Quantifying Urban Foodprints and Mitigation Opportunities

Goldstein, Benjamin Paul; Fernandez, John; Birkved, Morten; Hauschild, Michael Zwicky

Publication date:
2015

Citation (APA):

General rights
Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

- Users may download and print one copy of any publication from the public portal for the purpose of private study or research.
- You may not further distribute the material or use it for any profit-making activity or commercial gain.
- You may freely distribute the URL identifying the publication in the public portal.

If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.
Quantifying Urban Foodprints and Mitigation Opportunities

Benjamin Goldstein\textsuperscript{1,2} (bgol@dtu.dk and\textsuperscript{3}), John Fernandez\textsuperscript{2}, Morten Birkved\textsuperscript{1} and Michael Hauschild\textsuperscript{1}
\textsuperscript{1}Technical University of Denmark, Quantitative Sustainability Assessment Division \textsuperscript{2}Massachusetts Institute of Technology, Department of Architecture - Urban Metabolism Group

Introduction

As centers of wealth and population, cities are and will continue to be the major driving force of anthropogenic environmental impacts. Overviews of urban transport \cite{1}, building energy \cite{2} and water consumption \cite{3} have shown the importance of these activities in influencing urban environmental integrity. Urban food consumption has not received a similar treatment despite its large contributions to global climate change \cite{4}, non-renewable resource consumption \cite{5} and other ecological challenges. This study attempts to fill that gap by asking:

What is food consumption’s role in a city’s environmental profile (the ‘foodprint’) and how can urban designers re-imagine cities to mitigate it?

Methods

Comprehensive review of urban metabolism and related literature to find quantified urban foodprints in terms of:

- Urban food demand (tons\textpercapita) - MFA
- Ecological footprint (global ha\textpercapita) - EF
- Carbon footprint (tons CO\textsubscript{2}eq\textpercapita) - CF

\begin{itemize}
  \item 204 urban assessments
  \item 19 MFA, 20 CF and 21 EF foodprints
\end{itemize}

Fig 1: Overview of research methods

Conclusions

The urban foodprint is significant in scale and is poised to grow lockstep with future urbanization. Urban food waste is also set to grow simultaneously, which combined with the current linear metabolism of many cities food systems could result in a significant nutrient exhaust and methane production. These will challenge urban designers and policy makers to explore new infrastructural forms and policies for future cities:

- **Circular metabolic strategies**: wastewater sludge recycling, composting;
- **Behavioral nudging**: food waste attenuation, lower and dairy intake;
- **Alternative food supply-chains**: urban and peri-urban agriculture.

The combined effect of such interventions on the urban foodprint is unknown, making it a ripe question of practical importance for future urban metabolism research.

Works Cited

\begin{itemize}
  \item FAO. 2014. Livestock’s Long Shadow. Rome, IT. http://www.fao.org/docrep/010/a0701e/a0701e00.HTM.
  \item Goldstein, B., M. Birkved, J. Fernandez and M. Hauschild. 2013. Surveying the environmental footprints of urban food consumption (forthcoming).
\end{itemize}