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Emphasising and Enabling Urban Agriculture for Local Authorities – Elaboration of Urban Agricultural Activities and Policies in Glasgow and Dresden

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Abstract <p>Urban agriculture (UA) holds significant potential for enhancing food security, promoting social cohesion and providing environmental benefits, contributing to sustainable urban development. However, its integration into urban planning remains inconsistent and faces numerous challenges. This study provides a comparative analysis of UA policies and activities in Dresden, Germany and Glasgow, Scotland, to identify systemic barriers and propose strategies for more effective integration of UA into urban planning frameworks. Dresden and Glasgow represent different stages of UA integration within their urban policies. Dresden's approach, including the "Edible City" initiative and recent efforts such as the appointment of a dedicated UA employee in 2023, reflects a growing interest in UA. However, the city still faces significant barriers, including regulatory constraints and limited institutional support. In contrast, Glasgow demonstrates a more advanced integration of UA through the Glasgow City Food Plan and the Food Growing Strategy 2020-2025, supported by organizations like the Glasgow Community Food Network (GCFN). Glasgow's approach illustrates the importance of strong institutional backing and comprehensive policy frameworks. The study identifies several systemic barriers to UA integration, including regulatory challenges, land tenure issues and fragmented policy domains. Regulatory constraints often arise from zoning laws that do not accommodate urban farming, while land tenure issues stem from insecure access to land for urban farmers. The fragmentation of policy areas related to land use, health and economic development further complicates UA integration. Historically, UA has been underrepresented in urban development discussions, which have prioritized other sustainability topics such as energy and mobility. To address these challenges, the study highlights the importance of supportive policy frameworks and institutional mechanisms. Cities worldwide have implemented strategies to promote UA, such as zoning regulations permitting urban farming, incentives for rooftop and community gardens and financial support for UA initiatives. The formation of food policy councils and urban agriculture networks fosters collaboration among government agencies, community organizations and residents.</p> <p>In conclusion, while UA offers significant benefits, its integration into urban planning requires overcoming systemic barriers and enhancing institutional support. By developing supportive policy frameworks and practical tools, cities can better incorporate UA into their planning processes, fostering sustainable urban growth and improving food security. The comparative analysis of Dresden and Glasgow provides valuable insights and lessons for other cities seeking to promote sustainable urban agriculture.</p>		
Keywords Urban Agriculture, Community Gardening, Sustainable Urban Development		
Originality statement. I hereby declare that this Master's dissertation is my own original work, does not contain other people's work without this being stated, cited and referenced, has not been submitted elsewhere in fulfilment of the requirements of this or a other award.	Signature	

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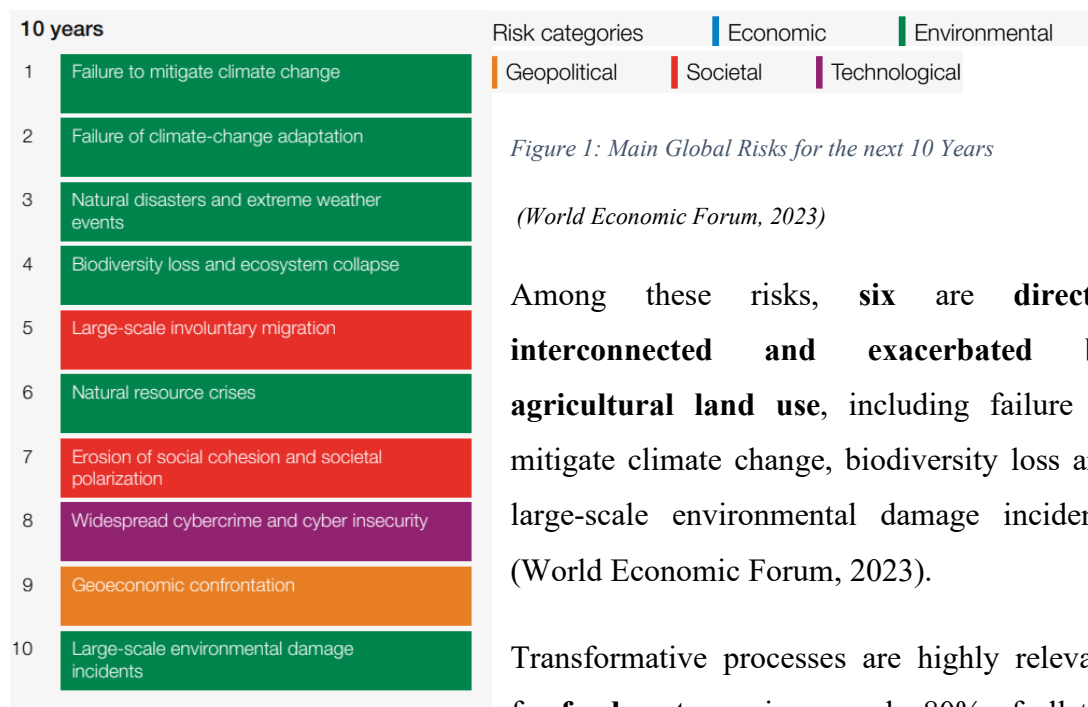
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1. INTRODUCTION

1.1 Rationale

Many risks of different categories threaten the earth. The World Economic Forum states **10 main risks for the next ten years** (Figure 1).



Among these risks, **six** are **directly interconnected and exacerbated by agricultural land use**, including failure to mitigate climate change, biodiversity loss and large-scale environmental damage incidents (World Economic Forum, 2023).

Transformative processes are highly relevant for **food systems** since nearly 80% of all the food produced in the world is **consumed in urban areas** (World Economic Forum, 2023). Three in four EU citizens live in cities, towns or suburbs. Cities and their inhabitants represent a force for change, notably in terms of the choices cities make about procurement, managing food loss and waste and designing their food environment and in terms of consumer behavior and people’s relationship with food and food culture. Numerous novel practices as part of innovative food systems are tested at a local level in cities and show **potential for being scaled up** or further disseminated into new areas (World Economic Forum, 2023).

The climate crisis is increasing the urgency to act and the social shift toward greater environmental awareness is progressing (Adams, Larkham and Hardman, 2023). As color-coded in Figure 1, the global risks can be categorized into environmental and societal issues.

Pothukuchi and Kaufman (1999) underscored the **minor role of the food system, including urban agriculture (UA), in urban development planning**. However, given that public authorities control the future direction of urban development, local authorities emerge as central actors in placing UA at the forefront of urban society to harness its benefits. Moreover, there has been a notable increase in UA varieties across Europe in recent years, as demonstrated by the work of Hardman, Clark and Sheriff (2022).

Assuming that urban crop cultivation has great potential to counteract global crises on a local level and that UA has not found a sufficient place in urban development and initiatives encounter several obstacles, **effective answers are needed**.

1.2 Aim and Objectives

Aim

This paper seeks to examine the incorporation of UA as a vital component of the food system within urban development planning. Specifically, the aim is twofold:

1. Analyse Representation and Integration of UA in Urban Development: The study aims to examine crop-growing activities as part of the food system in urban development planning in Glasgow and Dresden. This involves exploring the systemic barriers and challenges that hinder the integration and enhancement of UA into city development processes.

2. Emphasize and Enable UA in Urban Development: The study aims to explore strategies and measures for emphasizing the role of UA in urban development. This includes guiding policymakers and planners of local administrations and municipalities on how barriers and challenges of UA can be overcome.

This aim aligns with the broader objective of fostering sustainable urban development and leveraging UA as a means to address environmental, social and economic challenges within urban areas.

The objectives consist of four parts:

1. Framework UA in Policies, Concepts and Institutions in Dresden and Glasgow

UA is a broad topic where a large number of different methods can be incorporated. There are various interpretations of concepts. It is important to find suitable definitions at the beginning and to develop a framework appropriate to the scope of this work and which parts of UA can be considered. To obtain a holistic approach, the attitudes towards UA at various levels (EU, Federal State, etc.) need to be identified, where opinions and policy papers need to flow in.

2. Elaboration and Coding of the diverse Benefits, Barriers and Challenges of Urban Agricultural Activities

The goal of this objective is to systematically explore and categorize the diverse benefits, barriers and challenges associated with UA activities and to identify and provide an overview of the fundamental elements essential for successful urban food growing. By examining these aspects, the research aims to offer a comprehensive understanding of the multifaceted impacts of UA, including its contributions to community well-being, environmental sustainability and local food security. Additionally, the thesis will highlight the critical factors that influence the feasibility and effectiveness of urban food-growing initiatives, thereby providing valuable insights for policymakers, practitioners and community stakeholders engaged in UA activities.

3. Investigate established Solutions and Strategies

In order to comprehensively assess opportunities to enhance urban agricultural activities, this thesis aims to identify transferable strategies and mechanisms that effectively address conflicts and barriers encountered in Dresden and Glasgow.

4. Establish a Leaflet for Local Authorities to multiply Results and foster UA Activities in the Future

The findings from above (3rd objective) can be used by other local authorities to improve the support for UA activities in urban planning and development. A leaflet is therefore derived from the results.

1.3 Outline

Methodology

The research methodology employed in this thesis will primarily adopt a qualitative approach, centering on conducting interviews with stakeholders to gain insights into UA initiatives and their integration within urban planning paradigms. These interviews will facilitate comprehension of UA, as well as the associated challenges and opportunities inherent within them. Additionally, a thorough literature review will be conducted to identify relevant policies and UA activities, thereby adding analytical depth and fostering contextual understanding.

Furthermore, the chosen methodology can be considered action research due to the proactive involvement of stakeholders aimed at solving real problems.

Structure

Following this introduction, the literature review explores the conceptual framework of UA, delving into definitions and theoretical perspectives, while also reviewing existing literature on related policies, initiatives and their integration into urban planning processes. Identified gaps in the literature serve to establish the theoretical foundation for the study. Moving on, the methodological approach section describes the mixed-methods approach employed, emphasizing stakeholder interviews, alongside the rationale for incorporating action research principles. Subsequently, the data collection and analysis section outline the process of conducting interviews with relevant stakeholders, including local authorities, network institutions, actively involved persons and academia detailing selection criteria and data collection strategies, followed by an explanation of the thematic analysis approach utilized. The analysis and integration of findings present insights gleaned from interviews, including the role of UA in urban development, identified potentials, barriers and challenges as well as measures and levers, aligning these findings with existing literature and theoretical

frameworks while highlighting implications for practice and policy development. Furthermore, the development of a leaflet for local authorities on how to enhance UA in other cities forms part of the subsequent section of the results. Finally, the conclusion summarizes key findings, reflects on research contributions and identifies potential areas for future research.

2. LITERATURE REVIEW

2.1 Problem Statement and Procedure

Despite its recognized social and environmental benefits, UA remains inadequately integrated into municipal policies and strategies and encounters various obstacles (Pothukuchi and Kaufman, 1999; European Forum on Urban Agriculture, 2024b). This research aims to investigate the reasons behind this gap and explore strategies to emphasize UA within urban development planning. By identifying systemic barriers and best practices, this study seeks to provide insights and guidance to policymakers and local authorities to better integrate UA into urban planning processes, fostering more sustainable urban development.

The literature for this review was gathered from the Glasgow Caledonian University Library, covering articles published up to June 2024. The search process involved two phases. Initially, the scientific database of the GCU online library was queried using a set of keywords and their combinations, encompassing terms related to UA, such as 'urban', 'gardening', 'agriculture', 'farming', 'Urban food system', 'development strategies' and 'policy'.

2.2 Definitions

Considering the purpose of this paper and its accompanying limitations, the following definition is used as an orientation: UA is a multifactorial discipline involving actors like communities, activities, places and economies (Sanyé Mengual, 2015). The main output of UA is harvested and consumed products, in other words, a biobased production within areas considered "urban" according to local perspectives and standards (European Cooperation in Science and Technology, 2013). UA is an intentional effort by an individual or a community and occurs in both intra-urban and peri-urban zones (European Cooperation in Science and Technology, 2013).

Co-benefits that come along with UA can be divided into different categories: food security, economic, social and environmental (McEldowney, 2017). Sanyé-Mengual, (2015) visualises the variety of definitions and interpretations of UA activities (Figure

2). This is not intended to provide specific definitions, but to illustrate the complexity of the topic and the variety of existing approaches to definitions.

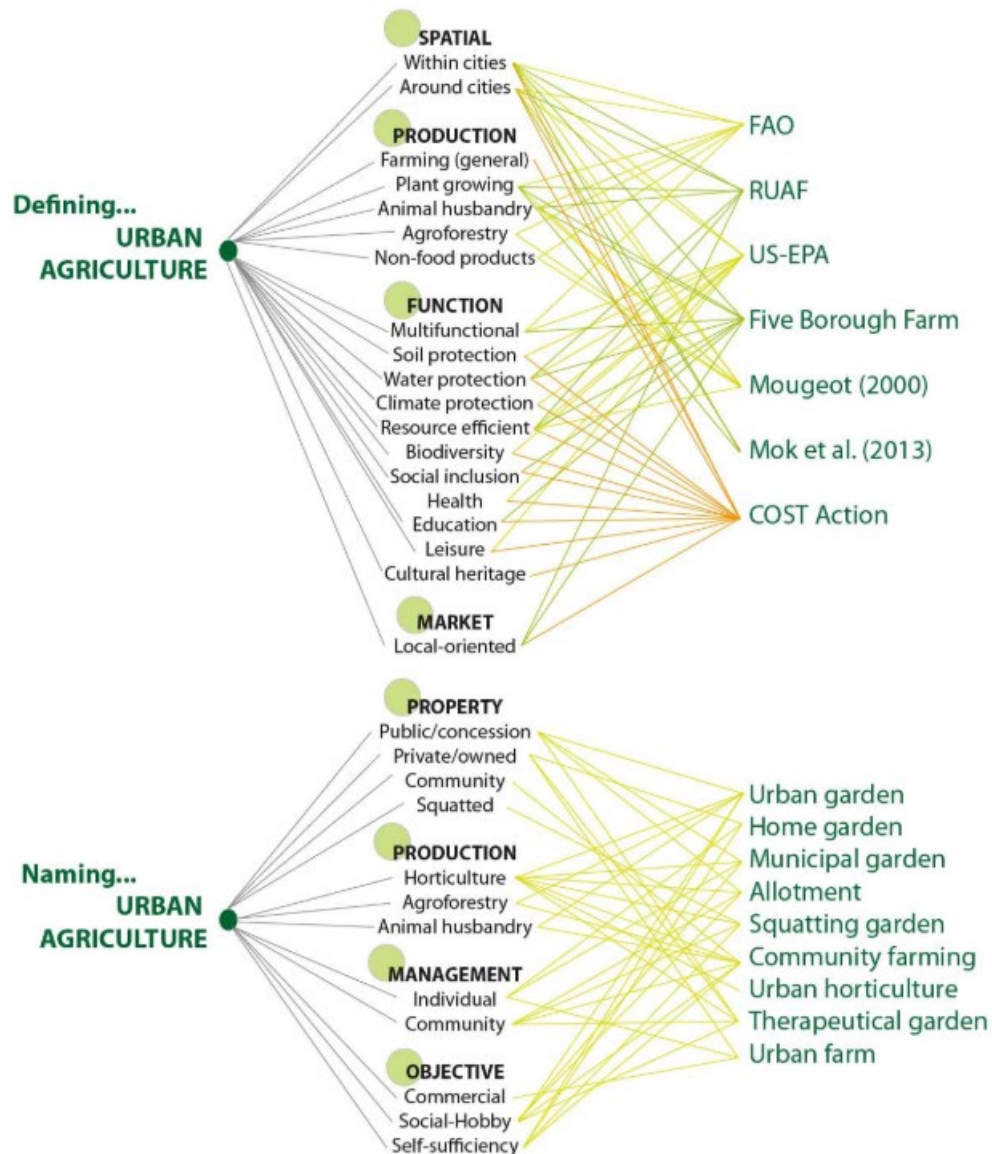


Figure 2: Spectrum of Definitions and Interpretations of Urban Agriculture (Sanyé Mengual, 2015)

In addition to the definitions provided, this thesis contains other terms that are obtained by a publication from the European Forum on Urban Agriculture (EFUA) in 2022 and the book Urban Agriculture – Food, Jobs and Sustainable Cities by Smit, Nasr and Ratta (2001), as they cover the definition of the terms clearly and holistically.

Urban

The term "urban" broadly refers to the entire region where a city's social, ecological and economic impacts are directly experienced by its inhabitants. Defining the boundaries of a city's metropolitan agriculture zone is essential for understanding the farming systems present and their contributions to the urban food system, including food production, employment and sustainability (Smit, Nasr and Ratta,2001). This analysis aims to provide inspiration and guidance for municipalities; therefore, the precise spatial delineation and detailed definition of an urban area are considered secondary.

Agriculture

Agriculture encompasses a wide array of practices, including horticulture, aquaculture, arboriculture, poultry farming and animal husbandry. It extends beyond mere food production to include pre-production, post-production and waste recycling processes. Additionally, agriculture involves the production of various non-food products such as fuel, wood for multiple purposes and animal feed. The term "farmer" applies to individuals engaged in agricultural activities on a full-time basis as well as those participating part-time or recreationally (Smit, Nasr and Ratta, 2001).

UA-related Activities

Activities related to growing, processing and distributing food within urban or peri-urban areas (European Forum on Urban Agriculture, 2022b).

Food System

The food system includes all stages involved in the production, processing, distribution and consumption of food. This covers agricultural production, food processing and packaging, transportation, retailing and waste management (European Forum on Urban Agriculture, 2022b)

Sustainability

Sustainability is the principle of fulfilling present needs without hindering future generations' ability to meet their needs. In the context of UA and planning, it encompasses environmental, social and economic considerations (European Forum on Urban Agriculture, 2022b).

Urban Planning

Urban planning refers to the process of designing and organizing the physical layout of urban areas. This includes land use planning, transportation systems, infrastructure development and environmental management to ensure cities are sustainable and livable (European Forum on Urban Agriculture, 2022b).

Urban Development

Urban development involves the strategic planning and execution of projects and policies aimed at shaping the physical, social and economic landscape of urban areas. It encompasses land use planning, infrastructure projects and environmental management to promote sustainable and inclusive urban growth (European Forum on Urban Agriculture, 2022b).

Urban Food Strategies

The term "urban food strategy" encompasses a variety of approaches that outline how municipalities envision the future of their food systems and the steps they intend to take to realize these visions. These strategies often aim to promote "health and well-being" and "environmental protection," along with other goals that are directly or indirectly associated with supporting a plant-based diet (European Forum on Urban Agriculture, 2022b).

Urban Food Policies

Urban food policies are deliberate initiatives by city governments to tackle food-related challenges. These policies often emerge with substantial input from civil society. Integrated food policies address multiple food system challenges and typically require

coordination across several government departments. In contrast, single-issue policies focus on specific objectives, such as reducing food waste or improving public health. While urban food policies play a crucial role in food system change, many issues, such as trade, economic, agricultural and public health policies, extend beyond the city level and require broader governance frameworks (IPES-Food, 2017).

Policy

Policy consists of a set of rules, guidelines and regulations established by governments or organizations to tackle specific issues or achieve certain objectives. In UA this might include zoning laws, incentives for urban farming and measures to support local food systems (European Forum on Urban Agriculture, 2022b).

Policy Instrument

A policy instrument is any mechanism used by governing bodies, such as the European Commission, to attain specific goals. This can include strategies, action plans and funding initiatives (European Forum on Urban Agriculture, 2022b).

Community Engagement

Community engagement involves the active participation of residents, stakeholders and organizations in planning and decision-making processes affecting their communities. In UA, this might involve participatory planning, cooperative gardening projects and community-supported agriculture programs (European Forum on Urban Agriculture, 2022b).

Bottom-up initiatives in UA originate from grassroots movements, community groups, or individual efforts. Residents or small organizations often initiate them with a focus on community building, local food production and social or environmental sustainability. Top-down initiatives in UA are typically initiated and managed by governmental bodies, corporations, or large organizations. These projects tend to be more structured and may be part of broader urban planning or sustainability strategies (Casazza and Pianigiani, 2016).

2.3 Decoding Urban Agriculture

2.3.1 Underrepresentation of Urban Agriculture Activities in Urban Development

Municipal sustainability initiatives have traditionally concentrated on other topics, like energy and mobility, often overlooking the substantial environmental impact of food systems (Pothukuchi and Kaufman, 1999). The supply of food to municipalities is predominantly perceived as being secured through trade and logistics as well as technological advances (Pothukuchi and Kaufman, 1999). Concurrently, the range of municipal policy tools appears to be limited to spatial planning issues related to the location of (food) retail businesses and the awarding of contracts within the framework of public procurement. Additionally, most citizens view nutrition as a "private" matter, in which "state" actors should not interfere (Schanz *et al.*, 2020). Although sustainability reports occasionally address food indirectly, there remains significant potential to reduce the ecological footprint by focusing on food systems. Municipalities committed to sustainability and the Sustainable Development Goals of the United Nations must therefore engage with their food systems. A thorough engagement with municipal food systems is essential for the sustainable development and revitalization of cities and communities, given that food intersects with numerous municipal policy areas (Pothukuchi and Kaufman, 1999).

The aspiration for self-sufficiency in food supply emerged in various regions many years ago (Figure 3). For instance, in Germany, publications such as 'Everyman Self-sufficient: A Solution to Settlement Issues Through New Gardens' in 1918 and 'The Green Manifesto' in 1919 advocated for urban gardening models that enabled families to cultivate their food (de la Cal, 2018). UA has been practised since the early 1920s, but for a long time, it was only applied with the idea of food utilisation in mind (Figure 3). With growing environmental awareness and increasing technologization of agriculture, activities for community building and ecological protection grew. The concept of Continuous Productive Urban Landscape (CPUL) emerged later, integrating UA directly into urban space planning (Viljoen and Bohn, 2009). Consequently, UA should be viewed as a critical component of sustainable urban infrastructure planning.

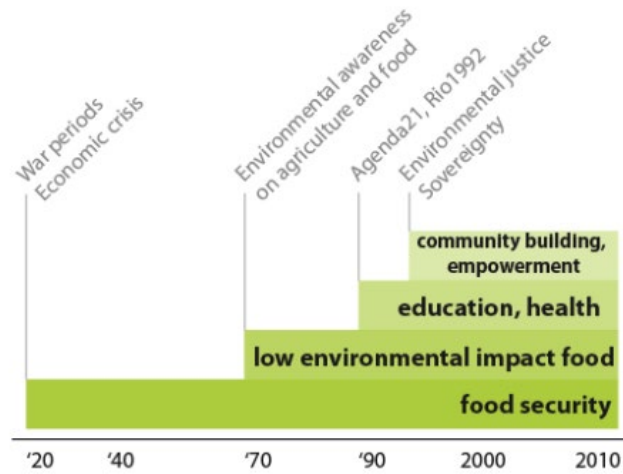


Figure 3: Urban Agriculture and Corresponding Intentions throughout the Last Century (Sanye Mengual, 2015)

2.3.2 Classification

UA is mostly found in densely populated city areas, with community gardens, school gardens and rooftop gardens typically close to where people live. Peri-urban agriculture (PUA) is located on the edges of cities (Figure 4). These areas used to be outside the city but have become part of the urban fringe due to city expansion. The placement of UA and PUA varies depending on regional factors, making their boundaries less clear-cut (Opitz *et al.*, 2016).

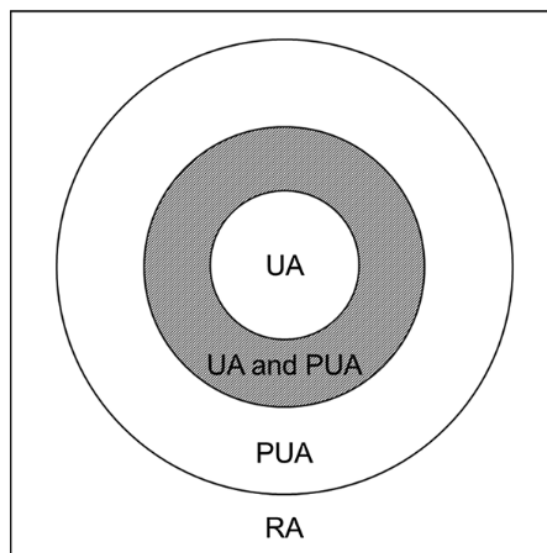


Figure 4: Classification of Urban Agricultural Types according to Opitz *et al.* (2016)

Dietl (2015) distinguishes between ground-based and building-based agriculture. Whereas the majority of ground-based crop production is accomplished in peri-urban

areas, the building-based methods only occur in densely populated urban areas (Dietl, 2020) (Figure 5).

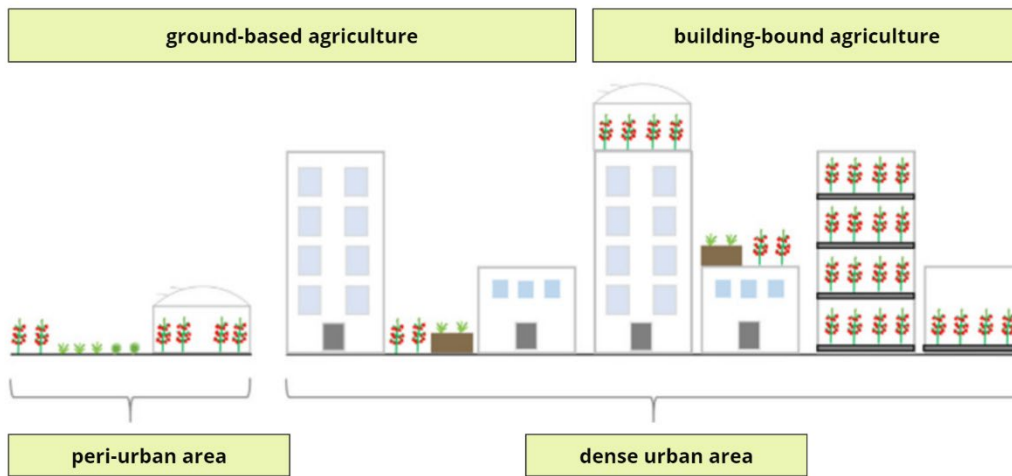


Figure 5: Classification of Urban Agricultural Types according to and translated from Dietl (2020)

To facilitate a nuanced understanding and to ensure municipalities adopt a comprehensive approach to supporting UA, this master's thesis will delineate its analysis into three distinct categories (Figure 6). By doing so, it aims to provide a structured framework that captures the complexity of UA activities.

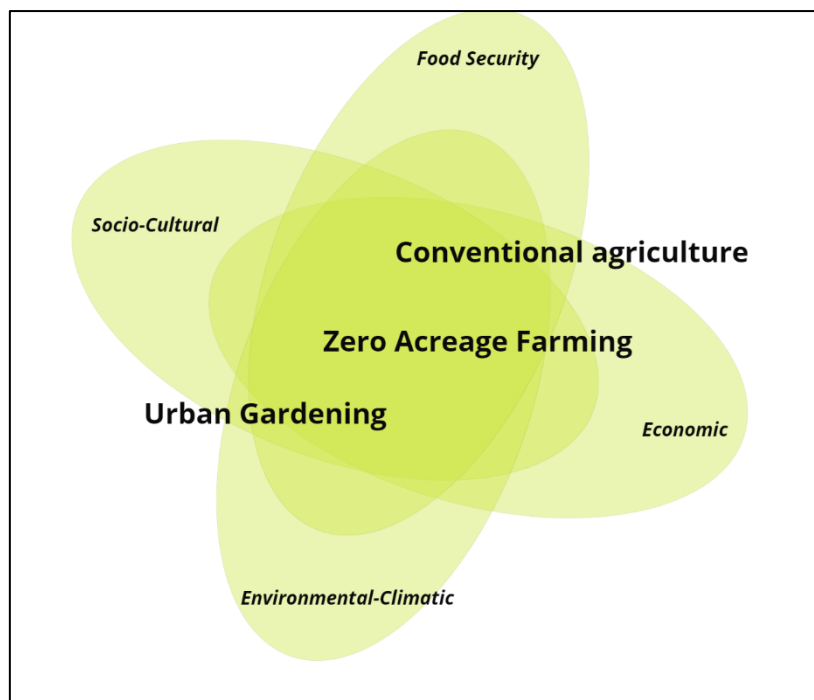


Figure 6: Mapping Categorised Agricultural Methods according to their Drivers (Own Representation)

2.3.2.1 Zero Acreage Farming

The first category, zero acreage farming, encompasses innovative techniques such as vertical farming and aquaponics. These methods are characterized by their ability to produce food without relying on traditional farmland (Figure 7), often utilizing advanced technologies to optimize space and resource efficiency (Sanyé Mengual, 2015).

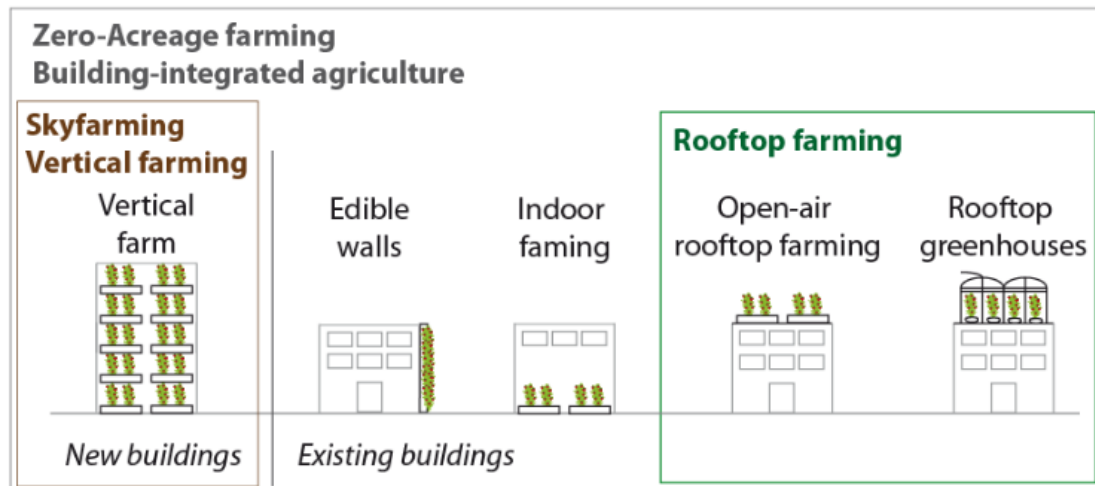


Figure 7: Further Differentiation of Zero-Acreage Farming (Sanyé Mengual, 2015)

2.3.2.2 Agriculture in Peri-Urban Areas

The second category, conventional agriculture in urban and peri-urban areas, includes traditional farming practices adapted to the urban context. This form of agriculture often occupies larger tracts of land on the outskirts of cities and integrates standard agricultural techniques to meet urban food demands (Opitz *et al.*, 2016).

2.3.2.3 Urban Gardening

The third category, urban gardening, involves smaller-scale, community-focused initiatives such as community gardens, allotment gardens and community-supported agriculture. These projects not only contribute to local food supply but also enhance community engagement and urban green spaces. By categorizing UA activities in this manner, local authorities can more effectively develop targeted policies and urban

planning strategies that support the diverse forms of UA and their unique contributions to sustainable urban development (Cunk and Straus, 2017)

2.3.3 Benefits

UA presents a multitude of benefits across sociocultural, health and well-being, environmental, food security and economic dimensions (European Forum on Urban Agriculture, 2022a). Initial research highlighted its role in enhancing food security, community cohesion and economic opportunities in cities. Urban farming addresses food deserts by providing fresh, nutritious produce, thereby improving public health. It also promotes social cohesion as community members engage in shared gardening activities. Economically, UA creates job opportunities and supplemental income, particularly for marginalized groups (Reiß, Seifert and Artmann, 2024). Additionally, it supports environmental sustainability by reducing greenhouse gas emissions, improving air and water quality and mitigating urban heat island effects. Practices like composting and rainwater harvesting enhance ecological resilience and biodiversity (Dietl, 2020). Numerous successful initiatives, such as Cincinnati's food waste reduction and São Paulo's composting programs, demonstrate the practical benefits of UA (ICLEI - Local Governments for Sustainability, 2021). Consequently, it is no surprise that UA features prominently in the EU's agenda (Figure 8), with many ongoing research projects and activities exploring its potential (European Union, 2023). Therefore, this thesis will not focus on the benefits but rather on challenges and mechanisms to overcome those.

Website	Project	CORDIS
DECISIVE	A DECentralized management Scheme for Innovative Valorization of urban biowaste	689229
ROBUST	Rural-Urban Outlooks: Unlocking Synergies	727988
SKIN	Short supply chain Knowledge and Innovation Network	728055
INFARM	The vertical farming revolution, urban Farming as a Service	739479
SMARTCHAIN	Towards Innovation - driven and smart solutions in short food supply chains	773785
SIEUGreen	Sino-European innovative green and smart cities	774233
EdiCitNet	Edible Cities Network Integrating Edible City Solutions for social resilient and sustainably productive cities	776665
FOX	Innovative down-scaled FOod processing in a boX	817683
SHEALTHY	Non-Thermal physical technologies to preserve healthiness of fresh and minimally processed fruit and vegetables	817936
WaysTUP!	Value chains for disruptive transformation of urban biowaste into biobased products in the city context	818308
VALUEWASTE,	Unlocking new VALUE from urban bioWASTE	818312
CLEARING HOUSE	Collaborative Learning in Research, Information-sharing and Governance on How Urban tree-based solutions support Sino-European urban futures	821242
PROTEAN	Prospective Environmental Assessment of Urban Agriculture Emerging-Systems	842460
FoodShift2030	Food System Hubs Innovating towards Fast Transition by 2030	862716
CONEXUS	CO-producing Nature-based solutions and restored Ecosystems: transdisciplinary neXus for Urban Sustainability	867564
WIDER UPTAKE	Achieving wider uptake of water-smart solutions	869283
CITIES2030	Co-creating resilient and susTainable food systEmS towardS FOOD2030	101000640
EFUA	European Forum for a Comprehensive Vision on Urban Agriculture	101000681
Fusilli	Fostering the Urban food System Transformation through Innovative Living Labs Implementation	101000717
FOOD TRAILS	Building pathways towards FOOD 2030-led urban food policies	101000812
URBANE	One Health approaches to support agroecological transformation of peri-urban farming	101059232
FOODCLIC	integrated urban FOOD policies	101060717
INCITIS-FOOD	INtegrated and Circular Technologies for Sustainable city region FOOD systems in Africa	101083790
AWARE	Aquaonics from WAstewater REclamation	101084245
AfriFOOD-Links	Transforming Africa's urban food environments through strengthening linkages between food customs stakeholders in cities	101084322

Figure 8: Overview of Urban Agriculture Research Projects led by the EU (European Union, 2023)

2.3.4 Barriers and Strategies

UA, while offering numerous benefits, confronts a range of challenges, such as regulatory hurdles, land tenure complexities and restricted access to resources and infrastructure (Dietl, 2020). Dresden and Glasgow, the two case studies of this thesis have already made efforts to identify and address the challenges for UA activities. Dresden has published a comprehensive document on the edible city (Croy *et al.*, 2022) - "Stumbling blocks on the way to the city of the future? - Driving and braking factors in the realisation of initiatives for edible public urban greenery" and Glasgow, in the position of Roots to Market, has produced comprehensive openings in the area of needs and future challenges (Glasgow Community Food Network and Propagate, 2018)

One major issue is that urban farming exists in organizational and structural intermediate spaces within city councils, lacking a clear place in the urban administrative framework. Additionally, UA intersects with numerous policy areas,

such as land use, health, education and economic development, but it is not fully integrated into the implementation measures of any of these domains. This lack of cohesive policy support and clear organizational placement can hinder the development and sustainability of UA projects, as they struggle to secure necessary resources and recognition within the broader urban planning and policy framework (European Forum on Urban Agriculture, 2024a).

To address these issues, policymakers, activists and grassroots organizations have pushed for the creation of supportive policy frameworks and planning strategies (Figure 9) aimed at integrating UA into urban development processes (ICLEI - Local Governments for Sustainability, 2021). Cities worldwide have implemented innovative policies and programs to foster urban farming initiatives. These include zoning regulations that permit agricultural activities in urban areas, incentives for rooftop and community gardens and financial support for urban farming startups (Hardman, Clark and Sherriff, 2022). Additionally, the formation of food policy councils and UA networks has promoted collaboration among government agencies, community organizations and residents, leading to the development of comprehensive strategies for advancing UA and enhancing food security (Ilieva, 2017).

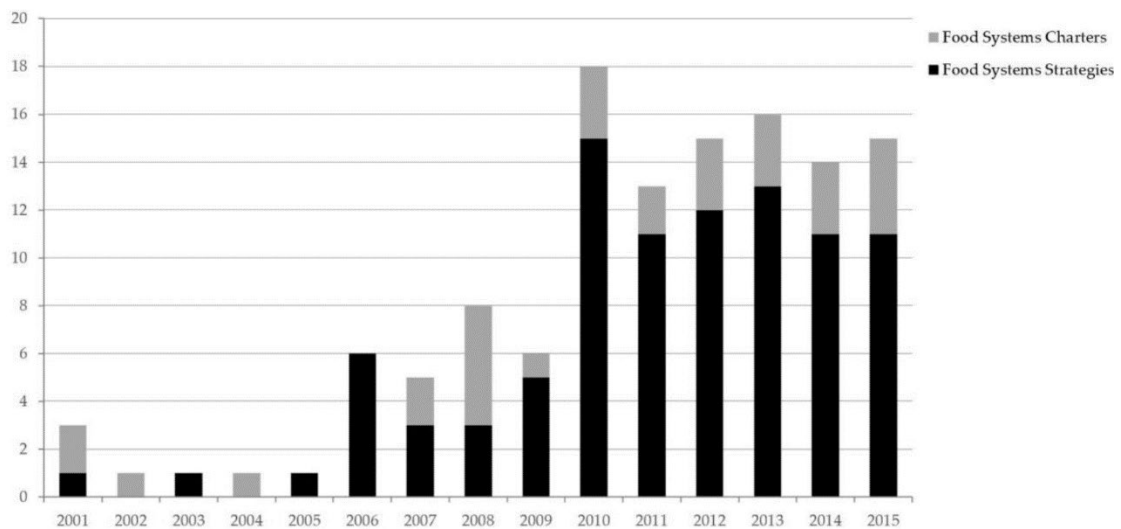


Figure 9: Food Systems Charters and Strategies in Developed Countries (Ilieva, 2017)

To ensure a sense of permanence and security for successful UA projects, fostering a supportive policy environment and continuing the shift from ‘municipal hindered’ to ‘municipal enabled’ practices is essential (European Forum on Urban Agriculture,

2024b). When local politicians and policymakers recognize the value of UA, they can bridge gaps by connecting grassroots stakeholders with government entities concerned with sustainable cities, food security and climate change. Such collective action can significantly contribute to transforming the food system (White and Bunn, 2017).

2.3.5 Toolkits, Manuals and Handbooks

Four toolkits were identified to support and enable UA activities in cities. Food for the Planet focuses on the UK, emphasizing greenhouse gas reduction with its "Every Mouthful Counts" toolkit for local authorities (Food for the planet, no date). The ICLEI Practitioner's Handbook takes a comprehensive approach, addressing the entire food system with examples from around the world, guiding cities in integrating sustainable food practices into their urban environments (ICLEI - Local Governments for Sustainability, 2021). The solution proposed by the INTERREG book "Approaching Urban Agriculture as a Social Innovation" provides guidelines for developing and implementing actions that enhance the ability of public administrators to engage relevant stakeholders and civil society in governance and public participation through UA (Cunk and Straus, 2017). The Milan Urban Food Policy Network clustered 37 measures into 6 categories of which one examines food growing (Milan Urban Food Policy Pact, 2024). In addition to these four toolkits, there is a draft paper from Sustain, published in 2021, which describes the role of the food council in growing food and guides through the support options (Sustain, 2021). These efforts by higher institutions are a helpful guide to support municipalities in promoting UA, but they always refer to a larger geographical area, which lacks the concreteness for example of legal measures. Some manuals focus on a specific issue of UA, such as Food for the Planet's approach to greenhouse gas emissions, which somewhat obscures other aspects.

2.3.6 Limitations

While offering valuable insights into UA, this thesis encounters certain limitations inherent to its scope. As described before this thesis divides UA into three categories zero-acreage farming, PUA and urban gardening. Even though the aspiration is to

picture holistically urban crop growing, some components of this thesis only cover parts of these three categories. The demarcation of different landforms may pose challenges in providing a comprehensive overview, while the exclusion of private gardening due to limited local authority jurisdiction may result in gaps in the analysis (Opitz *et al.*, 2016). It must be made clear that food production can only be one part of municipal food strategies and therefore cannot be seen in isolation from processing, distribution and recycling processes. The focus is on methodical crop growing rather than on other processes related to UA activities. Additionally, the focus on European climatic and societal contexts may limit the generalizability of findings to other regions. Geography becomes a major limitation, especially in the legal system, as even in Europe countries have different regulations and guidelines regarding land declaration, community forms, urban farming methods and certifications, for example for organic products. Interpretation differences among researchers and stakeholders may influence the application and understanding of the presented findings (Sanyé Mengual, 2015). Moreover, the continuous evolution of society and technologies necessitates an acknowledgment of the dynamic nature of UA and its future trajectories. Finally, the broad nature of the topic and potential generalizations may lead to incompleteness, urging further research to explore nuanced aspects of UA comprehensively. These limitations highlight the complexity of the subject and emphasize the importance of cautious interpretation and continued inquiry.

2.4 Research Gaps

Western societies are shifting from efficiency-orientated, pre-cooked meal consumers to more purpose-orientated lifestyles. Environmental awareness is trending. Therefore, the potential of emphasizing UA in local authorities with evolved technological and ecological knowledge and the ongoing societal change needs to be discussed (Adams, Larkham and Hardman, 2023).

While existing research has offered valuable insights into the social, economic and environmental aspects of UA many papers propose further research on the “complexity of local UA practice, while also considering the regional and national context for UA” (White and Bunn, 2017), or using mapping technologies like GIS (Russell, Li and

Wang, 2023). Significant gaps remain in understanding the integration of UA activities into broader urban development planning processes (Cunk and Straus, 2017 and White and Bunn, 2017). Firstly, a more detailed understanding of the systemic barriers and challenges that hinder the integration of UA into urban development frameworks is needed. Although some studies have identified regulatory barriers and land use conflicts as key issues, there has been little focus on the underlying political, economic and social factors that influence urban development policies and practices (Tapia *et al.*, 2021). Secondly, comprehensive research on the strategies and approaches cities can adopt to promote the integration of UA into urban development planning is lacking. The need for bridging practical know-how and scientific evidence is stated by the European Forum on Urban Agriculture (2024b). Lastly, there is a scarcity of research on sharing and multiplying the respective solving mechanisms to overcome structural challenges as the identified toolkits either focus on a specific region or on the whole food system, lacking focus on food growing support mechanisms. These three points lead to the creation of the following research gaps (Table 1).

Table 1: Identified Research Gaps

1	What variance in policies and activities exist towards UA at various levels of governance in Dresden and Glasgow and how do the activities enhance social and environmental conditions in urban areas?
2	What are the systemic barriers and challenges of UA as part of the food system in urban development planning processes?
3	What supporting mechanisms from existing levers and policies in Dresden and Glasgow can improve the development of conditions for initiating, supporting and enabling UA in other cities?
4	How can the findings of the study be translated into practical tools and guidance for urban planning departments to better integrate UA into urban development planning processes in cities across Europe with similar climatic and cultural conditions?

This study seeks to fill existing knowledge gaps and pinpoint research priorities, with the aim of enhancing the understanding of how UA can be integrated into urban planning frameworks to foster sustainable urban development.

3. METHODOLOGICAL APPROACH

This thesis adopts a mixed-methods research approach to ensure a comprehensive analysis of UA policies in Glasgow and Dresden. Glasgow and Dresden were chosen as case studies as they are part of the master's in Urban Climate and Sustainability program and already have established mechanisms to facilitate and support UA. Glasgow has implemented a City Food Plan and a Food Growing Strategy. Furthermore, there is no language barrier due to the bilingualism of the author and connections to the respective city administrations existed through the author's two supervisors. The mixed methods approach allows for triangulation of data from different sources, providing a more robust understanding of the topic. Qualitative methods such as document analysis and stakeholder interviews offer insights into policy development, implementation and stakeholder perspectives, while quantitative methods enable data synthesis and evaluating results.

Figure 10 represents the structure of the different tasks and their respective methodological approach. These will be further described in the following.

Structure and Methodology






Research Questions	<i>What variance in policies and activities exist towards urban agriculture at various levels of governance in Dresden and Glasgow, and how do they enhance social and environmental conditions in urban areas?</i>	<i>What are the systemic barriers and challenges of urban agriculture as part of the food system in urban development planning processes?</i>	<i>What are the best practices and lessons learned from existing urban agriculture activities and policies in Dresden and Glasgow, and how can they improve the development of strategies for initiating, supporting, and enabling urban agriculture in other cities?</i>	<i>How can the findings of the study be translated into practical tools and guidance for urban planning departments to better integrate urban agriculture into urban development planning processes in cities across Europe with similar climatic and cultural conditions?</i>	
Methodological Approach	Literature Review, Interviews and Survey	Document Review (Municipal Strategies), Interviews and Survey	Literature Review, Interviews and Survey	Document Analysis (Municipal Strategies), Findings from Interviews and Survey	
Superior Question	Why Urban Agriculture?	What is the current situation like?	What keeps us from Urban Agriculture?	How do we enhance urban agricultural activities?	
Topic	 Benefits	 Status quo	 Barriers (Conflicts and Restrictions)	 Solutions and Strategies	 Leaflet

Figure 10: Structure of the Methodology

3.1 Data Collection Methods

1. **Document and Desk Research:** Conduct comprehensive desk research to identify key stakeholders and organizations involved in UA initiatives in both Dresden and Glasgow. This involves existing literature, policy documents, organizational websites and stakeholder lists.
2. **Framework Mapping:** Develop framework maps to visually represent the relationships between different institutions, strategies and concepts and their levels of influence, interests and connections within the UA ecosystem. The framework helps to identify relevant interview partners.
3. **Stakeholder Consultation:** Consult with stakeholders in the field of UA, local government officials, community leaders, academia and network institutions to gather insights and recommendations. Utilize snowball sampling techniques to identify additional stakeholders through referrals and recommendations from initial interviewees, ensuring a broad and diverse representation of stakeholders in the study.

4. **Survey Conduction:**

Conduct a survey focused on community gardens, which have been identified as key areas where social and environmental benefits converge. Due to limited time, the survey was restricted to this UA method, though a holistic approach encompassing other forms, such as PUA or zero-acreage farming, could be explored in future studies. The survey examined fundamental elements such as land, funding, community involvement and legal matters. Results regarding barriers and needs from the survey were integrated with findings from interviews, contributing to a comprehensive analysis of UA's challenges and requirements.

3.1.1 Document and Desk Research

Based on the extensive literature review, five categories are established, that are relevant for the subsequent elaboration of the master's thesis (Table 2).

Elaboration of relevant topic blocks for UA research:

Table 2: Structure of different relevant Categories

I Legal matters and Economy

1. Legal categorisation	a) Ownership
	b) Form of organisation
	c) Requirements
2. Economic viability	a) Financial matters
	b) Regional and local value creation
	c) Economic goals

II Benefits and Resources

1. Benefits	a) General
	b) Side benefits
	c) Leisure and Activity
	d) Urban Greening
	e) Microclimate
	f) Biodiversity
2. Ressources	a) Agricultural method
	b) Use of resources
	c) Soil and water
	d) Energy

III Spatial Aspects

1. Use of space	a) Land access
	b) Type
	c) Planning system and space utilisation decisions
2. Infrastructure	a) Distribution
	b) Transportation

IV Community components

1. Stakeholders	a) Main actors
	b) Participation
2. Network and Interactions	a) Social contribution
	b) Educational purpose
	c) Connection between consumer and producer
	d) Accessibility
	e) Network

V Challenges and Levers

1. Challenges	a) Funding Access
	b) Land Access
	c) Future Viability
2. Levers	a) Financial support
	b) Materialistic support
	c) Public Awareness

Subsequently, a systematic review of official documents, reports and policy publications related to UA in Glasgow and Dresden was conducted. This will involve a thorough examination of policy objectives, regulatory frameworks, funding mechanisms and monitoring and evaluation strategies related to UA in Glasgow.

3.1.2 Stakeholder Interviews

A conceptual framework was developed to outline the overarching conditions of UA in Glasgow and Dresden, providing a framework for the study. To ensure a comprehensive understanding of UA activities, stakeholders from various sectors including local councils, networks, associations, research and initiatives were purposefully sampled using maximum variation sampling. Semi-structured interviews were then conducted with these stakeholders to delve into their perspectives on UA policies, implementation challenges, successes and areas for improvement. The majority of interviews were audio-recorded and coded to facilitate thorough analysis.

The interview partners were chosen after a first establishment of the framework of both cities. Therefore, important stakeholders were identified according to the following criteria:

Relevance: Stakeholders should have a direct interest or involvement in UA policies and initiatives.

Influence: Stakeholders should have the potential to affect or be affected by UA policies and decisions.

Expertise: Stakeholders should possess relevant knowledge, expertise, or experience in areas related to UA, such as urban planning, food systems, sustainability, or community development.

Representation: Stakeholders should represent diverse perspectives, including government agencies, community organizations, academia and the private sector, to ensure a comprehensive understanding of UA issues.

Engagement: Stakeholders should demonstrate a willingness and capacity to actively participate in stakeholder engagement processes, such as interviews or focus groups.

Tables 3, 4, 5 and 6 represent the contacted players which are referenced by the ID in square brackets in the following chapters.

Table 3: Interview Partners Dresden

ID	Name	Related Field	Association	Date and duration
1	Frank Hoffmann	Allotment Association	Chairman Dresdner GartenFreunde	29.05.2024 (41 min)

2	Juliane Dziomla	Research (Vertical Farming)	United Nations University	24.05.2024 (44 min)
3	Franziska Krone	Community Gardening (Vertical Farming)	Wolkenfarm e.V	30.05.2024 (40 min)
4	Susanne Lämmel	Community Gardening	ANNALINDE gGmbH (based in Leipzig, collaboration with community gardens in Dresden)	05.05.2024 (35 min)
5	Anke Hahn	City Council	OLGA	07.06.2024 (35 min)
6	Amrei Zürn	Community Gardening	UFER	11.06.2024 (30 min)
7	Stephan Viertel	City Council	Office for Urban Greenery and Waste Management	17.06.2024 (35 min)
8	Claudia Petersen	Food Council	Project Lead Food Council and Edible City	24.06.2024

Table 4: Interview Partners Glasgow

ID	Name	Related Field	Association	Date and duration
9	Alexander Paterson	City Council	Greenspace and Biodiversity Department	09.05.2024 (45 min)
10	Ebany Dohle and Chris	Network Institution	Glasgow Community Food Network	14.06.2024 (50 min)
11	-	Network Institution	Propagate	No response
12	-	Allotment Association	Allotment Forum	No response
13	Selina Boyack	Community Gardening	Urban Roots	No availability
14	-	Research	Sustain	No availability

Table 5: Further online Interviews

ID	Name	Country	Related Field	Association
16	Malm Nordlund	Finland	Community Gardens	DODO
17	Ulrich Dilger	Germany	City Council	Urban Planning Department

Table 6: Further written Interviews

ID	Name	Country	Related Field	Association
18	-	Spain	Community Gardening	El Caminito
19	Carlos Maria Weiland Ardaiz and Antonio Santos Rufo	Spain	Academia	Universidad de Huelva

A catalog of questions orientated by Table 2 was drawn up at the beginning (Appendix 1). Each interview was prepared in advance regarding the interviewee's background and expertise. The questions placed in the interview were adapted, expanded and supplemented.

3.1.3 Survey Conduction

Given the diversity in funding, land access and legal aspects among Community Gardens, a survey was conducted to explore these fundamental elements of crop growing in more detail. Network institutions were consulted for information and to provide an overview of existing initiatives. In Dresden, a city-specific list provided by the City Council was utilized in combination with web research, while in Glasgow, the Glasgow Community Food Network (GCFN) expressed interest in the results and helped disseminate the survey among its members.

The survey was divided into four sections: Organizational Matters (funding, community structure, land legal matters, volunteers), Benefits (types and importance of benefits), Barriers & Challenges and Wishes & Needs.

In Dresden, five community gardens responded and in Glasgow, three responses were received. The survey questions were informed by desk research results and some

interview outcomes. To categorise the benefits the Leaflet of the European Union EFUA (European Forum on Urban Agriculture, 2022a) was used as an orientation.

The following figure (11) visualises the data sources described in this chapter and what led to the respective outcomes of this thesis:

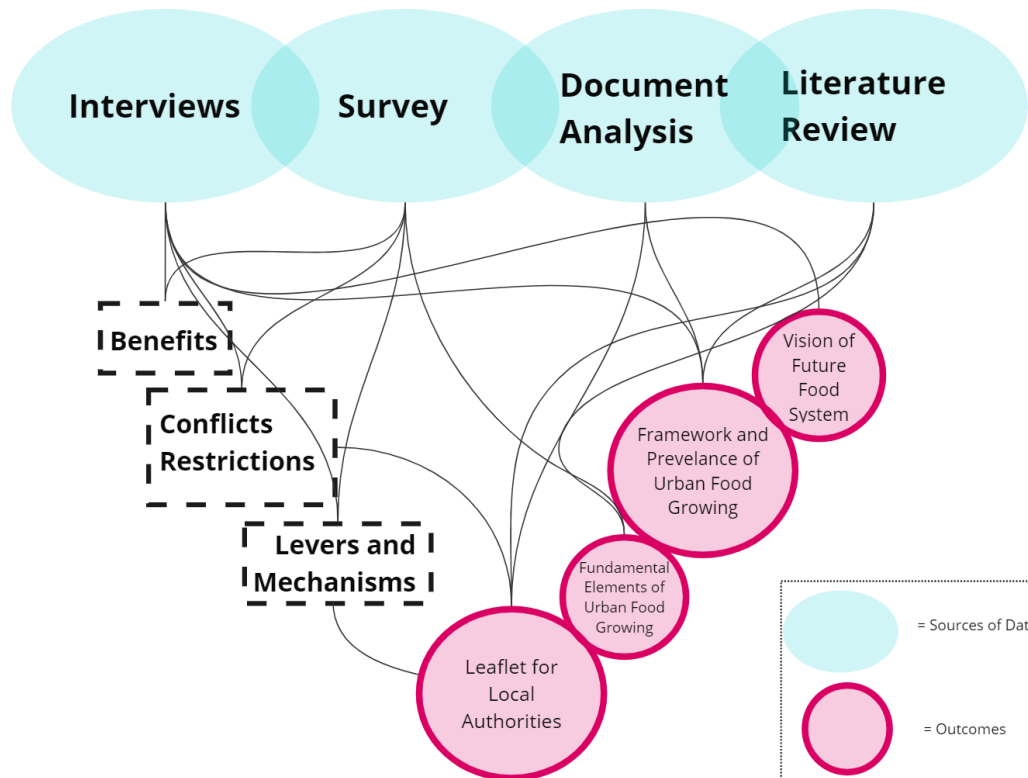


Figure 11: Process from Data Sources to Outcomes

3.2 Data Analyse Techniques

3.2.1 Qualitative Analysis

The qualitative analysis of the study employed thematic analysis and a systematic approach to code the data, identifying recurring themes, patterns and relationships. This process included pinpointing challenges and barriers for UA activities, as well as opportunities for improvement and effective strategies.

The interviews were conducted qualitatively, accommodating the availability of the interviewees and the circumstances of each interview. A qualitative approach was

chosen to capture the diverse forms of UA in as much detail as possible and to identify their specific characteristics. While standardized quantitative surveys with relevant stakeholders could reveal differences based on predetermined common characteristics, they would not uncover the exceptional features and relationships inherent in the diverse UA activities.

After the completion of each interview, the data were coded into the following categories:

- **Implemented and Proposed Levers:** Strategies and mechanisms supporting UA activities.
- **Barriers and Challenges:** Obstacles faced in the implementation and sustainability of UA.
- **Benefits and Potentials:** Positive outcomes and future possibilities of UA.
- **Perception of UA in the Respective City:** How UA is viewed and valued in each city.
- **Fundamental Elements of Food Growing:** Core components such as land, funding, community involvement and legal matters.

The first two categories, implemented and proposed levers and barriers and challenges, were organized into tables that included statements and quotations from the interviewees. These tables led to the final results presented in the appendix (A1 and A2), detailing the identified challenges and supportive mechanisms.

The outcomes related to the perception of UA were included in the broader analytical framework, helping to contextualize the findings within the unique urban environments of Dresden and Glasgow.

3.2.2 Quantitative Analysis

The quantitative analysis of this study involved two main approaches: content analysis of strategic documents and survey results analysis, aimed at exploring UA activities, policies and outcomes in Glasgow and Dresden.

Survey Results Analysis:

Survey results were utilized to examine the fundamental elements and benefits of UA activities in both cities. The data gathered from the surveys complemented the qualitative analysis, particularly in identifying challenges and mechanisms supporting UA (Appendix A1 and A2). By integrating survey data into tables alongside qualitative insights, a comprehensive overview of the barriers, supportive strategies, benefits and core elements of UA activities were achieved.

Document Analysis (Word Counts):

Document analysis involved counting words related to UA and related topics in the strategic documents of Glasgow and Dresden. This quantitative approach provided quantitative indicators of the extent to which UA is prioritized and integrated into city development strategies.

This combined quantitative analysis methodology enriched the study's findings by providing both qualitative depth and quantitative breadth, facilitating a comprehensive assessment of UA practices, policies and strategic orientations in urban environments

3.3 Ethical Considerations and Limitations

Ethical considerations were paramount throughout the research process. Informed consent was obtained from all participants before each interview, ensuring transparency and respect for participants' rights. The research adhered strictly to ethical guidelines and regulations set forth by the university, safeguarding the integrity and confidentiality of the study. However, certain limitations were encountered during the research:

Limited Survey Responses: While the survey garnered insights from 8 respondents, it does not fully represent the holistic view of community gardens in Dresden and Glasgow, where there are for example an estimated 20-30 such initiatives just in Dresden. Despite efforts, including multiple reminders by network institutions, response rates remained modest.

Unequal Interview Participation: There was an unequal number of interviewees between Dresden [8] and Glasgow [2] due to varying response rates and participant availability. Glasgow's lower interview count was offset by slightly longer interview durations and Glasgow's comprehensive Food Strategy and the established Glasgow Community Food Network, which provided extensive data and insights into UA activities.

Despite these limitations, the study's ethical foundation ensured rigorous data collection and analysis, contributing valuable insights into UA practices and policies in Dresden and Glasgow.

4 RESULTS

Figure 12, an enhancement of figure 11 displays how the outcomes are achieved by what methods. It includes the interim results that can be found in the appendix (A1 and A2)

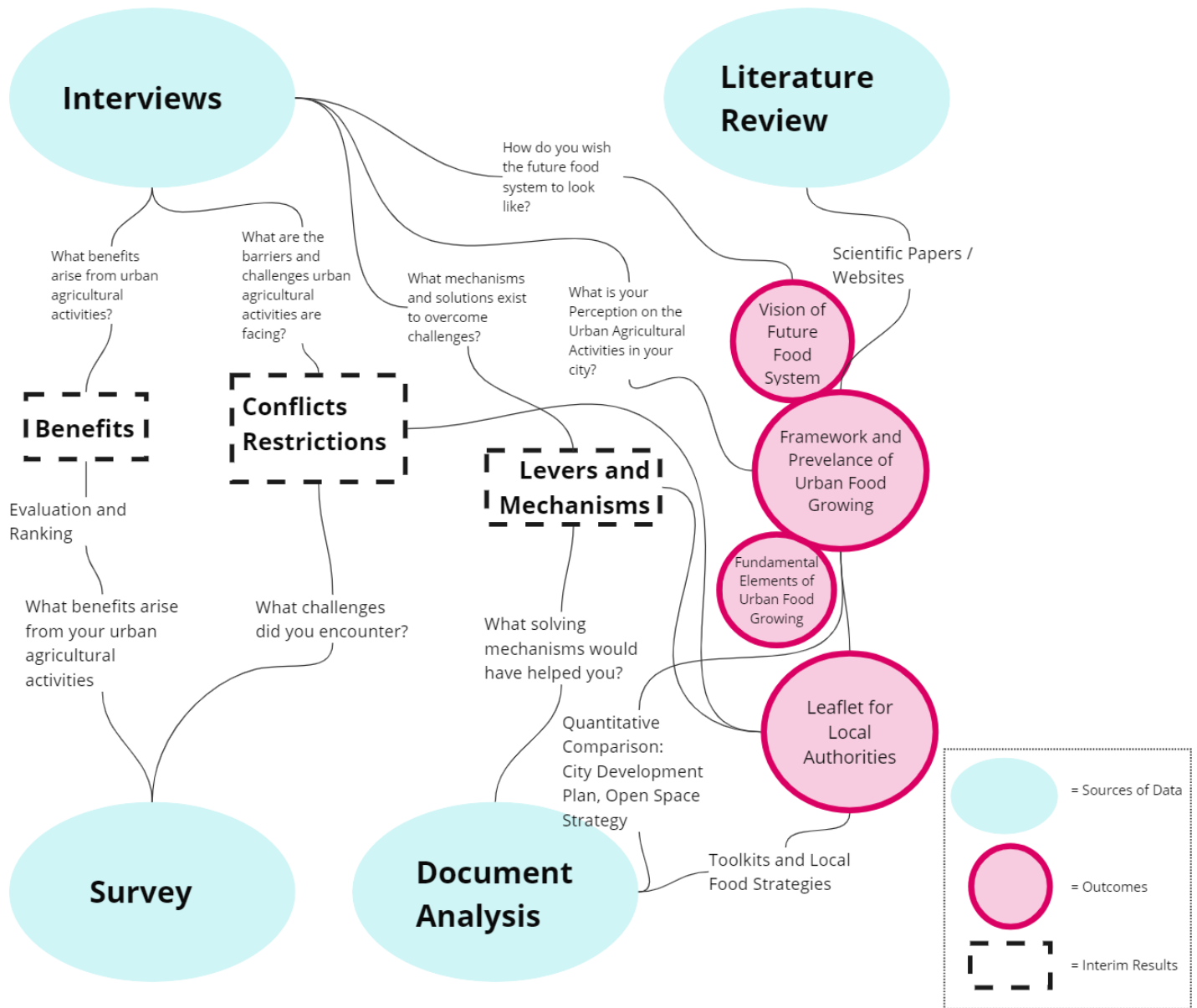


Figure 12: Detailed Workflow of Sources of Data, Outcomes and Interim Results

4.1 Framework of the Urban Agriculture Activities

As a result of the desktop analysis a framework including relevant institutions, concepts and methods was established, that displays the diverse and broad topic of UA as part of a regional food system. The overall frameworks of Dresden and Glasgow are visualised in the following figures 13 and 14 and individual items are further explained in tables 7, 8, 9, 10.

Framework Urban Agriculture Glasgow

Relevant Concepts	Subordinate Level	Milan Urban Food Policy Pact		Glasgow Food and Climate Declaration			
	National Level	Community Empowerment (Scotland) Act 2015		Land Reform (Scotland) Act 2016	Good Food Nation (Scotland) Act 2022		
	Local and Regional Level	Stalled Spaces	Glasgow City Food Plan Priorities 2023-2026		Open Space Strategy		
		Glasgow Food Growing Strategy 2020-2025		Glasgow Food and Climate Declaration		Parks and Greenspace Vision	
Most relevant Institutions	Glasgow Community Food Network		Glasgow City Council		Glasgow Food Policy Partnership		
Associations and Unions	Sustainable Food Places			Sustain		national level ↕ local level	
Networks	Urban Roots	South Seeds	Propagate		Locavore		
Methods	building bound	Allotment Gardens		Conventional Agriculture		ground based	
	dense urban area	Vertical Farming	Community Gardens	Community Supported Agriculture			Biological Agriculture
Schemes					Agroecological Agriculture		peri-urban area
	Zero-Acreage-Farming		Urban Gardening			Peri-Urban Agriculture	
	Predominantly Top-Down		Predominantly Bottom-Up			Predominantly Top-Down	
	Predominantly Economic drive		Predominantly Socio-Cultural and Environmental drive			Predominantly Economic drive	

Figure 13: Framework of Urban Agriculture Activities, Concepts, Policies and Institutions in Glasgow

Framework Urban Agriculture Dresden

Relevant Concepts	European Level	Farm to Fork Strategy	Food2030	Barcelona Declaration on Urban Agriculture	European Forum on Urban Agriculture	
	National Level	Nutrition Strategy Germany	White Paper "Municipalities shape nutrition"	Edible Cities	Position paper of the German Association of Cities	
	Local and Regional Level	Integrated Urban Development Concept		Biodiversity strategy	Allotment garden development concept	
Most relevant Institutions	Urban Planning Department	OLGA	Department for Urban Greenery and Waste Management	Food Council Dresden and Region		
Associations and Unions	Mundraub		Marktschwärmer	anstiftung		national level
Networks	Gartennetzwerk Dresden		UFER	Dresdener Gartenfreunde e.V	Verbrauchergemeinschaft	local level
Methods	building bound		Edible Public Urban Greenery	Allotment Gardens	Conventional Agriculture	ground based
	dense urban area	Vertical Farming	Community Gardens	Community Supported Agriculture	Biological Agriculture	peri urban area
Schemes		Zero-Acreage-Farming	Urban Gardening		Peri-Urban Agriculture	
		Predominantly Top-Down	Predominantly Bottom-Up		Predominantly Top-Down	
		Predominantly Economic drive	Predominantly Socio-Cultural and Environmental drive		Predominantly Economic drive	

Figure 14: Framework of Urban Agriculture Activities, Concepts, Policies and Institutions in Dresden

4.1.1 Glasgow

Table 7: Relevant Policies, Programmes and Concepts in Glasgow

Policy, Programme or Concept	Short Description
<i>Subordinate Level</i>	
Milan Urban Food Policy Pact	An international agreement initiated by Milan Municipality in 2015 to establish sustainable urban food systems (Milan Urban Food Policy Pact, 2024). Glasgow joined in the year 2019.
Glasgow Food and Climate Declaration	Presented during the United Nations Climate Change Conference 2021 (COP26) in Glasgow, it aims to influence global climate negotiations and promote sustainable food systems (Glasgow Food and Climate Declaration, 2024).
<i>National Level</i>	
Community Empowerment (Scotland) Act 2015	Advances land reform, allowing community bodies to acquire private land for sustainable development (Glasgow City Council, 2020a).
Land Reform (Scotland) Act 2016	Advances land reform, allowing community bodies to acquire private land for sustainable development (UK Government, 2024).
Good Food Nation (Scotland) Act 2022	Mandates Scottish Ministers, local authorities and health boards to develop Good Food Nation Plans (Government Scotland, 2024).
<i>Local Level</i>	

Glasgow Food Growing Strategy 2020-2025 (GFGS)	The Glasgow Food Growing Strategy 2020-2025 outlines initiatives to promote UA and emphasizes collaboration and community engagement to foster a resilient and inclusive food system within the city (Glasgow City Council, 2020a).
Glasgow City Food Plan (GCFP)	The Glasgow City Food Plan is a comprehensive 10-year initiative designed to establish Glasgow as a model for accessible, healthy and affordable food (Glasgow Food Policy Partnership, 2021).
Roots to Market Report 2018	"Roots to Market" is a flagship project supporting local growers and the Glasgow local food economy. Key recommendations include sustainable procurement strategies, integrating food production in city planning, creating a growers' cooperative and developing an online portal for local produce (Glasgow Community Food Network and Propagate, 2018).
Stalled Spaces	Stalled Spaces, launched by Glasgow City Council, supports community groups by enabling temporary projects on vacant or underutilized sites (Glasgow City Council, 2023).
Open Space Strategy	The Glasgow Open Space Strategy (OSS), adopted on 6 February 2020, aims to enhance the city's liveability, health and wellbeing and resilience (Glasgow City Council, 2020b).

Table 8: Relevant Players and Associations in Glasgow

Relevant Player or Association	Short Description
Local Level	

Glasgow City Council (GCC)	<p>Glasgow City Council (GCC) plays a pivotal role in the Glasgow Food Policy Partnership (GFPP), informing all relevant departments about GFPP's work. As a key member of the Glasgow City Food Plan team, GCC oversees and delivers the plan's actions through various working groups (Glasgow Food Policy Partnership, 2024).</p>
Glasgow Community Food Network (GCFN)	<p>Glasgow Community Food Network (GCFN) represents the collective voice of community food organizations, offering extensive expertise in community-led, resilient and healthy food systems (Glasgow Food Policy Partnership, 2024).</p>
Glasgow Food Policy Partnership (GFPP)	<p>The Glasgow Food Policy Partnership (GFPP) is a coalition of public, private and voluntary sector organizations focused on creating a fairer, healthier and more sustainable food system for Glasgow (Glasgow Food Policy Partnership, 2024).</p>
Glasgow Allotments Forum	<p>The Glasgow Allotments Forum is an independent voluntary organization supporting ploholders in Glasgow (Glasgow Allotments Forum, 2024).</p>
Network Communities Urban Gardening	<p>Urban Roots, South Seeds and Locavore are prominent community organizations in Glasgow dedicated to fostering sustainable food systems and environmental stewardship (Urban Roots, 2024; Locavore, 2024; Propagate, 2024).</p>
<i>Subordinate Level</i>	

Sustain	Sustain is a coalition of organisations and communities dedicated to improving food, farming and fishing systems through policy advocacy, network building for projects and campaigns, impactful advocacy efforts and engaging with governments and regulatory bodies to ensure accountable and sustainable practices (Sustain, 2024)
Sustainable Food Places	Sustainable Food Places (SFP) advocates for the establishment of inclusive cross-sector food partnerships involving public agencies, community organizations, businesses and academics (Sustainable Food Places, 2024).

4.1.2 Dresden

Table 9: Relevant Policies, Programmes and Concepts in Dresden

Policy, Programme or Concept	Short Description
-------------------------------------	--------------------------

<i>Subordinate Level</i>	
European Forum on Urban Agriculture (EFUA)	The European Forum on Urban Agriculture is a significant initiative within the broader European strategy to enhance UA. EFUA aims to unlock the potential of UA through improved networking, knowledge dissemination, deployment strategies and policy development. One of its key components, Work Package 5, focuses on shaping EU policies to fully harness the diverse functions and benefits of various UA types (European Forum on Urban Agriculture, 2022b).
FOOD2030 & Farm to Fork Strategy	Food2030 stands as a cornerstone of the EU's research and innovation (R&I) agenda, strategically crafted to propel the transformation of food systems. This holistic approach resonates with the farm-to-fork strategy advocating for science-informed, multi-actor governance mechanisms, instigates systemic frameworks for intervention and fortifies cities as hubs of innovation and catalysts for change (European Commission, Directorate-General for Research and Innovation <i>et al.</i> , 2023)
Barcelona Declaration	The Barcelona Declaration acknowledges UA's role as a driver of innovation and cultural enrichment within urban settings, urging heightened awareness and research efforts (European Cooperation in Science and Technology, 2013).
<i>National Level</i>	

Edible Cities	Edible cities can be regarded as a significant urban asset, encompassing any shared space within city and peri-urban areas that harbors naturally occurring edible plants and fungi (Reiß, Seifert and Artmann, 2024).
Federal Government's Nutrition Strategy	The German nutrition strategy released in 2024 aims to achieve a sustainable food policy (Bundesministerium für Ernährung und Landwirtschaft, 2024).
Whitepaper “Kommunen gestalten Ernährung” by the German Association of Towns and Municipalities	The whitepaper published by the German Association of Towns and Municipalities (Deutscher Städte und Gemeindebund) emphasizes the definition of concepts like urban food systems, stressing their vital role in bolstering community resilience and sustainability. Best practice examples underscore the effectiveness of these systems, such as urban farming and community-supported agriculture initiatives (Schanz <i>et al.</i> , 2020).
Position Statement “Urbane Landwirtschaft”	The German Association of Cities (Deutscher Städtetag) advocates for a range of measures to promote UA, highlighting its multifaceted benefits (Deutscher Städtetag, 2021).
Partnership Agreement Brazzaville	On November 16, 2021, Dresden and its partner town Brazzaville held a digital workshop to explore urban gardening and agriculture in their variety of approaches (Dresden City Council , 2022).
<i>Local Level</i>	

Web Presence	Dresden provides an overview of ongoing urban gardening activities to keep citizens informed about urban gardening opportunities (Dresden City Council, 2023a).
Integrated Urban Development Concept “Zukunft Dresden 2035+”	The Integrated Urban Development Concept "Zukunft Dresden 2035+" is the overarching strategy of the City of Dresden for managing urban development, aimed at the planning horizon of 2035 (Dresden City Council, 2022).
Biodiversity strategy	The brochure "Stadtnatur mit Perspektive" showcases the unique aspects of Dresden's urban nature and the city's numerous conservation activities (Dresden City Council, 2021).
Allotment garden development concept	Based on the Allotment Garden Development Concept, the interests of allotment gardeners are integrated into urban planning. The goal of the concept is to preserve all plots while also outlining the long-term development of the associations (Dresden City Council, 2023b).

Table 10: Relevant Players and Associations in Dresden

Relevant Player or Association	Short Description
<i>Local Level</i>	

<p>City Council</p>	<p>The Office for Urban Greenery and Waste Management is primarily responsible for UA activities in Dresden. The city supports community gardens, allotment gardens and cooperative agriculture, moderating between these entities to involve diverse groups. Furthermore, it engages in exchanges with the food council and organizes events like herbal walks to promote community engagement and education in UA [7].</p>
<p>Lokale Agenda & Nutrition Council</p>	<p>Lokale Agenda, funded by the city, addresses various sustainability topics, with a focus on nutrition since 2016. The Ernährungsrat, a network associated with Lokale Agenda, addresses various sustainability topics, with a focus on nutrition since 2016, has about 100 founding members and received its first part-time position in 2023 [7,8].</p>
<p>Network Communities Urban Gardening</p>	<p>Founded 12 years ago, UFER focuses on creating community gardens, promoting urban greenery and providing environmental education for children [6]. The network Gartennetzwerk Dresden of about 20 urban garden projects includes multi-generational, neighborhood and intercultural gardens, as well as solidarity farming and urban beekeeping (Gartennetzwerk Dresden, 2016). Stadtgärten e.V. aims to utilize urban spaces for growing crops, preserving old and endangered plant species and supporting related projects (Stadtgärten e.V., 2024).</p>

Dresdner Gartenfreunde e.V.	Gartenfreunde e.V. serves as the umbrella organization for all member allotment garden clubs in Dresden, managing 23,000 garden plots across 360 clubs with an estimated 45,000 to 50,000 users [1].
OLGA	The OLGA project in Dresden aims to foster regional food systems by bringing together stakeholders involved in cultivation, processing, marketing and consumption of local foods [5].
Verbrauchergemeinschaft e. V.	Founded in 1994, Verbrauchergemeinschaft e. V. focuses on public outreach concerning environmental protection, consumer education and promoting sustainable, eco-friendly living (Verbrauchergemeinschaft Dresden, 2024).
Subordinate Level	

Mundraub	Mundraub.org, established in 2009, is the largest German-speaking platform for discovering and utilizing edible landscapes (Mundraub e.V., 2024).
Marktschwärmer	Marktschwärmer is a social enterprise that creates direct and regional sales channels for agricultural and artisanal food producers, providing customers with access to fresh, regional foods (Marktschwärmer, 2024).
Netzwerk Ernährungsgewerbe Sachsen	The network Ernährungsgewerbe Sachsen was founded in Bautzen on December 19, 2013, as a voluntary alliance of regional companies and industry stakeholders (Netzwerk Ernährungsgewerbe Sachsen, 2024).
anstiftung	The organisation anstiftung promotes, connects and researches spaces and networks for self-reliance, including intercultural and urban gardens, open workshops, repair initiatives, open-source projects, neighborhood revitalization efforts and public space interventions. The organization believes that self-reliance empowers people to take control of their lives and engage meaningfully with the world (Anstiftung, no date)

4.2 Categorisation of Potentials and Benefits

UA presents significant benefits and potentials for both Dresden and Glasgow, as highlighted by interviews with various stakeholders and survey results.

4.2.1 Socio-cultural Benefits

General Interview Results:

In Dresden, community and allotment gardens play a crucial role in fostering social cohesion and inclusion, especially through projects involving schools and youth clubs [6]. As one interviewee noted, "The main benefit is the coming together of the neighbours, i.e., gardening together, getting to know each other, digging in the soil together" [6]. Additionally, these spaces support significant inclusion and integration efforts for people with migration backgrounds [1]. In Glasgow, UA has proven instrumental in combating social isolation, particularly among marginalized groups such as refugees. Growing spaces offer a vital pathway to integration and community involvement, as highlighted by a participant: "These people [refugees] all come together in growing spaces and may be the first place where they start to become embodied in the community and the wider Glasgow family" [9].

Survey Community Gardens:

Community gardens provide a variety of socio-cultural benefits, with the most frequently cited being recreation and leisure activities, social cohesion, and the experience of nature. They also contribute to informal education about the environment, cultivation, and nutrition, as well as the enhancement of physical and mental health. Additionally, community gardens promote integration and inclusion, stress reduction, and the strengthening of self-esteem. They play a vital role in environmental justice by improving access to green spaces and better air quality.

4.2.2 Environmental-Climatic Benefits

General Interview Results:

Dresden's initiatives, such as utilizing unused flat roofs for agriculture [2] and integrating small composts across the city [5], contribute significantly to environmental sustainability by reducing urban heat island effects and carbon emissions. In Glasgow, the focus on biodiversity monitoring at sites like Drumchapel demonstrates innovative

approaches to climate resilience and biodiversity enhancement. A notable project in Drumchapel features a rainwater harvest capacity capturing up to 25,000 litres per hour [9]. This initiative has shown positive impacts on local biodiversity, increasing pollinators and flora [9].

Survey Community Gardens:

Community gardens offer significant environmental and climatic benefits, with the most frequently mentioned advantages being the improvement of green infrastructure and the conservation of urban biodiversity. They also help reduce urban heat islands and rainwater runoff, capture carbon, and reduce air pollution. Furthermore, community gardens provide essential pollination services, prevent land consumption, and facilitate the closing of local ecological cycles.

4.2.3 Food Security Benefits

General Interview Results:

UA in Dresden includes collaborations with organizations like the food charity "Tafel," which underscores the role of UA in supporting local food security efforts by providing food and equipment [1].

Survey Community Gardens

The primary benefit of community gardens for food supply, as indicated by the majority of responses, is the access to fresh and healthy fruits and vegetables. This was the most frequently mentioned advantage, underscoring its high relevance.

4.2.4 Economic Benefits

General Interview Results:

Technological advancements such as LED growing [3] further extend the agricultural season, enhancing the economic viability and sustainability of urban farming practices in both cities.

Survey Community Gardens

Community gardens provide significant cost savings through in-house food production and promote healthy eating, which reduces healthcare expenses. Additionally, they support social services, education, and green space maintenance, contributing to the circular economy. Community gardens also enhance health, particularly for the elderly, and contribute to local economic development by creating jobs and diversifying agriculture.

4.3 Categorisation of Barriers and Challenges

The following summary outlines the barriers and challenges encountered in the interviews, surveys and desktop research. The total amount was divided, according to respective subjects into 8 categories. Only the subjectively most significant ones are briefly described here, the others are only listed.

4.3.1 Funding and Financial Constraints

Diminished Financial Resources in Local Councils

Glasgow's city council has experienced reduced financial resources over the past 15 years, impacting support for UA initiatives. There's a pressing need for research and analysis to address this issue: "The city lacks a developed framework like the one you have developed" [5]. Securing funding and budget allocations is a time-consuming process for UA activities in Glasgow: "We spend an awful lot of time seeking funding in supporting what we are doing in Glasgow" [9]. Increased resources would accelerate

UA development: "Having access to increased resources would certainly make life a whole lot easier" [9].

Insufficient Focus on Nutrition and Food Systems

There is a lack of focus and funding directed towards nutrition and food systems within local councils: "I honestly don't see the support for it, unfortunately" [5]. This hinders the establishment of dedicated offices or initiatives aimed at improving nutrition and agricultural practices.

Inadequate Funding for Sustainable Agricultural Practices

Sustainable practices like agroforestry often receive inadequate funding, limiting their implementation and expansion: "There is inadequate funding for sustainable agricultural practices such as agroforestry" [5].

Unflexible and Complex Funding Schemes

Funding schemes, particularly from the EU, are often inflexible and complex. They typically operate on long cycles, such as seven-year funding periods, which can pose challenges for UA initiatives: "EU funds usually operate on seven-year cycles, making access difficult" [7]. This complexity complicates the application and utilization of funds.

High Leasing Costs for Land

The cost of leasing land is prohibitively high for many UA initiatives, impacting their financial feasibility and sustainability: "High leasing costs for land are a significant barrier" (Survey: The Rumpus Room Yard).

4.3.2 Land and Space Availability

Long and Complex Processes to Get Access to Land

Accessing land for UA involves lengthy and intricate processes. The pathways to secure land are often "long and complicated and obscure and are reliant on individuals who

have an understanding of what is required" [10]. Even after securing land, obtaining a lease that protects the rights to use the land can be difficult: "The process itself is long, so we've been in that process for three years now and we're just in the third stage" [10]. Legal structures can be supportive but also act as barriers [9].

Restriction on Public Land

Accessing public land is restricted due to the need to ensure accessibility, which increases the risk of vandalism and random picking of produce [3].

Funding Restrictions

Funding is often available only to certain types of communities. For example, funding assumptions are that only associations work for the public good: "They assumed that only if you are an association you are working for the public good" [4].

Difficulty in Reclassification of Land

Reclassifying land to reduce its price is challenging: "We have often tried to redesignate the areas differently, but it's not that easy" [4]. The definition of land type sets its price, which could be decreased by reclassification, but this process is complex.

New Farming Methods Not Recognized in Regulations

New farming methods, such as aquaponics or algae farming, are not well understood or recognized in existing regulations and handbooks, making it hard to access support: "When people have an idea and want to implement something like this, they are faced with a mass of regulations and paperwork" [2].

Contamination and Poor Soil Quality

Soil contamination and poor soil quality are significant barriers to finding usable land for UA, as highlighted by the Shettleston Community Growing Project and other survey results.

Outdated Legislation

4.3.3 Bureaucratic and Structural Hurdles

Land Constraints Leading to Conflicts of Interest

Urban expansion and infrastructure demands create significant land constraints, leading to conflicts of interest: "Land consumption is so high that agriculture near cities is losing more and more ground because cities are getting bigger and bigger [...] The energy demand is getting higher and higher, the substations have to go somewhere" [7]. The high utilization pressure on available land exacerbates these conflicts: "There is an insanely high utilisation pressure" [6].

Untapped Potential of Modern Agricultural Spaces

The potential of modern agricultural spaces, such as rooftops, remains largely untapped due to the time-consuming search for suitable locations and affordable technical solutions.

Concerns Over Legal Barriers

Legal barriers, particularly concerning insurance, make it difficult to secure suitable areas for UA: "It is relatively difficult to find areas, especially roof areas, because questions about insurance come up very quickly" [2].

Little Commitment to Long-Term Land Use

There is a lack of commitment to long-term land use, making it challenging for community gardens to secure stable, long-term spaces: "Getting long-term space is indeed difficult" [6]. Community gardens often only receive short-term leases, which can be revoked if the city decides to repurpose the land: "These areas can be used for development at any time if the city decides that these areas should go" [8].

Legal and tax frameworks restrict Funding and Benefits

The legal and tax frameworks for community organizations can be unfavourable. For example, not having non-profit status limits funding opportunities and creates tax challenges: "We have applied for non-profit status [...] this would give you much more

funding and the tax office story when you do your VAT would also be much more favourable, which would help a small organisation like us” [3].

Bureaucratic Hurdles for Cities Accessing Agricultural Land

Regulations like the Land Transfer Act in Germany restrict the sale of agricultural land to farmers, making it difficult for UA projects to acquire land: “Only a farmer is allowed to buy agricultural land, this is regulated in the Land Transfer Act in Germany” [7].

Long and Complex Process of Establishing a Form of Community

The process of establishing a community organization, such as a cooperative, is often long, complex and expensive: “Founding of co-operative is expensive, association legally requires 7 members including specific positions” [3].

Speculative Investments and Tax Saving Models in the Market [1]

4.3.4 Community and Volunteer Engagement

Challenges in Recruiting and Keeping Volunteers and Staff

Recruiting and retaining volunteers and staff is a major challenge for UA initiatives. Volunteers often leave when they realize the hard work involved: “It's always a challenge to find volunteers who are willing to put in the time and effort without receiving much financial reward” [6]. Many young people, especially students, participate temporarily due to their transient nature and members frequently leave after the initial enthusiasm fades: “After a rush of enthusiasm [...] and then when the hard work establishes you tend to find some people drift away or you lose a key personality from an organisation” [9].

Structural and Organizational Deficiencies

UA initiatives often depend heavily on key individuals, making them vulnerable to disruptions if these individuals leave: “My fear is that we lose key personalities, that communities dissolve, end up losing enthusiasm” [9]. Furthermore, untrained farmers

are sometimes responsible for managing volunteers, adding to the structural challenges: “Individual persons are key drivers” [9].

Homogeneity and Accessibility Issues

Accessibility issues are significant, particularly for refugees and asylum seekers in Glasgow who have the interest and knowledge to engage in food-growing activities but face bureaucratic barriers: “In Glasgow, there's a lot of asylum seekers and refugees who have a lot of knowledge [...] but they don't necessarily have access to spaces” [10].

Food Habits and Biological Adaptation

Residents in underprivileged areas are often accustomed to processed foods, making the transition to fresh, local produce challenging: “If you're used to having a certain diet, it then takes some time to shift your diet because your body is not used to it” [10].

Interpersonal Conflicts and Differing Opinions

Lack of Food Knowledge Among Volunteers

High Susceptibility of Volunteering

4.3.5 Public Awareness and Acceptance

Lacking Awareness for Healthy Food

In Glasgow, particularly in poorer areas, there is a significant lack of awareness about healthy eating. Many residents rely on processed foods due to food deserts and insufficient knowledge of how to prepare fresh produce: “The way people eat in Glasgow, especially in quite poor areas is that there's often food deserts, so people are reliant on processed food and they don't necessarily know how to prepare fresh produce” [10].

Societal Disconnection from Food

Many individuals are disconnected from the origins of their food, especially in impoverished areas where immediate concerns overshadow the benefits of food growing. One participant explained, “So many people that are entirely disconnected from the food that food really does not matter highly in their thinking” [9]. Additionally, public knowledge about edible plants is low, leading to confusion and a lack of educational initiatives: “People's knowledge about it is zero, the risk of confusion is high and the education is missing” [9].

Lack of Understanding of the Environment

There is a general lack of understanding about environmental issues, particularly soil health, which complicates the integration of UA into urban development. An interviewee noted, “People really do not understand the value of the soil” [9]. This extends to practices like vertical farming, which are often misunderstood: “Most people don't even know what it is (vertical farming)” [2].

Traditional Food Consumption Habits

Many people prefer the convenience of packaged food over sustainable options. This is a significant barrier to UA: “There are people that really do not want anything into that, they would much rather buy a plastic packaged salad leaves from a supermarket growing in Spain [...] rather than just put a spate in the ground and start their own growing” [9].

Controversial Perception of Urban Food Growing

UA faces polarizing perceptions. Some view these spaces positively, while others see them as unsightly. This polarization is compounded by concerns about property values: “Polarising positions in Glasgow towards UA – love growing spaces or see it as derelict shanty towns” [9]. Conventional farmers also feel misunderstood: “Conventional farmers shouldn't be demonised either; they love the land on which they work” [7].

Decreasing Respect and Awareness for Agriculture

Respect for agricultural activities is diminishing, evidenced by vandalism and misuse of agricultural spaces. Issues include uncontrolled dogs leading to sheep deaths and unauthorized harvesting: "People let their dogs onto these meadows, they defecate everywhere and in the end the sheep die" [9]. There is a need for greater appreciation and respect for agricultural areas.

4.3.6 Technical and Environmental Constraints

Climate Change Effects

Climate change exacerbates challenges in UA, such as increased drought conditions. These issues are not adequately addressed by city and state administrations: "The problem in the city and state administration is that these issues are still not being taken seriously enough, such as drought, water balance and biodiversity" [5].

Limited Season Duration

The growing season is limited in many urban areas, exacerbated by climate conditions and post-industrial legacies. Glasgow, for example, faces a short growing season of 13 to 14 weeks. This limitation necessitates energy-intensive indoor production and significant equipment needs: "The key challenge is the availability of land for UA. Glasgow's post-industrial heritage limits agricultural land availability" [9].

Struggle for Access to Resources like Infrastructure and Equipment

UA initiatives often face challenges in accessing essential resources like water and electricity infrastructure. This struggle impedes their operational efficiency and sustainability: "There is a struggle for resources and infrastructure, particularly water and electricity" [2].

Unfair Distribution of Resources

4.3.7 Administration Coordination and Certification Issues

Mismatch of Understandings and Needs

UA initiatives often face a mismatch between the aspirations of grassroots activities and the realities of local council structures. One interviewee noted, "At the moment there is a mismatch in terms of what people hope to achieve and what is feasible given the internal structures" [10]. Although there is significant enthusiasm from individuals wanting to grow food, there are many limitations due to existing administrative frameworks. A need for spaces where grassroots stakeholders and city council representatives can come together was emphasized: "I think we need more spaces to engage with people, where council officers and those who are making decisions have the opportunity to engage with communities and those who are doing on-the-ground work" [10].

Internal Structures within Administration

Significant issues within the internal structures of local administrations can lead to unfavourable circumstances for UA. When the food growing team is placed within the parks and leisure department, this limits its ability to address broader issues like food waste and procurement. An interviewee mentioned, "I think it is also quite difficult to do the internal structural changes that are needed at a local government level" [10]. Additionally, there are instances where are unaware of each other's work [6].

Coordination Processes and Strategic Level Integration

Coordination processes with city administration are often slow and cumbersome. One interviewee described these processes as "totally tedious" [7]. There is also a lack of strategic integration among various initiatives. "There's an acknowledgment that these initiatives need to be brought together at a strategic level" [10], accepting the need for a more cohesive approach.

No Organic Certificate with Vertical Farming

Vertical farming, typically involving hydroponic cultivation without soil, cannot obtain an organic label. This poses a challenge for marketing sustainable food, as consumers often expect organic certification. "The problem with vertical farming is that it is usually hydroponic cultivation, i.e., without soil, which also means that you can't get an organic label" [2].

Food Council Lacks Key Stakeholders

4.3.8 Sustainability and Economic Viability

Distribution Network and Local Producer Connections

Local producers often struggle with marketing their products and finding suitable markets. One interviewee mentioned, "Many farmers sometimes lack ideas and confidence in promoting their products or finding markets" [5]. The regional structures to support direct distribution are insufficient: "The biggest hurdle is really the regional structures that do not yet exist" [8]. The issue is compounded by centralized processing stages, which disrupt direct supply routes: "All the grain is transported to somewhere in central Germany, where it is milled and then distributed nationwide" [8].

Power of Big Players

Large retail chains like Aldi, Lidl and Netto are buying agricultural businesses and becoming majority shareholders, indirectly owning agricultural land. This prioritization of profit can lead to the conversion of farmland into solar installations rather than crop cultivation. "It's very important that cities own agricultural land, because if private companies only want to get what they can out of it, they might put up PV land instead of growing crops" [7].

Unlucrative Sustainable Agriculture and Unfair Subsidy Distribution

Sustainable agriculture is often seen as economically unviable due to initial low yields and long-term investment requirements. "If you start to farm regeneratively, the yield

will probably fall at first and then get better in the long run" [5]. The disparity in subsidies is also a significant issue, with organic products being unaffordable for those who need them most [9]. Additionally, there is economic pressure on agricultural land due to the higher profitability of non-agricultural uses, such as solar installations: "You get €250 rent from the farmer for a hectare of average farmland, but with PV systems, you get €3,500 to €4,000" [7].

Fundamental Economic Viability of Community Gardens

Community gardens face significant financial challenges. They often rely on writing funding applications to sustain their operations. "Financially, it is fundamentally difficult for many clubs. The Initiative 'Alte Gärtnerei' in particular has to fight for its continued existence" [6]. Additionally, the economic model of small suppliers, such as vegetable box schemes, is not sustainable without fairer subsidies and higher wages for employees [4].

Environmental Impact of Materials

4.4 Categorisation of Support Mechanisms

Similar to the barriers and challenges the solving mechanisms were collected from different sources and divided into 5 categories. Compared to the barriers and challenges the data source of the solving mechanisms involves additionally the Glasgow Food Strategies as Figure 15 indicates.

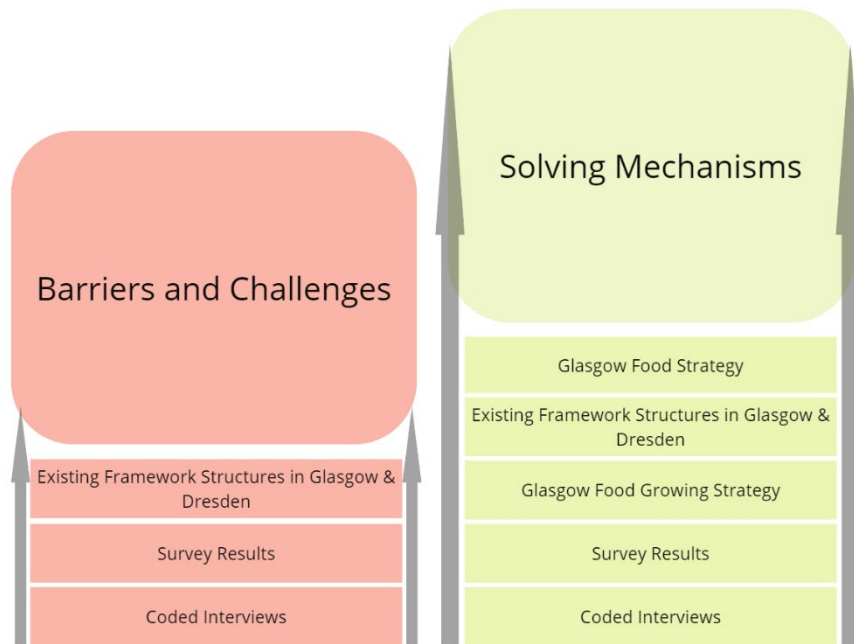


Figure 15: Data Sources for Barriers and Challenges compared with Solving Mechanisms

All these Mechanisms are combined with the barriers to establish the leaflet representing a helpful document to support other municipalities in enhancing and supporting agricultural activities (Appendix A3).

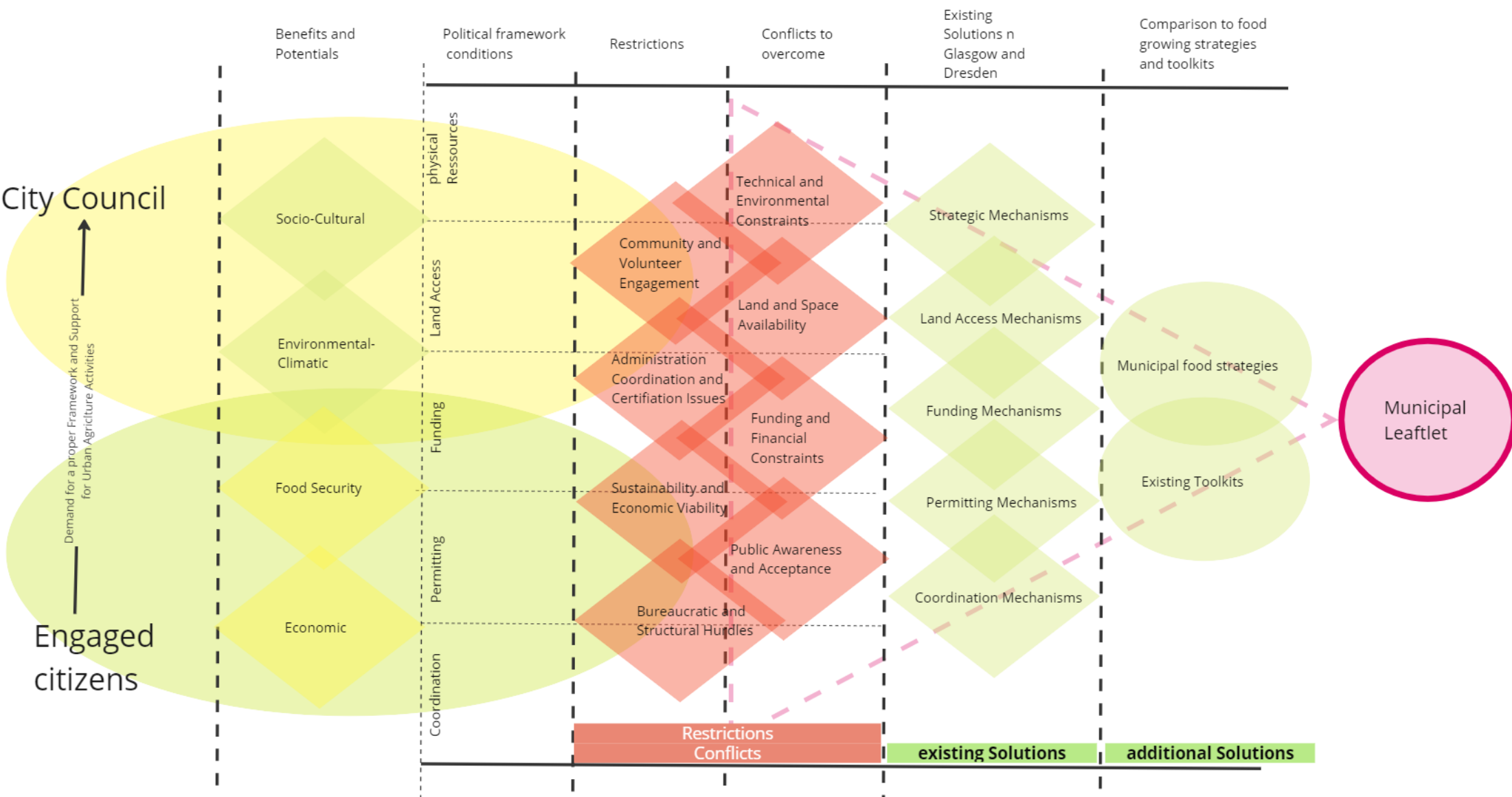


Figure 16: Interim Results and Workflow towards the Municipal Leaflet

4.4.1 Funding Mechanisms

Financial Support by the City Council

Cities can provide crucial financial support to community gardens and UA projects through dedicated funds and structured contracts. For example, Glasgow's Food Systems Fund offers capital funding for infrastructure and equipment, enabling the establishment of new projects. This financial backing helps ensure the viability and sustainability of urban agricultural initiatives [1, 10]. “The city itself also supports the community gardens both financially and by drawing up contracts for the use of individual areas” [1].

Government Tax Incentives to Promote a Healthy Diet

Implementing tax incentives and disincentives can play a significant role in promoting healthy dietary choices. Governments can provide tax breaks for fruits and vegetables, making these healthier options more affordable. Conversely, implementing taxes on unhealthy items, such as sugary drinks and junk food, can discourage their consumption and promote better public health outcomes [7].

4.4.2 Permitting Processes

Prioritisation for Small Urban-Agricultural Associations

A critical step in supporting UA is to prioritize smaller urban-agricultural associations in the permitting process. A code of conduct that favours smaller farmers, particularly those not farming large expanses (e.g., 3,000 hectares), can help ensure equitable access to land and resources. For instance, smaller farmers and those practicing organic farming are given preferential treatment to promote sustainable practices and diverse agricultural methods [7]. “We have given ourselves a certain code that we want to try, if we can, to give smaller farmers a chance, i.e., those who don't farm 3,000 hectares. And those who farm organically also have an advantage.” [7]

Easy Access to Agricultural Land for Cities

Facilitating easier access to agricultural land for cities is essential. Cities should be granted the ability to purchase agricultural land to lease it to farmers, ensuring that land remains available for farming purposes despite market pressures. This approach helps cities manage land prices and support farmers who may otherwise be unable to compete in the market [7]. “So you would have to somehow give the cities the opportunity to buy agricultural land so that they can lease it to farmers, but only if the farmers don't want to buy it themselves, because otherwise, the farmers can't keep up with the price war.” [7]

Regular Checks on Soil Condition and Ban of Environmentally Harmful Fertilisers

Regular monitoring of soil conditions and a ban on harmful fertilizers, such as glyphosate, are essential for maintaining soil health. Permitting processes should include provisions for soil checks and agricultural tenders might be canceled if soil improvement measures are needed. Such measures ensure long-term soil fertility and environmental sustainability [7]. “We also occasionally check whether the soil is getting into difficulties due to cultivation and then you can sometimes find that a tender for agricultural land is cancelled because soil improvement measures are due first.” [7] “For example, we have had a glyphosate ban for our farmers since 2016, I think, otherwise you can't wait.” [7]

Include Sustainably Cultivated Land in Compensation and Biodiversity Measures

Incorporating sustainably cultivated land into compensation and biodiversity measures can enhance land value without significantly impacting farmers. Allocating a small percentage (around 5-7%) of land for these purposes can contribute to broader environmental goals and improve agricultural sustainability [7].

Prioritisation Guidelines for Sustainable Methods

Establishment of Food Cultivation in Guidelines

4.4.3 Land Access Mechanisms

Allocate Unused Land for Gardening Purposes

One effective mechanism for improving land access is the allocation of unused land for gardening purposes. This approach involves repurposing idle land for community gardening, which can serve various social and environmental functions. For instance, some cities have designated unused plots specifically for food banks, creating "Tafel gardens" where fresh produce can be grown to support local food distribution initiatives [7]. At the local level, the "People Make Glasgow Communities" initiative of Glasgow City Council enables local communities to take ownership of local venues, buildings and facilities, thereby fostering community engagement and sustainable UA [10]. This initiative aims to build stronger, more resilient, fairer and healthier communities to meet social, climate and economic equity needs (Brown *et al.*, 2023).

Approach Urban Gardeners and Farmers for Collaboration

Collaboration between urban gardeners, farmers and city authorities is another vital strategy. The Office for Urban Greenery and Waste Management can play a crucial role in this by reaching out to community garden groups to explore potential partnerships. These collaborations can involve the exchange of knowledge and access to land, fostering a cooperative environment for UA [1].

Find Replacement Sites in Case of Interest Conflicts

In cases where conflicts of interest arise over land use, finding replacement sites close by can be a practical solution. City administrations can support community gardens both financially and through contractual agreements for alternative land use. For example, when an area is needed for another purpose, the city can work closely with community gardeners and relevant departments, such as waste management and green spaces, to identify and secure new sites for UA [1, 6].

Identify Potential Future Agricultural Sites

Proactively identifying potential future agricultural sites is another mechanism to enhance land access. City food plans can include the identification of suitable plots for urban farming. Additionally, creating participative platforms where residents can suggest new spaces for agricultural use can be beneficial. An online map, which went live in April 2024, allows people to request specific plots of land. The council then assesses these requests based on soil condition, infrastructure, topography, fencing and accessibility, ensuring that the identified sites are suitable for gardening (Mordin *et al.*, 2022) and [9]. This approach is complemented by efforts in Dresden, where the planning department notes down brownfield cadastre and the environmental department tracks neglected properties (Rößler *et al.*, 2010).

4.4.4 Strategic Mechanisms

Introduce Network Institutions with Employees

Establishing network institutions with dedicated employees can significantly enhance the coordination and effectiveness of UA initiatives. For example, the Glasgow Community Food Network (GCFN) has recently started to work with full-time employees. This shift from a volunteer-based model to one with dedicated staff has provided a more consistent and professional face for the organization, allowing for more targeted and effective actions [10]. Previously, the Food Council operated as a loose network since 2017, relying heavily on volunteers who often worked late into the night to meet deadlines [8].

Introduce Research Institutions

Research institutions play a crucial role in supporting and advancing UA. Initiatives like OLGA (Office for Local and Global Agriculture) contribute to the research and development of sustainable agricultural practices and help in formulating strategic plans [5].

Introduce a Food Strategy

Developing a comprehensive food strategy is essential for guiding UA efforts. For instance, having a food strategy was one of the primary goals of OLGA, aimed at pushing forward UA initiatives. Such strategies help in implementing targeted offers and getting community support [5, 7]. As part of the Glasgow City Food Plan, there are ongoing efforts to incorporate edible plants and fruits into council planting [GFGS Action 16].

Explore Synergy Effects by Linking Other Topics

Creating synergy by linking UA with other environmental and social initiatives can amplify the benefits. For example, in Drumchapel, a program was linked with biodiversity monitoring, leading to positive outcomes such as an increase in pollinators and flora [9].

Support Community-Based Agriculture

Expanding solidarity agriculture can increase production and reduce costs, making membership more inclusive. By growing solidarity-based agriculture and cooperatives, these initiatives can become more widespread and accessible, not just to academics but to a broader community, including those with lower incomes [7].

Compare Different Agricultural Methods

Evaluating and supporting various agricultural methods based on their effectiveness and sustainability is crucial. This involves comparing different approaches and deciding which ones deserve more support and resources [7].

Decentralised Food Processing Systems

Exploring smaller, decentralized food processing solutions can address issues related to centralized processing locations. This could make the food supply chain more resilient and accessible [8].

Encourage and Support Housing Associations with Growing Spaces

Encouraging housing associations to include growing spaces in their plans is part of the Glasgow Food Growing Strategy [GFGS Action 4]. This can help integrate UA into residential areas, providing residents with access to fresh produce.

Monitor Implementations and Keep Reports Updated [GFGS Action 16]

Achieve Policy Change at Different Political Levels [GFGS Action 5]

Consult Large Canteens of Public Institutions [GCFP Action 28]

4.4.5 Coordination Mechanisms

Collaboration between the City Council and Relevant Institutions

Effective collaboration between the city council and key institutions can significantly enhance the support for community gardens and UA initiatives. For example, in Dresden, there is a strong collaboration between the Urban Development Association for Environmental and UA (UFER) and the city council to address the needs of community gardens [6].

Connect Local Producers with Restaurants or Caterers

Connecting local producers with restaurants or caterers can create a robust local food economy. This approach has been successfully implemented in Dresden, where a farmer growing lentils was connected with a local caterer to make lentil falafel, generating mutual benefits and promoting local produce [5].

Provide Accessible Information on the Website

Making information readily accessible on a website regarding know-how, funding opportunities, land access and other resources can empower individuals and groups to

participate in UA. For instance, a website offering comprehensive information can significantly aid those interested in starting or expanding urban gardening projects [9].

Moderate Between Different Agricultural Players

City councils can play a crucial role in moderating between different agricultural stakeholders, such as community gardens and allotment gardens, to ensure harmonious relationships and collaborative efforts. Regular participation in exchanges with food councils, involving diverse partners, helps in strengthening the sense of community and shared goals [7].

Focus on Nutrition Education Programs for Children

Implementing nutrition education programs for children can have long-term benefits for community health and food sustainability. An initiative that involves giving each child a garden bed in daycare and promoting home gardening helps learn sustainable practices from a young age. This not only educates children but also involves parents, promoting self-sufficiency and reducing reliance on imported foods [7].

Role Model for Citizens by Providing Local Food at Events

City councils can set a positive example by using locally produced food for public events and receptions. This not only supports local farmers but also raises awareness among citizens about the benefits of consuming local produce [7].

Introduce Consumer Society

Encouraging the formation of consumer societies can strengthen the local food network. In Dresden, there is a significant consumer community that supports local producers and promotes sustainable consumption practices [8].

Support Activities with Access to Resources

Providing access to necessary resources such as funding, infrastructure and land is critical for the success of UA projects. Ensuring that community gardens and other initiatives have the support they need can foster growth and sustainability [6].

Considerations of Growing Spaces in New Developments

Incorporating growing spaces into new urban development plans ensures that future cityscapes are designed with sustainability in mind. This can be seen in Glasgow's Food Growing Strategy, where Action 3 focuses on integrating growing spaces into new developments [GFGS Action 3].

Ensure Schools Have Access to Growing Spaces [GCFP Action 71]

Raise Public Awareness Through Events and Workshops [Survey]

4.5 Leaflet for Local Administrations

The creation of the leaflet for local authorities involved a systematic and structured approach to categorize and address the various measures related to UA. This process was essential to ensure that the findings from the study could be effectively communicated and utilized by local authorities to foster urban agricultural activities.

Fundamental Elements of UA

Four identified core Elements are critical to the successful establishment and sustainability of UA initiatives: land, funding/costs, form of establishment and resources. These elements were determined through extensive desktop research, interviews and surveys. Each of these fundamental elements encompasses various aspects and facets that provide a detailed understanding of the needs and requirements of UA (Figure 17).

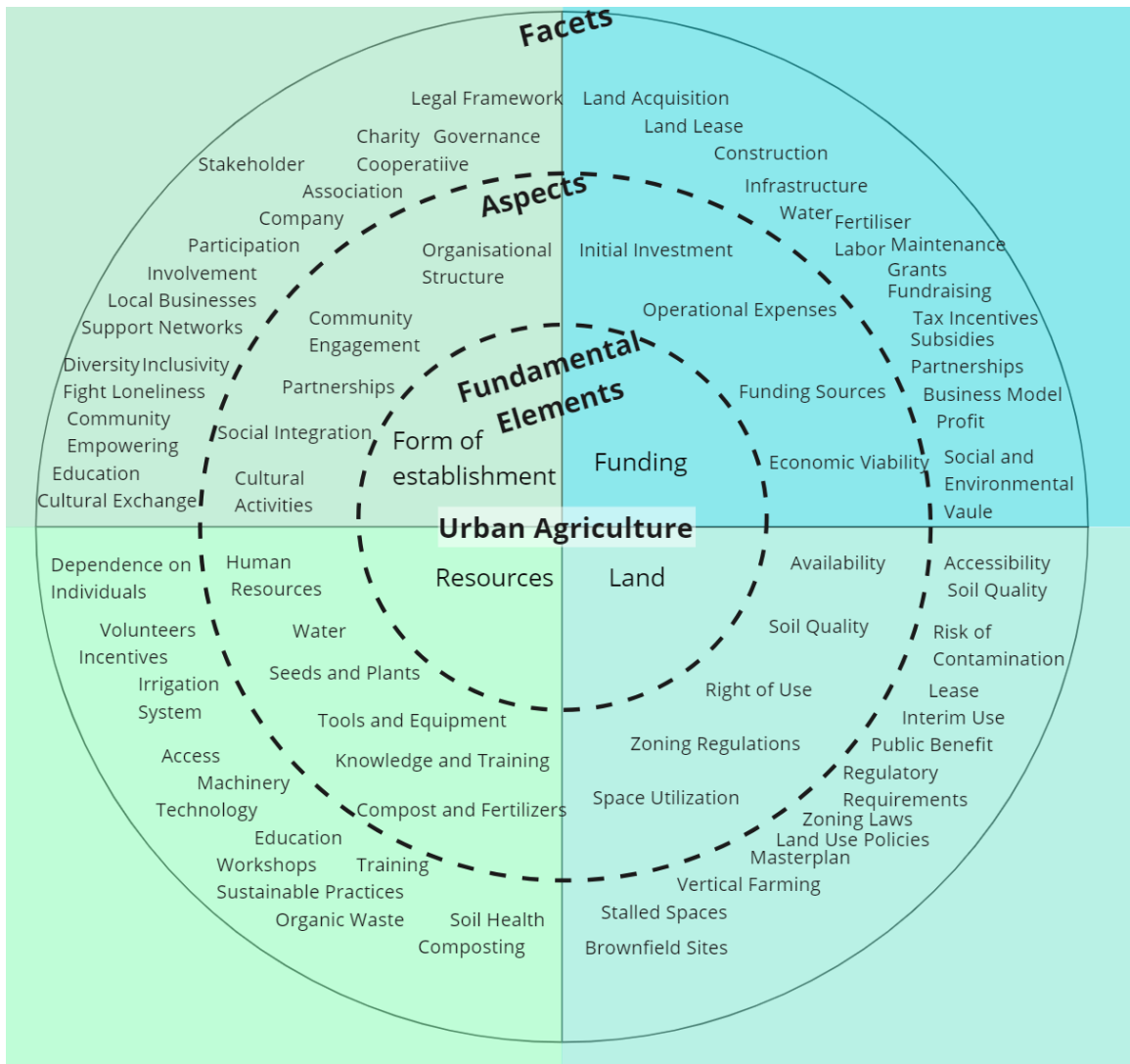


Figure 17: Infographic about the Core Elements of Urban Agriculture utilised in the Leaflet

In addition to the information presented in the information graphic on the fundamental elements, a further graphic was created to provide information on UA methods, city forms and the potential of UA. To increase the empathy of the decision-takers, relevant quotes from the interviews were included (Figure 18).

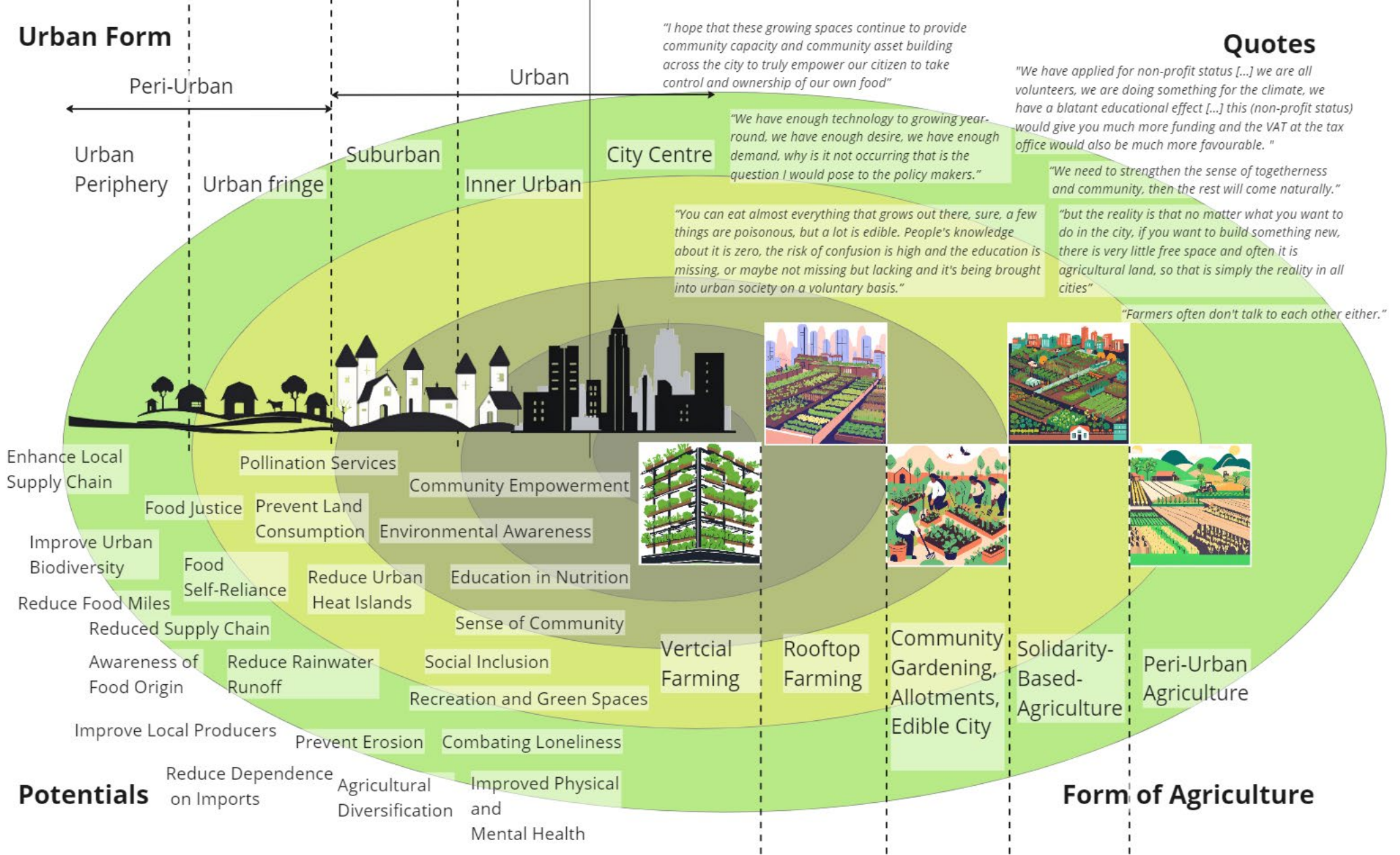


Figure 18: Additional Provision of relevant Information graphically represented to Increase the Comprehension

Arrangement of Levers and Courses of Action

Based on the findings from Chapter 4.4, key mechanisms are identified and the responsibilities and endeavors of local authorities in promoting economic prosperity, social inclusion, food supply and a healthy environment are described. These findings outline the courses of action and the respective levers that can be utilized to achieve these goals. The infographic visually represents these mechanisms, responsibilities and courses of action, illustrating the interconnected nature of the various elements and highlighting the specific levers that can be employed by local authorities to promote and sustain UA (Figure 19).

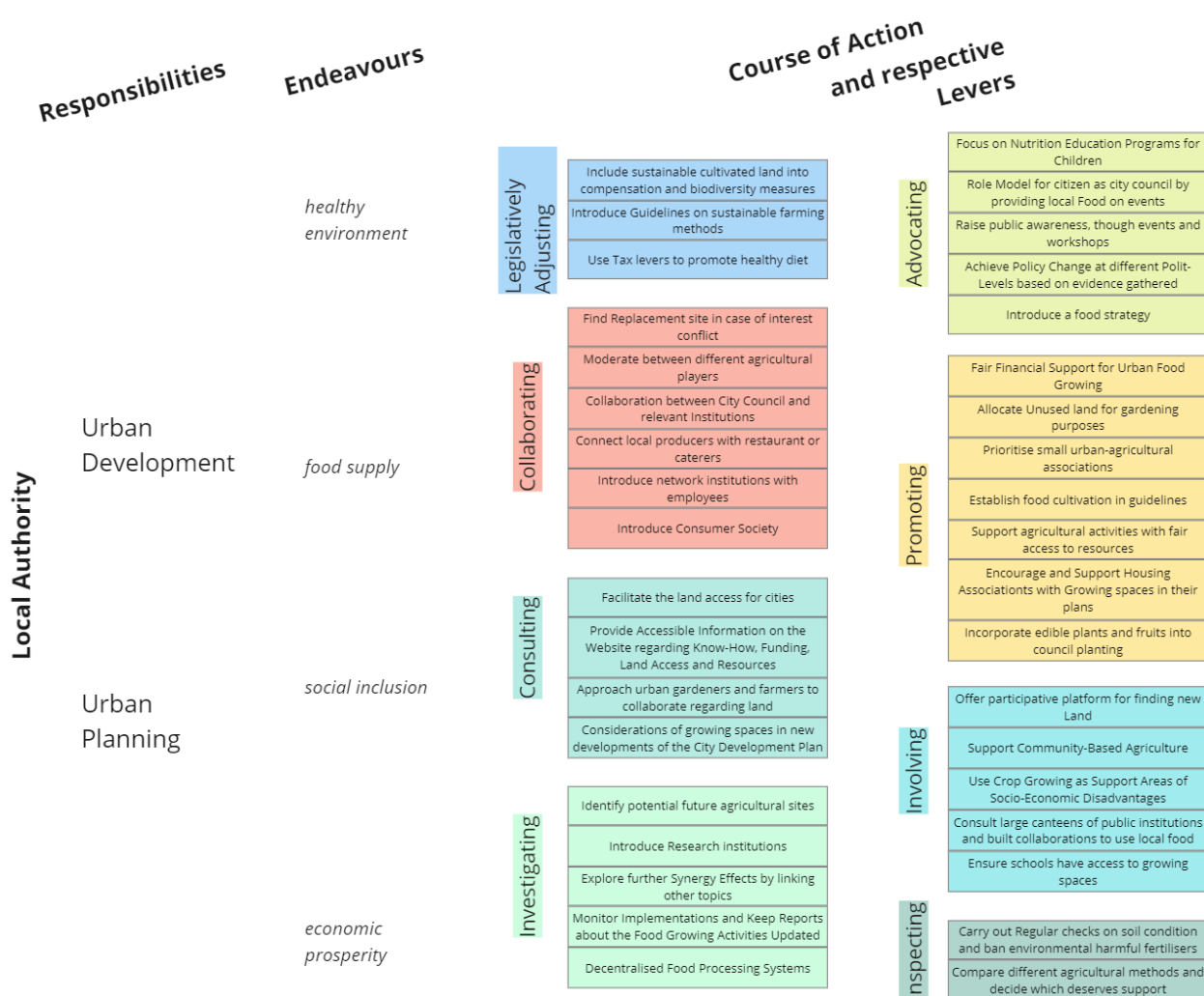


Figure 19: Infographic about the Levers and Courses of Action a Local Authority can take to Enhance Urban Agriculture, utilised in the Leaflet

The most unique and subjectively important measures implemented in Glasgow and Dresden were described in detail on two further pages, including concrete key practices for success (Appendix 3).

Categorization of Barriers and Mechanisms

The first step in developing the leaflet was to list all identified barriers and hindrances associated with UA. These barriers were then categorized according to the mechanisms that could potentially overcome them. A clear and actionable guide was created by examining and matching each barrier with its corresponding mechanism. This categorization allowed for a detailed analysis of how specific mechanisms could address particular barriers, thereby providing targeted solutions.

Identification of Restrictive Barriers

A further distinction was made for barriers that could not be resolved at the local administration level. These barriers were classified as restrictions, acknowledging that they require broader, often systemic changes beyond the scope of local governance. The identified restrictions include:

- Challenges in Recruiting and Keeping Volunteers and Staff
- High Susceptibility of Volunteering
- Interpersonal Conflicts and Differing Opinions
- High Dependency on Individuals
- Controversial Perception of Urban Food Growing
- Climate Change Effects and Weather Events
- Limited Season Duration
- Land Constraints Leading to Conflicts of Interest
- Environmental Impact of Materials

By recognizing these restrictions, the leaflet provides a realistic framework for local authorities, helping them understand the limitations of their influence and encouraging collaboration with other stakeholders to address these broader issues.

Visual Representation

The barriers and mechanisms conceptually linked were arranged in a circular, overview format (Figure 20). This visual representation allows users to easily identify which mechanisms can be applied to overcome specific barriers, facilitating a more intuitive understanding of the strategies available to support UA.

The circular format not only simplifies the complex relationships between barriers and mechanisms but also highlights the interconnected nature of UA challenges and solutions. This holistic approach ensures that urban planners can quickly grasp the key points and apply the insights to their local contexts.

The leaflet (Appendix A3) is designed to serve as a practical tool for policymakers and practitioners, offering clear guidance on what UA activities in its fundamentals need, what enhancing mechanisms exist and how to overcome barriers to UA. By categorizing barriers, identifying restrictions and visually representing the solutions, the leaflet provides a comprehensive resource that can help local authorities effectively support and enable urban agricultural activities. This, in turn, contributes to the broader goal of sustainable urban development, leveraging UA to address environmental, social and economic challenges within urban areas.

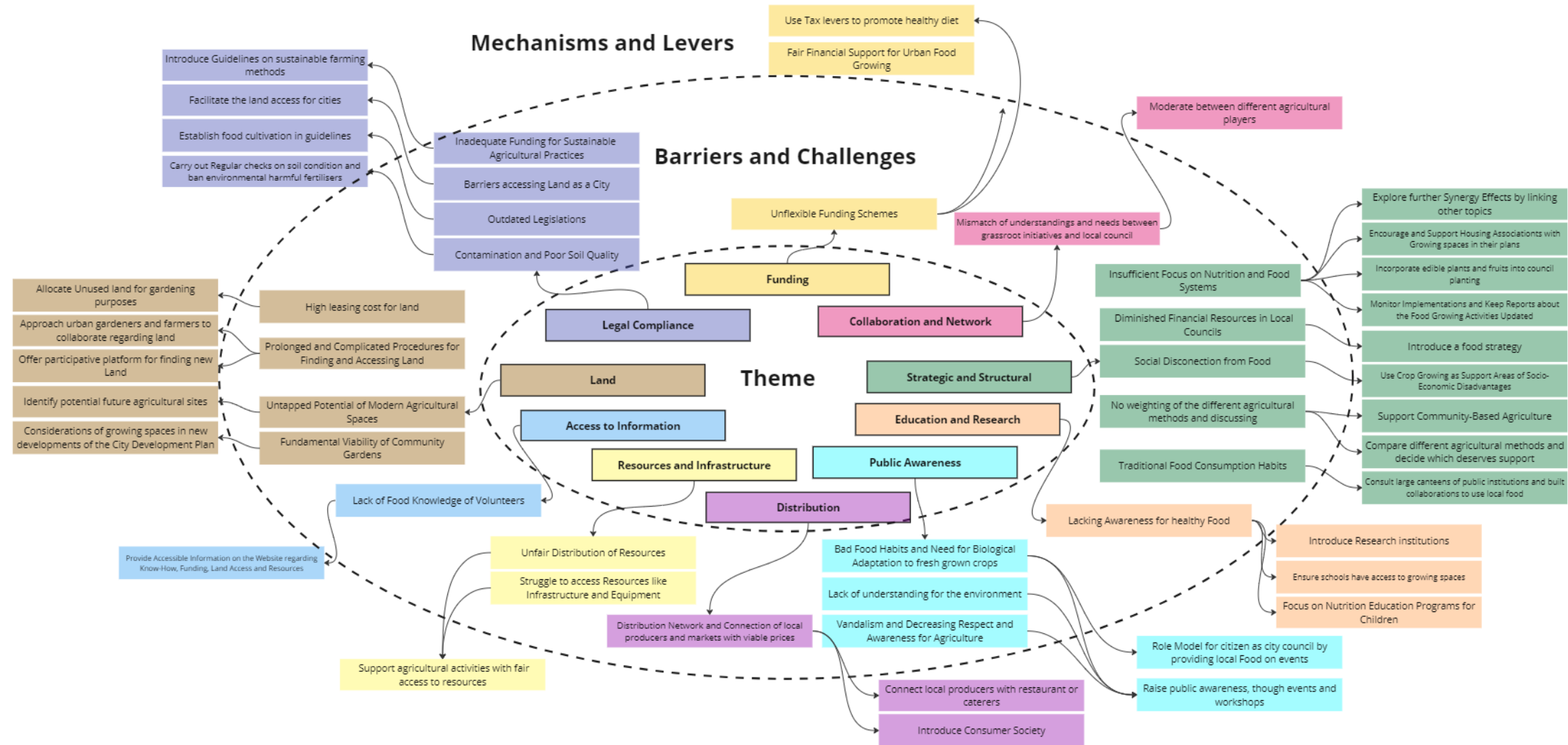


Figure 20: Allocation of each lever to the respective barrier

5 CONCLUSION, DISCUSSION AND FUTURE RESEARCH

5.1 Conclusions

Overarching Policies and Concepts

Overarching policies, concepts and institutions in both Scotland and Germany recognize the importance of UA and are actively working to promote it. However, the frameworks differ significantly in terms of detail and specificity. In Scotland, urban agricultural implementations are clearly articulated within the Community Empowerment (Scotland) Act, Part 9, which mandates each local authority to develop and publish a food growing strategy within two years of the Act's enactment. This strategy must identify potential allotment sites, suitable land for community cultivation, plans to increase the provision of allotments and cultivation areas, particularly in socio-economically disadvantaged communities and must be publicly accessible online (White and Bunn, 2017). The Land Reform (Scotland) Act 2016 further supports these efforts with key provisions, including a Land Rights and Responsibilities Statement, the establishment of the Scottish Land Commission to oversee land reform and strategic plans (UK Government, 2024). Additionally, organizations such as Sustain and Sustainable Food Places in the UK are actively involved in promoting sustainable food practices. Sustain has published extensive reports on PUA, while Sustainable Food Places has developed a toolkit for local authorities (Sustainable Food Places, 2024).

In contrast, Germany has recently introduced a nationwide Nutrition Strategy and several whitepapers on UA, but no comparable specific guidelines have been identified. The *anstiftung*, a nationwide organization in Germany, is committed to advancing UA, including financial support for individual projects in cities like Dresden. At the European level, numerous research projects and initiatives focus on UA. The EFUA aims to unlock UA's potential through networking, knowledge dissemination, deployment strategies and policy development. The Edible City Network, supported by the EU under Horizon 2020, connects cities globally to enhance urban living through sustainable food production, distribution and utilization, including community gardens (Engelhardt *et al.*, 2024). Although EFUA's efforts are ongoing across Europe,

interviews with stakeholders in Dresden revealed no noticeable impact yet. EFUA reports highlight the need for integrated funding and legislative frameworks that view UA as a multifaceted tool for sustainable urban and regional development. The report emphasizes breaking down barriers between disciplines and fostering collaboration to fully harness UA's potential. This comprehensive approach aligns with the study's findings, which indicate that integrating various sectors such as urban planning, agriculture and health is crucial for the success of UA projects.

Strategic and Institutional Structure:

The structural integration of UA in city development differs significantly between Glasgow and Dresden. In Glasgow, UA is institutionalized through the Glasgow Community Food Network and the Glasgow Food Policy Partnership. These two comprise various relevant stakeholders, consolidating UA activities, providing strategic directions and serving as contact points for any related questions. There is an integration of the Glasgow City Council in both. Interviews indicated that financial resources have declined in recent years, which are necessary to drive transformative changes.

In Dresden, there is no comparable institution that operates across different methods, such as zero acreage farming, peri-urban and urban gardening. The Dresden Food Council emerged from an individual initiative and operated purely on a voluntary basis until recently, being linked to the Lokale Agenda organization. There are network institutions like UFER, representing the interests and needs of community gardens. Within the city administration, responsibilities for all UA activities fall mainly under the Office for Urban Greenery and Waste, which provides supportive functions.

Strategically, the situation mirrors these differences. Glasgow has two clear food strategies: the Glasgow Food Growing Strategy, which focuses explicitly on food cultivation and the Glasgow City Food Plan, which aims to improve the entire food system in Glasgow. Additionally, Glasgow maintains a website where essential information to support urban agricultural activities is listed, reflecting the four core elements from the leaflet.

In contrast, Dresden lacks a comprehensive food strategy and explicit guidelines on funding or land access for the public. Those interested in community gardens and allotments can find information through the respective network organizations, but no centralized resource or strategy is guiding UA initiatives.

Interviews and Survey Work

There was limited feedback from institutions in Glasgow for interview requests, which impacted the depth of insights gained. While the interviews provided valuable perspectives on the structure and interconnectedness of UA activities in both cities, they occasionally lacked depth, particularly concerning legal levers. The complexity of the subject matter and the evolving focus of the thesis posed challenges during the interview process. Initial interviews with UA participants from Spain and Finland, for instance, proved impractical for detailing barriers and mechanisms, as their inclusion would have expanded the scope of the thesis beyond its limits.

The development of the thematic areas and relevant facets of UA, as outlined in Table 2, was instrumental for the subsequent interviews. The interview approach remained flexible, allowing for the exploration of interesting aspects based on interviewees' responses. While the questionnaire served as a useful guideline, the diverse perspectives and situations of the interviewees necessitated individual preparation and follow-up for each interview.

Surveys were developed after completing several interviews, addressing the lack of in-depth information regarding cultivation methods and structures of initiatives. Community gardens emerged as growing trends in both cities and the existence of umbrella organizations like UFER and GCFN facilitated systematic outreach to initiatives. The survey results proved beneficial in identifying the benefits, barriers and mechanisms of UA activities but more valuable they provided insights into the organization and legal frameworks of these communities, highlighting diversity in aspects such as financing, land-use relationships and organizational structures. This diversity underscores the challenges in supporting these initiatives due to their complexity. Conducting similar surveys for locally producing agricultural enterprises could yield comparable insights.

Despite reminders and dissemination through official channels like GCFN and UFER, the response rate to the surveys was low. Feedback from a community garden in Finland indicated that the high volume of interview requests might explain the limited responses.

Community Gardens: Assessment of Needs and Understanding the Structure

Community gardens represent just one aspect of UA. Despite limited feedback, trends and conclusions can still be drawn regarding the needs and organization of these gardens.

Requirements

Figure 21 demonstrates that land access and availability are the highest priorities for community gardens. To receive this data, responses to the question, "Which of these options would have helped you earlier or would be useful for you in the future?" were categorized into thematic areas. Following land access, funding and public awareness measures were also highly desired by UA participants. The low scores for distribution and access to information suggest that information access is not a pressing need and that the distribution of produce plays a minor role in community gardens.

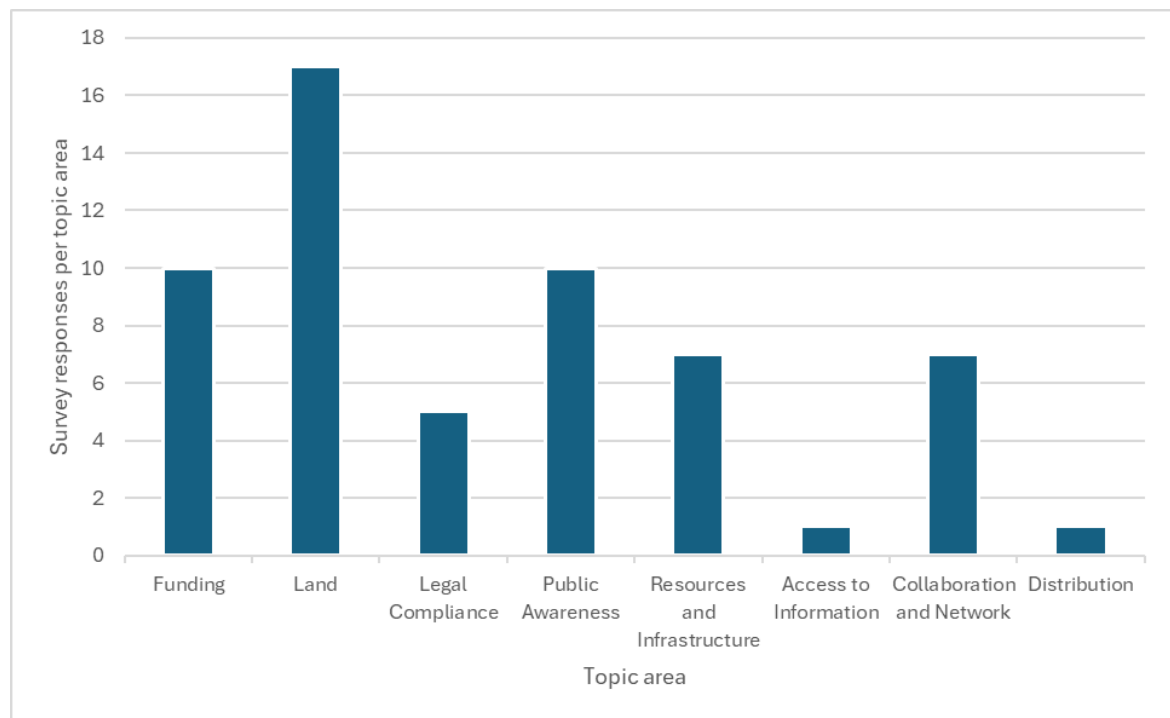


Figure 21: Survey Results: Assessment of respective Support Measures clustered in Topic Areas

Land Ownership and Planning

The survey results regarding land ownership and declaration in development or master plans highlight why it is challenging for policymakers to provide uniform solutions and measures. Diverse ownership options (Municipal Housing Association, Municipality, Non-profit Organization or Foundation, Common Property, Individual Person, Combination of Different) are similarly represented in both Glasgow and Dresden, with Municipal Housing Association ownership standing out with three mentions.

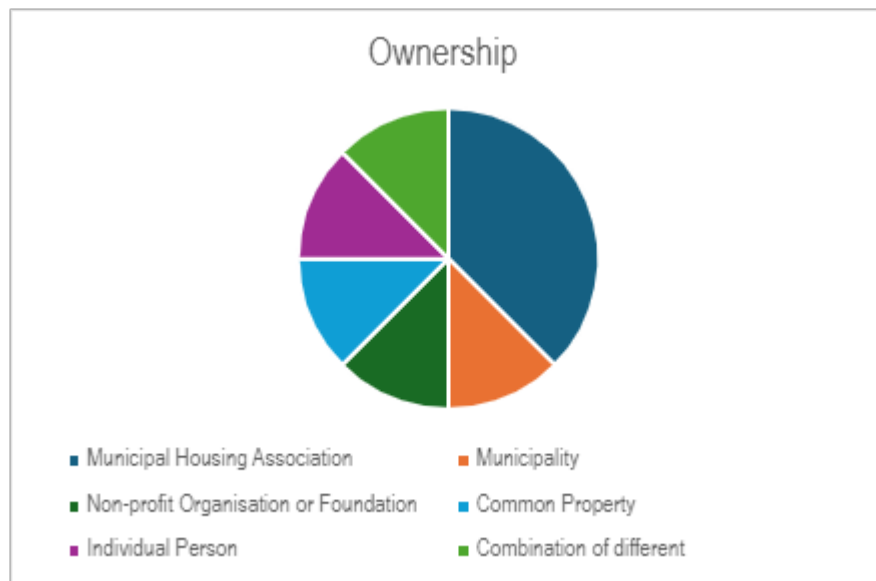


Figure 22: Survey Results: Ownership of the Land

High diversity is observed in the designation within the master plan (Figure 24), where community gardens have a slight predominance in residential areas, and in the development plan, where green and open space is the most common designation (Figure 23).

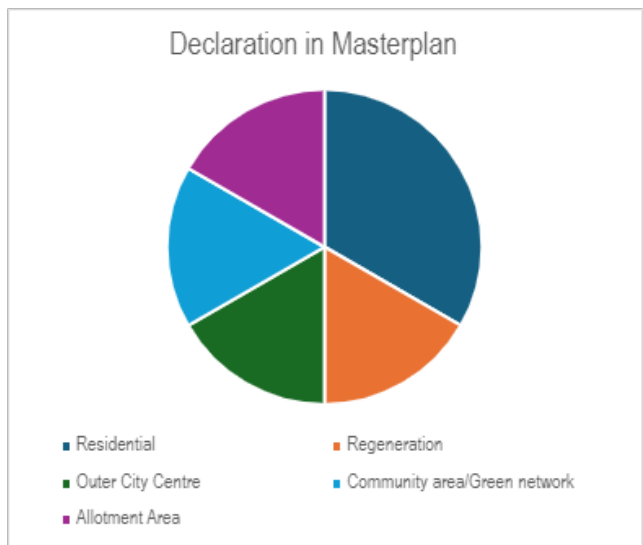
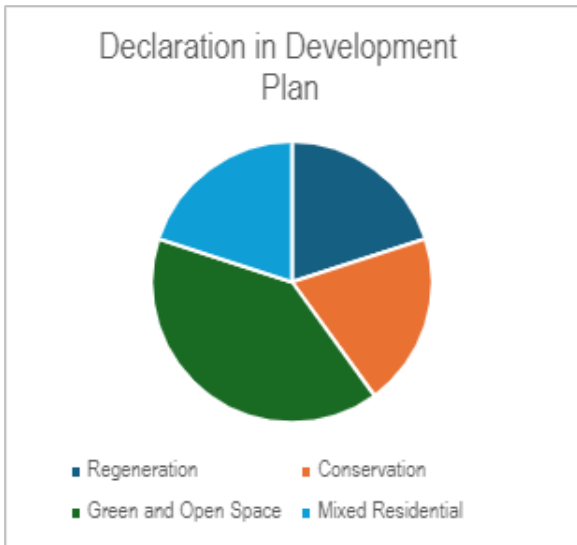


Figure 23: Survey Results: Declaration in Development Plan Figure 24: Survey Results: Declaration in Masterplan

Uniformity exists in the usage relationship, with five respondents indicating land lease and two providing other, unspecified answers. The size of the areas ranged from 30m² to 25,000m², with an average of 3,750m².

Form of establishment

The existing forms of community garden organization include five associations or non-profit organizations and two charities (Figure 25).

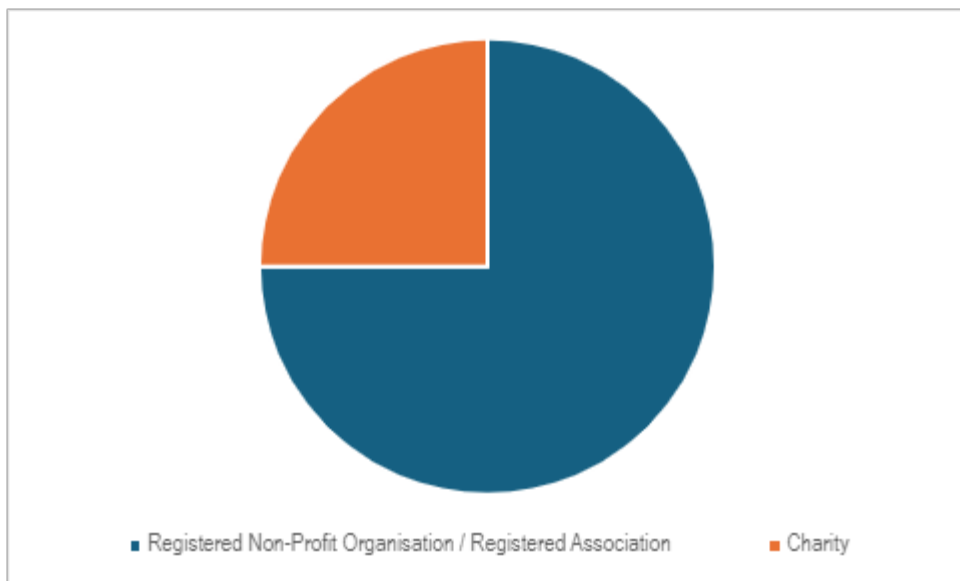


Figure 25: Survey Results: Form of Establishment

Funding

The results for initial funding of community gardens show that three gardens each received funding from the local government or a national-level institution (Figure 26).

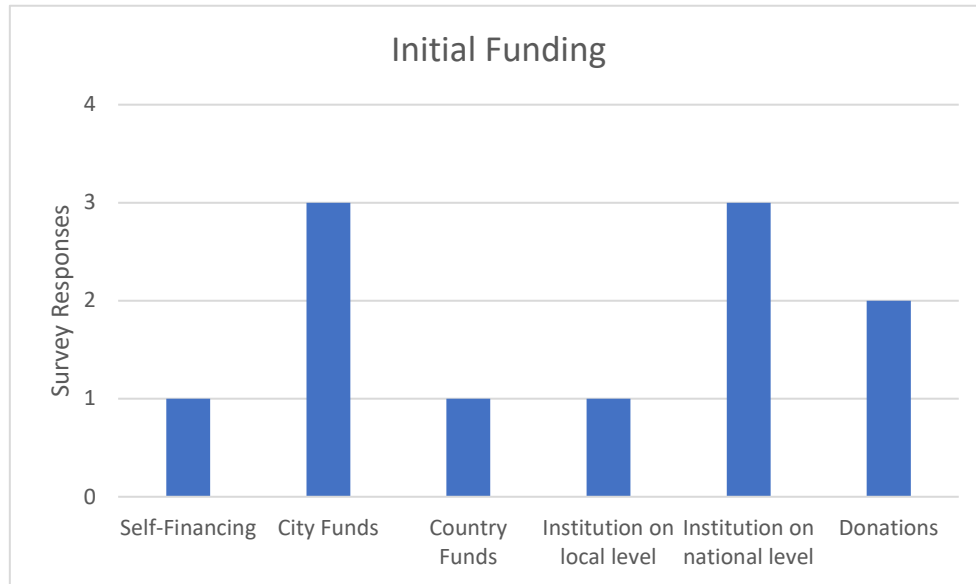


Figure 26: Funding received to initiate the Community Garden

In the long term, membership fees and low maintenance costs are also common practices to deal with funding (Figure 27).

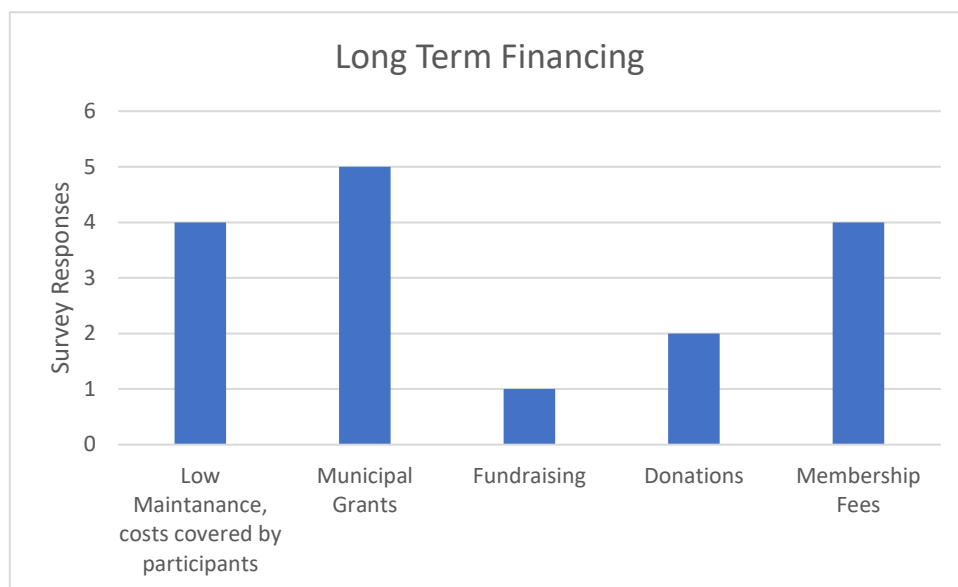


Figure 27: Funding received to keep up the Community Garden

These findings illustrate the diverse needs and organizational structures of community gardens. Land access and availability are paramount, while funding and public

awareness are also critical. The complexity of land ownership and planning designations underscores the need for tailored policies.

5.2 Discussion

Holistic View of Urban Agricultural Activities

The categorization of urban agricultural activities into Zero-Acreage, PUA and urban gardening in this thesis reveals the lack of addressing UA comprehensively in the city councils. A notable example of this is Dresden, where only information on community gardens and allotment gardens is provided for the public. This narrow focus neglects other important aspects such as efforts of local producers or vertical farming initiatives. The absence of comprehensive information on these approaches highlights a gap in the city's strategic planning and support for UA, indicating a need for broader awareness and integration of diverse urban agricultural practices.

Understanding and Analysing the Identified Barriers and Mechanisms

The study identified several systemic barriers to the integration of UA into urban planning. These include regulatory hurdles, land tenure complexities and limited access to resources and infrastructure. The lack of cohesive policy support and clear organizational placement within city councils further complicates the integration process. UA often relies heavily on individual volunteers and grassroots initiatives, as also highlighted by White and Bunn (2017). While legislative support is increasing, it's crucial to maintain the grassroots spirit without overwhelming UA projects with bureaucratic complexities. Many strategic measures are already described in documents and partially implemented. However, interviews reveal that these measures are not yet fully effective. The processes for accessing land, funding and resources remain complex.

The establishment of the leaflet has provided a detailed analysis of the barriers and corresponding mechanisms related to UA in Glasgow and Dresden. The findings highlight significant discrepancies in some thematic areas, while others exhibit a balanced match of problems and solutions.

Legal Compliance

Legal compliance emerged as the most critical thematic area, presenting numerous barriers with a notable lack of sufficient corresponding mechanisms. Specifically, nine barriers were identified without suitable mechanisms in either Glasgow or Dresden.

These barriers include:

- Lack of Regulatory Support for New Farming Methods
- Challenges in Land Reclassification
- Community type determines access to land and funding
- Complexities in Forming Community Organizations
- Speculative Investments and Tax Saving Models in the Market
- Concerns Over Legal Barriers and Responsibilities of Lands and People
- Little Commitment to Long-Term Land
- No organic certificate with Vertical Farming
- Overarching Power of Big Players

The absence of effective solutions in this area underscores the complexity and rigidity of existing legal frameworks that urban agricultural initiatives must navigate. As such, legal compliance stands out as the most pressing area for renewed efforts and targeted research.

Strategic and Structural

In contrast, the strategic and structural thematic area demonstrates an excess of mechanisms relative to the barriers identified. This indicates that numerous solutions exist for the few barriers in this category, suggesting that strategic and structural challenges are well-addressed.

With nine mechanisms identified to address these barriers, it is evident that UA benefits from a robust strategic framework. Additionally, proactive strategies, such as achieving policy change at different political levels based on gathered evidence and implementing decentralized food processing systems, further strengthen this area. Therefore, the need

for additional research and development in strategic and structural aspects is comparatively lower, allowing for a focus on other pressing issues.

The remaining thematic areas show a well-balanced match of barriers and mechanisms. For instance:

Public Awareness: Effective mechanisms, such as raising public awareness through events and workshops, adequately address identified barriers.

Resources and Infrastructure: Mechanisms like supporting agricultural activities with fair access to resources cover the barriers related to resource distribution and access.

Access to Information: Providing accessible information on websites effectively counters barriers related to knowledge gaps and accessibility issues.

Distribution: Identified barriers, such as distribution network challenges, are well-covered by existing mechanisms in both cities, e.g. the work of the OLGA research.

Education and Research: Barriers related to knowledge and awareness are effectively addressed by mechanisms focused on education.

These areas demonstrate good coverage of their respective problems and solutions, indicating that existing strategies are largely effective and require only ongoing maintenance and minor improvements.

Collaboration and Network

However, the collaboration and network thematic area reveals a discrepancy between barriers and mechanisms, similar to legal compliance. Specifically, barriers such as:

- Internal structures within the administration
- Network institutions missing agricultural stakeholders

This mismatch highlights the need for enhanced strategies to foster collaboration and integrate agricultural stakeholders into existing networks.

Consumers Responsibility, Attitude and Vision

In early interviews (ID 9, 19), it was recognized that a barrier to UA is the tendency towards habitual lifestyles and divergent opinions exist regarding the food system and urban crop growing. Some people prefer processed food and do not value local food. The issue of UA stands and falls with the city's inhabitants, with people's awareness and will. The interviews have also shown that individuals often have a high level of responsibility and a key role to play. However, each person is responsible for their consumption and thus sets the direction for how society deals with resources. Visions and dreams are important foundations for discussion and serve to inspire others. For this reason, the interviewees were also asked about their dreams for the future food supply where three visions and concrete future developments were derived from and transformed into graphical visualizations using Canva's AI tool.

Vision 1: Seasonal and Sustainable Urban Agriculture (Figure 28)

In this vision, urban areas are lush with seasonal produce, with people closely connected to the natural cycles of food growth. The image showcases a cityscape where rooftops, balconies and community gardens are bursting with fresh, organic produce. People are seen engaging in activities such as composting, tending to gardens and harvesting fruits and vegetables. There is a strong emphasis on the cyclical nature of food production and waste management, highlighting a closed-loop system where excess produce is composted to enrich the soil.

Key Elements:

Urban gardens with seasonal produce, People harvesting and composting, Rooftop and balcony gardens, Community Garden spaces, Composting bins and soil enrichment activities.



Figure 28: Vision 1 Seasonal and Sustainable Urban Agriculture (Canva AI)

Vision 2: Community-Centric Food Systems (Figure 29)

This vision emphasizes community involvement and cooperation in food production. The image depicts urban neighborhoods with community gardens and cooperative farming spaces. People of all ages are seen participating in hands-on harvesting and tending to crops. The scene reflects a balance of 70% regional and 30% local food sourcing, with transparent and direct connections between producers and consumers. There are communal spaces where people gather to share the fruits of their labor, reflecting a strong sense of community and solidarity in agriculture.

Key Elements:

Community gardens in urban neighborhoods, People of various ages harvesting and tending to crops, Cooperative farming spaces, Transparent food sourcing and direct producer-consumer connections, Communal areas for sharing and enjoying harvested food.

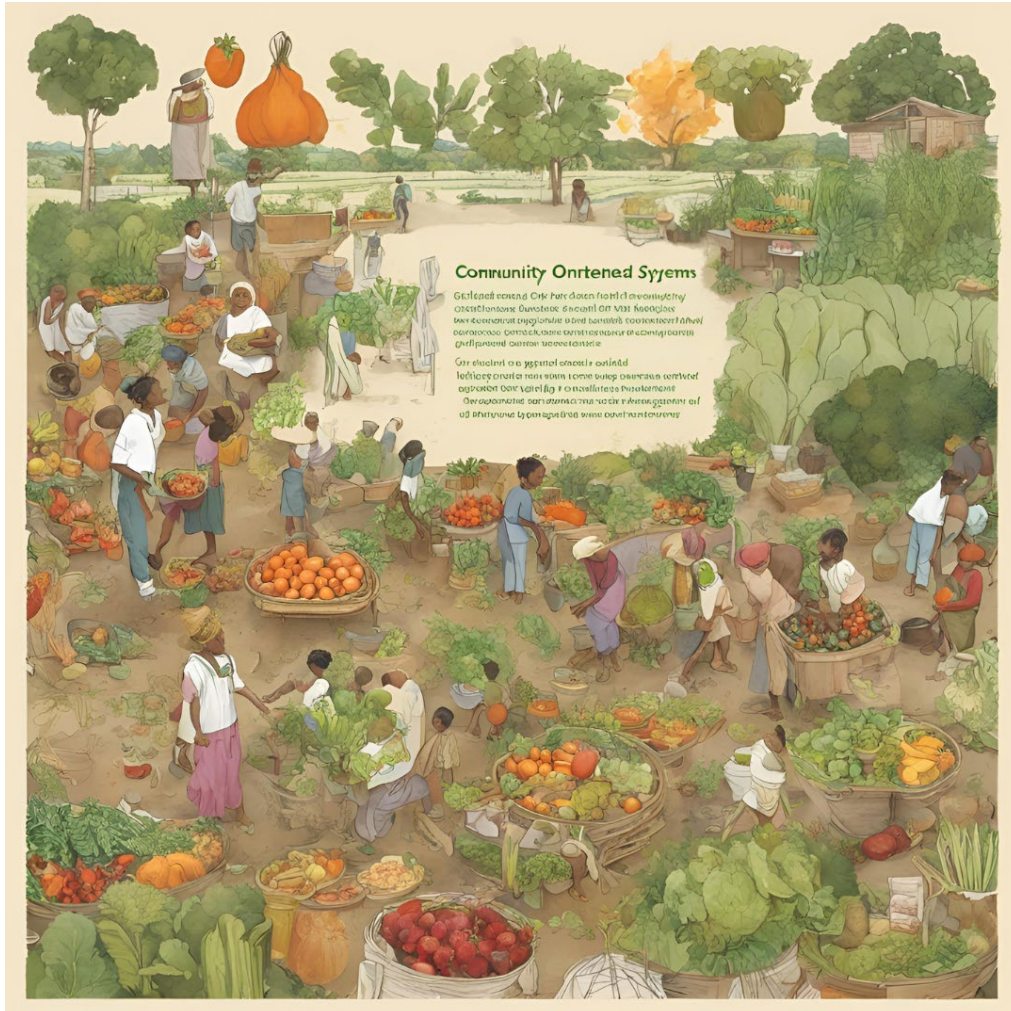


Figure 29: Vision 2 Community-Centric Food Systems (Canva AI)

Vision 3: Self-Sufficient and Hyper-Local Urban Food Production (Figure 30)

This vision portrays a future where cities and regions are self-sufficient in food production. The image shows innovative use of urban spaces for growing food, including rooftops, brownfields and even cellars. People receive boxes of fresh vegetables as part of their salary, symbolizing the integration of food production into everyday life. The urban environment is transformed into a green oasis with food being produced and consumed locally, minimizing the need for long-distance transportation.

The focus is on neighborhood-level production, with every available space utilized for growing nutritious, organic food.

Key Elements:

Rooftop and brownfield farming, People receiving vegetable boxes as part of their salary, Utilization of unconventional spaces (cellars, urban areas) for food production, Green urban environment with abundant local food sources, Emphasis on local self-sufficiency and minimal food transportation.



Figure 30: Vision 3 Self-Sufficient and Hyper-Local Urban Food Production (Canva AI)

While increasing awareness through the provision of information and workshops, as mentioned in the barriers, is crucial, this issue is potentially larger and more significant. Therefore, future strategies should include comprehensive public engagement initiatives that not only inform but also inspire and motivate behavioral change. This

could involve community-based projects, educational campaigns and partnerships with local businesses and organizations to create a more supportive environment for UA.

Comparison of Leaflet Results with Published Toolkits and Handbooks

The results of this thesis are visualized in a leaflet intended as a guideline for other cities, making a comparison with published toolkits and handbooks, briefly described in Chapter 2.3.5, pertinent. This comparison highlights the alignment and potential enhancements based on established resources.

Sustain Draft for Policymakers

Similar to the leaflet created in this thesis, the Sustain Draft for Policymakers outlines the benefits of UA and emphasizes why city councils should support UA activities. The draft lists potential benefits such as access for residents to healthy, local food; healthy and active residents; resilient and mentally healthy communities; safer, cohesive communities; and greener, environmentally sustainable communities. These benefits align closely with those identified in this thesis. The draft also details support mechanisms for city councils that parallel the mechanisms identified in this research. For instance, it advocates for a cross-cutting approach to incorporate food growing into strategic documents like health strategies or climate action plans to achieve synergy effects. It also suggests proactively identifying land for food growing and facilitating access to it. An interactive checklist aids city administrations in concretely addressing individual measures, a method that could have been valuable in this work.

Milan Urban Food Policy Pact

The Milan Urban Food Policy Pact outlines seven measures that generally align with those in the Sustain document. However, each measure in the pact includes specific indicators, providing detailed descriptions and measurement possibilities for these indicators. This granularity could enhance the comprehensiveness of the developed leaflet by providing measurable outcomes for each suggested action.

ICLEI Handbook

The ICLEI Handbook is a comprehensive guide with measures categorized into three action fields: Regenerate, Rethink and Reduce. Political instruments are clustered into Regulatory and Planning, Economic, Cooperation and Education & Knowledge, each containing specific interventions. A significant focus is placed on supporting ecological and regenerative farming. There are overlaps with the measures identified in the leaflet, such as including regenerative farming methods in public procurement or implementing food quotas in food service contracts (e.g., for events organized by the city council). However, the handbook also suggests measures that extend beyond those proposed in the leaflet, such as introducing a currency to support local food chains or developing a standardized label to distinguish regeneratively farmed products from conventional ones.

Food for the Planet Toolkit

The Food for the Planet toolkit clusters measures into five themes: Policy, Strategy and Partnership; Land Use, Farming and Planning; Food Use, Waste and Resource Efficiency; Procurement and Sustainable Diets; and Supporting Sustainable Food Businesses. Compared to the leaflet, this toolkit lists externally impactful actions, such as declaring a climate and nature emergency or signing the Glasgow Food and Climate Declaration. A notable feature of this toolkit is the categorization into Quick Wins and the indication of CO₂ savings per hectare. These overviews facilitate prioritization for local administrations and aid in acquiring funding. Otherwise, the measures are very similar to those developed in this thesis.

In summary, while the toolkits are similar and holistic, they often lack the depth and specificity of individual measures due to their generalized nature aimed at benefiting a wide range of regions. For example, the measure to integrate UA into zoning and land use mechanisms is a valuable suggestion but requires extensive background knowledge and work that cannot be generalized. Planning laws and zoning differ significantly between countries, such as Germany and Scotland. If a city has sufficient capacity, it can tailor this measure to its context and detail what specific changes are necessary. However, this is feasible only if the resources are available.

In Dresden, for instance, there is neither a full-time position for UA nor a developed strategy that concretely applies such measures to the local context. Despite being one of Germany's larger cities, Dresden lacks the capacity for such detailed work, a challenge even more pronounced in smaller cities. This underscores the thesis posited in Chapter 2.3.1 about the historical underrepresentation of UA, which still persists to some extent.

Systemic Approach and Linking UA to the Urban Food Systems

A comprehensive examination of the entire UA system is crucial for identifying connections and networks that enhance its efficacy. Urban food councils and food strategies serve as effective frameworks for fostering these connections.

Glasgow has exemplified this approach effectively, having published two strategic documents: the Glasgow City Food Plan and the Glasgow Food Growing Strategy. These documents illustrate the integration of UA activities with broader urban food systems, which is both sensible and challenging. A more nuanced and effective approach involves defining a city-region food system, as locally produced food does not cease to be local at the city boundary but encompasses the surrounding region. Food councils adopt this broader perspective by addressing and improving all food-related issues within a region. Given the potentially overwhelming complexity of this holistic view, there is a need for assistance in assessing the sustainability and resilience of existing city-region food systems (Dubbeling, Marielle and Balbo Alice, 2013).

The Food and Agriculture Organisation of the United Nations (FAO, 2023). provides a comprehensive approach through its Assessment and Planning Handbook. This resource offers a thorough framework for evaluating and planning city-region food systems. However, two main issues arise with such extensive toolkits. First, urban administrations often lack the resources to engage deeply with these documents. Second, the level of generalization, aimed at applicability to cities worldwide, is high, necessitating extensive further development to suit local contexts (Figure 31).

As indicated by the red arrows in Figure 31, individual efforts are frequently unharmonised. This underscores the importance of tailored, localized strategies that consider the unique characteristics and needs of each urban and regional food system.

While frameworks and toolkits like those from the FAO are invaluable, their practical implementation requires significant adaptation and resources. The successful integration of UA into urban food systems hinges on coordinated efforts, local adaptability and sufficient administrative capacity. Further adaptation to local legislation, cultural circumstances and regional initiatives must be developed. This means that all political levels must be made responsible for inspecting the overarching endeavours and approaches and, building on this, developing a comprehensible framework with specific measures for the smaller geographical unit. Cities must strive to develop specific, actionable plans that bridge the gap between general guidelines and local realities.

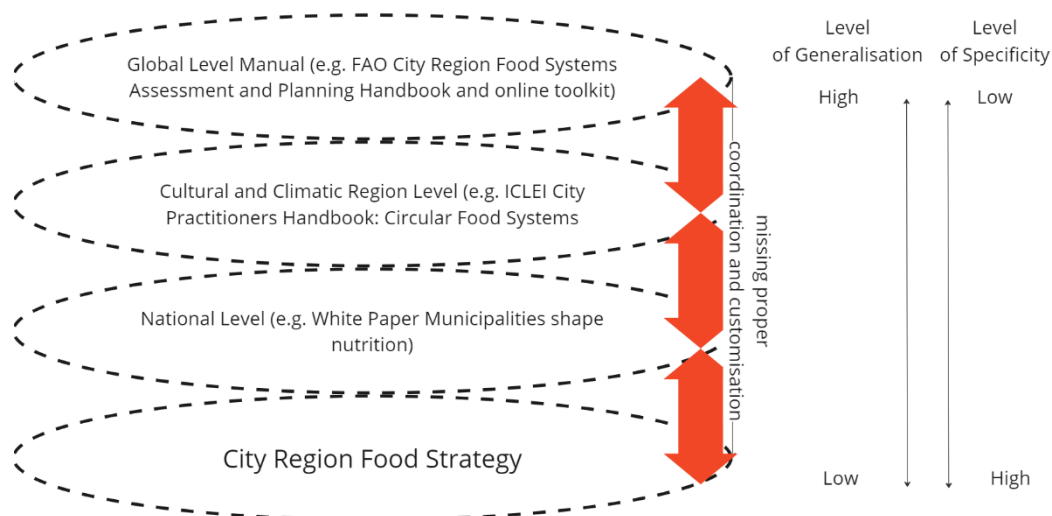


Figure 31: Level of Generation of Handbooks and Toolkits on different Levels

Economic Viability and Necessity for Funding

The economic viability of UA often hinges on the level of support and funding provided by local authorities and institutions. While some urban agricultural initiatives require external financial support and institutional backing to thrive, there is potential for certain business models within UA to achieve self-sufficiency. For instance, community-supported agriculture demonstrates that with proper planning and

execution, UA can generate enough revenue to sustain itself without heavy reliance on municipal support. This is also the statement of interviewee 18, who sees no need for direct support regarding funding of the local authority, as they work financially self-sufficient.

However, many UA projects, especially in their nascent stages, benefit greatly from initial funding and resources provided by local governments. This support can include grants, subsidies, or access to land, which help overcome financial barriers and foster the growth of urban farming initiatives.

Institutions like consumer cooperatives can play a crucial role by creating markets for UA products and fostering a direct connection between producers and consumers. Such collaborations not only support local economies but also enhance community engagement and awareness. The consumer community in Dresden is unique and is therefore also described in the leaflet as best practice to inspire other municipalities. Additionally, major supermarket chains have the potential to drive consumer demand for urban-grown produce, creating a stable market that could reduce the need for municipal support over time.

Limitations

One critical observation is the inadequate detail of the individual mechanisms. For example, the identified mechanism of supporting agricultural activities with fair access to resources. While this mechanism addresses barriers related to resource distribution and access, specific steps necessary to implement fair access and indicators to evaluate the implementation remain underexplored.

While categorizing agricultural methods helped simplify the elaboration, it also generalized the topic. The distinctions between methods aimed at different goals make it challenging to address them collectively. The study touched on numerous topics but could not delve deeply into all of them. Community-based agriculture and market gardens received limited attention due to time constraints.

The identified barriers and levers were not adequately, and qualitatively evaluated, making it difficult to assess their relative importance and impact. The survey revealed

some challenges in data collection, such as limited feedback despite widespread distribution. Additionally, responses often included preemptive answers in incorrect categories, indicating a need for a clearer survey structure. An overview at the beginning of the survey could mitigate this issue by guiding respondents more effectively. In addition, the number of interviews conducted was different in the two cities, which may have led to limited analyses in Glasgow and important aspects being overlooked.

Dresden and Glasgow were selected for this study due to practical considerations such as the spoken languages and their inclusion in the Master's programme. Additionally, the supervisors' strong connections with important stakeholders in these cities facilitated access to stakeholder. However, it is important to note that other cities globally are forerunners in UA, achieving high coverage of consumed fruits and vegetables produced within the urban area. Future studies could benefit from examining these leading cities to gather additional best practices and innovative strategies that could be applied in diverse urban contexts.

The interpretation of the interview results, the selection of interview partners and the categorization and clustering of barriers and mechanisms are inherently based on subjective judgments. Despite adhering to a scientific methodology, these processes involve personal perceptions and biases of the researcher. The selection of quotes, for instance in the leaflet, also relies on the subjective perception of the author. This subjectivity must be recognized as a limitation, as it may influence the representation and emphasis of certain viewpoints over others.

It was assumed that UA is beneficial for food supply; however, alternative solutions, such as the spatial separation of production (rural areas) and consumption (urban areas), were not considered. Planning laws and regulations could not be explored in-depth due to the limited timeframe and the goal of creating a generally applicable leaflet for Europe.

The leaflet presented in this study lacks substance in several areas, including planning regulations and specific indicators for measuring effectiveness. Detailed descriptions of individual measures were not included comprehensively, which was intentional to

maintain the leaflet's general applicability. However, this approach has led to a deficiency in actionable insights and specifics necessary for in-depth planning and evaluation.

5.3 Recommendations for Future Work

Explore economically viable, self-sufficient economic models of UA

As outlined in the discussion UA activities often depend on external funding or subsidies. Further research into the economic sustainability of UA models is essential. Understanding how productive communities can be supported and scaled effectively will help in assessing whether continuous local authority support is necessary. Ultimately, fostering self-sustaining business models within UA could reduce dependency on external support, making the initiative more resilient and sustainable in the long term.

Focus on Evidence-Based Benefits

Future research should prioritize providing evidence-based data on the benefits of UA. This data is crucial for garnering political support and advancing the UA agenda. Quantifying the positive impacts of UA on environmental sustainability, social cohesion and local economies can help convince policymakers and stakeholders of its value. One approach could be the R package 'ediblecity' that aims to 'estimate the potential of UA to contribute to addressing several urban challenges at the city-scale'. Thus 8 indicators that address urban challenges can already be quantified (Pueyo-Ros, Comas and Corominas, 2023).

Holistic Assessment and Joint Discussion

A comprehensive understanding of UA requires a joint assessment involving urban planners, sociologists, economists and other relevant stakeholders. Overcoming silo thinking is essential to fully grasp UA's multifaceted role in urban development. Interdisciplinary collaboration can provide a more nuanced perspective and identify broader benefits and challenges.

Enhanced Institutional Engagement

Efforts should be made to enhance engagement from institutions and streamline permitting processes. Simplifying these processes can make UA more accessible and encourage more initiatives. Institutions should actively support UA through funding, technical assistance and by facilitating access to necessary resources.

Policy and Legislative Support

Continuous development and adaptation of policies and legislative frameworks are necessary to effectively support UA initiatives. This includes providing land access, financial incentives, simplifying access to resources and ensuring that policies are conducive to UA activities. A supportive policy environment can help overcome barriers and promote UA's integration into urban planning.

Explore Synergy Effects

Linking UA with other initiatives, such as biodiversity monitoring, climate resilience programs and social welfare projects, can enhance its impact. Exploring these synergies can lead to more holistic and sustainable urban development. Integrated approaches can amplify the benefits of UA and contribute to broader urban sustainability goals.

Explore and Evaluate Connections Between Stakeholders

Exploring the connections between different stakeholders, especially network institutions and evaluating them is essential for improving UA frameworks. The interviews revealed good coordination within the Dresden Nutrition Council, yet an absence of crucial players was noted by some interviewees. Evaluating the current state of collaboration and identifying opportunities for improvement can be highly beneficial. This includes assessing the roles and effectiveness of existing network institutions and ensuring that all relevant stakeholders are included and actively participating. Addressing these gaps can lead to a more cohesive and supportive network, ultimately enhancing the success and sustainability of urban agricultural initiatives.

Better Coordination Across Political Levels

The alignment between different political levels in terms of guidelines or funding is often inadequate and should be better coordinated. While the EU supports many individual projects, effective implementation at the municipal level is lacking. Ensuring that policies and funding streams are aligned across local, regional and national levels can enhance the effectiveness of UA initiatives.

Addressing the Underrepresentation of Food Systems in City Planning

The search for solutions to improve UA activities often highlights the underrepresentation of food systems and agriculture in city administrations. Investigating the reasons behind this underrepresentation could uncover leverage points that might need to be addressed by state or federal governments. Recognizing and promoting the benefits of a resilient and sustainable city-region food system can help integrate UA more deeply into urban planning.

Viewing UA as Community Empowerment

City administrations often view UA merely as gardening or peri-urban conventional agriculture. A shift in perspective is needed to see UA as a tool for community empowerment. Proactively providing communities with land and resources to develop local, sustainable economic sectors in collaboration with supermarkets and other stakeholders can be a valuable step towards sustainable transformation. This approach can support local food production, create jobs and foster a sense of community ownership and resilience.

Assessing UA's Contribution to Food Supply for Evidence-Based Revisions in Official Planning Documents

A detailed research study, extending beyond the approaches covered in this thesis, into the planning laws and regulations that govern UA would enable a more informed decision-making process, recognizing the multifaceted benefits of UA beyond its spatial impact. In Germany, the regional and land use plans still treat UA primarily as a land use category, focusing on its effect on the landscape rather than its contribution

to the local food supply. The analysis sections of these planning documents do not address the role of UA in self-sufficiency. Consequently, it is essential to determine UA's contributions to the local food supply to better balance competing land uses.

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APPENDIX

A1 Catalog of Questions for Interviews

Personal Background and Opinion

Who are you and what is your role in the city? Do you have agricultural experience?

What is your perception of urban agriculture in your city, regarding the local government and the people?

Which key challenges does your city need to deal with now and in the near future?

Legal Matters and Economy

Who owns the Food growing land and how is the area designated?

What legal form of community exists?

How are initiatives economically structured and do they create regional/local value chains?

City Matters

Does your city have a strategy how to organise the food system from producing crops to recycle waste?

Which agricultural methods exist in your city?

What reputation does agriculture have in your city? Is there a conflict of interest?

Why do you think urban agriculture is less emphasised in urban development, as air or water aspects?

Do you have institutions (public or private) that try to increase the sustainability of the food system such as food sharing etc.?

In which departments or areas is urban agriculture discussed?

Benefits

Do you have programs in the city promoting biodiversity or microclimatic aspects?

Do you believe an urban agricultural initiative could tackle social isolation, inclusion, justice and bring people together?

Where do you apply environmental education in your city?

Challenges, Needs and Levers

Do you know any networks or initiatives in your region? Would you be interested in being involved?

Are you missing inspiration or help with enabling urban agriculture?

Which legal requirements make it difficult to support UA activities?

What are the biggest challenges you fear in implementing or supporting urban agriculture projects? Can you go into detail? Could you prioritise them?

What speaks against implementing urban agriculture? Have you heard of or had bad experiences?

Do you have offers to promote, support, or inform future interested people?

How can we build bridges between Bottom-Up and Top-Down initiatives?

Are there UA activities you initialised, led or plan to implement?

Are there initiatives you supported, collaborate or plan to promote in any way?

What levers in funding, permitting and accessing land exist?

A2 Tableset of Identified Challenges and Barriers

Funding and Financial Constraints

Quotation	Example	Reference	Encounter ing of Communi ty	Challenge	Source of Data
<p>“ The city actually lacks a framework like the one you have developed” (5) “ We spend an awful lot of time seeking funding in supporting in [the urban agriculture activities] what we are doing in Glasgow” “ Having access to increase resources would certainly make life a whole lot easier. The time we spent securing funding, securing budget could be utilised in developing and growing spaces” “ If we would increase budget, if we would increase resource, then we could be accelerating urban agriculture in my opinion” (9), “ [Employees in the city administration] they are well-disposed towards us, they just don't have the resources” (8) “ Major: ‘ we have to fight for each tree’ ” (8)</p>	<p>decrease in funding in the last 15 years, need for analysis and understanding</p>	<p>5,8,9</p>		<p>Diminished Financial Resources in Local Councils</p>	<p>Interview</p>
	<p>support for agroforest</p>	<p>5</p>		<p>Inadequate Funding for Sustainable Agricultural Practices</p>	<p>Interview</p>

<p>“ It would be the perfect follow-up to Olga, so that such an office would continue to work on the topic of nutrition or agriculture. But I honestly don't see it, so that the funds are freed up for it or that it is somehow a priority topic, that you say we're going to do it, we're going to put it off, but then it has to go through the city council first and then everyone here in the house has to say yes, yes, that would be important and I just don't see the support for it, unfortunately.” (5)</p>	
	EU funds usually for 7 years
5	7
	Nan McKay Community Hall Food Growing Space, Shetleston Community Growing Project, Interkultureller Gemeinschaftsgarten Prohlis, Kleiner Garten, Apfelgarten Strehlen e. V.
Insufficient Focus on Investing in Nutrition and Food Systems	Unflexible and Complex Funding Schemes
Interview	Interview

Land and Space Availability

Quotation	<p>“ The pathways to access are really long and complicated and obscure and are reliant on individuals who have an understanding what is required” “ A lot of the time even when they do manage to give access to land, there is the difficulty of obtaining a lease that protects the rights to be on the land” “ The process itself is long, so it's we've been in that process for three years now and we're just in the third stage and a lot of what they ask for is very involved. So we have to do a community engagement, to assess the needs of the local community are and whether they are interested in having an urban farm. We have to create legal structures. And for the market garden, we also have to create a business plan to demonstrate that it's able to sustain itself. And we also have to engage with local connectors to get their support. It's complicated.” (10) “ the legal structures can be very supportive [...] but it can equally be as much of a barrier” (9)</p>					<p>„they assumed that only if you are an association you are working for the public good“ (4)</p>
Example	Founding of co-operative is expensive, association legally requires 7 members including specific positions (3)		Accessibility must be			
Reference (ID)	10	7	3	3		
Encountering of Community Gardens	the Rumpus Room Yard, Strieskanne, Interkultureller Gemeinschaftsgarten Prohlis, Apfelgarten Strehlen e.V.					
Challenge	Prolonged and Complicated Procedures for Land Access	Outdated Legislations	Restrictions on Public Land Use	Community type determines access to land and funding		
Source of Data	Interview	Interview	Interview	Interview		

	<p>“ We have often tried to redesignate the areas differently, but it's not that easy” (4)</p>	<p>“ when people have an idea and want to implement something like this, they are faced with a mass of regulations and paperwork, especially when you have a new product [like algae] or method [aquaponic]. The page on how to deal with this is missing in the suitable handbook therefore initiatives get a ‘no’ from the relevant administration” (2)</p>			
4	<p>Definition of land type sets the price, which could be</p>	2			
	<p>Challenges in Land Reclassification</p>	<p>Lack of Regulatory Support for New Farming Methods</p>	<p>Contamination and Poor Soil Quality</p>	<p>High leasing costs of land</p>	<p>Finding usable land</p>
Interview	Interview	Interview	Interview	Survey	Survey
		<p>Shettleston Community Growing Project, the Rumpus Room Yard, Strieskanne, Interkultureller Gemeinschaftsgarten Prohlis, Apfelgarten Strehlen e.V.</p>	<p>the Rumpus Room Yard, Interkultureller Gemeinschaftsgarten Prohlis, Apfelgarten Strehlen e.V.</p>	<p>Interkultureller Gemeinschaftsgarten Prohlis, Kleiner Garten, Apfelgarten Strehlen e.V.</p>	

Bureaucratic and Structural Hurdles:

Quotation		<p>“ Nevertheless, the land consumption is so agriculture is still losing ground near the cities, because the cities are getting bigger cities have their demands and you don't need to fool yourself.” (7) “Energy demand is getting higher and higher, transformer stations have to go somewhere.” (7)</p> <p>“ There is an insanely high utilisation pressure” (6)</p>		<p>“ It is relatively difficult to find areas, especially roof areas, because questions about insurance come up very quickly” (2)</p>
Example	allotment gardens Dresden	post industrial legacy of Glasgow	Time-consuming search for suitable roof surfaces	
Reference (ID)	1	2,4,6,7,9,10	3	2, 4
Encounterings of Community Gardens				the Rumpus Room Yard, Strieskanne, Apfelgarten Strehlen e. V.
Challenge	Speculative Investments and Tax Saving Models in the	Land Constraints leading to Conflicts of Interest	Untapped Potential of Modern Agricultural Spaces	Concerns Over Legal Barriers of Lands and People
Source of Data	Interview	Interview	Interview	Interview

	<p>“ Getting long-term space is indeed difficult” (6) “ At first it was said that there would be no playground for the time being because there was money available and then it suddenly happened very quickly” (6), “ The second hurdle for community gardens is that they only receive leases from the city and these areas can be used for development at any time if the city decides that these areas should go” (8)</p>	<p>"We have applied for non-profit status [...] we are all volunteers, we are doing something for the climate, we have a blatant educational effect [...] this (non-profit status) would give you much more funding and the tax office story when you do your VAT would also be much more favourable, which would help a small organisation like us. Because we produce and have a harvest that is more or less given to the members who pay for it [...] you fall under an economic association at the tax office and don't get charitable status." (3)</p>	<p>“ Only a farmer is allowed to buy agricultural land, this is regulated in the Land Transfer Act in Germany and if agricultural land is sold, then the farmer must sell to a farmer, so to speak.” (7)</p>
6, 7, 8	<p>Little Commitment leads to little security for the people, which is not favourable in agriculture, limited lease period,</p>	3	7
	<p>Little Commitment to Long-Term Land</p>	<p>Unfavourable forms of community</p>	<p>Barriers accessing Land as a City</p>
Interview		Interview	Interview

	Founding of co-operative is expensive, association legally requires 7 members including specific positions (3)
3	
	Shetleston Community Growing Project, Seniorengemeinschaftsgarten der Volkssolidarität Dresden e.V. Anfelearten
	Complexities in Forming Community Organizations
Interview	

Community and Volunteer Engagement

Quotation	Example	Reference (ID)	Challenge	Source of Data
“ Otherwise, it's always a challenge to find volunteers who are willing to put in the time and effort without receiving much financial reward” (6), “ The main hurdles are always finding new volunteers” (8)	Many young people, often students, are involved temporarily due to their transient nature. Members often left when realizing the hard work involved, not just leisure activities. (1) After rush of enthusiasm people drift away, Losing key personalities (9)	1,6,8,9	Challenges in Recruiting and Keeping Volunteers and Staff	Interview
“ We had corona, everything has fallen asleep, so people are still not participating in the workshops the way they did before corona.” (8)	Structural and Organisational Deficiencies (9)	8,9	High Susceptibility of Volunteering Systems	Interview
	Encounterings in Community Gardens			
	Strieskanne, Kleiner Garten			

<p>“ We have offered them the possibility, if we have free spaces, for example, to include them in our garden sites. This has only happened in one case, otherwise these possibilities have not been taken up because on the one hand they reject these structures, these obligations and on the other hand of course they have to face the allotment gardeners and their counterparts who for their part are of the opinion that an allotment garden has to look like something. And that's the way it works and community gardens are not quite as tidy as allotment gardeners were perhaps used to 30-40 years ago.” “ The nutrition advisory board is also perceived as difficult by our people, because there was a lot of idealism at the beginning, but over time it has become increasingly clear that everyone wants to realise individual interests and that is not entirely in our interests.” (1)</p>	<p>“ In Glasgow, there's a lot of asylum seekers and refugees who have a lot of knowledge, interests and willingness to engage in food growing activities, but they don't necessarily have access to spaces. [...] bureaucratic processes are hard. It's even harder if English isn't your first language and you don't necessarily have the computer skills to be able to fill in long, complicated forms. They are often sort of funnelled into specific processes that don't necessarily connect up to market gardens or to community gardens even. So they don't necessarily know that those resources are available?” (10)</p>
<p>Tensions between allotment gardening and community gardening. No endeavors of allotment association to enter into major collaborations with the Nutrition Council (1)</p>	<p>Homogeneity ind Community Garden, Refugees and Asylum seekers in Glasgow (10)</p>
<p>1,7</p>	<p>10</p> <p>Shetleston Community Growing Project, Kleiner Garten, Apfelgarten Strehlen e.V.</p>
<p>Interpersonal Conflicts and Differing Opinions</p>	<p>Homogeneity and Accessibility Issues</p>
<p>Interview</p>	<p>Interview</p>

		<p>“ if you're used to having a certain diet, it then takes a little some time to shift your diet because your body is not used to it. So even though they might know that actually they should be eating healthier food and that an apple is better than eating a packet of crisps. Your body is rejecting the apple and actually craving the crisps.”</p>	<p>“ My fear is that we lose key personalities, that communities dissolve, end up losing enthusiasm” “ Individual persons are key drivers” (9)</p>
in community gardens (6)	Underprivileged areas are used to processed food and fresh local food was not available in the past(10)	Untrained Farmers’ Responsibility for Volunteers (4)	
6	10	9	
the Rumpus Room Yard			
Lack of Food Knowledge of Volunteers	Food Habits and Biological Adaptation	Dependency on individuals	
Interview	Interview	Interview	

Public Awareness and Acceptance

Quotation
Example
Reference (ID)
Encountering in Community Garden
Challenge
Data Source

	<p>“ the way people eat in Glasgow, especially in quite poor areas is that there’s often food deserts, so people are reliant on processed food and they don’t necessarily know how to prepare fresh produce” (10)</p>	<p>“ So many people that are entirely disconnected from the food that food really does not matter highly in their thinking and I can understand that, we have high levels of poverty in the city in areas of multiple social deprivations across the city. And if you worry how you got to get a meal on a table for your two or three hungry children while you are a single parent who is trying to work and keep up everything else going it is not even possible” (9)</p> <p>“ You can eat almost everything that grows out there, sure, a few things are poisonous, but a lot is edible. People’s knowledge about it is zero, the risk of confusion is high and the education is missing, or maybe not</p> <p>Raising awareness, Raising disconnection from the food, Poverty and deprived social areas make it impossible to care about food growing, (9)</p> <p>Public knowledge on edible plants is generally low, High risk of confusion and lack of educational initiatives in the community (9)</p>
10		9
Lacking Awareness for healthy Food		Societal Disconnection from Food
Interview		Interview

<p>“ Why do I say that Urban agriculture is less emphasized in urban development as air or water aspects? Because people really do not understand the value of the soil” (9)</p> <p>“ Most people don't even know what it is (Vertical Farming).” (2)</p> <p>“ The awareness that this is finite [land consumption] is not there. Because what we grow and where we get it from will soon no longer be possible.” (2)</p> <p>“ If you buy a tomato from Rewe, an organic tomato, it is usually from Almeria in Spain, where it is grown under giant plastic football pitches. That has nothing to do with sustainability, even if we as consumers might think it does. (2)</p> <p>People dont understand the soil. (9)</p>
<p>2, 9</p>
<p>Lack of understanding for the environment</p>
<p>Interview</p>

<p>“ There are people that really do not want anything into that, they would much rather buy a plastic packaged salat leaves from a supermarket growing in Spain [...] rather than just put a spate in the ground and start their own growing.” (9)</p>	<p>“ Yes and conventional farmers shouldn't be demonised either, they are subject to their own constraints and have to take these funding and framework conditions into account somewhere, but they also love the land on which they work and are not just after some subsidy payments, they really work on this land and often find it a bit sad how they are seen by the general public.” (7)</p>
<p>People just want to keep their food consuming behaviour by buying packaged food from other countries. (7,9) People value freedom of choice in their shopping and lifestyle decisions (9)</p>	<p>Polarising positions in Glasgow towards UA – love growing spaces or see it as derelict shanty towns, Lacking awareness of people that are not engaged in growing, Perception of negative impact on their houses, Broken window effect: derelict farms lead to bad reputation of UA. (9) Conventional farmers should not be demonized, They face their own constraints and adhere to funding and regulatory frameworks, They care deeply about the land they work on, Often feel misunderstood or unfairly portrayed by the public (7)</p>
<p>7,9</p>	<p>7, 9 Shetleston Community Growing Project, Apfelgarten Strehlen e. V.</p>
<p>Traditional Food Consumption Habits</p>	<p>Controversial perception of urban food growing</p>
<p>Interview</p>	<p>Interview</p>

<p>“ For example, I have the meadows with me and the shepherd regularly no longer wants to take over certain areas at all, because people let their dogs onto these meadows, they defecate everywhere and in the end the sheep die from the dogs' experiments, which carry bacteria that sheep cannot tolerate.” (9) “ No one is interested in a freshly tilled field today” “ if vegetables are grown somewhere, then you just take some with you. These are the kind of appreciation and respect things that we have to work on so that people understand again.” (9)</p>
<p>Fear of vandalism (3) Issues with dog owners not controlling pets on fields, leading to sheep deaths from bacteria. Farmers struggling to use contaminated fields, affecting hay quality, Lack of respect for freshly cultivated fields; drone enthusiasts and dog walkers contributing to trampling. Vegetation often disturbed or taken without permission. Need for greater appreciation and respect for agricultural areas. Stopped free access for orchards as People freely taking and damaging property, such as by prematurely picking apples and breaking trees due to lack of proper equipment (9)</p>
<p>3,9</p>
<p>Shetteston Community Growing Project, Apfelgarten Strehlen e.V.</p>
<p>Vandalism and Decreasing Respect and Awareness for Agriculture</p>
<p>Interview</p>

Technical and Environmental Constraints

Quotation	Example	Reference (ID)	Challenge	Encountering of Community Garden	Source of Data
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<p>“ Actually, after the pandemic, a lot of seed funding to promote new organisations was set up, but there wasn't any support available for existing organisations, who were also struggling and so they would eventually have to fold, had to fold” (2) “ Rents for allotment gardens are lower than community gardens” (8)</p>		<p>„I suppose the key challenge is that the city has is the availability for land for urban agriculture. Generally talking soil for growing. Glasgow is post-industrial heritage does not provide too much land of an agricultural classification that is a value. In fact, there is not a lot of registered agricultural land within Glasgow.“ (9) “ If we want to build up a completely resilient food supply, we need to look at how we can cap the winter season.“ (2)</p>	
<p>Seed distribution during Covid</p>	<p>more drought</p>	<p>13 to 14 weeks growing season in Glasgow, Availability of land for agricultural activities (post-industrial legacy) Limited season duration, high energy consumption for indoor production, Need for big amount of equipment</p>	<p>Struggle for resources and infrastructure (water and electricity)</p>
<p>2</p>	<p>5</p>	<p>2,9</p>	<p>2,6</p>
<p>Unfair distribution of resources (2)</p>	<p>Climate change effects and weather events (5)</p>	<p>Limited Season duration (2,9)</p>	<p>Struggle for Access to Resources like Infrastructure and Equipment (2,6)</p>
	<p>Nan McKay Community Hall Food Growing Space, Shettleston Community Growing Project, Interkultureller</p>		<p>Strieskanne, Interkultureller Gemeinschaftsgarten Prohlis, Apfelgarten Strehlen e.V.</p>
<p>Interview</p>	<p>Interview</p>	<p>Interview</p>	<p>Interview</p>

Administration Coordination and Certification Issues

Quotation	<p>“ At the moment there is a mismatch between in terms of what people hope to achieve and what is feasible given the internal structures” “ There is a lot of energy and excitement from a grassroots perspective, that people wanting to grow food” “ although there’s a willingness and a lot of enthusiasm from individuals to set up these spaces, there’s lots of limitations” “ I think we need more spaces to engage with people, where Council officers and those who are making decisions have the opportunity to engage with communities and those who are doing on-the-ground work.” “ Yeah, there isn’t a shared understanding at the moment. Amongst all actors” (7) “ If you organise any fancy days, of course you (political representatives) administration] are just totally tedious” (7) “ If you organise any fancy days, of course you (political representatives) will come to the community gardens with a political delegation and present them, because they are somehow community places, open places, environmental education places, ecological places.” (4) “ The problem in the city and state administration is that these issues are still not being taken seriously enough, such as drought, the water balance in Germany, biodiversity in our own fields, but also where we get our vegetables from.”</p>
Example	<p>Need space space where grassroots initiatives stakeholder and City Council comes together (10)</p>
Reference (ID)	<p>4, 7, 10</p>
Encountering of Community Gardens	
Challenge	<p>Mismatch of understandings and needs between urban agriculture activities and local council</p>
Source of Data	<p>Interview</p>

<p>“ A major topic is certainly also the juxtaposition of the existing alternatives” (2)</p>	<p>“ there’s an acknowledgment that these initiatives need to be brought together at a strategic level” (10), “ I think it is also quite difficult to do the internal structural changes that are needed at a local governments level.” (10)</p>	<p>“The problem with vertical farming is that it is usually hydroponic cultivation, i.e. without soil, which also means that you can’t get an organic label. I think if you want to sell sustainable food [...] you have to take the target group with you and they say ‘it doesn’t even have an organic label!’” (2)</p>
<p>2</p>	<p>Need for network on a strategic level (10), Food growing team is within the department of parks and leisure but it needs to be dealt with outside of the scope of parks. Interconnection with food waste or procurement is needed. GCFN has not enough support in place to be able to engage in all</p>	<p>2</p>
<p>No weighting of the different agricultural methods and discussing</p>	<p>Internal Structures within administration (6,10)</p>	<p>No organic certificate with Vertical Farming (2)</p>
<p>Interview</p>	<p>Shertleston Community Growing Project</p>	<p>Interview</p>

	Farmer, agricultural companies, fishing club and hunters' organisation are missing in the exchange with the food council (7)
7	
	Nutrition Council lacks Key Stakeholders
Interview	

Sustainability and Economic Viability

Quotation	“ But the products don't come to Dresden by the direct route, because it's all about processing stages, i.e. the value chains themselves [...] The big problem is that there are only centralised locations for many processing steps, for example centralised mills. All the grain is transported to somewhere in central Germany, where it is milled and then distributed nationwide, so processing levels are a huge issue.” (8), „the biggest hurdle is really the regional structures that do not yet exist“ (8) “ but it's easier for them [local producers] if a lorry comes and picks them up and they then get Sum x” (8)
Example	Many farmers sometimes lack ideas and confidence in promoting their products or finding markets (5)
Reference (ID)	5,8
Encountering of Community Garden	Shetleston Community Growing Project, the Rumpus Room Yard
Challenge	Distribution Network and Connection of local producers and markets with viable prices (5)
Source of Data	Interview

<p>“ And so for me, it’s very important that cities own agricultural land, because if private companies only want to get what they can out of it, then instead of growing crops, for example, they want to put up PV land.” (7)</p>
<p>Retail chains like Aldi, Lidl, Netto, etc., buy agricultural businesses but not the land itself. They become majority shareholders in the farming companies, owning the agricultural land indirectly. Private entities may prioritize profit, converting farmland to solar installations rather than cultivating crops.</p>
<p>7</p>
<p>Power of big players (7)</p>
<p>Interview</p>

<p>“ If you start to farm regeneratively, it [the yield] will probably fall at first and then get better in the long run because it covers many ecosystem services that you can't yet calculate or count and can't convert into monetary value and that hasn't yet sunk in that you first have to invest at the beginning, unfortunately” (5)</p> <p>“ Yes, that's right, the biggest problem so far has been the economic viability” (2)</p> <p>“ you get €250 rent from the farmer for a hectare of average farmland. if you put one of these PV systems on it, you get three and a half to €4,000 without having to negotiate much and you can already see that the pressure on agricultural land is enormous, also an economic pressure” (7), “ The producers don't feel they are in good hands and we don't really have the opportunity to bring regional producers to the weekly markets and make them more attractive again” (8), “ How can a small supplier serve 4-5 catering establishments, which also have a certain idea of products and also need a certain degree of reliability?” (8)</p>
<p>Apprehension about agroforest due to concerns about machinery width and uncertainty about how to manage these changes effectively (5)</p> <p>Organic products are not affordable for people who would need less processed food. (9), Vegetable box rather expensive, wages for employees too low, must be subsidised more fairly, Economic model is not sustainable (4)</p>
<p>2,4,5,7,8,9</p>
<p>Unlucrative sustainable agriculture and unfair subsidies (5,7,8,9)</p>
<p>Interview</p>

<p>“ What is a huge issue is what additional materials you always need. [...] They already have all the environmental influences. It is necessary to look at the life cycle assessment of these things [...] You have to try to achieve circularity in the additional materials.”</p> <p>“ If we want to integrate the topic of vertical farming in Dresden, we have to somehow understand and integrate it into the food system. We need to understand the fields of action and the supply chains.” (2)</p>	<p>“ Financially, it is fundamentally difficult for many clubs. You always have to write funding applications. The Initiative “ Alte Gärtnerei” in particular has to fight for its continued existence as a location” (6)</p>
<p>2</p>	<p>6</p> <p>Nan McKay Community Hall Food Growing Space</p>
<p>Environmental Impact of Materials (2)</p>	<p>Fundamental Viability of Community Gardens</p>
<p>Interview</p>	<p>Interview</p>

A2 Tableset Identified Mechanisms and Levers

Funding Mechanisms

Quotation	Example	Reference (Interview ID)	Food Growing Strategy (Action)	Reference	Mechanism
“ The city itself also supports the community gardens both financially and by drawing up contracts for the use of individual areas” (1)	Council: Glasgow Food Systems Fund (Capital Funding for Infrastructure and Equipment) to set up new Projects (10)	1, 10	9	https://www.glasgowlive.co.uk/17-local-food-projects-receive-28665106 , https://www.glasgow.gov.uk/article/4056/Let-s-Grow-Together-Fund	Financial Support by the City Council
	government tax incentives for fruits and vegetables to promote healthy diet Consider implementing taxes on unhealthy items to influence behavior.	7			Tax levers promote healthy diet (7)

Permitting Processes

Quotation	Example	Reference (ID)	Mechanism
			Glasgow City Food Plan

<p>“ We have given ourselves a certain code that we want to try, if we can, to give smaller farmers a chance, i.e. those who don't farm 3,000 hectares. And those who farm organically also have an advantage.” (7)</p>	<p>“ So you would have to somehow give the cities the opportunity to buy agricultural land so that they can lease it to farmers, but only if the farmers don't want to buy it themselves, because otherwise the farmers can't keep up with the price war.” (7)</p>
<p>Code of conduct aims to support smaller farmers (those not farming 3,000 hectares) (7)</p>	
<p>7</p>	<p>7</p>
<p>Prioritisation for small urban-agricultural associations</p>	<p>Easy access to agricultural land for cities to distribute it fair</p>

<p>“ We stipulate various things in lease agreements that mean erosion protection, so to speak, water protection, for example, only to plough crossways to the slope, even if it is less economical in terms of machine width to be as sensitive as possible.” (7)</p>
<p>Organic farmers are given an advantage. Lease agreements include conditions for erosion and water protection (e.g., ploughing crossways to slopes). (7) Aim to prevent continuous production of only rapeseed and maize. Restrictions to avoid monocultures in a single area. Ensures diversity in crops. (7) Implementing guidelines for soil management in agricultural leases. (7)</p>
<p>7</p>
<p>49, 55</p>
<p>Prioritisation Guidelines for Sustainable Methods</p>

<p>“ We also occasionally check whether the soil is getting into difficulties due to cultivation and then you can sometimes find that a tender for agricultural land is cancelled because soil improvement measures are due first” (7) “ for example, we have had a glyphosate ban for our farmers since 2016, I think, otherwise you can't wait.” (7)</p>		<p>“ Requirement in the allotment garden law for horticultural cultivation of the area” (1)</p>
<p>Regular checks on soil condition; tenders may be canceled if soil improvement is needed. Glyphosate ban for farmers since 2016 (7)</p>	<p>Allocating a small percentage (around 5-7%) could enhance land value without significantly impacting farmers.</p>	<p>The allotment development concept in Dresden includes a section on community gardens. (1)</p>
<p>7</p>	<p>7</p>	<p>1</p>
	<p>50</p>	
<p>Regular checks on soil condition and ban of environmental harmful fertilisers</p>	<p>Include sustainable cultivated land into compensation and biodiversity measures</p>	<p>Establishment of food cultivation in guidelines</p>

<p>“ The city itself also supports the community gardens both financially and by drawing up contracts for the use of individual areas” “ The city and we and I can speak for myself, are working quite closely together in this area.” (1) “ The aim was to find an alternative area and the city worked very closely with us. Together with the waste management and green spaces department, we searched for and found a new area together” (6)</p>	
	<p>Potential Sites identified in City food plan (9)</p>
	<p>9</p>
	<p>2</p>
<p>Find Replacement site in case of interest conflict (1,6)</p>	<p>Identify potential future agricultural sites</p>

	<p>Online Map that invites people to request a certain land, that will be checked by the council (soil condition, Infrastructure, topography, fencing, accessible) (went live in April 2024 (little analysis from previous model) (9)</p>
<p>9</p>	
<p>5,11</p>	
<p>Offer participative platform for finding new spaces</p>	

<p>“ So I believe that this co-operative idea and the idea of solidarity-based agriculture is a good thing if it gets a bit bigger, so to speak, with more land, so that they can produce so much that it doesn't cost quite so much, so that it's not just reserved for academics to be members. I know you also have a different tariff for poor people, which is good, but only a few people who are a bit enthusiastic do it. That would simply have to become more widespread and continue. I would also like to give more urban land there. The conventional farmer can cope with that, even if there are 50 or a hundred hectares less available for it.” (7)</p>	
7	
	3
	18
<p>Compare different agricultural methods and decide which deserves support</p>	<p>Considerations of growing spaces in new developments of the City Development Plan</p>

Strategic and Coordination Mechanisms

Quotation	Example	Reference (ID)	Mechanism
“ The fact that the Food Council has been operating more as a loose network since 2017 and is only now starting to work with someone full-time, there is a face behind the whole thing and you can really work on something in a targeted way without volunteers writing applications until 3 a.m. at the weekend” (8)	City has hosted “Most Beautiful Allotment Garden in Dresden” since 2005. Promotes competition and community engagement in gardening.	8, 10	Introduce network institutions with employees
“That (a food strategy) would have been the OLGa’s dream output, so to speak, to at least push this forward [...] We would like that too” (5)	OLGA	5	Introduce Research Institution
“ But I think it’s good to have a strategy and to say that you’re implementing targeted offers to get people on board” (7)	collaboration between UFER and city council for needs of community gardens (6)	6	Strengthen Collaboration between City Council and relevant Institutions
	GCFN or Nutrition Council itself	12	
	Glasgow Food Growing	12	
	Glasgow City Food Plan	6	
	Reference		
	Introduce Competitions to foster community engagement		

	<p>“ We also saw our mission as bringing the [players] together and then, for example, generating added value for each other, such as a farmer between Leipzig and Dresden who grows lentils, we have now networked with a caterer here in Dresden who now makes lentil falafel instead of normal falafel” (5)</p>	<p>“ A part of the program in Drumchapel was linked with the biodiversity colleagues to put a five years monitoring program in place [...] where on an annual basis to see how the site is impacted on biodiversity and it is has been massively positive. We have seen an increase in pollinators we have seen an increase in some of the bugs coming in and an increase in some of the flora that was rising on the sites.” (9)</p>
5,7	5	9
	9, 33, 37, 45	
Introduce a food strategy	Connect local producers with consumers	Explore further Synergy Effects by linking other

	“ We need to strengthen the sense of togetherness and community, then the rest will come naturally.”	
website for people for know how, funding, land access etc. (9)	City moderates between community gardens and allotment gardens, involving different groups of people. Regularly participate in exchanges with food council involving diverse partners, including groups interested in edible city initiatives and community gardening. (7)	Proposed future solutions: Initiative includes giving each child a garden bed in daycare and taking home a plant. Parents learn sustainable practices, reducing reliance on imported foods. Promotes self-sufficiency and local food consumption (7)
9	7	7
8,10		
14	15,25,30	1, 19, 20
https://glasgowgis.maps.arcgis.com/apps/Instant/basic/index.html		
Provide Accessible Information on the Website regarding Know-How, Funding, Land Access and Resources	Moderate between different agricultural players (7)	Focus on Nutrition Education Programs for Children

		“ Yes, well, as a city council you can of course also set yourself certain guidelines, for example you could say that you only use regionally produced products for receptions, public events, public events, etc.” (7)	“ Could smaller decentralised solutions work?” (8)	“ we have a huge consumer community I don't even think this exists somewhere else”
Expanding solidarity agriculture to increase production and lower costs, making membership inclusive beyond academics. (7)				
7	7		8	8
	27			
Support Community-Based Agriculture	Role Model for citizen as city council by providing local Food on events	Decentralised Food Processing Systems	Introduce Consumer Societies	

Local council works with community gardens to find suitable area and water access (6)				
6	4	14, 15		
			16	5
Support activities with access to resources	Encourage and Support Housing Associations with Growing spaces in their plans	Monitor Implementations and Keep Reports about the Food Growing Activities Updated	Use Crop Growing as Support Areas of Socio-Economic Disadvantages	Achieve Policy Change at different Polit-Levels based on evidence gathered

16	28	71		
Edible City Dresden			Survey	
Incorporate edible plants and fruits into council planting	Consult large canteens of public institutions and built collaborations to use local food	Ensure schools have access to growing spaces	Raise public awareness, through events and workshops	



Enhance and Enable Urban Agriculture

A manual for local authorities

Western societies are shifting from efficiency-oriented, pre-cooked meal consumption to more purpose-oriented lifestyles. Environmental awareness is trending. As cities set the course for future direction, local authorities need to focus on enhancing and enabling urban food-growing activities.

This leaflet is part of the results of a master thesis that investigated the levers a city can use to achieve better conditions that eventually lead to more urban agriculture activities.

The right picture was derived from the wishes and dreams expressed by interviewees. Pages two and three provide an overview of the topic and showcase the core elements and facets of urban agriculture, which can be seen as the needs of crop producers. The infographic on page four serves as a recommendation manual, outlining the course of action and the different levers needed to enhance and enable urban agriculture. The last page conveys an understanding of which levers overcome specific hurdles.

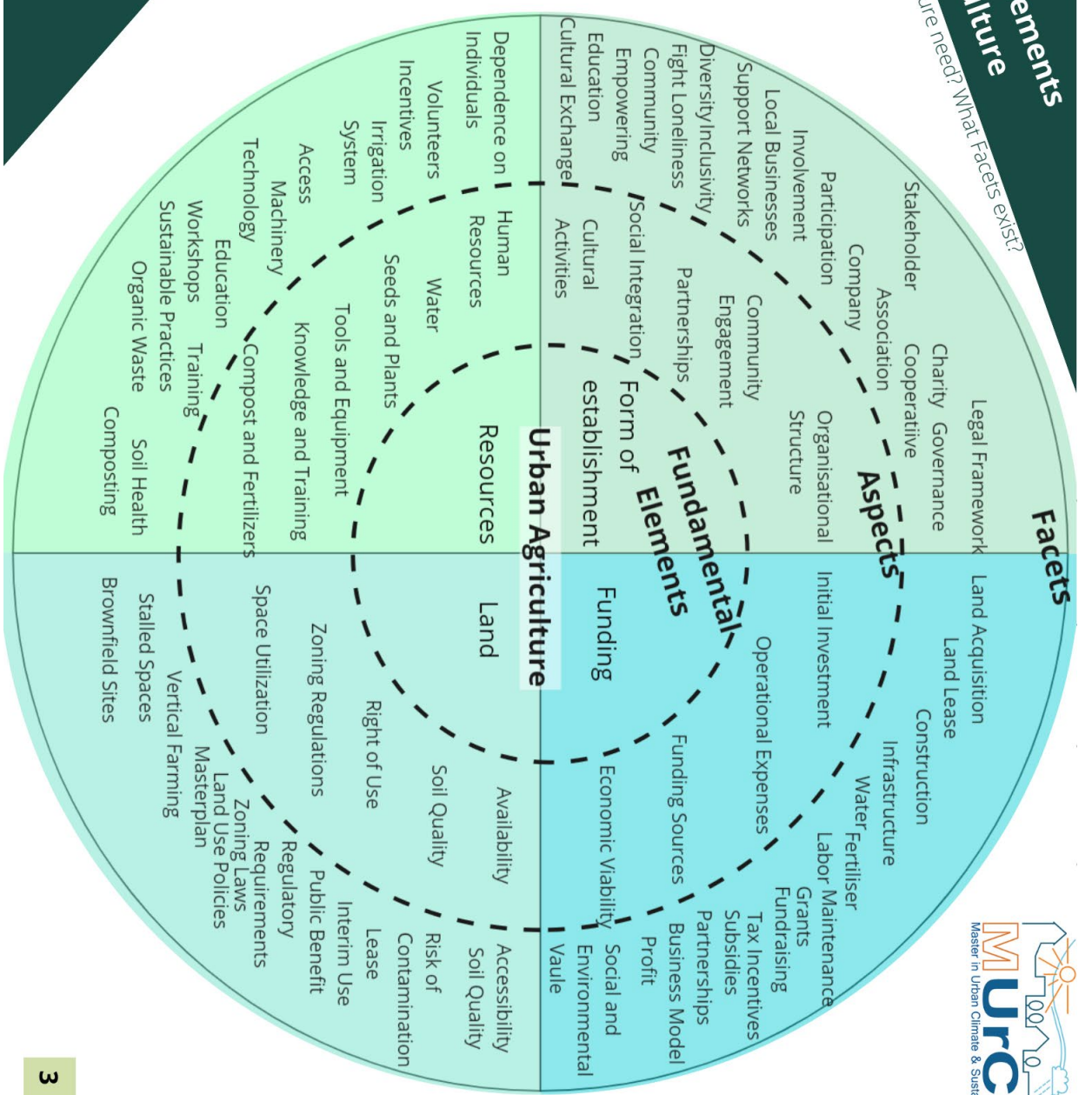
Page 2 and 3: Information
Page 4: Recommendation for Action
Page 5: Understanding



Fundamental Elements of Urban Agriculture

What does Urban Agriculture need? What Facets exist?

This leaflet refers to all urban agricultural methods of food production. The thesis divides into three categories: Zero Acreage Farming, Urban Gardening and Peri-Urban Agriculture. This graphic attempts to generalise the elements and facets of all three categories.



Responsibilities Endeavours

healthy environment

Legislatively Adjusting

- Include sustainable cultivated land into compensation and biodiversity measures
- Introduce Guidelines on sustainable farming methods
- Use Tax levers to promote healthy diet

Advocating

- Focus on Nutrition Education Programs for Children
- Role Model for citizen as city council by providing local Food on events
- Raise public awareness, through events and workshops
- Achieve Policy Change at different Policy Levels based on evidence gathered
- Introduce a food strategy

Urban Development

food supply

Collaborating

- Find Replacement site in case of interest conflict
- Moderate between different agricultural players
- Collaboration between City Council and relevant institutions
- Connect local producers with restaurant or caterers
- Introduce network institutions with employees
- Introduce Consumer Society

Promoting

- Fair Financial Support for Urban Food Growing
- Allocate Unused land for gardening purposes
- Prioritise small urban-agricultural associations
- Establish food cultivation in guidelines
- Support agricultural activities with fair access to resources
- Encourage and Support Housing Associations with Growing spaces in their plans
- Incorporate edible plants and fruits into council planting

Local Authority

Urban Planning

social inclusion

Consulting

- Facilitate the land access for cities
- Provide Accessible information on the Website regarding know-How, Funding, Land Access and Resources
- Approach urban gardeners and farmers to collaborate regarding land
- Considerations of growing spaces in new developments of the City Development Plan

Involving

- Offer participative platform for finding new Land
- Support Community-Based Agriculture
- Use Crop Growing as Support Areas of Socio-Economic Disadvantages
- Consult large canteens of public institutions and built collaborations to use local food
- Ensure schools have access to growing spaces

Investigating

- Identify potential future agricultural sites
- Introduce Research institutions
- Explore further Synergy Effects by linking other topics
- Monitor Implementations and Keep Reports about the Food Growing Activities Updated
- Decentralised Food Processing Systems

Inspecting

- Carry out Regular checks on soil condition and ban environmental harmful fertilisers
- Compare different agricultural methods and decide which deserves support

What levers do we have? What is within our power?
 Responsibilities, Courses of Action and Levers for a Local Authority
 economic prosperity

Empowering Urban Agriculture: Best Practices for Sustainable Growth from Glasgow and Dresden

Purpose	Lever and Example	Description	Key Practices for Success
Advocating	<p>Strategy</p> <p>Introduce a food strategy</p> <p><i>Food Growing Strategy Glasgow</i></p>	<p>To develop a successful urban food growing strategy similar to Glasgow's Food Growing Plan, it's essential to address several key areas and incorporate detailed, actionable content. Insights from Community Consultation are integrated to ensure the strategy reflects local needs. It provides practical guidance on Getting Started, including land acquisition, lease management, planning requirements, community support, funding, and expert advice. The strategy also identifies key Themes and Opportunities for future growth, and includes Monitoring and Review mechanisms to track progress and adapt as necessary, culminating in a detailed Next Steps / Action Plan for implementation.</p>	<ul style="list-style-type: none"> • Develop a Detailed Plan: Begin with a comprehensive Introduction and vision statement, followed by an exploration of various community growing options. Use feedback from community consultations to tailor the strategy to local needs. • Provide Clear Guidance: Include actionable steps for starting and sustaining community growing projects. This should cover finding and securing land, navigating leases and planning regulations, building community support, and accessing funding and advice. Ensure the strategy has mechanisms for monitoring progress and adapting plans as needed.
Consulting	<p>Accessibility</p> <p>Provide Accessible Information on the Website regarding Know-How, Funding, Land Access and Resources</p>	<p>Glasgow's website on Urban Agriculture (https://www.glasgow.gov.uk/foodgrowing) provides a robust framework for expanding urban agriculture through accessible information and support. The city an online platform with a map of growing sites, detailed guidelines for land access, and connections to funding and community support. This approach ensures that urban agriculture projects can be initiated and sustained effectively, benefiting both local communities and the environment.</p>	<ul style="list-style-type: none"> • Centralized Online Resource Hub: Create a detailed website with interactive maps of available and potential growing spaces, guidelines for land access, and contact points for inquiries to streamline project initiation and management. • Comprehensive Support and Funding: Implement systems for connecting growers with expert advice, organizational support, and targeted funding opportunities, such as annual grants or specialized funds, to support the development and sustainability of urban agriculture initiatives.
Promoting	<p>Information</p> <p>Website on Community Gardening Glasgow</p>		
Adjusting	<p>Interaction</p> <p>Prioritise small urban-agricultural associations</p>		
Legislatively	<p>Encouragement</p> <p>Introduce Guidelines on sustainable farming methods</p>		
	<p>Prioritisation</p> <p>Small-Scale Farmers and Sustainable Agricultural Incentives in Dresden</p>	<p>Dresden prioritizes smaller urban-agricultural associations and implementing sustainable farming methods. The city offers guidelines and incentives to encourage diversity and environmental protection in farming practices, promoting a more resilient and ecologically balanced urban agriculture system.</p>	<ul style="list-style-type: none"> • Support for Small Urban-Agricultural Associations: Develop policies that favor smaller farmers and organic producers, such as offering preferential lease agreements and providing support for those managing less than 3,000 hectares. This helps create opportunities for smaller-scale, sustainable agriculture. • Guidelines for Sustainable Farming Methods: Introduce lease agreements that include conditions for erosion and water protection, such as ploughing crossways to slopes and avoiding monocultures. Implement comprehensive soil management guidelines to ensure diverse and environmentally friendly crop production.

How do the levers look in detail? What works?
Best Practices

Purpose

Description

Key Practices for Success

Distribution

Introduce Consumer Society

The **Consumer Society** (Verbrauchergemeinschaft) in Dresden serves as a model for enhancing urban agricultural activities. This registered cooperative and association is dedicated to the marketing and promotion of environmentally friendly products. By forming a robust connection between producers and consumers, it collaborates with 130 organic farmers, small food producers, and artisanal businesses from Dresden and its surrounding areas. These partners supply seven organic markets, a natural goods store, five organic bistros, and an organic delivery service, making local, sustainable food accessible to a broad community.

- **Build Producer-Consumer Networks:** Create direct links between producers and consumers to foster trust and support for local businesses.
- **Support Diverse Suppliers:** Encourage a variety of suppliers, from organic farmers to small-scale food producers and artisanal businesses, ensuring a rich diversity of products.
- **Enhance Accessibility:** Utilize various outlets such as markets, stores, bistros, and delivery services to make local foods readily available to the community.

Local Value Chain

Consumer Society
Dresden

Diversity of Products

Connect local producers with restaurant or caterers

Introduce Research institutions

OLGA fosters urban-regional partnerships and value chains, particularly in agroforestry wood use and legumes for human consumption, and develops community-oriented and regional financing models for established businesses and products. The collaboration between OLGA, local farmers, and businesses illustrates the potential of urban-rural partnerships. During a workshop organized by OLGA and NAHhaft, Veronica, an OLGA legume expert, and Ali Habiballah, owner of Zaituna, discussed the use of locally-grown green lentils from Eckard Voigt's farm. Inspired by the quality and regional origin of the lentils, Ali created the first Saxon lentil Falafel.

- **Leverage Local Resources:** Identify and utilize additional value potentials for regional products. This includes using wood chips for heating and cultivating legumes for human consumption, providing both environmental and economic benefits.
- **Foster Partnerships:** Encourage collaboration between regional partners to strengthen value chains and urban-regional partnerships. For example, the cooperation between Ali Habiballah of Zaituna and local farmer Eckard Voigt resulted in the creation of innovative, locally-sourced products like Saxon lentil falafel.

Investigating

Network

OLGA Research and
Networking Dresden

Knowledge

Partnerships

Allocate Unused land for gardening purposes
Stalled Spaces Glasgow

Food Supply

Incorporate edible plants and fruits into
council planting

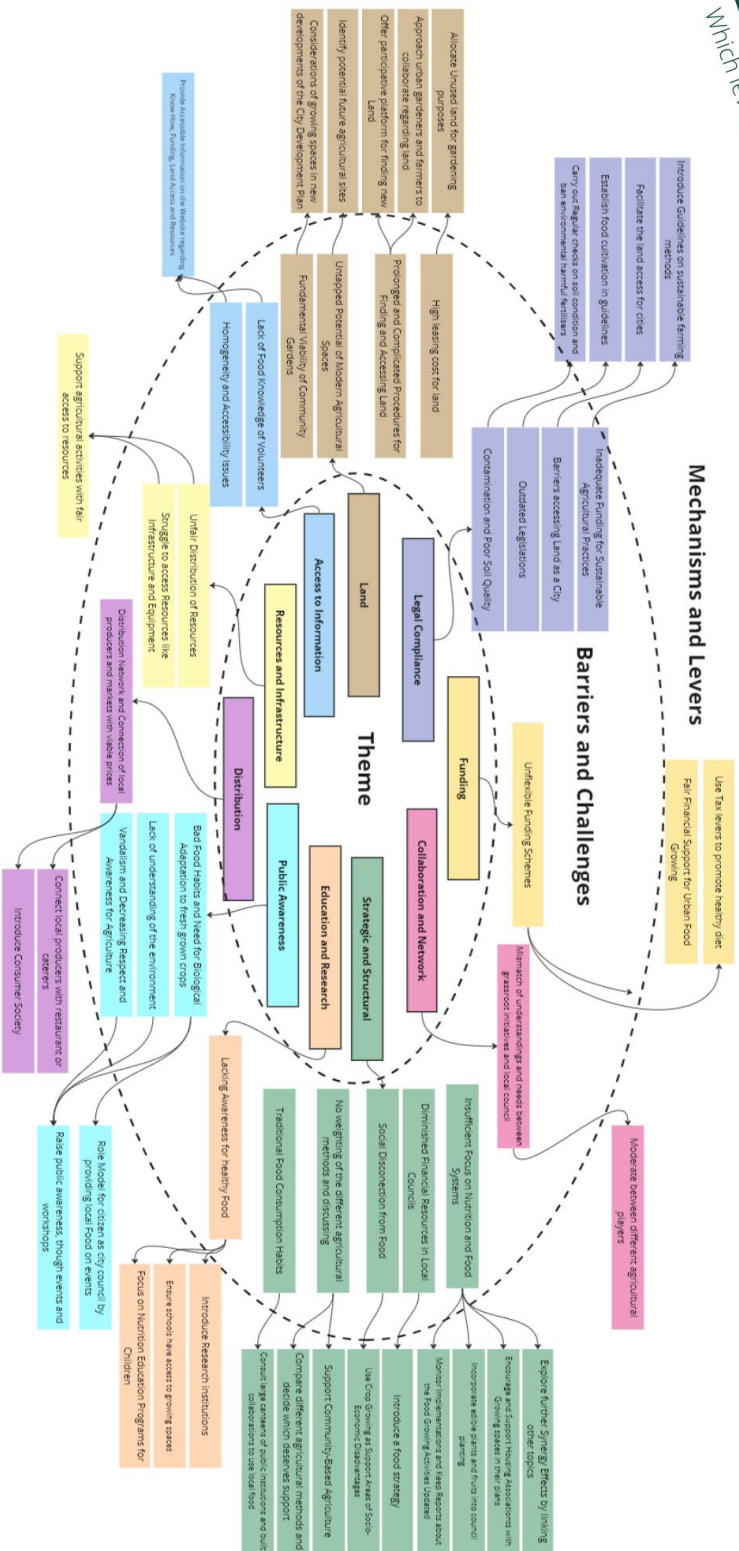
Social Capital
Edible City / Public Green
Spaces Dresden

Following the inspiring model from Andernach (Germany), Dresden has launched its own initiative: "**Edible Public Green Spaces**" (Essbares Öffentliches Stadgrün, EOS). This includes transformed wastelands, beautified tree bases, public community gardens, perennial and raised bed gardens, planted containers, and managed public gardens. These efforts collectively enhance urban biodiversity, community engagement, and local food production.

How do the levers look in detail? What works? Best Practices

Challenges and hurdles with their respective levers

Which levers work on or solve which hurdles and challenges?



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