# Mapping Local Food Futures

An open spatial tool for evaluating alternative protein and urban food production scenarios

**Yu Xia and Rob Newell**
Royal Roads University, Victoria, BC
CULTIVATING RESILIENCE SUMMIT · CALGARY · 2026

## Why location matters in urban food planning

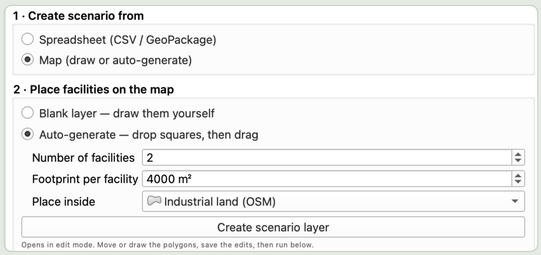
Mycelium protein, vertical farms and urban gardens could make city food more local and resilient. A just transition also asks where they go: who lives nearby, who gains access and jobs, and who bears the costs.

## An open QGIS screening tool

- **Land** — Industrial zones, rooftops, parking lots or parks
- **People** — Census tracts, residents within walking distance, low-income share
- **Assets** — Nine asset types, from mycelium protein to apiaries
- **Outcomes** — Food and protein, GHG on the provincial grid, land, biodiversity and jobs

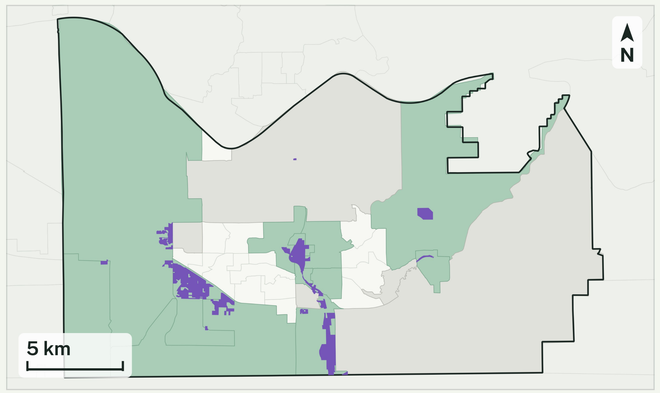
## Build scenarios three ways

Load a spreadsheet, draw sites, or auto-generate them; then validate, analyze, export.




## Abbotsford, BC: how much could one city host?

In the Fraser Valley, about 70 km east of Vancouver. A city-wide screening of 1,000 m² mycelium-protein facilities on industrial land.




**17** census tracts with industrial land

**12** can fit at least one facility on 5% of their industrial land

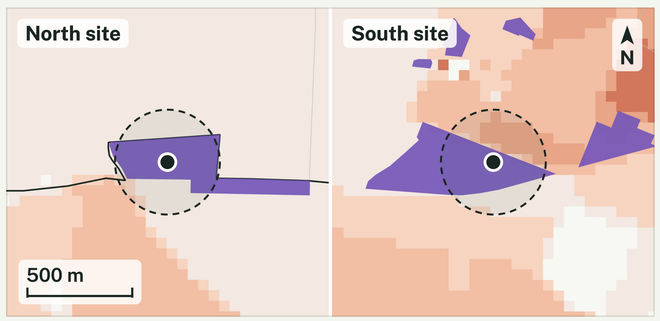
**364** facilities could fit, at most

**8.1 M** kg of food a year, a theoretical ceiling

**But Abbotsford's industrial land sits away from homes:** a facility on either of its two largest zones would have only 2–3 residents within a 250 m walk.

## Langford, BC: same facility, different neighbourhoods

In Greater Victoria, on Vancouver Island. Two 4,000 m² mycelium-protein facilities on Langford's two largest industrial sites. Each makes 89,480 kg of food a year at 5.0 kg $CO_2$e per kg, and both fit the developable land.




Two panels at the same scale, each centred on its site (3.5 km apart). Population: 2021 Census dissemination blocks placed on residential buildings (50 m grid); the totals match the census.

**3.3×**
more residents within a 250 m walk of the south site

**Residents within a 250 m walk**

| | |
|---|---|
| North site | 120 |
| South site | 399 |

**Low-income share**

| | |
|---|---|
| North site | 6.6% |
| South site | 9.8% |

## Trade-offs across asset types

Per m² of facility, salmon and mycelium give the most protein, container and vertical farms the most food, and market gardens the lowest emissions; apiaries feed pollinators.

| Asset type | Food kg/m²/yr | Protein kg/m²/yr | Emissions kg $CO_2$e/kg |
|---|---|---|---|
| **Mycelium protein** | 22 | 1.22 | 5.0 |
| Cellular salmon | 20 | 4.00 | 6.3 |
| Vertical farm | 40 | 0.52 | 1.3 |
| Rooftop greenhouse | 18 | 0.27 | 1.1 |
| Container farm | 55 | 0.72 | 3.6 |
| Market garden | 3.5 | 0.05 | 0.1 |
| Apiary | 0.2 | 0 | 1.4 |

Food and protein in kg per m² of facility per year; emissions in kg $CO_2$e per kg of food on BC's grid (lower is better). Screening coefficients; full LCA for mycelium protein only. Seven of the tool's nine asset types shown; mycelium protein, modelled in both case studies, is highlighted.

## Contact us to learn more

QGIS plugin for Windows and macOS
Screening level, testing version: not a site plan.
TRIAS Lab: **triaslab.ca**
Dr. Rob Newell: **Rob.1newell@royalroads.ca**

## Key findings

**Location matters**
**3.3×**
more residents within a walk at Langford's south site: location decides who benefits.

**Asset choice matters**
**No perfect solution**
Container farms lead on food, salmon on protein, market gardens on low emissions: pick by need.

**Electricity matters**
**5.0 vs 8.8**
kg $CO_2$e per kg of food on BC's vs PEI's grid: the power grid shapes the footprint.

**Acknowledgements.** The research was supported by Genome BC and Genome Canada through the Interdisciplinary Challenge Teams program (grant number: 321ICT). LCA: Rob Sianchuk Consulting. Data: Statistics Canada 2021 Census (incl. dissemination blocks); Open Database of Buildings; OpenStreetMap contributors; City of Abbotsford. Biodiversity: Scherer et al. (2023). Results are illustrative, from a testing version of the plugin.