some of the major factors that intersect to shape Māori peoples' everyday experiences of both inequality and agency. Although iwi, hapū, and whānau throughout Aotearoa had differing historical encounters with European settlers, Māori are united by a shared experience of colonisation and the resultant social, political, economic, cultural, and spiritual marginalisation and alienation this has wrought [141,142]. British settlers began to arrive in Aotearoa during the late 1700s and rapidly established export industries centred on raw materials, including Kauri (*Agathis Australis*) trees, whales, and seals [143,144]. In the 1800s, pastoral farming became an important part of this nascent capitalist economy, and vast swathes of land were unethically purchased and/or confiscated from Māori by the British government, in order to make way for settlement and the conversion, drainage, and manipulation of land for agriculture [120,145].

Māori rangatira (chiefs) and the British government signed the Treaty of Waitangi in 1840, officially bringing into being the nation of Aotearoa New Zealand. Although the treaty was supposed to guarantee Māori sovereignty over their lands and affairs [146], land alienation and conversion continued unabated and, in combination with increasing state control over waterways and marine environments, many iwi and hapū lost access to resources necessary for their physical, economic, cultural, and spiritual sustenance [147]. For instance, in the southern part of Te Tai Tokerau (the geographical focus of this paper), members of Te Roroa, Te Uri o Hau, and Ngāpuhi were left virtually landless through Crown-mediated land seizures and sales, and experienced great distress as they were cut off from spiritually and culturally important sites (wāhi tapu), subject to new limitations on gathering traditional kai (food), and witnessed the devastation of the ngahere (forest), whenua (land), kaimoana (seafood), awa (rivers), puna (creeks), and moana (ocean) through Kauri logging and gum digging, land drainage, and overfishing of the Kaipara Harbour by settlers [148–151]. Additionally, Māori throughout Aotearoa were subject to cultural assimilation policies designed to eradicate traditional spiritual and healing practices, the use of te reo Māori (Māori language) and customary practices tied to traditional systems of knowledge and beliefs [152–154].

By the 1900s, Māori had largely been divested of their economic base and political influence, and jobs they had previously fulfilled in colonial industries (such as Kauri logging and gum digging in the north) dissipated as these industries declined [155]. Many whānau left their rural homelands to seek waged work in growing urban areas, especially from the 1950s onward, where they fulfilled poorly paid manual labour, and experienced a

generally low quality of life [156]. As the population of rural Māori communities fell in regions such as Te Tai Tokerau, government investment there declined and key services, including schools and shops disappeared, further aided by the transition to neoliberalism in the 1970s and 80s [157,158]. An export economy centred on exotic (pine) forestry and dairy, sheep, and beef farming largely benefitted European landowners and overseas investors [159], and with the drive for production efficiency, mechanisation, and amalgamation of small family farms, the employment and economic gains promised for rural Māori communities failed to materialise. These industries instead furthered soil erosion, land degradation, and pollution of important freshwater and marine environments within Māori homelands [160–163].

Despite the official narrative of harmonious race relations in Aotearoa [164], it became clear by the mid to late 1900s that Aotearoa was a divided country, with significant inequalities along the lines of race and/or Indigeneity [165–170]. Literature began to evidence the systemic discrimination Māori faced in almost all areas of life, including education, employment, the legal system and politics, and disproportionate rates of poverty, ill-health, incarceration, and low educational attainment compared with Pākehā (European New Zealanders) [171–174]. The Waitangi Tribunal (in combination with the Māori cultural renaissance of the 1980s and 1990s) has served as a conduit for Māori to reassert their sovereignty and utilise their distinctive tribal identities to recover their lands and seek compensation for historical grievance and harm [175–177]. Many iwi and hapū (including Te Roroa and Te Uri o Hau) have now settled treaty claims and established 'post-settlement' tribal organisations to manage their lands and waters in accordance with local preferences [178,179], participate in local and regional governance, and provide health, educational, housing, and other social services to whānau [180,181].

Nonetheless, identifying as Māori in Aotearoa is still associated with great inequity [182–186]. For instance, Māori experience disproportionately high rates of un- and under-employment [187], child poverty [188], and health burdens including anxiety, depression, suicide, asthma, pneumonia, cancer, diabetes, stroke, and heart disease [44,156,189–194]. In Te Tai Tokerau, one of the most socio-economically deprived regions of Aotearoa [195], the average weekly income for Māori in 2021 was just $653 compared with $839 for Pākehā [196]. Growing unemployment in the region disproportionately affects Māori, who are four times as likely to live in overcrowded homes than non-Māori, twice as likely to live in substandard quality rented homes, and at increased risk of homelessness (especially in the wake of COVID-19) [197–199]. Many Māori in the north (particularly those in rural areas) are under-served by the healthcare system [200,201] yet have significantly higher rates of disease, hospital admission, and a lower life expectancy than non-Māori [199]. Institutional racism adds to the difficulties whānau face with gaining and maintaining employment and accessing healthcare [198,202,203].

At the same time, however, the literature demonstrates that Māori subjectivities and experiences of the world are complex and heterogenous, influenced by the intersection of racial and/or Indigenous heritage *with* factors including class, occupation, gender, sexual identity, and so on [204,205]. Such intersections or meetings situate different Māori individuals and whānau within dynamics of oppression and privilege that operate in Māori society and interact with the wider structures that marginalise Māori in Aotearoa [38,206,207]. For instance, scholars challenge the notion that poverty is aligned simply with Indigeneity or ethnicity in Aotearoa [37] by providing evidence of an "internal social hierarchy" [208] (p. 1021) centred on differential wealth and socio-economic standing within Māori society. As Poata-Smith [209] notes, in recent decades, Māori have been over-represented in the poorest 60% of households in Aotearoa, yet at the same time, Māori are prominent amongst the wealthiest 40% of households in the nation.

Socio-economic class has become an increasingly important marker of difference amongst Māori as some individuals, households, and whānau have experienced upward mobility and associated social and economic privilege through affirmative action policies, the treaty claims process, and the nascent Māori economy [37,206,210]. In the wake of treaty

settlements, for example, McCormack [204] and Kennedy [208] observe the development of a 'Māori elite' who control the development of landholdings and assets returned under treaty settlements and capture disproportionate shares of the associated economic benefits compared with other members of their iwi. The growth of the elite involves complex asymmetries within Māori society that emerge at the nexus of race, gender, location, and family and/or parental status [209,211]. For example, access to education, training, or social and business networking opportunities that enable the pursuit of professional and high-status occupations within iwi can be curtailed for rural whānau with limited services or denied for those who identify as part-Māori or mixed race due to intra-Māori racial discrimination [208].

The meeting of race/Indigeneity with gender is another significant intersection that shapes the dynamics of privilege and oppression within Māori society. Proponents of Mana Wahine theory—a form of Māori feminism—assert that the life experiences of wāhine Māori (Māori women) are filtered through a hierarchical social ordering based upon race and gender, where they occupy a subordinate position vis á vis not only Pākehā men and women, but Māori men also [30,207]. As Ballara [212], Te Awekotuku [213], and Marr [214] observe, wāhine Māori traditionally fulfilled important roles as leaders, healers, warriors, and visionaries and were revered for their spiritual and sexual power as creators. According to tikanga Māori, females and males fulfilled complimentary but different roles and one was not privileged over another [215], yet with the advent of colonisation and the introduction of patriarchal and Christian beliefs, the mana (power, status) of wāhine Māori was stripped away [216,217]. Māori women were recast as passive recipients of Māori male actions by white, male ethnographers and through the combined influence of land alienation, urban migration, and (Christian) schooling, wāhine were funnelled into domestic roles within the nuclear family and became increasingly financially and socially dependent on the male 'head of household' [215].

Mana Wahine theorists posit that these radical social changes have normalised the subordination of women under men within Māori society, with many wāhine being "made invisible, silenced (and) marginalised" [30] (p. 163) from important roles, decision-making, and positions of leadership and influence fulfilled by Māori men [207,211]. Māori women are therefore subject to a particular form of racialized and gendered oppression. Firstly, they experience fewer benefits and privileges than Pākehā men and women because of their race/Indigeneity. Evidence suggests, for instance, that Māori women with breast cancer receive a significantly poorer standard of healthcare than Pākehā women with the condition, have a 10% lower chance of surviving for longer than five years with advanced breast cancer compared with Pākehā females, and are regularly subject to culturally inappropriate procedures in a medical system that favours European norms concerning the body, health, and wellness [218,219]. Concurrently, Māori women also face internalised marginalisation by Māori men because of their gender identity.

However, as Irwin [29] (p. 3) observes, "in our work with Māori women we need to recognise that they, like any other community of women, are not a homogenous group." Indeed, scholars note that the realities of wāhine Māori are co-constituted by not only race and gender, but tribal or political affiliation, social class, sexual and gender preference, knowledge of tikanga Māori, te reo Māori (language), rural/urban location, level of schooling and educational attainment, racial heritage, religion, and so on, all of which can act as markers of difference, and set up dynamics of privilege and discrimination [220,221]. In research conducted with women of mixed Māori/Pākehā descent, for example, Moeke-Maxwell [38] asserts that the archetypal and essentialised notion of Māori women as nurturers of nations and traditions fails to reflect the incongruous power asymmetries that mixed-race women are situated within because of their racial diversity, corporeal difference, and cultural hybridity. Research participants' light-skinned privilege and affiliation with Pākehā society afforded them employment opportunities and social capital perhaps unavailable to women of sole Māori heritage. Yet, at the same time, their gender and bodily alterity generated oppression, including sexism and racism from male colleagues (both

Māori and Pākehā), being exoticized by their own whānau and othered by their whānaunga (relatives) for appearing 'too white' and therefore not 'Māori enough.'

It is important to keep in mind, however, that constellations of subjectivity are important sources of agency for Māori, and even those whose subjectivities locate them at multiple social, economic, and cultural margins act to shape their destiny and influence their reality rather than simply disempowering them. For example, Ngahuia Te Awekotuku is a prominent activist scholar/writer whose positionality as a queer Māori woman from a lower-class family resulted in significant discrimination but also served as the springboard for her work on lesbian, Māori, and women's rights. In an account of her life, Te Awekotuku [205] describes how her education and professional life have been shaped by systemic racism within Pākehā institutions and systems such as schools and universities, and sexism, heteronormativity, homophobia, and classism in both Indigenous and non-Indigenous settings. Despite these hardships, Te Awekotuku used her subject positioning to work for change and became an outspoken advocate for Māori sovereignty, and an integral part of the New Zealand (Māori) feminist and LGBTQI+ rights movements, for which she has received national and international recognition [222–224]. Te Awekotuku's work builds on a long history of female-led activism in Māori society that (despite being infrequently recorded) dates back to early colonial times [225–228] and finds expression through multiple avenues including the modern Mana Wahine movement and Mana Wahine claim to the Waitangi Tribunal. These efforts seek to analyse, understand, and redress past and ongoing harms to Māori women (including young wāhine, and those identifying as takatāpui (Māori identifying with diverse sexes, genders, and sexualities), whakawāhine (Māori assigned male at birth but living as a woman), and transgender) and reconnect current and future wāhine to their culture, knowledge, and position as rangatira [207,216,217]. From this brief exploration of Māori subjectivities, it is clear that although Māori may share a common Indigenous identity, Māori peoples' lived realities are highly heterogenous, shaped by their affiliation with different demographic, social, and genealogical communities that may both empower and disempower, depending on the context.

4. Materials and Methods

4.1. Region and People of Focus

The research discussed in this paper was conducted in four rural locations in Te Tai Tokerau (Northland region) that span the rohe of Te Roroa iwi, Te Uri o Hau (a hapū of Ngāti Whātua iwi), and Ngāpuhi iwi (see map—Figure 1). Despite the significant inequities faced by Māori in the north, iwi, hapū, and whānau are actively enhancing the physical, emotional, and spiritual wellbeing of current and future generations through an array of activities and projects [181]. Nevertheless, the social dimensions of climate vulnerability and adaptation have received comparatively little attention [229,230]. Some climate change planning is taking place at the iwi level [231] and through regional and local councils [232–234], but these conversations do not examine how particular Māori groups or subjectivities may be adversely affected or able to respond to ongoing and future change.

In the future, the region is projected to become amongst the hottest, driest, and most drought-prone areas of Aotearoa [235]. By 2090, annual temperatures will be between 1.4–3.1 °C warmer, the risk of extreme fire danger will increase by 40–50% each year, and overall streamflow will decline [236]. Marine and terrestrial biodiversity may be compromised by increased pest and disease incursion [237,238], habitat change, and a decrease in ocean pH of 0.3 units [239]. Similar to other regions of Aotearoa, low-lying areas will be subject to inundation and flooding as sea levels rise between 0.5–1.4 m by 2120 [240], and extreme rainfall and stronger storm events become more frequent [236].

Figure 1. Map of the research location.

4.2. Research Design

The research described in this paper emerges from a multi-year collaboration between myself, a white British female scholar, the two Indigenous co-authors (Karen Fisher (Ngāti Maniapoto, Waikato Tainui) and Meg Parsons (Ngāpuhi)), an Indigenous-led environmental collective—the (now disbanded) Integrated Kaipara Harbour Management Group (IKHMG)—and Māori community members in the study location. Guided by an approach called 'sensitive participatory ethnography,' this enquiry seeks to disrupt the power dynamics of traditional ethnographic and cross-cultural research *on* and with little benefit *to* Indigenous peoples [241–243]. Weaving together Indigenous research methodologies [244–247], sensitive cross-cultural research [248–250], community-based participatory research [251–253], and ethnography [254–256], the approach is grounded in collaboration between a researcher and community and aims to build holistic understandings about a topic of interest to all parties involved. It uses contextually appropriate protocol and modes of interaction, including long-term qualitative fieldwork, and prioritises reflexivity,

an iterative, inductive style of enquiry and analysis, and outcomes benefitting researcher *and* participants.

Accordingly, the research was designed in dialogue with the IKHMG and communities to provide not only material for my doctoral thesis, but information to assist these parties in adapting to climate change and communicating their aspirations for the future. Data were collected in 2019–20 during nine months of mixed-methods fieldwork split between the four locations and combining daily participant observation, reflective journaling, and unstructured and semi-structured interviewing. Participant observation allows the researcher to build relationships and learn while taking part in daily life 'in the field' [257,258] and enables rapport building with communities members, the identification of potential interviewees, and triangulation of information from interviews.

I interviewed 43 people, 36 of whom identify as wāhine Māori. Rather than sampling for pre-determined subjectivities (other than Indigeneity and gender), I used snowball sampling to recruit interviewees, where existing collaborators recommended further participants [259]. During daily reflection in a field journal and ongoing transcription of interview recordings, it became clear that intersecting subjectivities were relevant to understandings of vulnerability and adaptation. Consistent with the iterative and inductive nature of ethnography [260], I therefore pursued lines of enquiry, ways of listening, and individuals that would further these ideas. All research participants gave their informed consent before they participated in the study. The research was conducted in accordance with the Declaration of Helsinki, and the protocol was approved by the University of Auckland Human Participants Ethics Committee (number 022705).

4.3. An Intersectional Framework

There is no defined methodology for conducting intersectional research or analysis [261,262]. Some scholars advocate for greater methodological rigour [263]; however, the absence of a predefined framework for data analysis allows the analyst to tailor enquiry to their project. In keeping with the inductive method of inquiry, I developed an analytical framework that centred on instances in transcripts and fieldnotes where wāhine self-identified as privileged and/or marginalised because of their positionality/ies. In prioritising the subjectivities the women themselves emphasised in their kōrero (narrative), I became familiar with the particular types of subjectivity structuring the lived, grounded, everyday experiences of vulnerability and adaptation for individuals and households in specific places at a particular point in time. This "grounded approach" [264] (p. 886) to intersectional analysis is often used by qualitative researchers and is regarded as an appropriate strategy for creating meaningful analytical frameworks that reflect the research participants' experiences of the world [265,266].

Although each woman's kōrero was unique, it was clear that particular cases and experiences were linked to others through shared characteristics and subject positionings, such as the intersection of Indigeneity with gender, age, location, class, occupation, educational, marital, and socio-economic status. As is common with intersectional analysis, the analytical framework considered how these different constellations of subjectivity positioned the women within power dynamics operating at multiple levels [26,62,76,266]—institutions, social structures, ideologies, and norms from the household, to the community, the regional, and international scale—thereby structuring dissimilar experiences of climate change. In attending to the interaction of multiple subjectivities at multiple scales, I completed a final stage of intersectional 'readings' of the women's narratives, several of which are presented here in a style loosely based on ethnographic vignettes. Vignettes are a mode of ethnographic storytelling that introduce the reader to the field location in the form of a short yet detailed encounter [267,268]. Vignettes typically share rich details of everyday phenomena and realities, unusual events, or key characters that help build an ethnographic theory or support key points [267–272]. I engage vignettes in direct contravention to dominant modes of research on climate adaptation that privilege the global scale and universal solutions as opposed to the intimate and everyday [2,63,273,274]. Three vignettes are

presented to provide a rich portrait of contextual vulnerability at the micro, individual, and household scale and its diverse embodied manifestations amongst wāhine Māori. The vignettes draw on seventeen interviews with ten wāhine, information from which was triangulated and verified during nine months of intensive participant observation. Vignettes one and three tell the stories of a single woman, whereas vignette two presents a series of women's experiences as they relate to water shortage. The women in the three vignettes have very different subjectivities, material circumstances, relationships, skills, and capacities which translate to heterogenous experiences of climate change despite their geographical proximity, shared Indigeneity, and gender. The names used in the vignettes and other identifying descriptors have been changed or concealed to preserve anonymity of all research participants.

It is important to keep in mind that while the intersectional readings shared in the vignettes are based upon the subjectivities that the research participants emphasised themselves, the researcher's own positionality is also influential [263]. As a European, Indigenous-allied woman with training in anthropology, an unseen disability, and unresolved trauma, these 'parts' of myself have shaped the research approach, my ability to be accepted and gather data in particular circumstances, the subjectivities I emphasised during analysis, and my conviction that the stories told here are but partial, incomplete renderings [275] of a complex whole. A wealth of scholarship in anthropology, feminist social science, intersectionality, and Indigenous and decolonising research methodologies advocates that reflexivity is integral to the pursuit of ethical and rigorous research endeavours [243,249,266,276,277]. Reflexivity involves an awareness of how researchers' subjectivities position them in relation to research participants, set up power dynamics within the research, and influence the design and conclusions of the enquiry [278,279]. Such awareness is a navigational tool that helps researchers understand their own limitations and pursue thorough, careful enquiry that is sensitive to context and the desires of those involved [248,280,281].

5. Results and Discussion

5.1. Vignette One: Food Insecurity and Changing Seas

"Like this"—she demonstrated the twisting motion needed to dislodge the mussel, to disentangle its fibrous beard from the mass of shells covering the rocks at the end of the beach. A small hole in my gumboots was slowly soaking my left foot whilst my right struggled to balance on the barnacle-encrusted surface. The briny scent of kelp encircled the four of us as we worked, each filling a five-gallon bucket as fast as we could to beat the incoming tide. Soon enough, 'the old man' (as the other two called him) decided time was up and we quickly made our way back to the safety of the truck. As we crested the ridge, I asked them to explain to me the draw of the beach, the reason for harvesting mussels so regularly. "It's just . . . that feeling of *freedom*" she said, being on the beach, getting your kai (food). "It's fresh, too" her husband added. "And to share" the old man explained.

Kaimoana (seafood such as mussels, pāua (*Haliotis iris*/Abalone), pipis (*Paphies australis*/clam), kina (*Evechinus chloroticus*/Urchin), mullet, crayfish) has sustained whānau in this remote coastal community since the first tūpuna (ancestors) walked the land. In addition to providing fresh, locally sourced protein to supplement kai purchased at the shop, kaimoana is a means through which whānau express manaakitanga (hospitality/respect)— a key Māori value—by sharing their catch with others. Sharing kaimoana with elders, local and visiting whānau is an important part of enacting the reciprocal duties of care between members of Māori kin networks that ensure whanaungatanga—the wellbeing of the larger family unit, without which the individual can never be well [282,283]. The sharing and consumption of kaimoana also reaffirms 'unique identity'—mana ake—another important part of Māori health and wellbeing [284]. This is particularly so when 'cultural keystone species' (foods linked to ancestral, spiritual, and intergenerational cultural practices in the rohe [285]), such as pāua in this community, are served by local whānau to manuhiri (visiting kin).

A glassy river snakes through the community, emerging into the charged air of the west coast several kilometres later. In recent years, community members have witnessed a decline in the availability and quality of kaimoana, which they connect with run-off from pine forest plantations surrounding the settlement, over-allocation of fishing quotas to commercial operators, illegal poaching, and increased coastal erosion. The nets in the estuarine remains of the river are mostly empty these days and there have been reports of strange-looking and even stranger-tasting fish. You have to dive for the crayfish now, and the pāua have grown small. Residents agreed that future climate-related change, including warming ocean temperatures, sea-level rise, and ocean acidification could further impact kaimoana availability. While this evoked sadness because of the emotional, cultural, and spiritual value of kaimoana, most people stated it would have a negligible effect on their ability to secure enough food and ensure physical wellbeing for their household. It came as a surprise, therefore, when one wahine, Ngaio, expressed to me her prime concern about climate change. Having spent the morning at work, she was anxious to get to the shop for a rare treat: pie for lunch. We climbed into their rusting vehicle, the seats deeply engrained with years of wear. Ngaio's high-viz vest glowed against the dark interior and crumpled slightly as she leant towards me. Her eyes widening, she half-whispered her fear: "the thing is (with climate change) ... how am I going to feed my family?" Table 1 (below) provides a summary of the different ways that women's health and wellbeing is affected by biophysical climate impacts in the study location.

Table 1. Biophysical impacts of climate change in Te Tai Tokerau and their implications for the health and wellbeing of Māori women. Based on observations and projections from National Institute for Water and Atmosphere (NIWA) and others [236,239,286].

Biophysical Impact	Observations and Projections	Local Consequences of Biophysical Impact	Impact on Health and Wellbeing for Māori Women in Te Tai Tokerau	Vignette Number
Sea level rise	By 2100: 0.5–1.4 metre increase	Decreases to kaimoana (seafood) especially mullet and shellfish such as mussels, pāua (abalone), kina (urchin), and crayfish	Limits ability of wāhine to share food with elders, local and visiting whānau (family) and therefore enact duties of care (manaakitanga) and affirm mana ake (unique identity) Reduces dietary protein and increases likelihood of food insecurity	One
Ocean acidification (change to pH)	By 2100: 0.06–0.32 unit decrease			
Increased ocean temperatures	Since 1981: 0.2 °C per decade observed in region Future warming mirrors air temperature increase			
Intensification of severe and prolonged drought	By 2090: 40–140 mm PED (potential evapotranspiration deficit) increase 10–20 more dry days (<1 mm rainfall) per annum	Household water shortage for those not connected to mains water supply	Stress from having to fulfil care-giving responsibilities at home with limited water, travel to use laundrettes, negotiate loans for water from government institutions and decide whether to buy food or water. Stress can lead to arguments within the whānau and sometimes result in intimate partner violence	Two
Decreased rainfall	By 2090: 5–20% decrease in spring 5–10% decrease in winter			
Drought	By 2090: 40–140 mm PED (potential evapotranspiration deficit) increase 10–20 more dry days (<1 mm rainfall) per annum	Decreases to tuna (eel) abundance	Increased stress and household food insecurity	Three
Decreased stream flow	By 2090: Up to 11% annual flow decrease			
Increased river temperatures	Dependant on river catchment but will mirror air temperature increase			

Unlike other wāhine in the community who work full time or are in receipt of a regular state pension or unemployment benefit, Ngaio's income ebbs and flows as her highly specialised skills—once the source of a secure livelihood—are utilised in cycles, as dictated by the operations of the forestry industry. When they are working, Ngaio and her partner can afford to shop for a varied diet as their neighbours do, yet between cycles, money is scarce, and they depend on locally sourced kaimoana. As she observed, when out of work, their diet is:

"total beach, you know? Seafood on. Try and get some money somehow and maybe ... chuck a little bit of veg in there. Step away from the meat. You know, get flour, the basics ... tea, milk powder and that, if we can afford it, and just live like that. Make our own bread and stuff. Then beach, beach, beach. A lot of fish. If the tide's right, get kina and pāua ... pipis ... mussels."

The inflated cost of goods in the closest small food stores plus a ban on harvest of traditionally and regionally important wild food species such as toheroa (*Paphies ventricosa*/large surf clam) and kereru (*Hemiphaga novaeseelandiae*/New Zealand pigeon/Kukupa)—imposed on Māori as part of settler-mediated environmental conservation efforts [147,287,288]—adds to the difficulties Ngaio faces with food provisioning. Furthermore, it is hard to take advantage of discounted food when it is available in the shops, since the settlement was never connected to the national power grid [151]. While some wāhine have access to freezers in their adult children's nearby homes (that are connected to the power grid), Ngaio and her partner lack family in these locations and live in a property served by a solar panel that allows for lights but not a fridge or freezer. During our meetings, Ngaio often reminded me of their reliance on locally harvested foods. She would gesture towards the bush, the river or the beach, and tell me, "that's our fridge."

One morning I had visited Ngaio at her home. The sun streaming through the window warmed my back but the air in the kitchen was cold. Every so often I caught a waft of the canned beans Ngaio's partner had been heating for their breakfast when I arrived, and which stood, congealing, on the commercial size stove. An oversized cat brushed at our legs with her tail, asking to be fed. "I'm being interviewed, not you!" Ngaio said dismissively to the cat. I was keen to understand how Ngaio would respond to future decreases in kaimoana availability with climate change, and asked if she would consider looking for other work to offset her reliance on kaimoana.

Ngaio explained that several intersecting factors decreased her chances of success. In such a remote area with few businesses and services, job opportunities are severely constrained, meaning potential employees must commute to the nearest town, Dargaville. As Ngaio observed, commuting would be risky since "our cars are illegal" and lack the costly paperwork, vehicle maintenance, and inspection required to drive on public roads. Living in town, she noted, would be prohibitively expensive, and the modest wages offered by the type of roles she might fulfil as a labourer in the local horticultural or agricultural industry would hardly offset rent, bills, and fuel. Indeed, as a wahine employed in the kūmara (sweet potato) gardens near to Dargaville explained, "the hourly rate's pathetic. You know, everyone's on minimum rate." Despite her specialist skillset, Ngaio lacks the qualifications needed for better paid jobs, and as she reflected, upskilling is not an option: "because of my age now, there's no way they're going to give me a student loan, in case I drop dead tomorrow. So you get to a certain age bracket and that's it, mate, you're over." She chuckled, but I could see she was serious.

Furthermore, Ngaio maintains that men in the region have greater chances of securing a job (including within Māori organisations) because even though "a lot of the women in here are just as strong as the men, physically ... and mentally," patriarchal beliefs prevail and men are perceived as more insightful at work and better suited to physical labour than women. Ngaio also recounted the difficulties she faced in the past with finding work as a mixed-race (Māori/British) individual: "(when I was) running round trying to get jobs, 'Oh no, you're a half-breed' sort of thing. That's what I got off them. Or if you have Māori blood in you back then, they sort of discriminated slightly." While she acknowledged that workplace diversity is more common nowadays, Ngaio noted Māori tend to be found in far fewer numbers in 'white collar' jobs than low paid labouring positions: "they wouldn't have a problem shoving you in a kūmara garden or something like that, but inside an office, I don't think so. Unless you've had the training." These are not isolated observations, and wāhine Māori throughout the field-site expressed their concerns that the introduction of colonial European gender norms has shifted the balance of power in Māoridom, such that women are no longer seen as equals with men, while experiences

of systemic racism and racist micro-aggressions are widespread in daily life. Concluding her kōrero, Ngaio explained that adapting to kaimoana shortages by finding more stable employment would be challenging: "Age, sex and race. They all . . . go against you."

Seen through an intersectional lens, Ngaio's distinct constellation of subjectivities (re)produce a distinctive form of vulnerability that is not shared amongst others in the community. As an older, mixed-race Māori woman who inhabits her traditional homeland, has limited qualifications, and irregular employment, Ngaio may experience increasing difficulty in securing enough nutritious food for her household with greater climatic variability and change. Although Ngaio and her partner generate a little extra income by collecting and selling Kauri gum, and, she noted, would take to hunting wild kai and growing gardens if needed, they are still more vulnerable to food insecurity than other residents of the settlement, for whom climate-related kaimoana decline presents challenges to emotional and spiritual wellbeing but not physical health and nutrition. As the inner wheel of Figure 2 depicts, all residents are subject to a level of marginalisation through their shared occupancy of an environment where factors including inflated food prices, waterway degradation, and lack of electricity could heighten their vulnerability to climate-related food insecurity. The degree to which an individual or household within the settlement is actually vulnerable, however, is a product of internalised power asymmetries involving socio-economic status, occupation, education, social networks, gender, age, and racial heritage (the outer wheel of Figure 2).
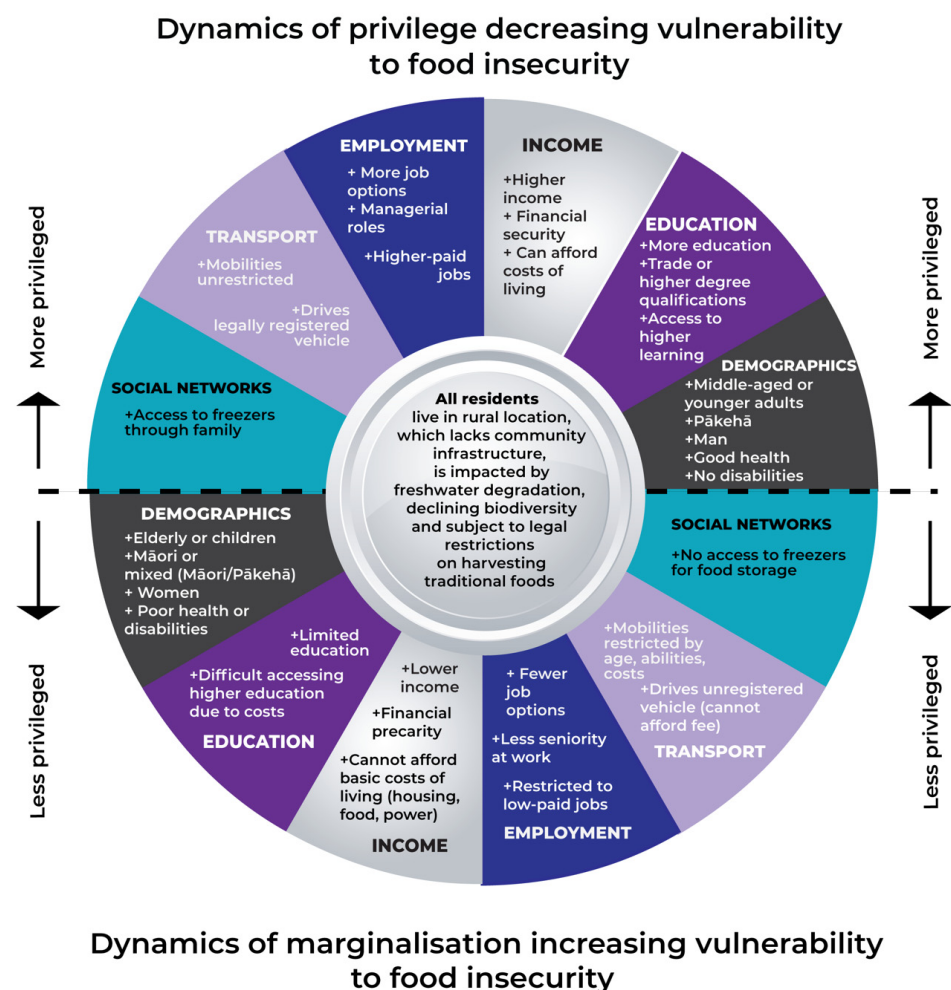
Figure 2. Aspects of privilege and marginalisation that determine vulnerability to food insecurity with future climate change amongst residents of a small coastal settlement in Te Tai Tokerau discussed in vignette one. Residents whose subjectivities mean they have fewer privileges and are more marginalised (such as Ngaio) are at heightened risk of food insecurity.

The ability to reveal unique and varied lived experiences [31,289] is one of the key assets that intersectionality brings to climate scholarship [73]. Originally developed by black and Latina feminists to convey how their realities were distinct from white women and structured through the interaction of race, class, and gender [290–293], intersectionality has been adopted by members of the disability community, those working in education, health promotion, and resource management to better understand patterns of difference within social groups [294–296]. Through attending to the power dynamics present within Māori and other Indigenous societies, an intersectional approach offers significant opportunities to address the present gap in scholarship on socially mediated Indigenous climate vulnerability at the sub-tribal or sub-community level both within Aotearoa and globally [26,36]. As this vignette reveals, most residents of the community are not vulnerable in the same way as Ngaio because their relative financial stability (from being employed or a beneficiary) and access to freezers (through their social network) places them in the privileged position of being able to buy (not gather) their kai and safely store quantities of cheap, perishable food (see Figure 2). Additionally, Ngaio's limited finances and the potential for discrimination based on her age, race, gender, and educational status mean she has fewer opportunities to adapt through seeking alternative employment than do others in the settlement with a legal car, enough money to commute or move to town, further education, specialised training, or who are younger, male, or Pākehā. Observations such as these emphasise that (despite limited scholarship on the topic) different Indigenous individuals and households do and will experience the (health) effects of the same climate hazard in very different ways [297,298] even if they are related, live in close proximity, and/or share other forms of subjectivity such as Māori womanhood.

To enhance the likelihood of equitable and inclusive outcomes [299,300], it is essential that those developing Indigenous-focussed adaptation policy and strategies (be they Indigenous groups, government agencies, or NGOs) recognise divergence within communities (rather than simply between collectives such as iwi, hapū, or tribes) and incorporate the experiences of groups, households, and individuals who (such as Ngaio) are anomalous and/or more marginalised and vulnerable compared with the majority. Evidence suggests that adaptation which assumes a homogenous Indigenous experience of climate change does not necessarily result in vulnerability reduction for all within a group or community and may even introduce new harms and/or become maladaptive (i.e., increasing, not reducing vulnerability) [89,126,301]. The magnified pace and severity of climate change within many Indigenous homelands and communities [302–304] underscores the need for adaptation to serve a wide base of Indigenous interests and support those most at risk to reduce their vulnerability in an appropriate manner.

5.2. Vignette Two: Stress, Drought, and Water Storage

During the summer of 2019–2020, part way through my fieldwork, Northland experienced a major drought [305], leading to unprecedented water restrictions that coincided with the outbreak of COVID-19 and Aotearoa's first lockdown. In late 2020 I moved to Mangakāhia, a rural valley in the northeast of the field site, where it became apparent that water scarcity has a major effect on the health and wellbeing of residents, especially wāhine Māori. Whānau are particularly keen to address localised water insecurity, given the wide-ranging impacts on women's emotional and mental wellness, physical safety and family nutrition, as well as projections for intensifying drought with future climate change [236]. Droughts are not a new phenomenon in Mangakāhia [306] but Māori women with whom I spoke feel they have worsened over time. As one observed: "I think with the drought . . . . you just learn to live with it, because it occurs so often. We actually get droughts virtually every year, but they're getting longer, drier, more intense." The ability to 'live with' drought, however, is not uniform throughout the valley.

At the lowest end of the valley, residents are connected to the mains water supply provided by the local city council. Further up the Mangakāhia River valley, however, the majority of households have no access to municipal water supplies and must therefore

rely on rainwater tanks. These cylindrical structures—rough grey concrete or smooth green plastic—collect rainwater from the roof of almost every building in the upper reaches of the valley. They function well in winter, yet frequently run dry in summer, especially during drought. As local kuia (grandmother) Karamū explained, tank-fed households such as hers can mitigate water shortages by installing water-efficient appliances and greywater recycling systems, pumping from creeks, or purchasing additional tanks. Yet these strategies, costing in the range of $1000–$5000, require savings and access to a water source. Reflecting on her position as a university-educated professional with a stable and diversified income from her job and properties, and her household's proximity to a healthy creek, Karamū observed: "I mean . . . I'm just blessed that I'm in such a privileged situation." Karamū and I had been meeting regularly over the course of three months, taking turns to buy coffee at her favourite local café. This time, we sat in the café's newly opened gallery, surrounded by antiques and local handicrafts, several of which caught Karamū's eye. She took a sip of her drink, a slight frown appearing on her forehead. In contrast to her household, Karamū continued, wāhine Māori from further "up the valley (are) all reliant on tank water, and they have . . . a different degree of poverty. A lot of them . . . . are on benefit." Whether dictated by age or inability to work through ill-health, care responsibilities, the constrained local job market, lack of transport, low literacy or criminal history, reliance on a government benefit or pension was associated by wāhine in Mangakāhia with hardship. Many beneficiaries experience difficulties in setting aside money to meet the basic needs of the household, including water.

Long-time Mangakāhia resident Āwhina had agreed to talk with me at her marae near the top of the valley. As I waited for Āwhina to arrive, a logging truck laden with pine spars rounded the corner, billowing dust in its wake. A rattling noise emanated from the marae building to my left as the truck drove past, almost dislodging the blue tarpaulin covering a leaking section of roof on the neighbouring property. In the silence that followed the passing of the truck, Āwhina arrived, showing me inside what she called "our humble little marae." Explaining her efforts to raise money to install a new roof for the marae Āwhina observed: "we were going to hold a social, but that didn't pan out. The tickets weren't going. You know, we're picking on poor people here. All the ones local . . . you know, no money. Every week . . . we're all striving to survive, because we're all on benefit."

Unlike Karamū's whānau, beneficiaries up-river do not have the same options to offset water shortage by investing in costly water infrastructure. Even if money were available to pump water, this is not always possible or desirable according to locals since the intensive, foreign-owned pine forestry—imposed on these ancestral lands since the 1970s after they were seized during the nineteenth century [150]—has reduced streamflow and releases large quantities of sediment into the waterways [307,308]. Whānau at the head of the valley must therefore manage water shortages during drought differently, a task which often falls to wāhine in multi-person households because of normalised gender roles. Research participants explained that wāhine view themselves as responsible for the wellbeing of their whānau (especially tamariki—children—and mokopuna—grandchildren) and while this manifests in many different ways, it is expressed through daily domestic 'care' duties such as doing laundry, cleaning, and cooking. As Karamū explains, during a drought, when tank water runs low, "Māori women have to be organised within their family, about the use of water." This is a stressful exercise for wāhine that entails careful allotment of water between essential household tasks, and costly and time-consuming use of laundrettes in the nearest city, Whangārei.

The strain is magnified if the tank runs dry and whānau have to find four, five, or even six hundred dollars to refill. As Āwhina observes, "what beneficiary has $500?" Some whānau will approach Work and Income New Zealand (WINZ) for a one-time loan to refill the tank, yet this can be a stressful process almost always mediated by gender. Āwhina explains, people may think, " . . . 'no money, how am I going to pay for the water? Oh, somebody has to go to WINZ.' It's never the man, *he* won't go and do it. The wife has to, the partner, the woman. And they've got four, or five, or six kids, and they're all on

benefits. It adds to the stress alright." In the absence of a loan, wāhine must make difficult decisions that affect the wellbeing of themselves and their dependents: "some people may give up the money for water and go without food" noted another local kuia, Tui. These difficulties are compounded by the deleterious impact of forestry, farming, and drought on local waterways, which limits the availability of wild food such as tuna (*Anguilla dieffenbachii*/Longfin eel, *Anguilla australis*/Shortfin eel, and *Anguilla reinhardtii*/Australian longfin eel) that whānau might utilise to reduce their weekly food bill and save for a water delivery. As kuia Ani states, "there's no food as an alternative that they can go and say, 'hey, we'll live on eel this week while we put the money into water.' There's just nothing there now."

Adaptive options are further constrained for wāhine whose partners live with addiction, as funds saved for water may be co-opted to buy alcohol or the drug of choice, methamphetamine, which puts further strain on relationships. As Tui remarked, "as stupid as it may sound, it can get like that: 'well, where's the money I gave you? You spent it on booze?' It can go there. That's the source of some of these arguments, is the money." Many of the wāhine with whom I worked had personal experience of stressful and indeed violent relationships. While they noted the hidden or 'taboo' nature of the problem, violence against wāhine connected in myriad ways to the gender-mediated effects of climate change, including water shortages. As Āwhina exclaimed: "the life of a beneficiary is pretty full on, stressful. Right up until payday, whānau are stressed out, and they've got kids. And they've got bills pending. And then you run out of water. It just adds to the problems. And it wouldn't surprise me if . . . domestic violence is around. You hear it, and then you see cars screaming out the drive. You know it's tense in that house, especially if they've run out of water." Research participants noted that the risk of violence against women is magnified when their partner experiences addiction, a finding echoed within the literature on intimate partner violence [309–312].

When viewed through the lens of multiple subjectivities, it is clear that the bodily and emotional consequences of water shortage are not (and will not be) evenly distributed amongst whānau and wāhine in Mangakāhia. Although disparities and discrimination based on race/Indigeneity certainly contribute to Indigenous peoples' climate vulnerability [20,137,313], the heterogenous lived experiences of climate impacts, coping, and adaptive capacity at the community and household level are reproduced through the intersections of Indigenous peoples' subjectivities and the power differentials these entail [85]. As Karamū so succinctly explains, whilst her household is tank-fed, her financial, educational, occupational, and asset-based privilege—in other words, her class privilege—enables her to prevent water shortage (see Figure 3a) and shields her from the visceral harms other wāhine endure when their tanks run dry. In contrast to the previous vignette, whānau who receive a benefit in Mangakāhia live in a state of financial precarity, which provides few opportunities to offset water shortages. In combination with their positionality as a woman, wife, partner, and/or mother (and the roles, responsibilities, and relative power deficits this entails) and their location in a degraded environment dominated by neoliberal resource extraction (over which Māori have limited control), wāhine from benefit-dependent whānau are vulnerable to stress (and sometimes) food insecurity as they navigate domestic life under water shortage (see Figure 3b). Yet even amongst these most marginal of households, some women have the privilege of safety at home and can work with their partner to save money and allocate funds for tank refills as needed. Those with a partner experiencing addiction face greater challenges in saving money and are at increased risk of physical harm during arguments over water.

(**a**)

Figure 3. *Cont.*

(**b**)

Figure 3. (**a**) Aspects of privilege enabling Karamū to avoid water shortage during drought and related health impacts as discussed in vignette two. (**b**) Aspects of disadvantage that intersect to create water shortage during drought and heighten embodied health impacts for wāhine in the upper Mangakāhia as discussed in vignette two.

By identifying how subjectivity relates to differing experiences of water shortage, intersectional observations such as this provide critical insights into under-explored social drivers of Indigenous vulnerability (including but not limited to gender, age, class, health, and marital status) [34,314]. While the legacy of colonisation is increasingly recognised as a cause of Indigenous vulnerability in settler states [111,113,315,316], multiple subjectivities and power dynamics within Indigenous communities are rarely seen as relevant in climate research and policymaking [26,129]. For example, research seeking to improve safety and

security of drinking water supplies amongst drought-affected and remote Māori communities in Te Hiku o te Ika (in the Far North of Aotearoa) suggests that inadequate home water supply is largely dictated by factors such as poverty, unemployment, and ongoing neglect by the Crown [102]. Although individual households were surveyed during the research, there is no mention of how other forms of subjectivity amongst the whānau involved might impact vulnerability to water shortage.

Attending to the connection between subjectivity, power, and vulnerability, in contrast, builds valuable knowledge of how and why vulnerability arises in particular contexts, and can reveal novel causal pathways that heighten climate risk for Indigenous peoples. For instance, only a few studies connect addiction with increased climate vulnerability [45,85,317–319], yet for whānau in Mangakāhia this is a very real scenario. Given that many Indigenous communities (including Māori) are disproportionately affected by addiction (often the result of historical or intergenerational trauma connected with colonisation and ongoing marginalisation) [320–326], the potential for addiction to interact with climate vulnerability is something that climate researchers and policymakers should be sensitive to. In fact, developing adaptation strategies without attending to the full range of factors driving Indigenous peoples' vulnerability could further worsen the situation of those most at risk (such as wāhine and tamariki from whānau affected by addiction) and give way to greater inequities within Indigenous communities over time. To avert maladaptation, it is essential to pay close attention to how vulnerability arises on the ground at the nexus of Indigeneity, class, gender, and other markers of difference [81,327–329] and to actively offset the root causes of risk, even if the causal factors are not traditionally associated with climate change.

5.3. Vignette Three: Multiple Subjectivities and Adaptation

As Valentine [262] explains, when seeking to understand how lived experience is mediated by the intersections of subjectivity, it is important to remember these intersections are not fixed, but emergent. Different assemblages of subjectivity coalesce in particular contexts, with some subjectivities becoming dominant while others recede or take on new meaning [262]. Relatedly, as Fylling and Melboe note [330], subjectivities commonly interpreted as the basis for oppression or discrimination—such as the intersection of Indigeneity with disability—can, in fact, produce opportunities and positive experiences, depending on the situation. During my fieldwork, I witnessed the amorphous nature of subjectivity; how particular combinations could produce heightened risk of bodily and emotional harms yet also enabled actions to offset vulnerability and drive adaptation at the individual and community level. Research participants could be both highly vulnerable yet adept at responding to change as different facets of their subjectivities converged or took on new meaning, depending on the context.

A case in point is an un-named older wahine whom a research participant described as at risk from climate-mediated food insecurity and stress. This wahine lives on her ancestral whenua (land), is without full-time employment, and the whānau have limited financial means. For most of her whanaunga (relatives), tuna (eel) is considered a culturally important species yet eaten only at special events such as tangi (funerals). Given their financial situation, however, tuna is an essential source of nutrition for this particular whānau. Tuna are highly sensitive to climate change [331], including fluctuations in river temperature and flow, which impact upon migration and life cycle and are already under pressure in the region. Kaitiaki (environmental guardians) from several local marae work tirelessly to monitor and protect tuna in the Mangakāhia valley, yet poorly regulated commercial eel harvesting, localised water abstraction, intensive horticulture, forestry, dairying, extensive wetland drainage, and waterway modification [332–334] have all impacted tuna populations in recent decades. When viewed from this perspective, poverty, employment status, and location work to potentially undermine food security for this wahine with future climate change. However, other elements of her subjectivity present opportunities to adapt to change, and even those same characteristics that contribute to vulnerability can also function as assets for adaptation.
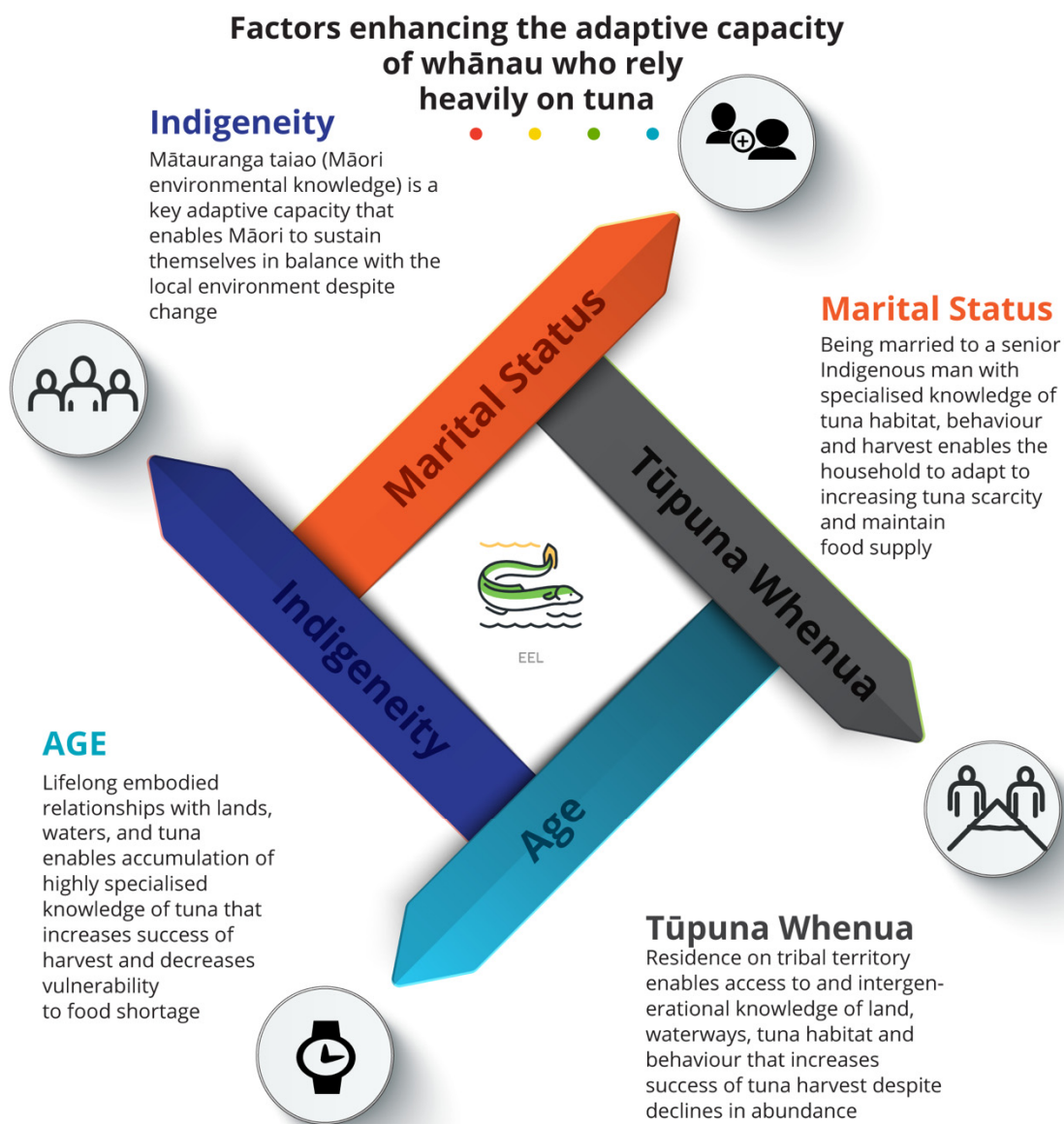
A number of interviewees in the region noted that Māori are inherently adaptable, having persisted through colonisation and sustained livelihoods and cultures for many generations using their highly specific, place-based mātauranga taiao (environmental knowledge). Mātauranga taiao is one of the key adaptive capacities that enables this wahine to offset food insecurity; however, it is important to recognise that access to this knowledge is not simply a function of her Indigeneity, but her age, location, marital, and employment status. As a senior Indigenous woman partnered to a senior Indigenous man living on tribal territory and without permanent employment, she has access to an unusual degree of highly specialised knowledge around tuna habitat, behaviour, gathering, and preparation that enables the whānau to maintain access to tuna, despite their increasing scarcity. As the research participant remarked, this knowledge and skill base is especially refined in her male partner, a "tuna fisherman," and has been developed as a result of intergenerational knowledge transfer and lifelong embodied relationships with the land and waterways of their tūpuna whenua (ancestral territory). As the research participant reflected of their situation:

"I'm thinking of a couple that . . . . lives on a mud floor. I didn't know anyone did that still. Some people are very resilient. Her husband, I can't remember him ever having a job—*ever*. She goes out and does fruit picking and packaging, when there's seasonal work. She's got six kids but they're all big and just the grandchildren now. She's lived like that all that time and he's the tuna fisherman. Very, very good fisherman. Always have tuna."

Furthermore, while being unemployed or working part-time may create vulnerability, it has also enabled this whānau to spend extended time on the whenua and build their knowledge of tuna. As the research participant observed: "I suppose the thing about being unemployed is you have the time to go fishing, whereas you'd be eating supermarket food if you were working because you probably wouldn't have time to go fishing. So, there's some ups with it all." Indeed, many other research participants lamented the fact they no longer had time to go eeling because of work, and several kuia described their sadness that their mokopuna were being brought up without the embodied skillset needed to "get a feed" of tuna (enough for a meal).

An intersectional approach builds crucial knowledge of the potential for multiple subjectivities to not only reproduce vulnerability, but facilitate action to cope with, offset, and adapt to climate change [335,336], a topic that is largely unexplored in both the international Indigenous climate adaptation and Aotearoa Māori literatures [34,57,337]. The connection between Indigeneity and climate adaptation has received global attention; however, most scholarship is concerned with Indigeneity alone and portrays Indigenous peoples as either resilient to climate change (because of their IK) [338,339] and/or as vulnerable victims unable to adapt (because of structural disadvantages) [340,341]. The nascent Māori adaptation scholarship follows suit, emphasising iwi or hapū-level mātauranga as the conduit for adaptation and resilience [33,100], while the NCCRA [129] identifies general socio-economic disparities as key drivers of Māori vulnerability. However, neither truly captures the complex (and sometimes contradictory) reality of climate adaptation as it is lived on the ground by Māori individuals and whānau.
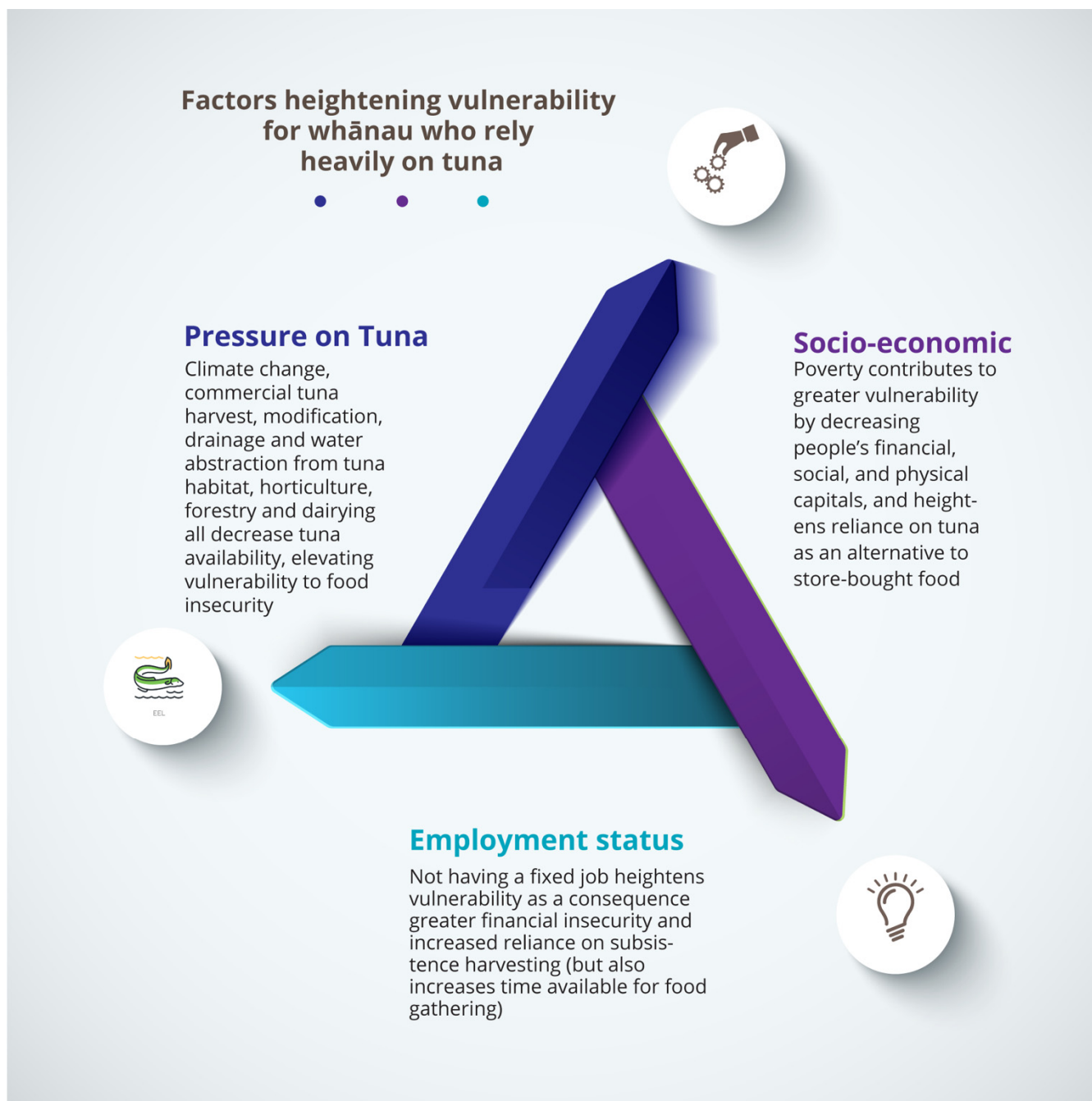
As demonstrated in this vignette, the woman and her household exist at the margins of society, yet they cannot be classified as simply vulnerable because of the disparities they face. Neither can they be read as adaptable and resilient just because they have access to Indigenous knowledge. As Figure 4a indicates, the intersections of Indigeneity, location, age, marital, and occupational status enable this wahine and her family to largely counter the impacts of climate change on their food security and emotional wellbeing. Even subjectivities that may induce vulnerability (Figure 4b) for this woman (such as her lack of continuous employment and location in a modified, extractive landscape) have the potential to also facilitate adaptation (for example, by enabling detailed knowledge of tuna) when they are combined with other positionings such as age and marital status.

Factors enhancing the adaptive capacity of whānau who rely heavily on tuna

Indigeneity
Mātauranga taiao (Māori environmental knowledge) is a key adaptive capacity that enables Māori to sustain themselves in balance with the local environment despite change

Marital Status
Being married to a senior Indigenous man with specialised knowledge of tuna habitat, behaviour and harvest enables the household to adapt to increasing tuna scarcity and maintain food supply

EEL

AGE
Lifelong embodied relationships with lands, waters, and tuna enables accumulation of highly specialised knowledge of tuna that increases success of harvest and decreases vulnerability to food shortage

Tūpuna Whenua
Residence on tribal territory enables access to and intergenerational knowledge of land, waterways, tuna habitat and behaviour that increases success of tuna harvest despite declines in abundance

(**a**)

Figure 4. *Cont.*

**Factors heightening vulnerability
for whānau who rely
heavily on tuna**

● ● ●

Pressure on Tuna

Climate change,
commercial tuna
harvest, modification,
drainage and water
abstraction from tuna
habitat, horticulture,
forestry and dairying
all decrease tuna
availability, elevating
vulnerability to food
insecurity

Socio-economic

Poverty contributes to
greater vulnerability
by decreasing
people's financial,
social, and physical
capitals, and height-
ens reliance on tuna
as an alternative to
store-bought food

Employment status

Not having a fixed job heightens
vulnerability as a consequence
greater financial insecurity and
increased reliance on subsis-
tence harvesting (but also
increases time available for food
gathering)

EEL

(**b**)

Figure 4. (a) Factors that enhance the capacity of tuna-reliant whānau in Mangakāhia to adapt to and offset stress and food insecurity related to climate change, as discussed in vignette three. (**b**) Factors that reproduce vulnerability to food insecurity and stress with climate change amongst whānau who rely heavily on tuna as discussed in vignette three.

When applied in this way, intersectionality brings to light the dynamic, interactive, and highly complex nature of climate adaptation and helps reframe understandings of Indigenous peoples' adaptive responses and capacities in line with their fluid and het-erogenous everyday experiences. Although generally focussed on oppression and vul-nerability [60], intersectional scholarship suggests that multiple subjectivities are sites of possibility [336] that enable adaptation, even for otherwise vulnerable groups [342]. Amongst Indigenous peoples, for example, intersectional (and related) approaches demon-

strate the highly varied and specific forms of adaptation-relevant knowledge different individuals possess because of their gender, age, location, occupation, and other subjectivities [34,40,41]. In Aotearoa, for instance, Māori women draw on their distinctive subject-mediated knowledge and responsibilities to sustain the health and wellbeing of their hapū by growing food in māra kai (vegetable gardens) at marae [343]. Likewise, in Mexico, Indigenous Tseltal and Purépecha women utilise their gendered knowledge and social networks to maintain food sovereignty despite climate variability through selective breeding of drought-resistant, heritage maize [335,336].

Attending to these nuances generates more sophisticated and accurate analyses of Indigenous adaptation than are currently available in Aotearoa and further afield. It helps drive recognition and support for the vital role groups such as Indigenous women play in climate adaptation despite the vulnerabilities they may face and their ongoing exclusion from climate change negotiations and decision making, including at the hands of Indigenous men [23,54,344,345]. Holding space for variety within Indigenous adaptation (Māori or otherwise) increases the chance adaptation strategies will be relevant and relatable—whether they are developed by Indigenous peoples or not—and helps avoid wasting funds on interventions that prove unnecessary given the existing adaptive capacities of diverse individuals and households.

6. Conclusions

As Cho et al. [261] note, intersectionality is not only a theoretical tool but a transformative praxis. In exploring the diverse experiences of climate change amongst Māori women in rural Aotearoa, I build crucial knowledge about multiple subjectivities, vulnerability, adaptation, and Indigeneity in a Global North context that not only enhances climate scholarship [71,81] but signals opportunities to ensure equitable and sustainable outcomes for adaptation amongst Māori and other Indigenous (and marginalised) groups [345]. Rather than being universally vulnerable or vulnerable in the same manner, I show that multiple subjectivities and multiple vulnerabilities exist within Māori whānau (families), communities, hapū (sub-tribes), and iwi (tribes). The intersectional framework reveals how different subjectivity positions held by Māori women give rise to heterogenous experiences of (ill)health in a changing climate and yields important empirical evidence of how and why differential vulnerability exists amongst Indigenous groups [34,57]. I provide tangible examples of subject-mediated vulnerability and adaptation that highlight the complex interactions driving climate risk for Indigenous peoples whilst also demonstrating the ability of Indigenous peoples—including those who are marginalised and vulnerable—to resist, cope with, and adapt to change because of who they are [26,74,93,205].

These developments help to offset damaging and inaccurate narratives about Indigenous peoples and women as uniquely and uniformly vulnerable 'climate victims' [54,136,346,347], instead underlining Indigenous women's diversity and agency in the face of change. Intersectional health-focused research encourages meaningful engagement with Indigenous peoples' diverse and fluid lived realities and makes it clear that no 'one-size-fits-all' adaptation strategy will be sufficient. Climate change is increasingly framed as the foremost threat to public health [348,349], and as nations around the world (including Aotearoa) seek to develop both National Adaptation Plans and Health National Adaptation Plans (HNAPs) [138,350], it is essential that the needs and perspectives of multiple Indigenous subjectivities are incorporated from the start.

To avoid potential maladaptations that "exacerbate rather than reduce existing injustices" [74] (p. S248), it is essential for adaptation to recognise, address and ameliorate the differential, intersecting root causes of vulnerability for Indigenous individuals, households, and collectives [81,93,327]. At the same time, adaptation must accommodate and support the strategies that Indigenous peoples (especially Indigenous women) utilise to transform the socio-political drivers of their own vulnerability and adapt to change [345,351,352]. Many Indigenous communities (including those who participated in this research) are actively enhancing their health and wellbeing (and thereby mitigating climate risk) on a

variety of levels [353–355]. Supporting these flaxroots (or 'grassroots') efforts is just one way that adaptation might achieve sustainable, just, and tailored vulnerability reduction whilst also aligning with Indigenous peoples' desires for self-determination and sovereignty, despite the challenge of climate change [113,356].

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