



Planning the urban foodscape: policy and regulation of urban agriculture in Aotearoa New Zealand

Christina Hanna & Pip Wallace

To cite this article: Christina Hanna & Pip Wallace (2021): Planning the urban foodscape: policy and regulation of urban agriculture in Aotearoa New Zealand, Kōtuitui: New Zealand Journal of Social Sciences Online, DOI: [10.1080/1177083X.2021.1996403](https://doi.org/10.1080/1177083X.2021.1996403)

To link to this article: <https://doi.org/10.1080/1177083X.2021.1996403>



© 2021 The Author(s). Published by Informa UK Limited, trading as Taylor & Francis Group



[View supplementary material](#)



Published online: 24 Nov 2021.



[Submit your article to this journal](#)



[View related articles](#)



[View Crossmark data](#)

RESEARCH ARTICLE



Planning the urban foodscape: policy and regulation of urban agriculture in Aotearoa New Zealand

Christina Hanna  and Pip Wallace 

Te Kura Aronui – School of Social Sciences, Te Whare Wānanga o Waikato – The University of Waikato, Kirikiriroa – Hamilton, Aotearoa, New Zealand

ABSTRACT

Policy support for urban agriculture (UA) has increased internationally in the past decade, driven by factors such as urban decay, food insecurity, climate change and disasters, self-determination efforts and the Covid-19 pandemic. To date, there has been little analysis of the emergent practices across different cities in Aotearoa New Zealand. To address this gap, we examine key aspects of UA in Aotearoa and assess the application of local plans and regulation to determine how UA is defined and treated in the four most populous cities. The results reveal a lack of specific attention to and policy direction for UA. This vacuum is compounded by purpose-driven zoning typologies, restrictive resource use controls, scant provision for Māori food practices and a failure to keep pace with the changing forms of UA. The results identify the need for cities to review and clarify provision for UA, to create greater certainty and where appropriate, facilitation of food sovereignty and diverse urban foodscapes.

Glossary of Māori terms: Ahikā: continuous occupation of territory; Ahuwhenua: agriculture; Huawhenua: horticulture; Kai: food; Kaitiakitanga: guardianship; Kaupapa Māori: Māori customary practice; Kūmara: sweet potato; Mahinga kai/hauanga kai: the customary and contemporary activity of and the place of harvesting, collection, hunting and gathering of food resources and other materials; Māketē: market; Mana whenua: the people of the land who have mana or customary authority - their historical, cultural and genealogical heritage are attached to the land and sea; Māra kai: food garden; Marae: open area in front of the meeting house, where formal greetings and discussions take place. Includes the grounds and buildings around the marae; Mātauranga Māori: the body of knowledge originating from Māori ancestors, including the Māori world view and perspectives, Māori creativity and cultural practices; Pākehā: New Zealander of European descent; Papakāinga: a settlement or village which has genealogical connections to that land; Māra rongoā: medicinal garden; Tangata whenua: indigenous people - people born of the land; Te Tiriti o Waitangi: Te reo Māori text of the Treaty of

ARTICLE HISTORY


Received 28 July 2021

Accepted 18 October 2021

KEYWORDS

Food policy; land use planning; zoning; urban farming; food sovereignty

CONTACT Christina Hanna  Christina.hanna@waikato.ac.nz

 Supplemental data for this article can be accessed at <https://doi.org/10.1080/1177083X.2021.1996403>

© 2021 The Author(s). Published by Informa UK Limited, trading as Taylor & Francis Group

This is an Open Access article distributed under the terms of the Creative Commons Attribution-NonCommercial-NoDerivatives License (<http://creativecommons.org/licenses/by-nc-nd/4.0/>), which permits non-commercial re-use, distribution, and reproduction in any medium, provided the original work is properly cited, and is not altered, transformed, or built upon in any way.

Waitangi; Tikanga: protocol - the customary system of values and practices that have developed over time and are deeply embedded in the social context; Whānau: extended family; Whare hoko: the use of land and/or buildings to provide readily accessible retail activities and commercial services required on a day to day basis

Glossary sources: Te Aka Online Māori Dictionary, Auckland Unitary Plan 2016, Christchurch District Plan 2017.

Introduction

Air, water, food, and shelter are among the essentials of life, yet food has largely been divorced from the urban planning regime (Pothukuchi and Kaufman 2000; Morgan 2015) thus reducing opportunity for food sovereignty. Traditional settlements demonstrate close relationships with spaces of cultivation and food production. However, the twin forces of industrialisation and urbanisation have operated to distance people from food in geographical, economic, cognitive and political terms (Bricas 2019). This paper identifies and discusses problems which arise due to this distance and examines planning approaches to urban agriculture (UA) in Aotearoa New Zealand (Aotearoa).

The presence of agriculture in cities waned due to changes in modes and places of production driven by the Industrial Revolution and demands for stronger sanitation controls (Daviron et al. 2019). Promoting local wellbeing and economic prosperity was an early rationale of planning and a key approach used was the separation of incompatible activities (Rydin 2011). Modern western cities developed according to segregated zones with garden city landscapes constituting exclusive home gardens, parks and residual green-spaces (Tornaghi 2014). Binary divisions between urban and rural and the implicit definition of a 'garden' as either a private enclosed garden or a public park, led to further exclusion of food production from urban spaces (Tornaghi 2014; Morgan 2015).

Horst et al. (2017) record how in the last decades of the twentieth century in the United States, restrictive zoning inhibited UA, by measures such as outlawing keeping of animals, controlling vegetation, restricting food production practices and the sale of goods. Similar practices were applied in Aotearoa through zoning schemes and local bylaws directed at limiting perceived nuisance effects generated by UA (Palmer 1984; Beattie and Boileau 2020). Urban intensification further reduced the presence of agriculture in the city. On the other side of the fence, to protect the agricultural economic base, rural land has long been segregated and defended as the primary production space, with zones and greenbelts in place to prevent urban sprawl (Schrader 1999).

These boundaries are reinforced by the dominance of the 'conventional' food system, which is characterised by spatial and resource intensive industrialised modes of producing and processing food, based on efficiency within global scale systems, delivered by sophisticated supply chains (Wald and Hill 2016). This demarcation of territory between the rural and the urban and the dominance of industrial food production may, however, disregard the relational geographies (Massey 2005) of people and food, functioning to bring food production closer to the people who are sustained by it. In the context of Aotearoa, for Māori, land alienation, urbanisation and territorial

segregation have intensified food distance both geographically, economically and politically. In a cognitive sense, they have contributed to limit and marginalise traditional Māori practices and knowledge relating to systems-based environmental management and guardianship (McKerchar et al. 2015; Hond et al. 2019).

More recently, issues including urban decay, food insecurity, climate change and disasters, indigenous self-determination efforts, the promotion of wellbeing and the Covid-19 pandemic have motivated the return of agriculture to urban spaces. Farming in urban areas is commonly driven from the grassroots level, both nationally and internationally (Alkon and Agyeman 2011; Urban Farmers' Alliance 2020), although international examples demonstrate institutional support for this movement as well (Tefft et al. 2020). This paper examines UA in Aotearoa, its re-emergence in the city and the level of regulatory support or constraint for this.

Over time, the removal and neglect of the food system has created opportunity costs for improving the urban realm. For example, the presence of food deserts, where people with predominantly lower incomes have limited access to affordable and nutritious foods (Nathan 2011), or the significant organic material sent to landfill each year (Climate Change Commission 2021) as a result of failures to design food circulatory and waste avoidance into urban development. Abandoned practices of using animals, plants and soils to process organic material have limited the circulatory of urban ecology and intensified the separation of cities from the organic system (Daviron et al. 2019; Beattie and Boileau 2020). To improve human settlements, planners need to recognise and integrate food issues into their working models (Pothukuchi and Kaufman 2000). Accordingly, this article has a focus upon the current opportunities and gaps for integration of food production in urban areas.

UA is attributed to providing a range of benefits to enhance food security, address urban decay, mitigate and adapt to climate change, and enhance wellbeing and social justice (Mok et al. 2014). Now a 'burgeoning movement that aims to farm the city' (Morgan 2015), UA holds potential as multifunctional blue-green infrastructure to deliver a range of ecosystem services and benefits. UA may support biodiversity, storm-water drainage, carbon sequestration, air pollution and urban heat island effect mitigation, reduce food miles and shorten supply chains, and improve physical and mental health, aesthetics, land value, social capital, and resource circularity, among others (Mok et al. 2014; Meenar et al. 2017). Additionally, UA may help to create social justice in the form of secure local employment and increased access to nutritious food, green space, and outdoor activities – often missing from the places inhabited by low-income people and racially minoritised people (Alkon and Agyeman 2011). However, some agricultural methods may not always be ecologically sound or sufficiently safe for human exposure, highlighting the importance of regulations (Meenar et al. 2017).

Whilst strengthening the relationship between urban planning and the food system is necessary, UA is not a 'panacea that will automatically produce all the social, environmental, and economic "goods" attributed in the literature' (Siegnier et al. 2018). The reintroduction of UA is not necessarily as benign as the reintroduction of nature through provision of parks and rewilding, which of themselves are known to create problems for urban dwellers (Hunold 2020; Roman et al. 2021). The historic segregation between the urban and rural contemplated the wellbeing of urban dwellers in limiting exposure to the nuisance impacts such as offensive odour, animal and

machinery noise, and agrichemical spray drift. Further concerns include the introduction of disease to the urban ecosystem (Smit B et al. 2001), the addition of complicated, maintenance intensive systems to the urban infrastructure (Clinton et al. 2018), and other environmental and health risks associated with intensive production (Mok et al. 2014). These concerns suggest a need for some degree of oversight in relation to definition and control over UA for the wellbeing of urban populations. However, this paper will suggest that the positive contributions of UA must not be lost sight of in any urban planning regime, and reinforces the role of context specific and place-based treatment of UA and attention to beneficial outcomes.

In relation to definition, the literature demonstrates wide variance in explaining UA (Mougeot 2000; Mok et al. 2014; Opitz et al. 2016; Meenar et al. 2017). A narrow construction limits the term to the abiotic and biotic components of a plant growth system in an area otherwise classified as urban (Clinton et al. 2018). Likewise, a simple definition of ‘cultivating food in metropolitan areas’ (Horst et al. 2017) could also limit UA to growing plants if a restrictive construction of the verb ‘to cultivate’ was taken. In contrast, a more expansive view is enabled by the definition of the Food and Agriculture Organisation of the United Nations (FAO) as the ‘plant cultivation and animal rearing (including aquaculture) within cities and towns and in their immediate surroundings’ (Drechsel and Kunze 2001; Orsini et al. 2020). Siegner et al. (2018) identify that the ‘landscape of what constitutes urban agriculture’ is extremely heterogeneous, with diversity in definition, mission, scale, and means. Whether or not to include peri-urban agriculture as a facet of UA has been examined in several ways, however, a commonly agreed spatial definition is missing (Opitz et al. 2016).

For the purposes of this research, we adopt the FAO definition above, and envisage UA as encompassing community, domestic and commercial urban farms and gardens (including innovations such as vertical, rooftop, and replicated indoor farming) and urban wild food and resource foraging. We recognise that specific attention may be required to capture traditional cultural practices. In the context of Aotearoa, Māori food practices in urban areas can include a range of activities from *māra kai* and *māra rongoā* to *ahuwhehenua* and *mahinga kai*. Whilst plant cultivation may be the dominant form of UA (Mok et al. 2014) cultivation of animals (including fish and insects), arboriculture (Mok et al. 2014; Horst et al. 2017) and biotechnology are potential forms. We have included replicated farming environments and modern farming techniques such as hydroponic production, lab grown ‘meats’ and 3D printed food (Ministry for Business Innovation and Employment 2020) to better understand the regulatory landscape. The intersection of ‘farming’ with ‘gardening’ and respective definition is also relevant in terms of planning controls and property rights and this research considers regulatory extent.

In the context of Aotearoa, we include peri-urban agriculture in our definition of UA, due to the suburban nature of many urban areas, reflected in ‘large-lot residential’, ‘future urban’ and ‘rural-residential’ zones. We focus our examination of UA on those activities located within or on the fringe of a town or city, which may include growing, raising, processing, foraging and distributing a diversity of food and non-food products, largely using (and re-using) local human and material resources, products and in turn supplying resources, products, and services largely to that urban area (Smit J et al. 1996; Mougeot 2000). Within this remit, the nature (and the effects) of UA varies,

depending on the actors involved and the purpose of the activity (e.g. domestic, community or market based), location, spatial configuration, resource use, tenure, cultural practices and methods, reliance upon built form and technology, the produce generated, and the scale and intensity of the activity.

Whilst local governments in Aotearoa are beginning to address the disconnect between the food system and local policy, progress on the policy agenda has been slow, catalysed in some circumstances by disasters (Haylock and Connelly 2018). The literature identifies a range of problems that may arise as a consequence of UA emerging unregulated. Meenar et al. (2017) catalogue debate and contestation over: land tenure (Brown and Jameton 2000); land use designations and zoning (Thibert 2012; Meenar 2015); sociolegal concerns (Covert and Morales 2014); and the suitability, commercial viability and/or connection of UA to a community's comprehensive plan (LaCroix 2010). To this we would add a lack of strategic direction enabling the planning system to embrace and progress beneficial innovation and uneven promotion and distribution of social goods. As a counterpoint, we note the stifling effect that poorly targeted regulation may have on urban innovation.

To understand potential exposure to these problems and address gaps in the literature (Meenar et al. 2017), this article examines how the local planning regime enables and/or constrains UA in the regulatory context of Aotearoa. First, we outline the local context, followed by an analysis of key UA components and regulatory provisions of the Resource Management Act 1991, the Reserves Act 1977 and various regulatory animal controls. We conclude with a discussion on the limitations of the current system and opportunities for enablement of UA to foster food sovereignty – the ability to access and define culturally sound and sustainable food systems (Moeke-Pickering et al. 2015).

Aotearoa context

Historically, to sustain the people and social capital, cultivation was an essential function of Māori communities (Hond et al. 2019). *Māra kai*, a primarily collective exercise, is grounded in a cultural connection to ancestral lands and *kaitiakitanga*, with harvests often shared rather than sold (Hond et al. 2019). Reciprocity between land, water and people is fundamental to Māori culture – food is not simply a commodity, but a conduit to the 'woven universe' (Hutchings 2020; Hutchings et al. 2020). The systems-based nature of *kaupapa Māori* land and water food practices foster holistic wellbeing outcomes, supported by *mātauranga Māori*, to regenerate and restore the mauri of ecosystems (Hutchings et al. 2020). Severing these ties, colonisation transformed resource governance and use from collective action, holistic wellbeing and *kaitiakitanga*, to individualised, segregated assets and production zones to deliver economic progress within a capitalist regime (Hond et al. 2019).

Today, segregation of individual titles and environmental domains (e.g. rural and urban) remains evident in the Aotearoa landscape. The rural areas are dominated by pastoral farming which occupies at least half of the land area (Norton et al. 2020). Urban areas, where most in Aotearoa live, are minor by comparison in spatial extent, occupying in 2012 only 0.85 percent of the country's land cover (Ministry for the Environment & Stats NZ 2019). Cities are, however, increasing in size and pressuring high quality land on urban peripheries (Curran-Cournane et al. 2018; Ministry for the Environment &

Stats NZ 2019). Since the 1950s, land with high value for food production has been a particular planning concern and zoning is the key tool used to this end (Memon and Perkins 1993). Despite this, urban ‘intrusion’ onto prime productive soil has continued apace, both in rural areas as well as urban and peri-urban spaces (Miller 2017). This encroachment is identified as a growing threat to food production in Aotearoa (Curran-Cournane et al. 2018).

A national policy statement is currently proposed to address the issue of loss of highly productive land and strengthen protection in the face of a housing crisis and development pressure (New Zealand Government 2019). In addition, the common law has developed to enable protection from ‘reverse sensitivity effects’ in order to segregate and protect legitimate farming activities from the complaints of sensitive ‘incoming’ users (Nolan 2018). These types of measures combine with urban development standards to entrench the urban-rural divide, but overlook the role and place of UA.

Of particular concern in Aotearoa are rights guaranteed under *Te Tiriti o Waitangi* and Māori food sovereignty. Māori have been excluded from customary food practices due to dispossession from their land and culture, and colonial principles of land segmentation and privatisation (Moeke-Pickering et al. 2015). Māori and Pasifika continue to experience food insecurity today due to poverty and income marginalisation, obstructed access to traditional foods and territories, and deprivation of food development (Moeke-Pickering et al. 2015).

Food insecurity is a significant concern in Aotearoa with an estimated 10 per cent of the population being ‘food insecure’ in 2019 (Auckland City Mission 2019), and almost one in five children experiencing severe to-moderate food insecurity (Ministry of Health 2019). Women, Māori and Pasifika are particularly affected by food insecurity (Auckland City Mission 2019; New Zealand Government 2020a), which has been exacerbated by the Covid-19 pandemic (Neuwelt-Kearns 2020; Robson 2020). During the Aotearoa lockdowns, widespread panic buying meant dietary staples such as flour, canned goods, pasta and toilet paper were unavailable (Neuwelt-Kearns 2020) and vegetable seedlings were difficult to come by (Ainge Roy and Gorman 2020). People on low incomes had limited capacity to stock up on supermarket supplies, causing greater exposure to the virus, limited low-cost food options, and pressure on foodbanks (Neuwelt-Kearns 2020). As supermarkets and dairies were the only food suppliers allowed to open during the level four lockdowns (New Zealand Government 2020b) local food producers, who may have relied on farmers’ markets or produce stalls had to adapt to delivery systems or close. This monopoly of predominantly industrialised and processed food supply may act to further cement social dependence and trust in the conventional food system at the cost of food sovereignty.

Living in the ‘land of plenty’ is not enough, due to the neoliberal agricultural economy (MacKay and Connelly 2019), whereby high nutritional value foods are largely exported, and imports comprise a significant proportion of discretionary and nutrient-poor foods (Rush and Obolonkin 2020). Existing inequities mean that food is limited for some due to low incomes, restricted physical access to and distribution of foods, and food costs (Rush and Obolonkin 2020), constituting ‘food deserts’ (Nathan 2011). In Aotearoa, children in food-insecure households are more likely to live in a rented house (Ministry of Health 2019). Whilst people who are food insecure are resourceful by necessity, transient access to land is a barrier (McKerchar 2019).

Climate change will increasingly affect food security, with rising temperatures, changing precipitation patterns, and greater frequency of some extreme events (Mbow et al. 2019). In Aotearoa, primary production cycles may be affected, food supply chains disrupted and human health risks increased (Lake et al. 2018). International events may have cascading impacts on food imports and security as a result of climate-driven conflicts, water and food scarcity (CCATWG 2017). Conversely, the food system is a key opportunity for climate change responses, with potential for more ecologically sound and local production, more efficient transport and processing, modification of food choices, and reduction of food waste to reduce greenhouse gas emissions and enhance food system resilience (Mbow et al. 2019). Urban farms are emerging in Aotearoa, but it appears, with little evident formal policy or planning. Through the article we sought to understand this emergence and any relationship to extant planning policy.

Methods

In April 2020, we searched for urban farms in the subject cities, using the terms ‘urban agriculture New Zealand’ and ‘urban farming New Zealand’ on Google, social media sites, and on council databases to ascertain key components of UA and applicable planning zones. For each of the two search phrases, the top 50 Google results were reviewed. Where the principle production mode(s), district plan zone and productive land area could be obtained, we tabulated the information available online about the urban farm. This included composting functions, structures, community initiatives, the socio-economic model and any other features detailed. Eleven organisations were documented, from backyard gardens to large-scale community farms (Table 1, Supplementary material). The farms documented demonstrate a range of models with production, retail, cultural, geographic, zoning and economic diversity. As this research was undertaken during a Covid-19 lockdown period in 2020, the examination of urban farms was a desktop exercise and was therefore limited by online data availability. This interrogation helped inform the definition of UA and scope of the analysis, in conjunction with the international literature. By understanding the components and geographies of existing UA operations in Aotearoa, we were then able to focus the regulatory assessment on key activities and zones.

To assess the local resource management policies, we first identified the principal farming definitions in the relevant district and regional plans (Table 2, Supplementary material). For the District Plans, we reviewed the Residential, Commercial, Industrial, Māori and Open Space zone objectives, policies, and methods using the definitions identified and by reading the provisions in full, to ascertain activity statuses and conditions related to UA. In addition to assessing the plans against their own definitions, we also analysed the provisions for control over activities contemplated by our broad definition of UA. Regional plans were reviewed by topic matter. Local bylaws were reviewed and animal keeping restrictions were recorded according to the species. Fishery controls were ascertained from Fisheries New Zealand (2021) and secondary legislation. Whilst activities often found in ‘Institutional’ or ‘Knowledge’ zones such as schools, prisons and hospitals do play a role in supporting local food sovereignty, due to the wide variance, regulatory

controls, and functions of such services, these activities are not included in the scope of this research.

Components of UA in Aotearoa

Urban farming in Aotearoa has varied functions and forms in terms of scale, activities and retail components. Guided by the broad definition of UA, we examined urban farms in the subject cities to understand their scale and form, location, range of activities, commercial focus and educational functions. The documented farms predominantly use land for horticulture, including creative repurposing of sites such as a nightclub basement, retired bowling green, residential backyard, urban carpark and derelict areas. Alternatively, one farm utilises vacant rooftop space on urban buildings for beehives. Some of the farms undertake agricultural activities, incorporating poultry, livestock, and worm farms into their food production and soil regeneration practices. Land areas range from small scale farms (<2000 m²), to medium (2000 m²–4000 m²) and larger scales (>4000 m²) with the largest productive farm area examined being approximately 9000 m². Except for the rooftop apiarists and some indoor vertical farmers, soil generation is an important process for the urban farms, all of which compost organic matter, with some founding ‘community composting hubs’. For example, Kaicycle regularly collects (via bicycle) and composts food waste from local businesses and residents (Urban Farmers’ Alliance 2020) and Kelmarna Gardens (2019) use poultry and livestock to process ‘hard to compost’ and high volume local food waste. The Kai Ika project collects and distributes unwanted fish heads, frames and offal, diverting these from landfill. Papatūānuku Kōkiri Marae uses the offal as fertiliser in the *marae* gardens, in particular where *kūmara* is grown (Kai Ika 2020). In addition to food production and soil generation, most of the farms include education initiatives in their operations, from youth internship programmes to regenerative learning hubs. Retail components involve ‘Community Supported Agriculture’ (CSA) subscription boxes which are picked up by or delivered to local customers, produce stalls on-site and the use of market days to sell produce off-site. Community-based farms such as the Wai-ora Trust Community Garden Plots provide the land, tools, plants and support for *whānau*, community and ethnic groups to garden and have access to produce throughout the year (Wai-ora Trust 2018).

Regulatory provision for urban agriculture

The spatial attributes of the farms studied are diverse, and so too are the activities that UA can encompass. The following examines the Resource Management Act 1991 (RMA), Reserves Act 1977 (RA), Local Government Act 2002 (LGA) and urban fish cultivation controls related to UA on both private and public property, to ascertain regulatory control.

Resource Management Act 1991

Under the RMA, territorial (and unitary) authorities control the use of land by way of district plan policies and rules, and regional councils manage the effects of water

use, discharges, and activities in the coastal marine area (ss 31 & 32). While the RMA has a focus on managing the effects of activities in practice, land use planning documents lean on zoning and the regulation of named activities by status to achieve land use control (see Table 3, Supplementary material). Under s 9 of the RMA, land use generally falls under a permissive presumption, such that if not controlled, it is permitted.

District plan terminology

‘Urban farming’ and ‘urban agriculture’ are not provided for as land use activities in any of the case study district (and unitary) plans. ‘Farming’ however, is provided for, generally defined to include horticulture, beekeeping and livestock farming (often excluding aquaculture). However, ‘farming’ is treated as a rural activity: nested within the ‘rural environment’ in Auckland’s Unitary Plan; defined as ‘rural production’ in Hamilton’s District Plan; and a ‘rural activity’ in Wellington’s District Plan. The only plan to actively provide for urban ‘horticulture’ is the Christchurch District Plan, explicitly enabling ‘market gardens’ as well as non-commercial ‘garden allotments’ and ‘community gardens’ in urban environments.

The Christchurch definition for market gardening is confined to residential zones, involving the production and sale of fruit, vegetables and flowers (not animal/insect produce). Community gardens are defined as private or public land used collectively and not for profit by a group of people, whose members are from more than one household, for growing fruit, vegetables and flowers (Christchurch City Council 2017). Residential garden allotments involve the use of residential sites to grow food to support individual households. Christchurch’s clear urban gardening definitions are instructive – none of the other plans clarify the status of domestic or market gardening. However, there remains a vacuum across all plans (and the National Planning Standards 2019) with regard to the distinction between gardening and farming.

Additionally, UA innovations are not provided for, with plans silent on non-conventional forms such as vertical farming, indoor replicated farming, aquaponics and hydroponics. Whilst some of these activities could fall under ‘horticulture’, in certain cases, without specific reference, they may best fit definitions of ‘factory’ or ‘intensive farming’ where primary production occurs within buildings and the activity is not dependent on the soil characteristics of the site, among other conditions (see definitions in the studied District Plans and the National Planning Standards 2019).

While the production component of UA may fit within district plan ‘farming’ definitions, confinement to rural zones, and limitation to the practice of ‘farming’ is clearly insufficient to enable UA and its various expressions. Assessment of the exemplar UA operations suggests that UA includes commercial aspects such as sales of produce, seedlings, compost or fertiliser from worm farms. The diversity of UA and the lack of distinct provision for it in district plans, require careful examination of activity statuses to reveal any spatial facilitation of UA, whether this be by overt provision or piecemeal enablement of components, and where UA is constrained.

Residential zones

The Christchurch plan alone specifies domestic gardening as a permitted activity, in residential zones. The lack of express treatment in the other cities could suggest that it is

generally anticipated that people may plant and harvest produce to supply their household as they wish, although this is not entirely clear due to the employment of 'catch-all' provisions which reverse the permissive presumption to require consent unless specifically enabled. Garden support structures and ancillary greenhouses are permitted, provided RMA and Building Act 2004 standards are met, and earthworks do not exceed permitted area/depth measurements. Direct drilling of seed and no-tillage practices are generally excluded from the controls for earthworks.

For commercial activities, however, the rules become more restrictive (see Table 4, Supplementary material). In all of the cities (excluding large lot residential zones in Hamilton and Christchurch, livestock grazing on sites $>2,000\text{m}^2$ in Auckland, and Wellington Centres and Central zones) UA is a non-complying activity. This is the most restrictive consent category, although not prohibited outright. However, in Christchurch, market gardening (commercial urban horticulture), is permitted and is therefore enabled by the planning regime in all residential zones. Animal agricultural activities are also subject to separate animal law (see 'Animal and insect controls'), and all agriculture will be scrutinised in relation to discharges and the use of water under regional or unitary plans (see 'Regional regulation').

Whilst not directly enabled by district plans, there is potential for indoor UA to be achieved by way of 'home occupations.' However, this depends on the definition of and performance standards for home occupations. Most plans define home occupations to include crafts, businesses, trades, and professions occurring within the residential unit. This potentially includes food production, for instance, by hydroponic means. However, in Auckland for example, the definition explicitly excludes farm produce sales, including food and plants.

In addition to restrictions imposed by local authorities through district plans and bylaws, transactional private covenants applied by developers during the development process may also limit the use of land for UA. For instance, it is not uncommon to see minimum floor areas imposed to promote large scale dwellings and limitations of urban farming activities that may be undertaken on site. In summary, beyond domestic gardening, UA activities are generally non-complying activities in residential zones in the major cities, requiring resource consent.

Other urban zones

Vacant land, city rooftops or available yard space in commercial/business, industrial and central city zones are potential UA sites, but this is not generally provided for in district plans. In the subject cities, farming is generally a non-complying activity in these zones and therefore discouraged in these areas. Retail and supply activities are mostly permitted (subject to specific standards) in commercial, central and industrial zones. Therefore, retailing UA produce may not need resource consent, but food production will likely be treated as a non-complying activity. Reverse sensitivity is a key concern in these areas if mitigation measures cannot manage cross-boundary effects. While UA may be achieved with careful planning and design, the non-complying activity status is a potential barrier in these zones.

In the zones discussed thus far, the plans reverse the permissive presumption and predominantly restrict land use unless specifically enabled. The Wellington 'Centres' and 'Central' areas are in contrast to the zones previously reviewed in that all activities are

permitted, unless otherwise stated. Therefore, UA can occur in these zones without resource consent, provided the plan standards are met. For activities such as the example of converting a night-club to an indoor microgreen farm, the effects are likely to be contained within the existing basement and may not require resource consent. This demonstrates how the permissive presumption can better enable urban farming innovation.

UA is not restricted to ground-level space. Roof space is often underutilised, but it offers a fruitful opportunity for urban horticulturalists and apiarists. The underlying land use controls of a zone will dictate the status of activities on rooftops, with additional performance standards likely. These standards may, however, reflect a single objective such as amenity protection, potentially removing from view other opportunities. For example, ‘ensure the roofs of buildings are uncluttered when viewed from the street and surrounding buildings’ (Auckland Unitary Plan Chapter H8.6.9 – Business City Centre Zone). In this way, failure to address UA and its legitimacy in the urban environment, creates an uneven playing field and privileges objectives with which it may not necessarily be inconsistent. In addition, structural engineering evaluation of the building (be it new or a retrofit rooftop design) may need to be undertaken as part of a building consent application under the Building Act 2004 to identify the maximum weight of activities and objects on the rooftop that the building is capable of supporting. Building consent will also require that installations on roofs meet the Building Code.

Māori purpose zones

Māori purpose zones constitute a range of land ownership types across the main cities, from Māori customary and freehold land, or Māori land reserved for communal purposes (under Te Ture Whenua Māori Act 1993), to *Te Tiriti o Waitangi* Settlement land and other land with cultural features or facilities. Whilst *papakāinga*, *marae* and customary activities are often enabled (but not necessarily permitted) in other zones, these zones are intended to specifically provide for the social and cultural needs of *mana whenua*, to support prosperous Māori communities. As illustrated in Table 5 (Supplementary material), key zones and activities for UA and cultural food practices were examined. We note that we have assessed the Auckland Special Purpose Māori Zone which has a less limited range of activities than the Auckland-wide Treaty Settlement Land and Māori Land Zone provisions, and that the Wellington District Plan does not provide a specific Māori zone. Overall, the Christchurch provisions are the most enabling, with a range of relevant activities permitted in the Papakāinga/Kāinga Nohoanga Zone. The Auckland Special Māori Purpose Zone permits ‘market gardening’ as part of a *marae* and permits produce sales, however, ‘agriculture’ requires resource consent as a discretionary activity. The Hamilton District Plan is restrictive, with no provision for UA activities except for *māketē*, *marae* and *papakāinga*, but the definitions of *marae* and *papakāinga* do not include *māra kai*. At the very least, *māra kai* should be included in the definition of *marae* and *papakāinga*, to ensure the enablement of cultural practices.

Regional regulation

Under the RMA, land use is generally the concern of territorial authorities, but other farming-related activities such as discharges to land, air, and water (for instance, odour from compost or agrichemical application) and taking and using of water will

be the concern of the regional council and governed by a regional (or unitary) plan (ss 31 (e)&(f), s 65(1) RMA). Unlike district plans, regional plans tend to cut across zoning patterns and focus upon resource use and controlling the effects by way of permitted activity conditions or requirements for resource consent. A common objective is the limitation of effects and the focus on this may be sharpened where sensitive users such as dwellings or places of public amenity or public assembly are proximate (e.g. Policy 6.2.3.2 Waikato Regional Plan 2007).

Here we focus, as an example, on the manufacture and storage of compost, a key component identified in the exemplar farms (Table 6, Supplementary material). In Auckland, the manufacture and storage of compost is permitted in all 'air quality spatial areas' provided the total amount on site is less than ten cubic metres. Green waste collection stations are permitted in all zones provided the waste is not stored longer than three days from date of receipt. Unless 'enclosed' or sited in 'low and medium air quality' quarry, industrial and rural areas, composting more than ten cubic metres of material at one time requires resource consent (discretionary). In Waikato, 'small-scale composting', <20m³ per annum, is a permitted activity, otherwise requiring resource consent (discretionary). In Wellington, there is no limit on compost volumes, provided the manufacturing and storage of compost does not result in discharges to water and offensive odour beyond the property boundary, amongst other standards. In Canterbury, no more than 20m³ may be manufactured and stockpiled at once, unless there is a 50 m setback from water bodies, potable water supplying bores, the coastal marine area and property boundaries. Further controls may apply in relation to the discharge and spreading of compost onto land (for example, requirements for Farm Environment Plans and nutrient management).

To understand how this might impact UA practices, Organic Market Garden in Auckland processed 20m³ of material through hot composting on site in nine months (Waitemata Local Board 2019). Located in an Auckland 'high air quality area' it is compliant provided the gross compost processing does not occur all at once and performance standards are met. If this urban farm was operating in Waikato, however, it would require resource consent. Whilst a voluntary standard, commercial composting operations may be required to meet 'NZS 4454:2005 Composts, Soil Conditioners and Mulches' as a means of resource consent compliance.

Public land

As demonstrated in Table 7 (Supplementary material), 'farming' is permitted in the Wellington A and B Open Space zones and in select Open Space zones in Auckland and Christchurch, but non-complying in Hamilton. Community gardens are generally permitted in select Open Space zones, and accessory buildings such as greenhouses, garden sheds and crop protection structures are either permitted or discretionary, provided performance standards are met. Activities enabling commercial aspects of UA include retail or markets, both of which are generally or selectively permitted in these zones. *Mahinga kai* is generally permitted, but resource consent is required in Wellington due to it not being provided for as an activity.

Reserves Act 1977

Although RMA plans may be (selectively) permissive in Open Space zones, undertaking urban farming on classified reserve land requires further permissions under the Reserves Act 1977 (RA). Activities on public reserves require permission from the administering local authority and in certain circumstances, approval from the Minister of Conservation. As stewards of urban open spaces in Aotearoa, territorial authorities manage classified reserves in accordance with the RA, as well as reserve management plans, bylaws and other local government policy and plans. The RA generally requires activities to complement the primary purpose of a classified reserve, enabled via a concession, often in the form of a lease or licence, to ensure that activities do not adversely impact reserve values, users or the environment. Council authority to grant leases and licences over reserves depends on the reserve status and powers afforded under the RA. Many activities undertaken on public reserves require specific authorisation for the occupation of space. Leases grant a legal right for exclusive possession of reserve land for specified activities, whereas licences provide a non-exclusive right over the land.

Key provisions

Whilst there is no specific provision for UA in the Reserves Act 1977, there are a number of relevant provisions regarding occupation of reserve land. Temporary (up to ten years) licences to occupy reserves may be granted for grazing, gardening or similar purposes for any (except nature) reserves where it is necessary or desirable in order to manage the reserve for the purpose for which it is classified (s 74(2)(a)). Therefore, the purpose of a reserve is an important factor in the ability to farm urban reserve land. None of the reserve classifications is specifically committed to the enablement of horticultural or agricultural practices for the production of food, be it commercial or not. Sport and recreation, protection of scenic, open space, cultural, historic, archaeological, scientific, educational and government interests and local purposes are the primary values that the reserve classifications are designed to protect. Therefore, while grazing and gardening are features of UA, their application would be for the purpose of managing the land to enable recreation, not primarily to produce food.

Separate provisions of the RA (ss 71-73) enable leases (up to 33 years) on local purpose and recreation reserves for farming, grazing, afforestation or other purposes. This affords opportunities for UA, provided the reserve (or part of it) is not required for the purpose it is classified for, or if it is deemed to be in the public interest. Where urban localities have excess recreational or local purpose reserves, a lease could be an enabling opportunity, providing a source of income to the territorial authority whilst reducing open space maintenance costs.

A further opportunity under the RA is the leasing of local purpose reserves for farming, grazing, cultivation or cropping as provided by s 61(2A)(b). Although limited to local purpose reserves, this provision is most enabling as use is not contingent upon a dedicated purpose. Reserves (and parts of reserves) could be reclassified (s 24) to 'local purpose' in order to better enable UA. Specific contemplation of UA in the preparation of reserve management plans would better enable provision for UA. Alternatively, there may be opportunities for UA on council land that is not legally classified as a reserve (s 138 LGA 2002).

Animal and insect controls

RMA regulations

Commercial farming of animals and insects is predominantly reserved to rural zones in the four cities. Although some exceptions apply, resource consent is generally required where animals and insects are farmed for sale.

Local Government Act 2002 bylaws

In addition to RMA requirements, Council specific bylaws control the keeping of animals and bees within urban areas (Table 8, Supplementary material). In this respect, Christchurch and Hamilton city council controls are the least restrictive, with no specific limits for animal keeping, although additional standards are enforced in Hamilton under the Animal Nuisance Bylaw 2013. Roosters are not generally permitted in any of the cities, but licences can be obtained to keep them. ‘Small-scale’ beekeeping is permitted in all cities on private sites, provided flight paths are not directed across other sites and public pathways, hives are positioned to avoid excrement on neighbouring washing lines, buildings and vehicles, and overcrowding is avoided.

Fisheries regulations

Land-based urban aquaculture, is another potential form of UA. In addition to land use consent, regulatory requirements may include regional water and discharge permits. For commercial activities, a fish-farm licence (which includes farming of finfish, shellfish, algae, seaweeds, watercress, sponges, Cnidarians, bacteria and rotifers – Fisheries (Notice Specifying Fish Species Which May Be Farmed) Notice No. MPI 1134, 2020) is required by Fisheries New Zealand, among other administrative matters (Ministry for Primary Industries 2021). Where urban aquaculture is undertaken below mean high water springs, a regional coastal permit is required under the RMA, followed by an assessment of effects from the Ministry for Primary Industries (MPI). The commercial, customary and recreational harvest of wild stocks of marine species is managed by MPI through the Quota Management System. Recreational harvest of some species such as beach cast seaweed is generally unlimited under the Fisheries [Amateur Fishing] Regulations 2013. However, urban foraging of seaweed and other wild marine food may be risky due to pollution. Regulatory controls such as contamination limits do not apply to recreationally harvested wild foods and individuals must make their own judgement regarding food safety (King et al. 2013).

Strategic foodscape planning

Farming was once at the core of ancient cities and indigenous settlements, but it largely disappeared due to the urban-rural divide (Tornaghi 2014) and the industrialisation of the food system. Until recently, many cities have failed to engage with the food system, often isolating it as a ‘rural’ issue beyond the scope of the urban planning agenda (Morgan 2015). The separation of life spheres via zoning has rendered the food chain largely invisible for many urban dwellers, disempowering community-based place-making (Tornaghi 2014) and local food sovereignty. Our results reveal that this zoning segregation runs true in the most populous cities of Aotearoa, with

farming largely excluded from urban areas by way of restrictive planning zones and regulations. This exclusion of farming captures UA in its various forms, and the failure to specifically address its emergence in urban areas renders a policy vacuum. The general lack of specificity and provision for UA, with its diverse form and innovations, creates policy uncertainty and constraints due to restrictive regulatory presumptions.

Of the four cities, regulatory provision in Christchurch is the most enabling, reflecting its reformed ‘garden city’ identity to encompass food resilience and ‘public agriculture’ following the devastating 2010/11 Canterbury earthquakes (Berno 2017; Shimpo et al. 2019). With a collaborative Food Resilience Network and Food Resilience Policy, Action Plan, Community Garden Guidelines and tools such as the City Food Foraging Map (Christchurch City Council 2021), there is community and institutional leadership, advocacy, and support for the cultivation of food within the city, and its regulatory controls broadly reflect this vision. The Christchurch model is akin to the ‘Food Policy Council’ framework applied internationally, to involve stakeholders and advocate for engagement of planning and policy with local food systems (Haylock and Connelly 2018). Addressing food at the strategic planning level is vital for policy integration, and Haylock and Connelly (2018) detail key success factors of the Christchurch approach which could be employed elsewhere. Whilst Auckland and Wellington city councils have started to examine indicators (such as potential *mahinga kai* incorporation in urban design projects), and local governments are developing strategic policy to support the actions of civil society (MacKay and Connelly 2019; Auckland Council 2020; Wellington City Council n.d.), regulatory alignment is yet to advance.

In each of the cities analysed, the multifaceted regulatory milieu remains a barrier. A ‘confusing’ and ‘complicated’ policy landscape of legislation, district and regional plan rules, bylaws and standards make it difficult to grasp what is permitted or restricted and where – even for urban farming experts (Pure Advantage 2020). At the local level, urban farmers need an integrated policy or plan that consolidates the regulatory provisions relevant to farming activities to bring clarity to the regulatory environment (Pure Advantage 2020), and to mitigate the risks of exclusion of ‘others’ (Moragues-Faus and Morgan 2015). In the absence of clear guidance, some residents have attempted to use their berms to grow or sell produce, and in certain cases, to reduce pluvial flooding via guerilla ‘bermaculture’ – but not without institutional and social reaction (Radio New Zealand 2019; Edible Streets 2020). Whilst community organisations and individuals are slowly weaving farming back into urbanscapes, the planning regime could do more to facilitate regenerative urban food systems. From cultivating backyards and green roofs to planting community orchards on public land or undertaking commercial UA, people need to have access to and an understanding of the opportunities, risks, consenting or permission procedures and regulations in a transparent and functional manner.

UA may also require a shift in thinking and community ‘tolerances’ as to what is acceptable in urban environments. Intensifying air pollution, urban heat environments and other impacts from climate change may catalyse a reordering of priorities, however, farming activities which generate high nuisance effects are likely to remain unwanted in urban areas. A key matter for policy makers to consider in terms of environmental outcomes will be the intensity of farming activities. Intensive farming is generally enabled in rural zones, but not in urban areas. The urban farming tolerance threshold brings about important questions regarding acceptable levels of harm/nuisance and

activity compatibility in the urban environment. When considering adverse effects, should residents tolerate persistent noise and air pollution from private and public transport, but not the sound of backyard roosters or the odour of a mushroom farm? The spectrum of farming activities, their outputs, relative intensities, concomitant mitigation strategies and potential positive outcomes require reconsideration in the urban environment of the twenty-first century. Policy makers and communities should expect to have negotiations around potential evolution of conventional urban comfort levels. This is not to say that intensive UA is appropriate, but that social and political debate will be required to understand and potentially develop acceptance of forms of farming or ascertain appropriate mitigation measures, from backyard UA and produce stalls to more intensive practices and innovations. Furthermore, the geography and composition of the urban area will condition the nature and extent of UA appropriate in a particular place, with factors such as housing pressure and other spatial demands, climate, topography and relationship to existing food production activities/hinterland of relevance. Mapping of existing and potential farming sites, food deserts, accessibility, and constraints such as soil, water or air contamination and water availability, are key spatial planning tools to inform the development of equitable and safe urban food systems. However, simple geographic measurement will not necessarily capture reality (Wolch et al. 2014), with factors such as affordability, food supply, cultural familiarity, social exclusion, knowledge and start-up costs (particularly for community gardens) influencing access, necessitating detailed local analyses (Meenar and Hoover 2012). A strategic policy framework must not ignore local government's roles, responsibilities and operational practices relating to public spaces and services. Councils may need to reconsider the spraying of herbicides on berms and open spaces, and the distribution of food waste outside of city boundaries if local composting hubs can instead fulfil this role. Local communities may require different policy and funding mechanisms to support urban farming practices. For example, integrated planning beyond individual sites to improve cycleways for zero-carbon compost collection and food distribution, berm guidelines to support produce sales, open space food forest management, or soil remediation expertise and funding in cities where arable land is scarce. We recognise that there are levers far beyond the planning system, such as support for public health and food safety, infrastructure investment, research and development, education, and asset and waste management (Halliday 2019). UA is just one piece of the solutions portfolio to improve food justice, access and climate resilience, and requires reinforcement by broader public policy, planning and civic engagement efforts (Siegnier et al. 2018).

Whether new spaces of food system deliberation can reform current systems of power and exclusion in urban foodscapes depends, to some extent, on the creation of genuinely participative structures (Moragues-Faus and Morgan 2015). Ideally, to guide regulatory development, local food strategies, charters, and policy, local authorities will take a co-production approach, to share decision-making in this space, and negotiate the level of government control over UA practices. The marginalisation of UA projects led by racially minoritised people and lower-income communities, highlights the need to question who is leading the advocacy, development and implementation of UA policy, and who benefits (Halvey et al. 2020). In addition, the uneasy alliance between guerrilla techniques and regulation, and the stifling impact of regulation upon innovation will likely be central to the discourse.

Food sovereignty

The nature of the planning system and notions of regulation, policy frameworks and commodification of food are Eurocentric. However, food sovereignty is guiding indigenous communities and local farmers to challenge the ‘underlying spatial and temporal logics that created an unequal, unsustainable and crisis prone food regime’ (Wald and Hill 2016). Rigid and socially constructed divisions driven by zoning schemes and activity segregation have contributed to social, cultural, and ecological alienation in capitalist societies, which may be redressed in part by the visible and tangible nature of UA (Morgan 2015). Whilst accepting that the existing built form and zoning patterns, to a degree, determine the environment, there exists the possibility of weaving UA through these areas using the available structures, land, light, airspace, wind, soil and water. UA creates opportunities to soften the spatial divides and return food and nature to the city. To do so, the regulation of UA may need to contemplate greater enablement in land use plans and/or apply more fluid and nuanced practices to transcend restrictive zoning practices, such as the use of spatial overlays. In the Aotearoa context, planners must move beyond the ‘neat divisions of the *Pākehā* planning system’ to a more holistic understanding of *mātauranga Māori* (Viriaere and Miller 2018). Collaborative spatial planning which supports systems-based, Māori land and water food practices, could provide opportunity to enhance wellbeing outcomes and food sovereignty for all people in Aotearoa.

For successful placemaking, efforts around UA require more than a calculation of dis-benefits/adverse effects, but stronger recognition of the inherent compatibilities of UA with the promotion of positive outcomes and associated social, cultural, environmental and economic wellbeing. A stronger focus on outcomes, in contrast to adverse effects, is a theme identified by policy analysts and legislators engaged in reforming resource management law in Aotearoa (Resource Management Review Panel 2020). The recognition and promotion of UA and food sovereignty is a seminal example of how individual and community wellbeing could be boosted by strategic planning for positive outcomes. It is important that law and policy correspond to the things that matter in people’s lives (Sunstein 1993) and in order to do this well, policy makers must delve more deeply to understand the vital and eclectic relationships between people, food and cultivation and their social and cultural construction. Adjustments are required in terms of entitlements and opportunities stemming from law and policy to better support food sovereignty and wellbeing. Successfully enabling UA will require place-based engagement with communities, related expertise in science and *mātauranga Māori*, and close collaboration to secure desired outcomes and context specific policies.

In addition to more holistic, strategic spatial planning to enhance food sovereignty generally, there is a clear need to better support Māori food sovereignty. For indigenous communities, food is not just about nutrition, but about culture and history (Mares and Peña 2011). The degradation of the environment and exclusionary resource management practices have been sources of grievance for Māori (Tipa and Welch 2006). Food production plays an important role in supporting Māori cultural identity, revitalisation, social cohesion, health promotion, and resistance to colonial/capitalist systems of power (Hond et al. 2019). For example, UA can demonstrate *ahikā*, resisting land loss and symbolising its continued occupation (Stein et al. 2018). Alongside weaving spatially

bound UA into the city, is the revitalisation of the mobile practice of *mahinga kai* which, following European settlement, was restricted and virtually extinguished in Aotearoa (Tipa and Welch 2006). Ensuring *mahinga kai* is enabled and encouraged on Māori and public land is vital to supporting cultural identity, revitalisation and health. Iwi management plans recognise *mahinga kai* as being central to Māori culture (Te Rūnanga o Kaikōura 2007; Waikato-Tainui Te Kauhanganui Inc 2013), and these values must be ‘taken into account’ (RMA s 74(2A)) in the statutory planning context. District plans should explicitly enable *mahinga kai* and work collaboratively with *mana whenua* to identify and enhance them. Cultural impact assessments and iwi management plans can assist in the provision and enhancement of *mahinga kai* in the urban public realm. Partnerships with *tangata whenua* should inform the policy framework for resources of interest to Māori. This could propagate as empowerment in the design of indigenous *māra rongoā*, *māra kai* and *ahuwhehenua* in reserve management planning and urban design, indigenous aquacultural influences for blue–green infrastructure systems, environmental restoration to improve food safety, and greater protection and revival of historical *māra kai* sites (Viriaere and Miller 2018), among others.

The impacts of climate change are expected to increase the food safety risks of wild-food (Lake et al. 2018). Existing *mātauranga Māori* indicators already developed for monitoring cultural health in relation to freshwater such as the Cultural Health Index (Tipa and Teirney 2006), Te Mauri Model (Morgan TKKB 2007) and Wai Ora Wai Māori (Awatere et al. 2017) provide a foundation for planning for *mahinga kai* following *tikanga* based frameworks. These indigenous monitoring systems can assist *tangata whenua* in assessing the health of the environment to ensure safe customary harvest, and to collaboratively deliver their protection and enhancement.

Conclusion

Urban agriculture is not well provided for in urban planning in Aotearoa. In the most populous cities, the planning regulatory framework demonstrates a failure to acknowledge the potential of UA to assist re-nature the city, encourage climate-responsive community-based placemaking, support food sovereignty and promote wellbeing. Fracturing the dualisms of nature v society and urban v rural, UA challenges the planning regime to envision a softening of such divides and place-based expectations. UA is expressed variously, reliant upon dynamic stocks and flows, and entwined with extensive cultural and spiritual practices. Its presence and/or re-emergence asserts the need for policymakers to think beyond the geographical and into the relational. A focus on the disbenefits of urban farming and a failure to recognise the inherent compatibilities with the promotion of social, cultural, economic and environmental wellbeing requires adjustment. Collaborative, outcome-based planning attuned to both benefits and disbenefits of UA, offers potential to build places which successfully bridge the current distance between food and people. The driving forces of other important social and environmental agendas such as the housing crisis, the freshwater crisis and the protection of high-quality soils create strong single issue focuses which overshadow the growing need for communities to produce food. In Aotearoa, this issue acquires impetus due to obligations under *Te Tiriti*. Whilst UA will not magically resolve the ills of the city, and in fact, may introduce

new concerns to address, planners and communities have an opportunity to cultivate systems which support culturally sound, just, and resilient urban foodscapes.

Acknowledgements

We identify our positionality as Pākehā researchers in Aotearoa and recognise the continuing connections of tangata whenua to the land, air, waters and other taonga by which we are sustained.

Disclosure statement

No potential conflict of interest was reported by the author(s).

ORCID

Christina Hanna  <http://orcid.org/0000-0001-8149-2761>

Pip Wallace  <http://orcid.org/0000-0002-0969-7989>

References

- Ainge Roy E, Gorman A. 2020. Coronavirus gardening boom overwhelms seed suppliers in New Zealand and Australia. *The Guardian*. <https://www.theguardian.com/world/2020/apr/08/coronavirus-gardening-boom-overwhelms-seed-suppliers-in-new-zealand-and-australia>.
- Alkon A, Agyeman J. 2011. Introduction: The food movement as polyculture. In: Alkon A, Agyeman J, editor. *Cultivating food justice*. Cambridge, MA: The MIT Press; p. 1.
- Auckland City Mission. 2019. Shining the light on food insecurity in Aotearoa: Auckland City mission's call to action. Auckland: Auckland City Mission.
- Auckland Council. 2020. *Te Tāruke-ā-Tāwhiri: Auckland's Climate Plan*.
- Awatere S, Robb M, Taura Y, Reihana K, Harmsworth G, Te Maru J, Watene-Rawiri E. 2017. *Wai Ora Wai Māori – a kaupapa Māori assessment tool*. Policy Brief No. 19. Hamilton: Manaaki Whenua – Landcare Research.
- Beattie J, Boileau J. 2020. 'Cultivated with great carefulness': Chinese market gardening, urban food supplies and public health in Australasia, 1860s - 1950s. *New Zealand Journal of History*. 54(2):57–85.
- Berno T. 2017. Social enterprise, sustainability and community in post-earthquake Christchurch: Exploring the role of local food systems in building resilience. *Journal of Enterprising Communities*. 11(1):149–165.
- Bricas N, et al. 2019. Urbanization issues affecting food system sustainability. In: Brand C, Bricas N, Conaré D, editors. *Designing urban food policies: concepts and approaches*. Cham: Springer International; p. 1–25.
- Brown KH, Jameton AL. 2000. Public health implications of urban agriculture. *Journal of Public Health Policy*. 21(1):20–39.
- CCATWG. 2017. Adapting to climate change in New Zealand stocktake report. Wellington: Ministry for the Environment.
- Christchurch City Council. 2017. 'Community gardens' as defined in the Christchurch District Plan.
- Christchurch City Council. 2021. *Edible Christchurch*. [accessed 2021 10 January]. <https://ccc.govt.nz/environment/sustainability/edible-christchurch/>.
- Climate Change Commission. 2021. *Ināia tonu nei: a low emissions future for Aotearoa*. Wellington: New Zealand Government.
- Clinton N, Stuhlmacher M, Miles A, Uludere Aragon N, Wagner M, Georgescu M, Herwig C, Gong P. 2018. A global geospatial ecosystem services estimate of urban agriculture. *Earth's Future*. 6(1):40–60.

- Covert M, Morales A. 2014. Formalizing city farms: conflict and conciliation. In: Mukhija V, Loukaitou-Sideris A, editors. *The informal American city: beyond taco trucks and day labor*. Cambridge, MA: MIT Press; p. 193–208.
- Curran-Cournane F, Golubiewski N, Buckthought L. 2018. The odds appear stacked against versatile land: Can we change them? *New Zealand Journal of Agricultural Research*. 61(3):315–326.
- Daviron B, Perrin C, Soulard C-T, et al. 2019. History of urban food policy in Europe, from the ancient city to the industrial city. In: Brand C, Bricas N, Damien C, editors. *Designing urban food policies urban agriculture*. Cham: Springer International; p. 27–51.
- Drechsel P, Kunze D. 2001. *Waste composting for urban and peri-urban agriculture: closing the rural-urban nutrient cycle in Sub-Saharan Africa*. Wallingford, CT: CABI.
- Edible Streets. 2020. Facebook post 25 August - Neighbourhood complaint. [accessed 2020 1 September]. <https://www.facebook.com/Edible-streets-110974603598091>.
- Fisheries New Zealand. 2021. Fishing and aquaculture. [accessed 2021 26 May 2021]. <https://www.mpi.govt.nz/fishing-aquaculture/>.
- Halliday J, et al. 2019. Cities' strategies for sustainable food and the levers they mobilize. In: Brand C, Bricas N, Conaré D, editors. *Designing urban food policies: concepts and approaches*. Cham: Springer International; p. 53–74.
- Halvey MR, Santo RE, Lupolt SN, Dilka TJ, Kim BF, Bachman GH, Clark JK, Nachman KE. 2020. Beyond backyard chickens: a framework for understanding municipal urban agriculture policies in the United States. *Food Policy*. 102013.
- Haylock K, Connelly S. 2018. Examining the insider/outsider dimensions of local food system planning: cases from Dunedin and Christchurch New Zealand. *Planning, Practice & Research*. 33(5):540–557.
- Hond R, Ratima M, Edwards W. 2019. The role of Māori community gardens in health promotion: A land-based community development response by Tangata Whenua, people of their land. *Global Health Promotion*. 26(3):44–53.
- Horst M, McClintock N, Hoey L. 2017. The intersection of planning, urban agriculture, and food justice: a review of the literature. *Journal of the American Planning Association*. 83(3):277–295.
- Hunold C. 2020. Urban greening and human-wildlife relations in Philadelphia: from animal control to multispecies coexistence? *Environmental Values*. 29(1):67–87.
- Hutchings J. 2020. Māori soil sovereignty: advocating for the rights of our ancestral soils. In: Hutchings J, Smith J, editors. *Te Mahi Oneone Hua Parakore: a Māori Soil Sovereignty and Wellbeing Handbook*. Ōtautahi, Aotearoa: Harvest Freerange Press; p. 1–188.
- Hutchings J, Smith J, Taura Y, Harmsworth G, Awatere S. 2020. Storying kaitiakitanga: Exploring Kaupapa Māori land and water food stories. *MAI Journal*. 9(3):183–194.
- Kai Ika. 2020. Feeding communities with previously under utilised Kai Moana. [accessed 2020 20 April]. <https://kaiika.co.nz/>.
- Kelmarna Gardens. 2019. *Animals in Permaculture*.
- King N, Lake R, Kerr G. 2013. Wild foods. In: Dymond J, editor. *Ecosystem services in New Zealand – conditions and trends*. Lincoln: Manaaki Whenua Press; p. 287–299.
- LaCroix CJ. 2010. Urban agriculture and other Green uses: remaking the shrinking city. *The Urban Lawyer*. 42(2):225–285.
- Lake R, Bolton A, Brightwell G, Cookson A, Benschop J, Burgess S, Tait A. 2018. *Adapting to climate change: information for the New Zealand food system*. Wellington: Ministry for Primary Industries.
- MacKay P, Connelly S, et al. 2019. Searching for fit?: institution building and local action for food system change in Dunedin, New Zealand. In: Andrée P, Clark J, Levkoe C, editors. *Civil society and social movements in food system governance*. London: Routledge; p. 63–80.
- Mares TM, Peña DG. 2011. Environmental and food justice: toward local, slow, and deep food systems. In: Alkon AH, Agyeman J, editors. *Cultivating food justice*. Cambridge, Mass: The MIT Press; p. 197–220.
- Massey D. 2005. *For space*. London: Sage.
- Mbow C, Rosenzweig C, Barioni LG, Benton TG, Herrero M, Krishnapillai M, Liwenga E, Pradhan P, Rivera-Ferre MG, Sapkota T, et al. 2019. Food security. In: PR Shukla, J Skea, E Calvo

- Buendia, V Masson-Delmotte, H-O Pörtner, DC Roberts, P Zhai, R Slade, S Connors, R van Diemen, et al., editors. Climate change and land: an IPCC special report on climate change, desertification, land degradation, sustainable land management, food security, and greenhouse gas fluxes in terrestrial ecosystems. IPCC; p. 437–550.
- McKerchar C. **2019**. An outbreak of hunger: the spread of food insecurity in a time of Covid-19. Auckland: Child Poverty Action Group.
- McKerchar C, Bowers S, Heta C, Signal L, Matoe L. **2015**. Enhancing Māori food security using traditional kai. *Global Health Promotion*. 22(3):15–24.
- Meenar M. **2015**. Nonprofit-driven community capacity-building efforts in community food systems. *Journal of Agriculture, Food Systems, and Community Development*. 6(1):77–94.
- Meenar M, Hoover B. **2012**. Community food security via urban agriculture: understanding people, place, economy, and accessibility from a food justice perspective. *Journal of Agriculture, Food Systems, and Community Development*. 3(1):143–160.
- Meenar M, Morales A, Bonarek L. **2017**. Regulatory practices of urban agriculture: a connection to planning and policy. *Journal of the American Planning Association*. 83(4):389–403.
- Memon P, Perkins H. **1993**. Environmental planning in New Zealand. Palmerston North: Perkins Dunmore Press.
- Miller C. **2017**. Rural planning issues. In: Miller C, Beattie L, editors. *Planning practice in New Zealand*. Wellington: LexisNexis; p. 189–200.
- Ministry for Business Innovation and Employment. **2020**. Agritech Industry Transformation Plan. Wellington, New Zealand.
- Ministry for Primary Industries. **2021**. Setting up a land-based fish farm. [accessed 2021 25 May]. <https://www.mpi.govt.nz/fishing-aquaculture/aquaculture-fish-and-shellfish-farming/setting-up-land-based-fish-farm/>.
- Ministry for the Environment & Stats NZ. **2019**. New Zealand's Environmental Reporting Series: Environment Aotearoa 2019. Wellington, New Zealand.
- Ministry of Health. **2019**. Household Food Insecurity among Children in New Zealand. Wellington, New Zealand.
- Moeke-Pickering T, Heitia M, Heitia S, Karapu R, Cote-Meek S. **2015**. Understanding Māori food security and food sovereignty issues in Whakatāne. *MAI Journal*. 4(1):29–42.
- Mok H-F, Williamson V, Grove J, Burry K, Barker S, Hamilton A. **2014**. Strawberry fields forever? Urban agriculture in developed countries: a review. *Agronomy for Sustainable Development*. 34(1):21–43.
- Moragues-Faus A, Morgan K. **2015**. Reframing the foodscape: the emergent world of urban food policy. *Environment and Planning A: Economy and Space*. 47(7):1558–1573.
- Morgan K. **2015**. Nourishing the city: the rise of the urban food question in the Global North. *Urban Studies (Edinburgh, Scotland)*. 52(8):1379–1394.
- Morgan TKKB. **2007**. Waiora and cultural identity: water quality assessment using the mauri model. *AlterNative*. 3(1):44–69.
- Mougeot LGA. **2000**. Urban agriculture: definition, presence, potentials and risks. In: Bakker N, Dubbeling M, Guendel S, Sabel Koschella U, de Zeeuw H, editors. *Growing cities, growing food, urban agriculture on the policy agenda*. Feldafing: German Foundation for International Development; p. 1–58.
- Nathan M. **2011**. From industrial garden to food desert: demarcated devaluation in the Flatlands of Oakland, California. In: Alkon A, Agyeman J, editors. *Cultivating food justice: race, class, and sustainability*. Cambridge, MA: The MIT Press; p. 89.
- Neuwelt-Kearns C. **2020**. An outbreak of hunger: the spread of food insecurity in a time of Covid-19. New Zealand: Child Poverty Action Group.
- New Zealand Government. **2019**. Valuing highly productive land: a summary of the proposed national policy statement for highly productive land. Wellington, New Zealand.
- New Zealand Government. **2020a**. Child poverty related indicators. Wellington: Department of the Prime Minister and Cabinet.
- New Zealand Government. **2020b**. COVID-19 Alert Level 4. <https://covid19.govt.nz/alert-levels-and-updates/alert-level-4/>.

- Nolan D. 2018. Environmental and resource management law (Sixth ed.). NZ: LexisNexis.
- Norton DA, Suryaningrum F, Buckley HL, Case BS, Cochrane CH, Forbes AS, Harcombe M. 2020. Achieving win-win outcomes for pastoral farming and biodiversity conservation in New Zealand. *New Zealand Journal of Ecology*. 44(2):1–9.
- Opitz I, Berges R, Piore A, Krikser T. 2016. Contributing to food security in urban areas: differences between urban agriculture and peri-urban agriculture in the Global North. *Agriculture and Human Values*. 33(2):341–358.
- Orsini F, Pennisi G, Michelon N, Minelli A, Bazzocchi G, Sanyé-Mengual E, Gianquinto G. 2020. Features and functions of multifunctional urban agriculture in the Global North: a review. *Frontiers in Sustainable Food Systems*. 4(228):1–27.
- Palmer KA. 1984. *Planning and Development Law in New Zealand*. Sydney: The Law Book Company Limited.
- Pothukuchi K, Kaufman JL. 2000. The food system. *Journal of the American Planning Association*. 66(2):113–124.
- Pure Advantage. 2020. Our regenerative future Webisode Ten: urban regenerative agriculture with Sheldon Levet, Sarah Smuts Kennedy, Daniel Schuurmann and Bailey Perryman. [accessed 2020 22 July]. <https://www.youtube.com/watch?v=us5EsK0l0O0&t=32s>.
- Radio New Zealand. 2019. Neighbours at war over planted garden berm in Manly, Auckland. [accessed 2020 April 21]. <https://www.rnz.co.nz/national/programmes/first-up/audio/2018725109/neighbours-at-war-over-planted-garden-berm-in-manly-auckland>.
- Resource Management Review Panel. 2020. *New directions for resource management in New Zealand*. Wellington: Ministry for the Environment.
- Robson S. 2020. 'It's Christmas on steroids' – foodbanks in huge demand across NZ. Radio New Zealand. <https://www.rnz.co.nz/news/covid-19/414809/it-s-christmas-on-steroids-foodbanks-in-huge-demand-across-nz>.
- Roman LA, Conway TM, Eisenman TS, Koeser AK, Barona CO, Locke DH, Jenerette GD, Östberg J, Vogt J. 2021. Beyond 'trees are good': disservices, management costs, and tradeoffs in urban forestry. *Ambio*. 50(3):615–630.
- Rush E, Obolonkin V. 2020. Food exports and imports of New Zealand in relation to the food-based dietary guidelines. *European Journal of Clinical Nutrition*. 74(2):307–313.
- Rydin Y. 2011. *The purpose of planning: creating sustainable towns and cities*. Bristol: Policy Press.
- Schrader B. 1999. Avoiding the mistakes of the 'mother country': The New Zealand garden city movement 1900–1926. *Planning Perspectives*. 14(4):395–411.
- Shimpo N, Wesener A, McWilliam W. 2019. How community gardens may contribute to community resilience following an earthquake. *Urban Forestry & Urban Greening*. 38:124–132.
- Siegner A, Sowerwine J, Acey C. 2018. Does urban agriculture improve food security? Examining the nexus of food access and distribution of urban produced foods in the United States: a systematic review. *Sustainability* (Basel, Switzerland). 10(9):2988.
- Smit B, Pilifosova O, Burton I. 2001. Adaptation to climate change in the context of sustainable development and equity. In: McCarthy J, Canziani O, Leary N, editors. *Climate change 2001: impacts adaptation and vulnerability contribution of working group II to the third assessment report of the Intergovernmental Panel on Climate Change*. Cambridge: Cambridge University Press; p. 877–912.
- Smit J, Ratta A, Nasr J. 1996. *Urban agriculture: food, jobs and sustainable cities*. New York: United Nations Development Program.
- Stein K, Miroso M, Carter L. 2018. Māori women leading local sustainable food systems. *AlterNative: An International Journal of Indigenous Peoples*. 14(2):147–155.
- Sunstein CR. 1993. Well-being and the state. *Harvard Law Review*. 1303.
- Tefft J, Jonasova M, Zhang F, Zhang Y. 2020. *Urban food systems governance: current context and future opportunities*. Rome: FAO and The World Bank.
- Te Rūnanga o Kaikōura. 2007. *Te Poha o Tohu Raumati - Te Rūnanga o Kaikōura Environmental Management Plan*.

- Thibert J. 2012. Making local planning work for urban agriculture in the North American context: a view from the ground. *Journal of Planning Education and Research*. 32(3):349–357.
- Tipa G, Teirney L. 2006. A Cultural Health Index for streams and waterways: a tool for nationwide use. Wellington: Ministry for the Environment.
- Tipa G, Welch R. 2006. Comanagement of natural resources: issues of definition from an indigenous community perspective. *The Journal of Applied Behavioral Science*. 42(3):373–391.
- Tornaghi C. 2014. Critical geography of urban agriculture. *Progress in Human Geography*. 38(4):551–567.
- Urban Farmers' Alliance. 2020. Our urban farms. New Zealand: for the love of bees; [accessed 2020 3 April]. <https://www.urbanfarmersalliance.org.nz/urban-farms>.
- Viriaere H, Miller C. 2018. Living indigenous heritage: planning for Māori food gardens in Aotearoa/New Zealand. *Planning Practice & Research*. 33(4):409–425.
- Waikato-Tainui Te Kauhanganui Inc. 2013. Waikato-Tainui Environmental Plan.
- Wai-ora Trust. 2018. Community Gardens. [accessed 2020 3 April]. <http://www.waioratrtrust.org.nz/>.
- Waitematā Local Board. 2019. Community and Neighbourhood Composting in Tāmaki Makaurau/Auckland: a 2019 Snapshot Building Capacity within the Community Composting Sector.
- Wald N, Hill DP. 2016. 'Rescaling' alternative food systems: from food security to food sovereignty. *Agriculture and Human Values*. 33(1):203–213.
- Wellington City Council. n.d. Wellington sustainable food initiative. [accessed 2021 1 February]. <https://wellington.govt.nz/environment-and-sustainability/sustainability/sustainable-food-initiative>.
- Wolch J, Byrne J, Newell J. 2014. Urban green space, public health, and environmental justice: The challenge of making cities 'just green enough'. *Landscape and Urban Planning*. 125:234–244.