Exploring the conceptualisation of urban greenhouse farming.

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Bas Hendriks
Introduction

Feeding urban populations will become difficult, this Honours card identifies urban greenhouse farming as a trend and highlights the lack of a clear conceptualization.

Urban Greenhouse Farming

FUTURE PROOF
In light of climate change and rapid urbanization, how we feed urban areas in the future is a large challenge. There is a trend of bringing food production closer to cities. Within this trend, the potential role of covered cultivation methods has received little exploration so far, while there is movement.

Climate change

Rapid urbanization

HOW TO FEED URBAN AREAS IN THE FUTURE?

MOVE FOOD PRODUCTION
Shifting food production closer to urban areas reduces costs, carbon footprint and ensure fresher produce. This could solve the issue mentioned.

THE TERM
The term urban greenhouse farming emerged within this movement, referring to indoor horticulture farming in cities. This term covers a wide range of performances while there is no clear conceptualization at present. This Honours card explores how urban greenhouse farming is performed in practice and aims to investigate whether the different performances are to catch under a common denominator.
Methods

In three phases, various forms of urban greenhouse farming and results of interviews are analyzed to conclude on the main question.

Phasing

**PHASE I**

**LITERATURE STUDY**
- At the start of this research, a literature study is carried out to see how urban greenhouse farming emerges in academic literature.

**PHASE II**

**EMPERICAL FIELDWORK AND INTERVIEWS**
- In the second phase, visits are made to six case studies to observe the urban greenhouse farming performance.
- At every case study, at least one individual is interviewed about the ins and outs of the case.
- The different performances are compared with the help of Social Practice Theory.

**PHASE III**

**DRAWING CONCLUSIONS**
- In the third phase, the findings are summarized and analyzed to conclude on the research.
- The main takeaways and significance of the research in understanding urban greenhouse farming are projected.
The results of the desk research and interviews are mapped with help of the Social Practice Theory, two clusters appear.

Mapping of results

**FINDINGS**
- After the literature study and the fieldwork where six experts in urban food production of Dutch case studies are interviewed, the case studies are mapped on two axis:
  1. Dependency on citizens
  2. Acreage

**MAIN INSIGHTS**
Two dominant performances of urban greenhouse farming emerged from the results:
1. **Process optimisation** urban greenhouse farming
2. **Community-driven** urban greenhouse farming

**EXPLANATION GRAPH**
- The scores are interpretative estimations to visualise the urban greenhouse farming performances.
- In practice, differences among the case studies are more nuanced.
The first cluster is based on process optimisation within urban greenhouse farming, it involves high-tech and is characterized by resource efficiency.

**Process optimisation**

**PROCESS OPTIMISATION BASED**

Urban greenhouse farming practice with relatively high entry due to capital costs for technologies and the required expertise. It is space-efficient and might ensure food-related securities.

**SOCIAL CONTEXT**

The practice of urban farming does not rely strongly on social context, practitioners aim to make urban greenhouses replicable in various regional contexts and ensure food safety to contribute to global food consumption.

**HUMAN RESOURCES**

Entrepreneurs, technical- and natural science experts. There is expertise to further optimise the process and they dare to fail. This group enjoys the process of experimenting and exploring to optimise food production process.

**TECH USED**

Harvesting machines, various sensors and advanced irrigation systems.

**CONSTRUCTION**

Constructed the last couple of years.

**YIELD**

Characterized by high yields and resource efficiency with hydroponics.

**ACREAGE**

Acreage is ranging from 120 m² to 150 m².
Findings

The second cluster is community-driven, it involves lower-tech methods and citizen participation while focusing on sustainable and social relationships.

Community-driven

**COMMUNITY-DRIVEN BASED**

When social interaction and citizen involvement in cultivating foods is valued, this might be interesting. Food production tends to be lower and more urban land would be necessary. However, it demands less costs and specific expertise.

**SOCIAL CONTEXT**

This type of urban greenhouse farming relies on the active involvement of citizens who act as volunteers in the performance. The urban greenhouse farming performance is thus explicitly bound to the social context.

**HUMAN RESOURCES**

Horticulturists, coordinators, and citizens who act as volunteers. They form a community that cultivates food for the city region. The horticulturists provide guidance to citizens on the important matters.
Findings

While both forms of urban greenhouse farming are distinct, they overlap in certain aspects too.

Comparison

MAIN INSIGHTS
The results show that urban greenhouse farming is not unequivocal. Two dominant practice forms of urban greenhouse farming are put forward. These types have different goals, require various competences, and are enacted by different practitioners. It is, therefore, stated to look more nuanced at urban greenhouse farming since the performances are not to catch under a common denominator.

Urban greenhouse farming can be viewed as an emerging food production practice. Both types of urban greenhouse farming are in their early stages and have the potential to evolve into more established and recognizable forms of urban greenhouse farming.

**“URBAN GREENHOUSE FARMING”**
Emerged term
Referring to indoor horticulture farming in cities
What performances are to catch under a common denominator?

**TECH USED**
High-tech
Low-tech

**CONSTRUCTION**
Couple of years ago
Decade ago

**YIELD**
Higher
Lower

**ACREAGE**
150 m²
2,000 m²

**HUMAN RESOURCES**
Entrepreneurs, technical- and natural experts.
Horticulturists, coordinators and citizens.

**SOCIAL CONTEXT**
Relies not on social context.
Relies on active involvement of citizens

Referring to indoor horticulture farming in cities
What performances are to catch under a common denominator?
1. INTRODUCTION

2. METHODS

3. FINDINGS

4. CONCLUSION
Conclusion

No clear definition could be found, but understanding the emerging types of urban farming can contribute to a broader debate of food production in urban areas.

CONCLUSION
It appeared that the context of the urban greenhouse is crucial for the emergence of this practice. In the Netherlands, the community-driven type, which is more strongly embedded in the social context, seems to be taking off more in society compared to the other type. However, in regions that have to deal with limited arable farmland or resource insecurities, the process optimisation type is more likely to emerge.

COEXISTING
The two emerging urban greenhouse farming types can coexist; however, they serve different goals and have different connections to urban areas. For policy and research purposes, the described types of urban greenhouse farming might help us better understand urban greenhouse farming. Additionally, the exploration of urban greenhouse farming might advance debates about whether food production should be organized in urban regions, and how to do so.

COEXISTING

VALUES
Although the two urban greenhouse farming types serve different goals, they can coexist.

DEFINITION
Urban greenhouse farming can be viewed as an emerging food production practice. The results show that urban greenhouse farming is not unequivocal.

COSTS
The geography of the greenhouse could play an important role on the amount of costs for the greenhouse type.

“URBAN GREENHOUSE FARMING”

Based on the geography of the greenhouse, other values could be of importance for the community.