

Displacing imports and impacts with peri-urban agriculture: An integrated assessment of local produce in the Metropolitan Area of Barcelona

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Motivation

 Cities face a greater **reliance on food imports** amid urbanization, recognizing the need of increasing self-sufficiency through peri-urban and urban agriculture.

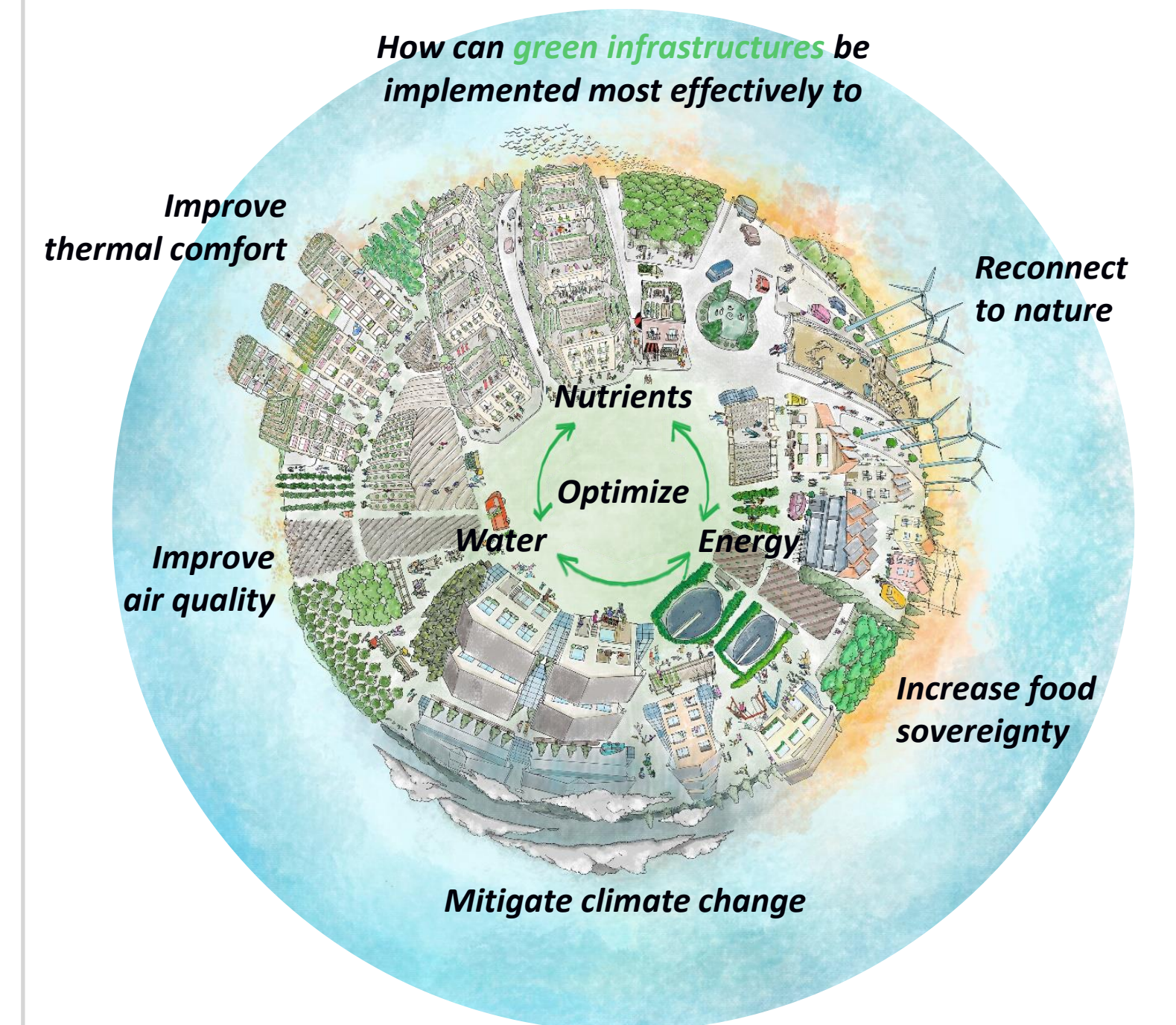
 Food produced outside cities implies environmental impacts associated with **lengthier supply chains** (food miles and food losses).

 Further impacts and degradation come from the use of **mineral fertilizers**, instrumental to meet the demand in conventional food systems.


 LCA has been applied to compare impacts between local and imported produce, but few have focus on assessing **nutrient circularity strategies** in local food production.

URBAG


Integrated System Analysis of Urban Vegetation and Agriculture

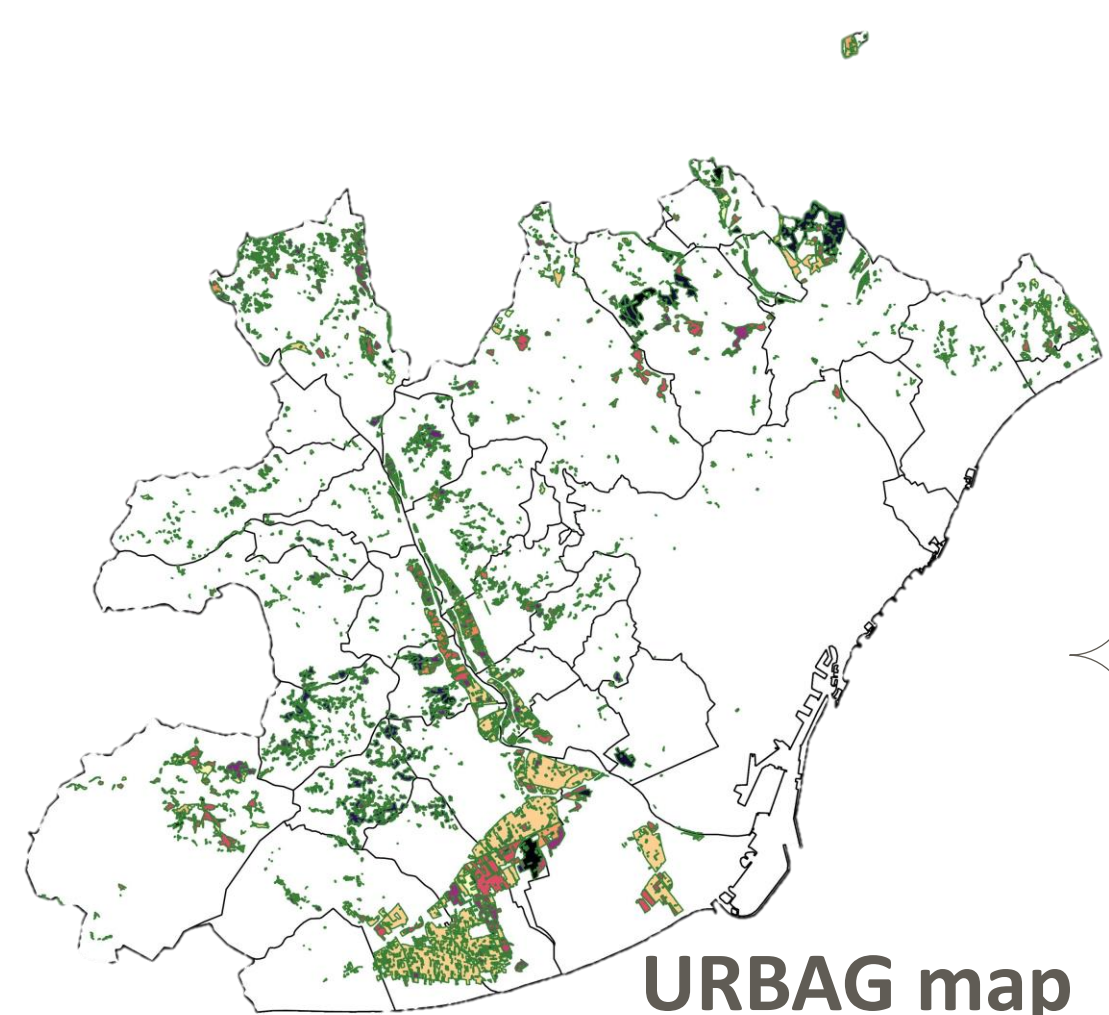


Goal & Scope

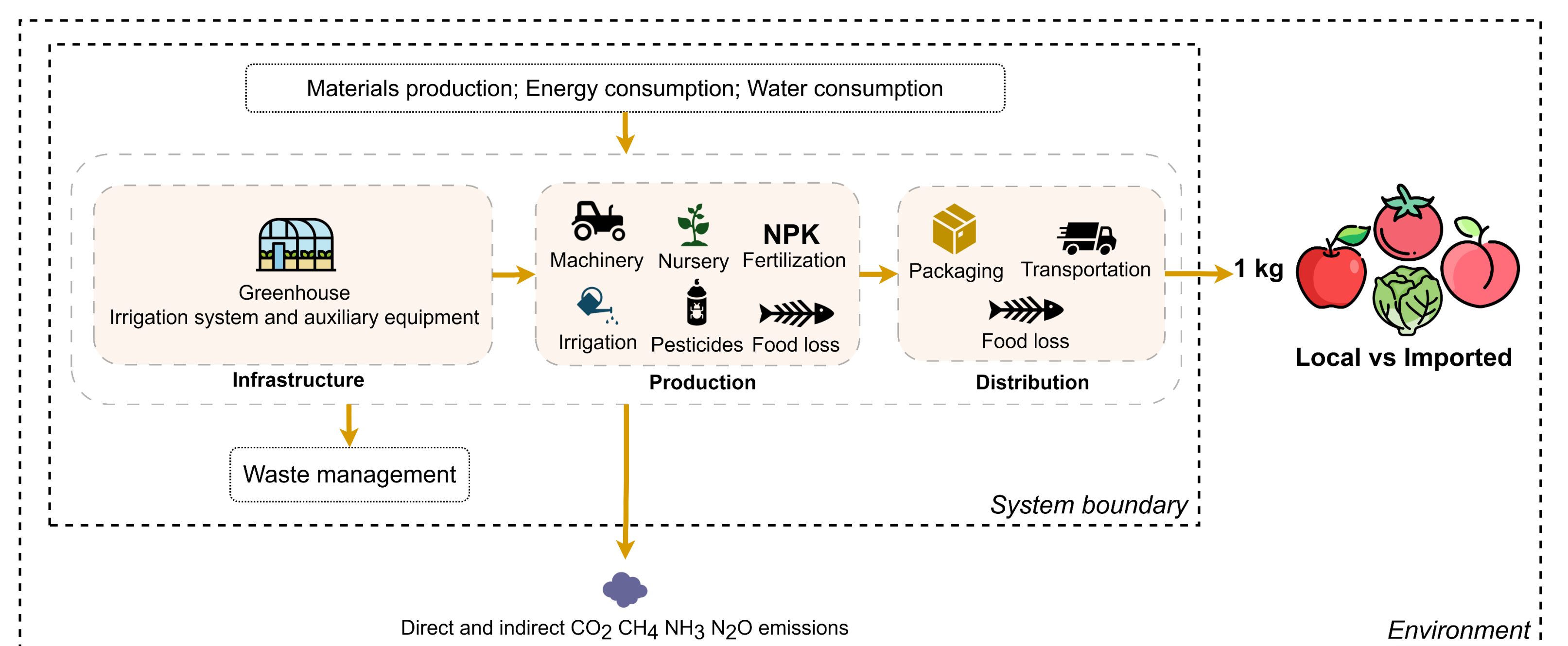
To determine produce self-sufficiency, compare the environmental impacts between local and imported produce, and identify the benefits and trade-offs of improving the sustainability of local food production with nutrient circularity. 

Materials & Methods


 Self-sufficiency assessed by contrasting the crop production data from the URBAG agricultural map with official household food consumption records, ensuring local dietary patterns.



- ✓ Area
- ✓ Yield
- ✓ Nutrient requirements
- ✓ Water requirements
- ✓ Climate
- ✓ River basins




 Full LCA using **geographically explicit eutrophication characterization factors** and inventory data representing specific geography of imports origins.

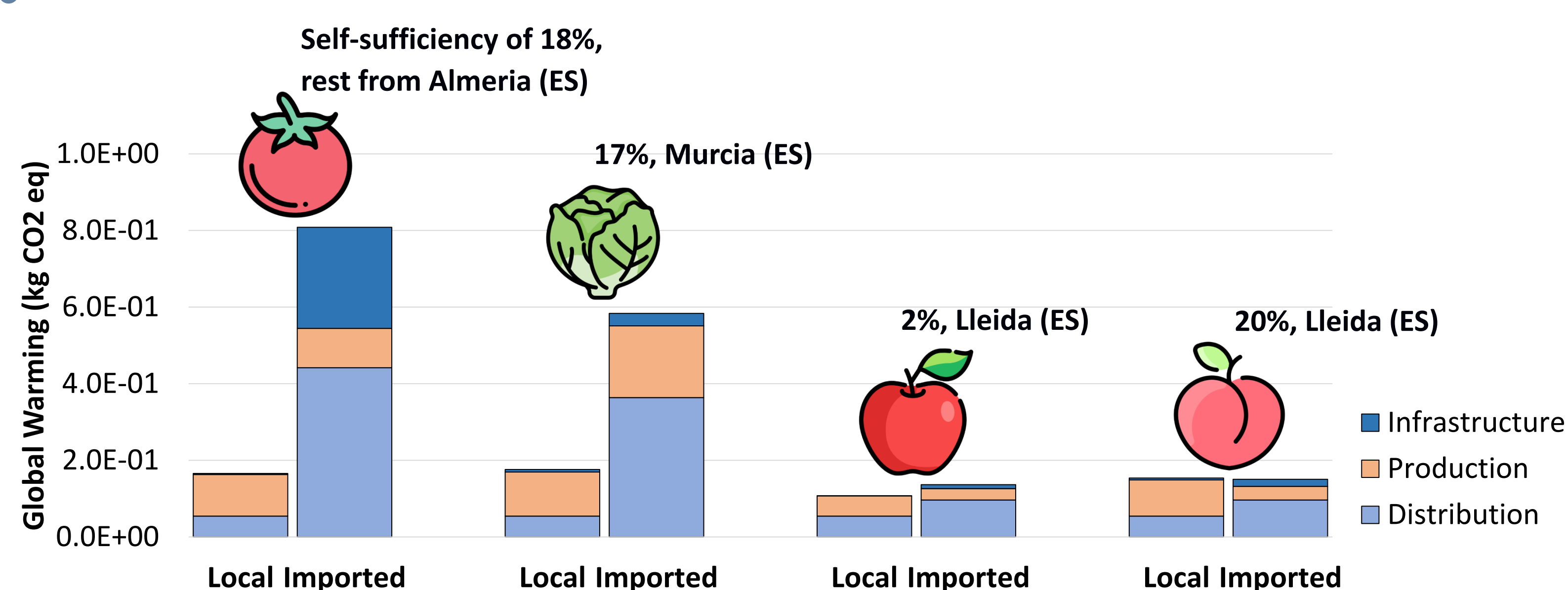
 Produce import origins were identified by analyzing official import statistics from the Metropolitan Area of Barcelona distribution market (Mercabarna) of the last 9 years (2015-2023).

FU is 1 kg of produce; LCI foreground from cradle-to-distribution market gate; background data from Ecoinvent 3.9.1; LCIA with ReCiPe method (H). **SímaPro**


Preliminary Results

 Only 3 out of the 10 most produced produce have a self-sufficiency greater than 20% (cucumber 28%, onion 21%, and peach 20%).

 Production of N mineral fertilizer contribute the most impacts (GW) in local production.



Ongoing Research

 Assessment of the nutrient circularity strategies in peri-urban and urban agriculture by replacing mineral fertilizers with nutrients recovered from urban residues.

