

Post-disaster food resilience in Wellington

Wellington Earthquake Resilience Collaboratory

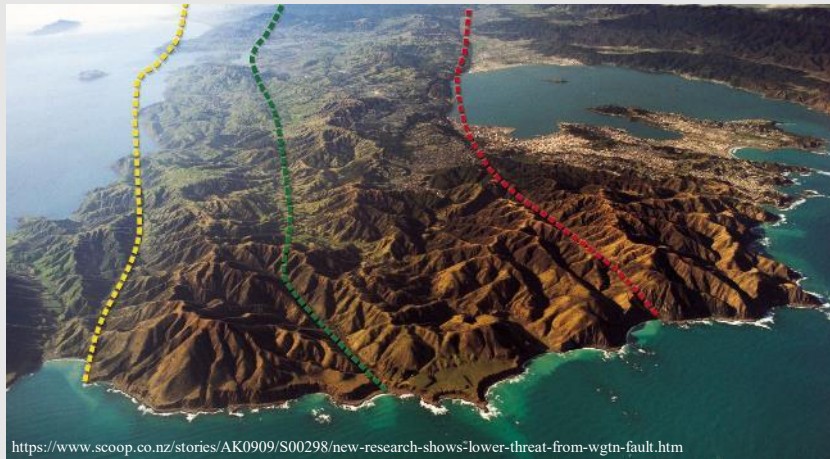
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July 2026**

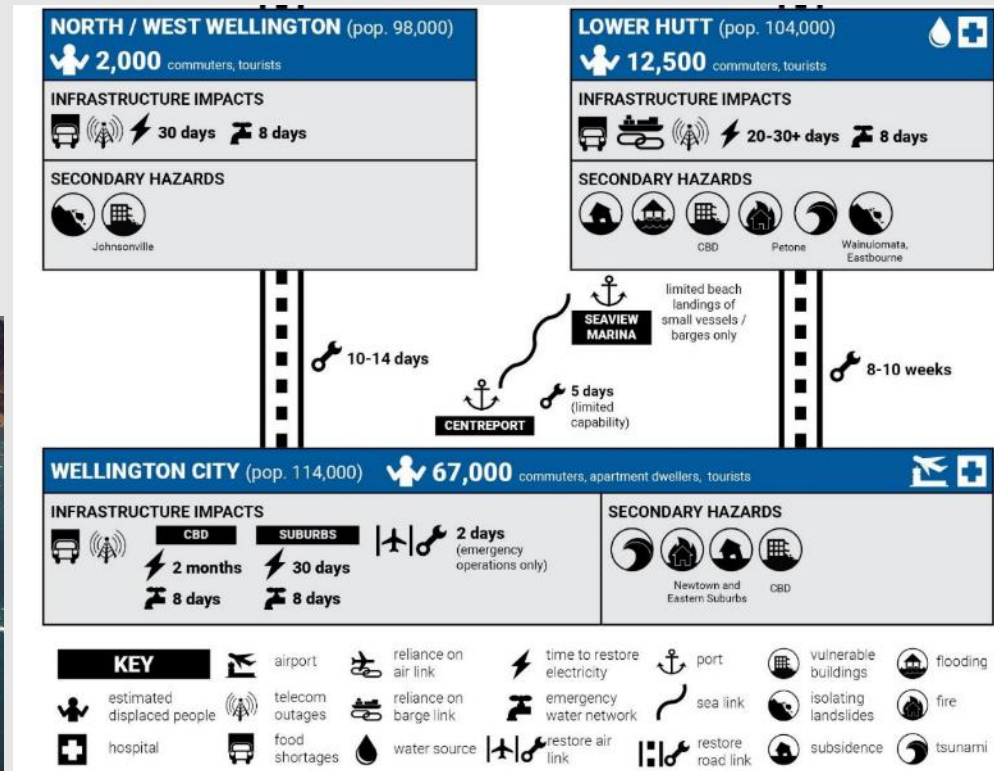


Wellington context

Earthquakes are the dominant hazard affecting infrastructure and lifelines



Fault lines in Wellington

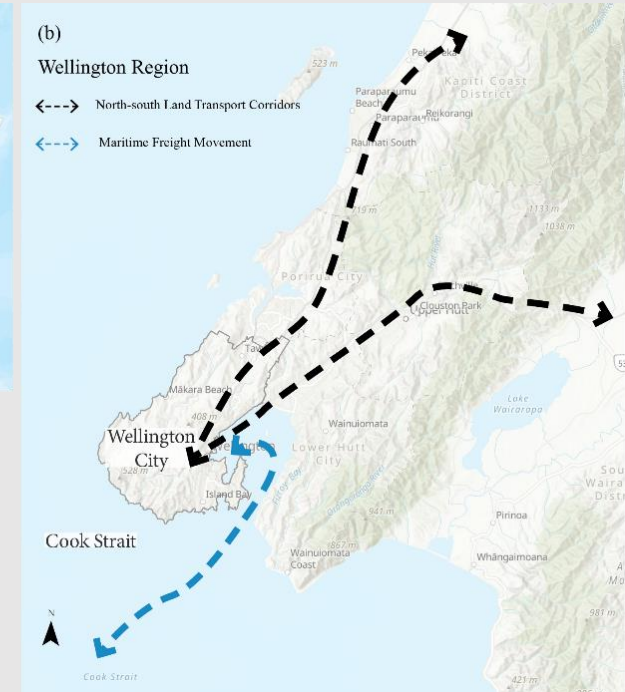


Ministry of Civil Defence & Emergency Management. (2018). *Wellington Earthquake National Initial Response Plan: Supporting plan* (Version 2.0, December 2018). Ministry of Civil Defence & Emergency Management.

The worst scenario after a major earthquake: **an isolated city** for at least **3-5 days**, with the potential for **weeks to months** of disruption

Food System Vulnerabilities

- High dependence on **external food supply chains**
- **Fresh food** relies on surrounding regions
- **Limited transport redundancy** (two main road corridors + Cook Strait freight)
- **Geographic constraints** reduce system flexibility and resilience



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NZ's over-reliance on roads for freight means natural disasters hit even harder. But there is a fix

Post-disaster food provision gaps

- Post-disaster planning focuses mainly on **immediate food relief** for **displaced populations**
- Households are advised to store at least **7 days'** **emergency food**
- Community emergency hubs provide potential food sources, **not food**
- Retail food **stocks are limited** under disruption scenarios

What food suppliers and providers are there?

- > Aro Bake, Aro St
- > Aro Café, Aro St
- > Aro Fruit Supply, Aro St
- > Dish Restaurant, Willis St
- > Jano Bistro, Willis St
- > Kai O Te Aro Community Gardens
- > Moore Wilson, Tory St
- > New World, Willis St
- > Other supermarkets, restaurants and cafes in the area
- > Patel's Dairy, Aro St
- > Piccolo, Willis St
- > Shalimar Mini Mart, Aro St
- > Wellington Seafood Shop, Cuba St
- > Willis St Food Market, Willis St
- > Yeung Shing Restaurant, Willis St

Where else could we find food?

- > Fishing
 - > Foodbanks
 - > Fridges & freezers
 - > Gardens
 - > Kaibosh
 - > Massey University
 - > Pantries
- (WREMO, 2017)

Post-disaster food security concerns

Short term

- Up to **67,000** people displaced (WENIRP)
- $\approx$ **1.4 million** meals required in the first week

Long term

- Reliance on long-life food increases **nutritional risk**
- **Vulnerable groups** face higher food access and nutrition

Mismatch between food demand and system capacity.

An alternative, resilient local food system is urgently needed in Wellington.

Urban agriculture as an alternative

Post-disaster food security concerns

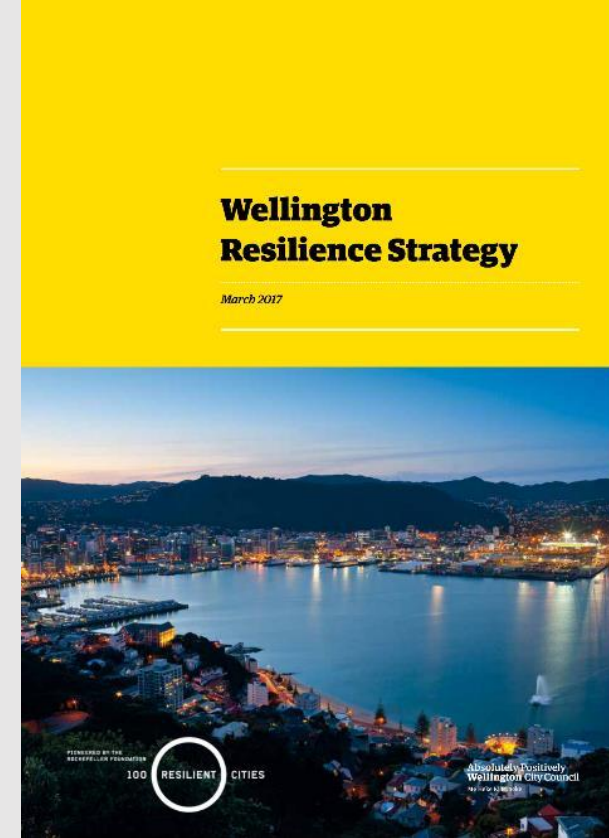
- External supply chains disrupted under isolation scenarios
- Limited transport redundancy for food distribution
- Reduced access to fresh and nutritious food
- Household storage only provides short-term buffer

Urban Agriculture's (UA) contribution post-disaster food security

- **Local production:** increases food availability when supply chains fail
- **Distribution resilience:** reduces dependence on long-distance transport
- **Nutrition support:** provides fresh and nutrient-rich food
- **Social continuity:** supports familiar food for local communities

Urban agriculture in Wellington

- Recognised by Wellington City Council as a **post-disaster resilience strategy**
- Existing initiatives include community gardens, private gardens and productive urban landscapes
- **Limited policy support** for its integration into disaster preparedness and recovery planning



WCC. (2017). Wellington Resilience Strategy. https://resilientcitiesnetwork.org/downloadable_resources/Network/Wellington-Resilience-Strategy-English.pdf



Community garden



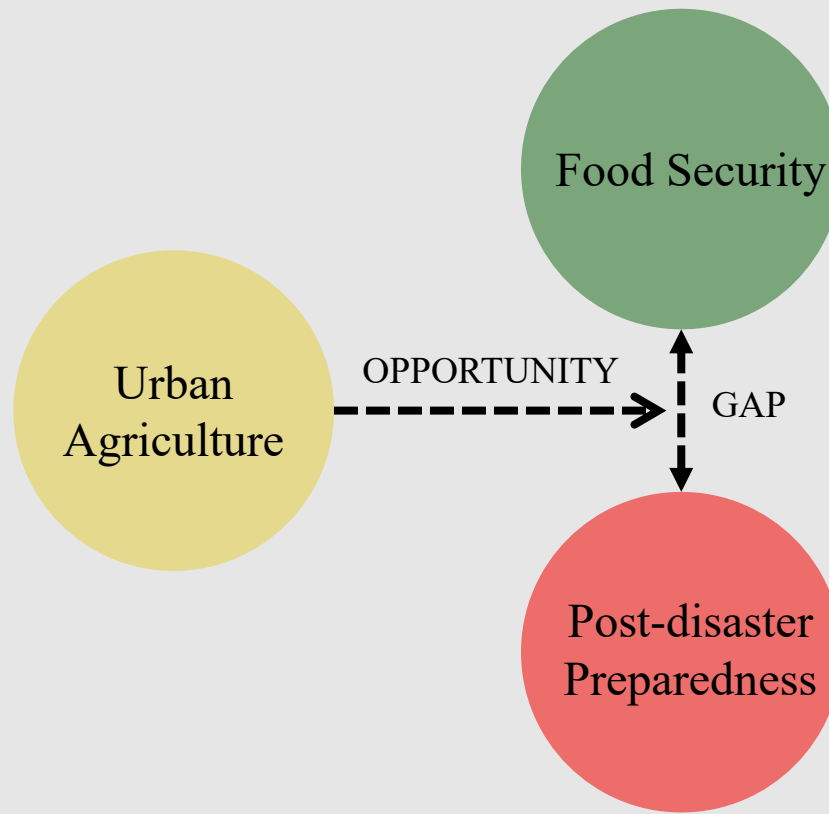
Private yard



<https://wellington.govt.nz/news-and-events/news-and-information/our-wellington/2021/10/garden-beds>

Productive urban landscape

Research Question



What is the role of urban agriculture in enhancing post-disaster food security in Wellington City, New Zealand?

Method

Qualitative		Quantitative
• UA’s social, cultural, and psychological benefits		• UA’s capacity to enhance post-disaster food security
Wesener, 2023	Berno, 2017	Sioen et al., 2017
Slater & Birchall, 2022	Montgomery et al., 2016	
Yoshida & Yagi, 2021	Adam-Bradford & Veenhuizen, 2015	
Wesener, 2020	Chan et al., 2015	
Shimpo et al., 2019	Okvat & Zautra, 2014	

Most research focuses on UA’s social and mental benefits
Limited research about its role in food provision

$$\% \text{ Self-sufficiency} = \text{Yield} \times \text{Area} / \text{Demand}$$

Method

$$\% \text{ Self-sufficiency} = \text{Yield} \times \text{Area} / \text{Demand}$$

Method:

-  Field surveys of community gardens
-  Review of relevant literature
-  On-site observation and spatial mapping
-  Analysis of aerial imagery
-  GIS mapping

Current UA capacity calculation

Future UA capacity calculation

Yield (focus on vegetables):



Productive land area:



Post-disaster food demands:



Current UA capacity: community gardens only (other UA types lack data)

Future UA capacity: community gardens, private yards, urban farms

UA capacity in Wellington-Scenario Setting

$$\% \text{ Self-sufficiency} = \text{Yield} \times \text{Area} / \text{Demand}$$

	Current UA capacity calculation	Future UA capacity calculation
Yield:	1 scenario based on survey and literature review	Scenario 1: Lowest Scenario 2: Average Scenario 3: Highest
Land area:	1 scenario based on survey	Scenario A: <15%, W, NW, N, NE, E Scenario B: <30%, W, NW, N, NE, E Scenario C: <15%, all aspects Scenario D: <30%, all aspects
Post-disaster food demands:	Scenario I: Entire pop. Scenario II: Displaced pop. Scenario III: Vulnerable pop. Scenario IV: Pop. around gardens (5mins) Scenario V: Vulnerable pop. around gardens (5mins) Scenario VI: Gardeners' families	Scenario I: Entire population Scenario II: Displaced population Scenario III: Vulnerable population
Post-disaster self-sufficiency rates:	6 scenarios	36 scenarios

Findings:

Current UA in Wellington

Post-disaster vegetable demand scenarios in Wellington

Self-sufficiency

1	Entire population	0.04%
2	Displaced population	0.12%
3	Vulnerable population	0.15%
4	Population within 5-mins walking distance	0.42%
5	Vulnerable population 5-mins walking distance	2.07%
6	Gardeners' families (allotments)	10.41%

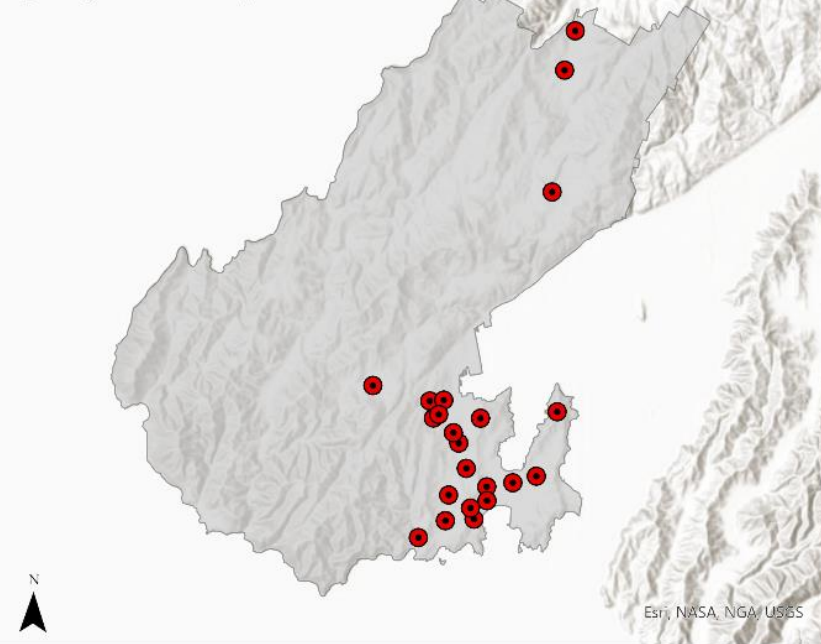
Previous studies calculating current UA capacity

Self-sufficiency

Cleveland, USA, study (Grewal & Grewal, 2012)	1.70%
Nerima, Japan, study (Sioen et al., 2017)	6.18%
Leicester, UK, study (Edmondson et al., 2019)	2.6%

Current community gardens' distribution

● Targeted Community Gardens

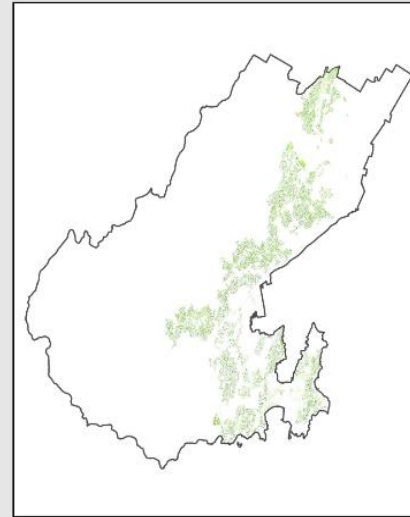


Findings:

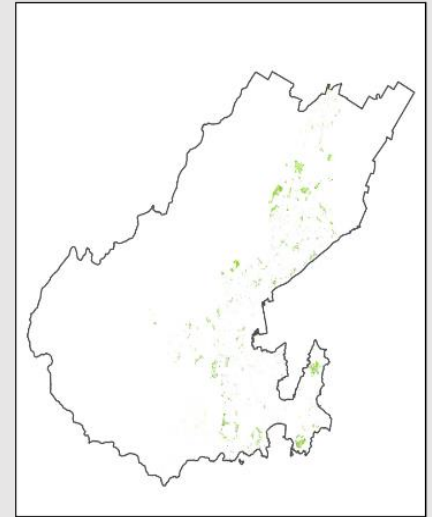
Future UA capacity in Wellington

Future UA in Wellington	Self-sufficiency
Entire population	3%-75%
Displaced population	9%-241%
Vulnerable population	12%-298%

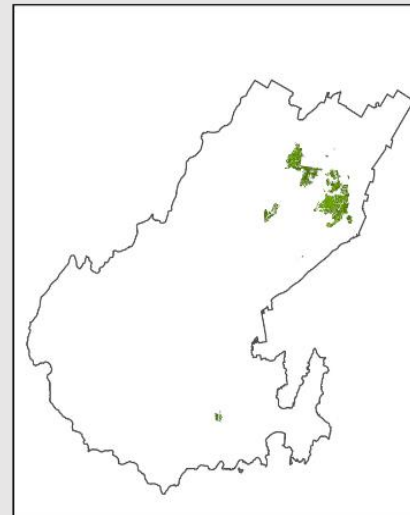
Future UA in previous studies	Self-sufficiency
Sydney, Australia, study (Mcdougall et al., 2020)	15%-34%
Dubbo, Australia, study (Ghosh, 2021)	23.4%-84.3%
Berlin, Germany, study (De Simone et al., 2023)	5%-82%



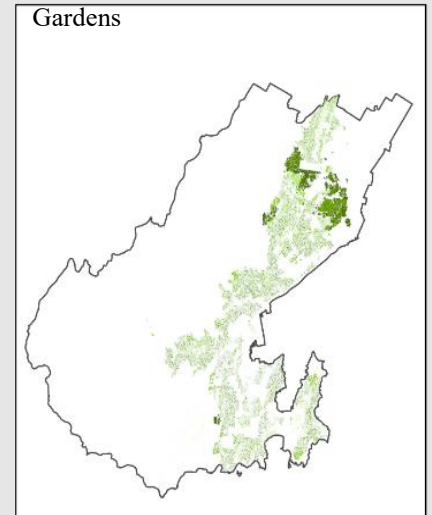
Potential Private Yards



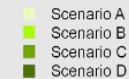
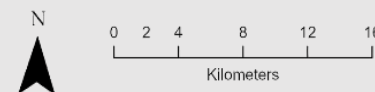
Potential Communal Gardens



Potential Urban Farms



All Potential Land



The role of UA in post-disaster Wellington

Role in food security

- **Current UA** has limited impact for city scale post-disaster food demands.
- **Future UA** shows significant potential for post-disaster food security.
- In reality, UA may be particularly important for **vulnerable populations**.

Beyond food security: multi-functional roles

- **Social & wellbeing**: supports social interaction and relaxation
- **Learning & skills**: enables knowledge sharing and skill development
- **Space & activities**: provides accessible community spaces
- **Food & Sharing**: supports informal food distribution and sharing

To expand UA's role in post-disaster context, Wellington needs to consider:

- Diversifying UA types
- Supporting a wider range of UA initiatives

Implications for Policy and Planning

Potential directions for Wellington

1. Integrating food systems into disaster preparedness

- Recognise food systems as critical infrastructure
- Integrate food security into CDEM planning and response frameworks
- Identify and map vulnerable populations and their spatial distribution

2. Establishing a dedicated UA governance structure

- establish a dedicated UA unit within WCC
- Strengthen cross-agency coordination (planning, resilience, community)
- Support community-led initiatives through funding and guidance
- Introduce incentives (e.g. grants, training programmes)
- Encourage diverse UA types, including residential gardening, to reduce pressure on public land



(NYC Mayor's Office of Urban Agriculture, 2023)



(Tokyo Metropolitan Government, 2023)

Implications for Policy and Planning

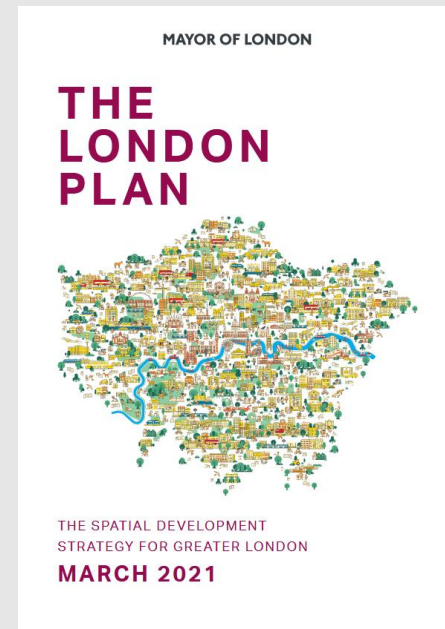
Potential directions for Wellington

3. Mainstreaming UA within urban planning and land-use policy

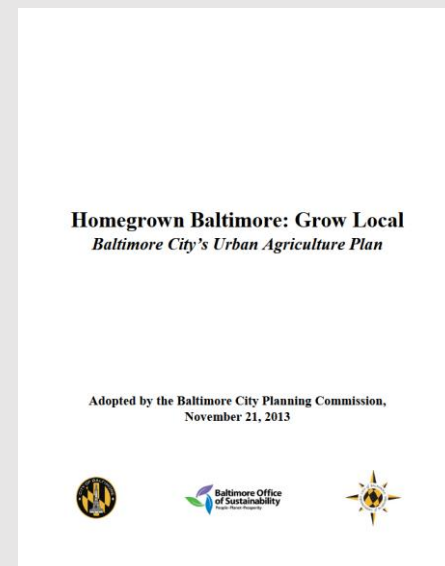
- Integrate UA into green infrastructure planning
- Revise the District Plan to include UA across wider land-use categories
- Identify and allocate underutilised or vacant land for UA
- Enable temporary use land

4. Considering UA's multi-benefits and potential in post-disaster context

- Link UA sites with emergency hubs to form hub-UA networks
- Support community-based preparedness activities (e.g. drills, workshops) to familiarise residents with local UA sites
- Develop targeted support for vulnerable populations



(Mayor of London, 2021)



(Baltimore Office of Sustainability, 2013)

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Thanks!



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