Let It Grow!

How Malmö municipality can help urban agriculture support the transition to a sustainable city.

Micaela Jennifer Cosgrove and Kamya Sati

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Lund University Centre for Sustainability Studies

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Supervisor: Genesis Tambang Yengoh, LUCSUS, Lund University

Abstract:

An increasing migration to cities had led to the recognition of the need for conceptualising urban sustainability strategies. These strategies are developed contextually according to the needs of the city. The city Malmö is known for setting ambitious sustainable development goals and strategies. Food is a crucial element to meet these goals, and urban agriculture with its multifunctionality has much to offer. This thesis aims to examine the contributions of urban agriculture in promoting sustainability in Malmö and investigate how the municipality can support the development of urban agriculture beyond a niche. To accomplish this, a document analyses of policies and regulations regarding urban agriculture were conducted. Also, semi-structured interviews with relevant urban agriculture practitioners and municipality officials were carried out. The findings identified environmental, economic, social and cultural contributions of urban agriculture to urban sustainability in Malmö. Concerns regarding the longevity of urban agriculture projects were established as the central theme. Lack of access to long term funding and land use agreements creates uncertainty regarding the future of these projects. Urban agriculture on public lands is prohibited from generating a profit as they must adhere to the municipality's regulations. While the municipality favours of a bottom-up approach to ensure the long-term survival of projects, some associations on public expect more support as they are unable to sustain themselves financially. It is hoped that the newly formed umbrella association, STAM will help alleviate these issues by streamlining communication between the municipality and associations regarding urban agriculture. While Malmö municipality is invested and supports urban agriculture projects, there is a need to legitimise and institutionalise urban agriculture projects while including it in policy in order to maximise its contributions to urban sustainability by ensuring its longevity.

Keywords: urban agriculture, governance, urban sustainability, longevity, funding, Malmö

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1. Introduction

Urban areas globally are seeing increasing migration; this is accompanied by the need to ensure the development of urban sustainability (Mougeot, 2005). The concept of urban sustainability and sustainable city are used interchangeably (Vásquez-Moreno & Córdova, 2013). Urban sustainability strategies currently prioritise humanmade and built structures over ecological components (Chiesura, 2004). Strategies and indicators to measure the concept are developed by the cities themselves. Alongside ecological concerns like water and energy saving, waste recycling, and transportation; social concerns like quality of life, community building and local empowerment are crucial to the concept of urban sustainability (Chiesura, 2004; Dempsey, Bramley, Power, & Brown, 2011). Food is an essential component of urban sustainability strategies (Deelstra & Girardet, 2005). Urban agriculture has become an increasingly popular approach to reform the urban food system and can play an integral role in increasing the sustainability of cities. According to Smit, Nasr and Ratta (1996) urban agriculture can be defined as "an activity that produces, processes, and markets food and other products, on land and water in urban and peri-urban areas, applying intensive production methods, and (re)using natural resources and urban wastes, to yield a diversity of crops and livestock". It includes small intensive urban farms, rooftop gardens and beehives, community supported agriculture, allotments, windowsill and balcony farming, greenhouses, backyard farming, housing estate public space cultivations and other initiatives (Mougeot, 2005, Tornaghi, 2014). With the percentage of urban dwellers in the global north rising continuously from 54.8% in 1950 to 78.1% in 2015 and the expected increase to 86.6% by 2050, the need to overhaul urban food systems to make them more sustainable cannot be underestimated (UN, 2018).

Urban agriculture can integrate social and ecological services beyond food production including "energy conservation, waste management, biodiversity, nutrient recycling, microclimate control, urban greening, economic revitalisation, community socialisation, human health, preservation of cultural heritage, and education" (Krishnan, Nandwani, Smith, & Kankarla, 2016). Concerns about the impact of climate change on the agricultural sector coupled with rapid urbanisation are also acting as drivers for urban planners to incorporate urban agriculture into policies to build sustainable cities (Lovell, 2010).

Malmö has prominently publicised its goals to be a sustainable city by 2020 (Cohen, 2011). The ambitious goals of the city are some of the highest in Sweden in terms of sustainable planning and development which has been a priority since the mid-1990s. They were also the first city in Sweden to ratify a commitment to incorporate SDGs into their policies (Engström & Salvi, 2018). Financing has played an integral role with developments, such as the Western Harbor, becoming synonymous with

"innovation, creativity, resident participation and sustainability" (Anderson, 2014). Malmö has been an international interest for its sustainable urban development initiatives for many years and invited COP-15 participants to its "Climate Study Tour" which showcased their efforts in 2009 (Anderson, 2014; Cohen, 2011). The city also publishes an annual Environmental Program which outlines the environmental goals and measures the level of achievement of these goals (Malmö Stad, 2019a). Urban agriculture is linkable to three of the published goals in this program. Objectives within these goals which are relevant include: (1) developing the green and blue qualities; (2) to become resource efficient; (3) agriculture in the city must be sustainable; (4) citizens need to be able to have a sustainable consumption and lifestyle, and (5) city sustainable procurement. The current achievement for these objectives lies between "achieved to some extent and does not appear to be achieved". This is however projected as mostly positive from the municipality's perspective (Malmö Stad, 2019a).

There are two major networks in Malmö collaborating with urban agriculture projects, and each has a different focus. *Stadsbruk* began as an innovation project funded by Sweden's innovation agency *Vinnova* in 2011, building it first growing beds in Malmö and now has expanded to Gothenburg and Växjö. *Vinnova* is a startup that aims to help develop economically sustainable businesses. Municipalities and landowners who want to encourage entrepreneurship and green cities are put in contact with urban farmers and growers. The farmers are also guided with developing business plans, models and practical tips on cultivation. In Malmö, *Stadsbruk* currently supports four urban farms with a combined area of 6 400m^2. It has grown to a network that works with multiple cities and stakeholders in Sweden, such as Malmö city, Gothenburg city, Växjö municipality, SLU Alnarp, Federation of Swedish Farmers (LRF) and White *Arkitekter*. Another network for urban agriculture in the city is *Stadsodling*, a place for private individuals, enthusiasts, projects and associations connected to urban cultivation, educational institutions and Malmö City officials to connect (Stadsodling Malmö, 2019b). It is a part of Malmö municipality's urban life development and sustainability work in collaboration with *Stadsodlingnatverket*. The locations for urban agriculture in the city are continually changing according to city planning (Malmö Stad, 2018). The *Stadsodling* website mentions current projects in the city practising urban agriculture and organise meetings and events for urban cultivators to meet and collaborate (Stadsodling Malmö, 2019b).

An Urban Studies Research Report by Malmö University identifies the current scale of urban agriculture in Malmö as being micro enterprises or non-profit organisations which are highly reliant on funding from the municipality but as urban agriculture has no inclusion in the sustainable city agenda or formal policy, acquiring funding is a tedious process (Kojonsaari, 2018). The current scale of urban agriculture in Malmö is considered a niche for the purpose of this research. The limited support system forces

urban agriculture practitioners, the majority of whom lack long term experience, to compensate by being innovative and collaborative with other farms through the network. There is limited information and understanding around the role that urban agriculture and organisations that practice urban agriculture can play in promoting sustainable city agenda.

1. 1. Research aim and objectives

This thesis aims to investigate how Malmö municipality can help urban agriculture support the transition to a sustainable city. To reach this aim, our study will fulfil the following objectives.

Objective (1) ***Examine the contributions of urban agriculture in promoting sustainability in Malmö city.***

Objective (2) ***Investigate how Malmö municipality can support the development of urban agriculture beyond a 'niche'.***

1. 2. Contributions to sustainability science

Sustainability science is a developing academic field which intends to comprehend the dynamics between ecological and social systems (Kates et al., 2001). Humankind's ability to facilitate a sustainable transition can be determined by the understanding of these dynamics with further research within the field (Kates, 2011; Kates et al., 2001). The relevance of this thesis is marked by the intense ecological pressure created by both agriculture and urbanization, which are driven by human needs and desires.

As sustainability science is a multidisciplinary and transdisciplinary field, research requires the inclusion of actors outside academia and data across multiple fields to fully comprehend complex sustainability challenges (Kates, 2011; Lang et al., 2012). As sustainability science is action-oriented research, it aims to create knowledge that can be applied practically in society (Lang et al., 2012). The above aspects relate to this thesis as it not only identifies contributions of urban agriculture to urban sustainability but also determines potential pathways for Malmö municipality to support the sustainable development of urban agriculture. A crucial element of sustainability science is connecting theory, practice and policy, which is also mirrored in this thesis (Bettencourt & Kaur, 2011).

1. 3. Thesis Outline

Chapter 2 provides insight into Malmö Municipality's Environmental Program and establishes its connection to food and its exclusion of urban agriculture. Chapter 3 introduces contributions to

urban agriculture in promoting urban sustainability across environmental, economic, social and cultural elements. Next chapter 4 presents a conceptual framework for Urban agriculture governance process which acts as a lens to analyze and discuss the results to arrive at the conclusion. In chapter 5 the methods used in the thesis, document analysis and semi-structured interviews are outlined. This is followed by chapter 6 which presents the results of the thesis. Chapter 7 then forms the discussion which explains the findings and contextualizes it within the contextualises it within the European setting. Lastly in chapter 8 the conclusion of the thesis is put forward.

2. Malmö Municipality's Environmental Program

As a city, Malmö has worked towards being "Sweden's most climate-friendly city" as part of its Environmental Program, which is detailed in Figure 1A (Malmö Stad, 2017). In 2009 the first of the city's environmental programmes were initiated which had the aim of making it one of the "Best Cities in the World for Sustainable Urban Development by 2020" (Malmö Stad, 2017). In addition to this, it was the first Swedish city to sign the Global Agenda 2030 for Sustainable Development.

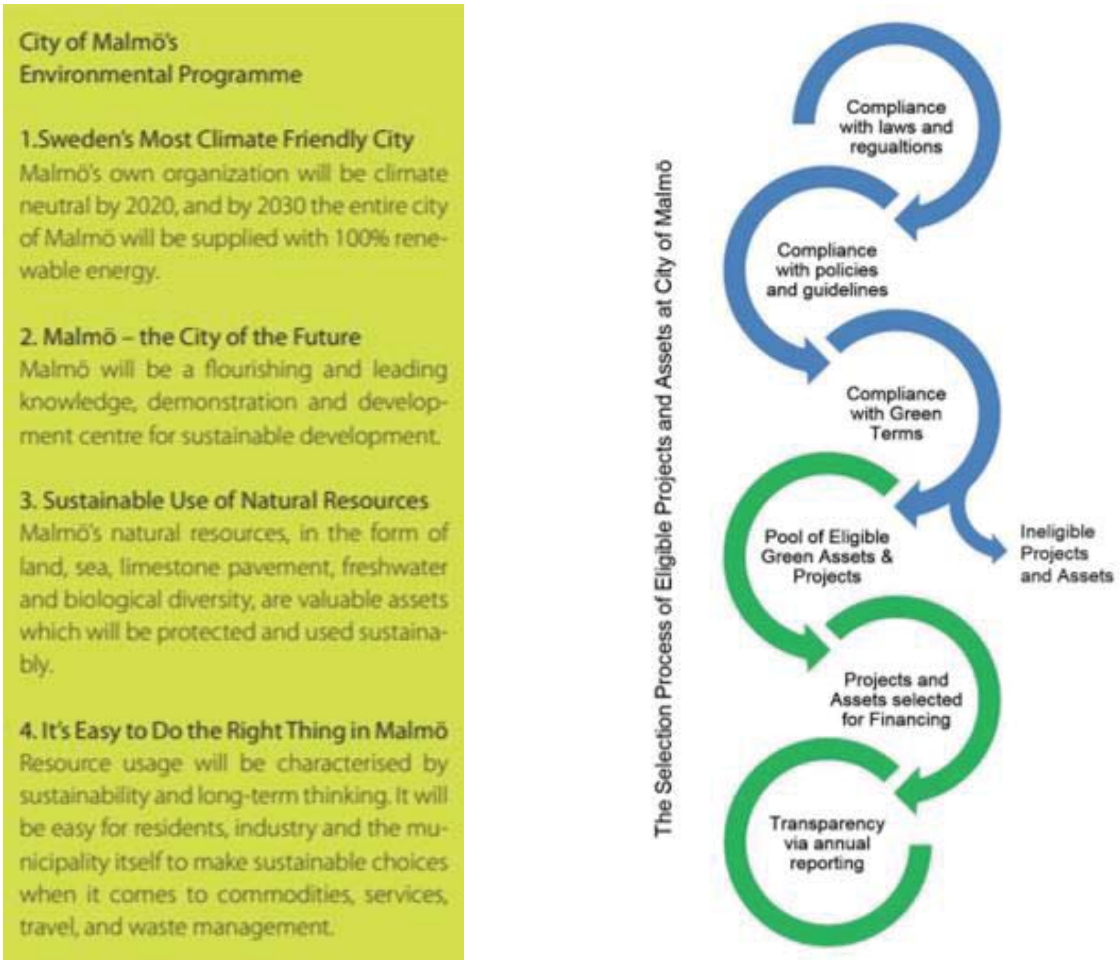

Figure 1. A) City of Malmö's Environmental Program (Malmö Stad, 2019A), source Malmö Stad (2017); B) The selection process of eligible projects and assets at the City of Malmö, source Malmö Stad (2017).

Malmö has a dense and diverse population of residential and green spaces, with services and other activities near each other. Due to this, the city has realised the responsibility it has to develop and realise the goals and objectives of the environmental program. It acknowledges that a successful agenda is not a perfect solution, but it should embody diversity and experimental elements to succeed (Malmö Stad, 2017). For a project to be considered eligible it needs to fit one or more of the specified criteria below:

1. Mitigation (M)

Reduce harmful emissions of greenhouse gas, either by improving and transitioning existing assets through significant upgrades and retrofits or by investing in new assets utilising low carbon-intensive technology and environmentally sound solutions.

2. Adaptation (A)

Adaptation investments to better withstand the effects brought on by climate change, improving the resilience to climate change and expected changes in the micro-climate and local environment, for instance, increased rainfall, heightened risk of flooding or sea level rise.

3. Environment and ecosystems (E)

Support environmental investments with a positive environmental impact other than the direct mitigation of climate change (max 15 % of net proceeds) (Malmö Stad, 2017).

These criteria are to support to the existing assets of Malmö municipality transition to low carbon intensity and future sustainable developments. For a project to be considered for selection the process illustrated in Figure 1B must be followed (Malmö Stad, 2017).

Sustainable food in Malmö has been a core objective in the city's environmental program under one of its four overall environmental goals of "It is Easy to do the right thing in Malmö" (Miljöförvaltningen, 2019). The focus so far has been on ensuring sustainable procurement of food. In 2010, a policy was also created for the sustainable development and food, with the objective that by 2020, all food purchased should be organic and greenhouse gas emissions from food should be reduced by 40%, based on 2002 CO_2 estimates of 13 360 tones (Nilsson & Andersson, 2018). The policy for sustainable development and food contributes to:

- A sustainable Malmö with healthy citizens.
- Strengthening the importance of food in the City of Malmö´s operations to increase the attractiveness of food.
- Working towards 100% sustainable purchasing in the City of Malmö.
- Ensuring that the City of Malmö leads from the front and only serves sustainable and safe food when serving food at official functions and representation (Nilsson & Andersson, 2018).

The above sustainable food policy has been successful so far in only achieving a 20% reduction of greenhouse gas emissions relating to the food produced and consumed in public kitchens in Malmö; which stems from the increased plant-based meals produced (Nilsson & Andersson, 2018).

2. 1. Exclusion of urban agriculture from environmental program

Urban agriculture has no direct policy linked to its practice in Malmö, nor is it considered in the City of Malmö's Environmental Program. However, there are two documents used to manage urban agriculture related matters- "Urban gardening in public spaces in Malmö- strategy for organisation, financing and maintenance" and "Regulations for urban gardening in public spaces in the City of Malmö". The formerly mentioned strategy acts as a guide for urban agriculture in Malmö including the current urban agriculture operations, the purpose and goals, organisation, financing and decision making. The time plan in this document indicates the need for the strategy to be implemented in 2016 so that urban agriculture can continue to exist and develop in the city and be also be able to start new urban agriculture initiatives in the city (Malmö Stad, 2016). The document regarding regulations for urban agriculture sets out the standards, processes and requirements of urban agriculture in Malmö as well as the responsibility of Malmö municipality and the urban agriculture association (Malmö Stad, 2019b).

3. Contributions of urban agriculture in promoting urban sustainability

An ever-increasing migration to urban areas has led governments across the globe to recognise the need to deal with the concept of urban sustainability (Mougeot, 2005). The development of the concept of a sustainable city or urban sustainability requires an appraisal of various actors, actions, infrastructure, plans and policies, all of which are shaped by spatial and temporal factors (Vásquez-Moreno & Córdova, 2013). It also requires an integrated governance approach to ensure longevity and self-sufficiency. However, it is important to note that cities do not exist in isolation and are reliant on outside regions for food and other ecosystem commodities and services (Andersson, 2006). Understanding urban sustainability also requires an investigation into its relationship with its surrounding regions and an examination of the inequity that is perpetuated by the urbanisation process (Allen, 2009). The multidimensional complexity of the concept prevents the creation of a single framework or model and needs adaptation to fit the local context. However, basic characteristics of sustainable cities have been identified such as ensuring public access to basic needs (food, shelter, safety, jobs), good governance and diverse economy, establishing cultural and environmental preservation, fair and equitable economic development and promotion of environment friendly alternatives amongst others (Duhl & Hancock, 1998; Williams, 2010; Vásquez-Moreno & Córdova, 2013).

Urban agriculture can give form to this abstract concept as it provides tangible benefits. The knowledge utilised in this thesis to identify contributions of urban agriculture to promoting sustainable cities is synthesised by Vásquez-Moreno & Córdova (2013) in Table 1. It is based on the four-pillar model of sustainability: environmental, economic, social and the more recent cultural, which is particularly relevant in the context of Malmö's newly arrived immigrants (Nurse, 2006). Additionally, Deelstra & Girardet, (2005) and Pearson, Pearson & Pearson (2010) were used to supplement knowledge in the Table 1.

Table 1. Potential contributions of urban agriculture to urban sustainability. Source: Vásquez-Moreno & Córdova (2013)

Environmental	**Economic**	**Social**	**Cultural**
Contribution to circular metabolism of nutrients and water in the city-composting of organic waste, rainwater use or reuse of grey water at the household	Development and diversification of local economies (alternative markets, use of local resources and inputs)	Food security and proximity (improves food self-sufficiency, diet quality, health): social justice, urban poverty alleviation. Vulnerability reduction of at-risk urban groups	Cultural connection to traditional practices and local knowledge
Promotion of green areas in a built environment and associated environmental services (microclimate, air quality, carbon sequestration, noise reduction, increased rainwater infiltration)	Reduction in cost of solid waste and wastewater disposal/treatment	Community building and empowerment; social diversity: gender, age, ethnicity; gender equity and social inclusion	Conservation of ancestral production systems (biological pest management, rainwater use for irrigation)/
Environmental education and awareness-raising	Food proximity (cost reductions)	Aesthetics in open spaces; "productive parks."	Maintenance of "food culture and identity" of urban migrant groups
Reduction of energy use and greenhouse gas emissions due to reduced food transportation	Efficient and productive use of vacant and small plots of urban land	Provision of recreational spaces; personal well-being (physical, intellectual and psychological benefit) Personal skills.	Preservation of cultural practices and environmental traditions that can influence current values, institutions and social patterns
Contribution to local biodiversity conservation. Creation of green belts and buffer zones.	Coming together of economic stakeholders	Awareness among urban dwellers of natural process and the way food is grown, processed and transported	Consideration of urban farmer as a cultural unit, and not only a productive entity
Clean production (little or no use of agrochemicals)	Impact on employment generation and household income	Consideration for urban and rural generations, present and future	Preservation of traditional culinary and medical practices

3. 1. Environmental contributions of urban agriculture

Urban agriculture provides many opportunities to improve the environment and ecology of cities. Composting of organic waste and using household greywater can help circular metabolism of nutrients and water while lowering the use of pesticides and fresh water and help conserve urban soils (Deelstra & Girardet, 2005). Urban agriculture also leads to the creation of green spaces in adjacent housing areas or neglected spaces which improves the local microclimate. The presences of vegetation increase

humidity and lowers temperature while the foliage attracts dust and gases from polluted air and act as windbreakers. Growing food within the city lowers energy consumption and greenhouse gas emissions as the distance of transportation is reduced. It also creates awareness about the environment and promotes local biodiversity (Pearson et al., 2010; Vásquez-Moreno & Córdova, 2013).

3. 2. Economic contributions of urban agriculture

Commercial urban farms can lead to job creation and generate household income. Farmer markets and urban farms can help develop and diversify local economies by creating alternative options. This brings different economic stakeholders together. Urban agriculture can also lead to effective and productive use of vacant and abandoned plots of urban land (Deelstra & Girardet, 2005; Vásquez-Moreno & Córdova, 2013).

3. 3. Social contributions of urban agriculture

Urban agriculture can lower the vulnerability of at-risk urban groups by providing them with food security. It can also act as a community building tool to improve gender equity and social inclusion across different ages and ethnicities. Urban agriculture can create recreation spaces that add to the aesthetics of the city while providing physical, intellectual and psychological benefits. It also creates bridges the gap between urban citizens and their food and raises awareness about how food is grown, processed and transported (Deelstra & Girardet, 2005; Pearson et al., 2010; Vásquez-Moreno & Córdova, 2013).

3. 4. Cultural contributions of urban agriculture

Urban agriculture can act as the connection to traditional practices and local knowledge and prevents its loss over time. Biological pest management and irrigation solutions are some examples of ancestral production systems that can be conserved. This also can lead to the urban farmer being considered as a cultural entity rather than just a productive one. It can lead to the preservation of traditional culinary and medical uses of local varieties of vegetation (Vásquez-Moreno & Córdova, 2013).

4. Urban agriculture governance processes- a conceptual framework

Urban Agriculture is a multidimensional concept spread across different spatial and utilitarian forms and involves a wide variety of actors. Thus, the task of its development creates unconventional requirements which need adaptation from policymakers, urban planners and institutions (Lovell, 2010). Governance of urban agriculture needs the establishment of instruments that can create innovative tactics to administer urban areas while engaging actors across different levels and sectors (Healey, 2004). The past decades are marked by a gradual movement away from obsolete top-down 'government' management techniques, towards a more inclusive, adaptive and multilevel 'governance' system which can ensure sustainable management of socio-ecological systems (Folke, Hahn, Olsson, & Norberg, 2005; Pahl-Wostl, 2009). These adaptive governance processes should ideally "be legitimate, accountable, equitable, transparent and inclusive" while ensuring its principles are effectively and efficiently shaped" (Davidson, Lockwood, Curtis, Stratford & Griffith, 2006).

This thesis uses a conceptual framework for Urban Agriculture governance processes as synthesised by Lohrberg, Lička, Scazzosi, & Timpe (2016) in a transdisciplinary meta-analysis study. The study was funded by COST (European Cooperation in Science and Technology), an international not for profit association which is supported by the EU Framework Programme Horizon 2020. The characteristics of urban agriculture governance process were identified using the analysis of an extensive collection of different urban agriculture initiatives in Europe and their stakeholders while incorporating additional global cases to broaden the mandate. The composition and dynamics of each case were methodically investigated, and contrast and resemblances were emphasised. The governance characterises arising from these insights were compiled into a conceptual framework (see Figure 2) (Lohrberg et al., 2016).

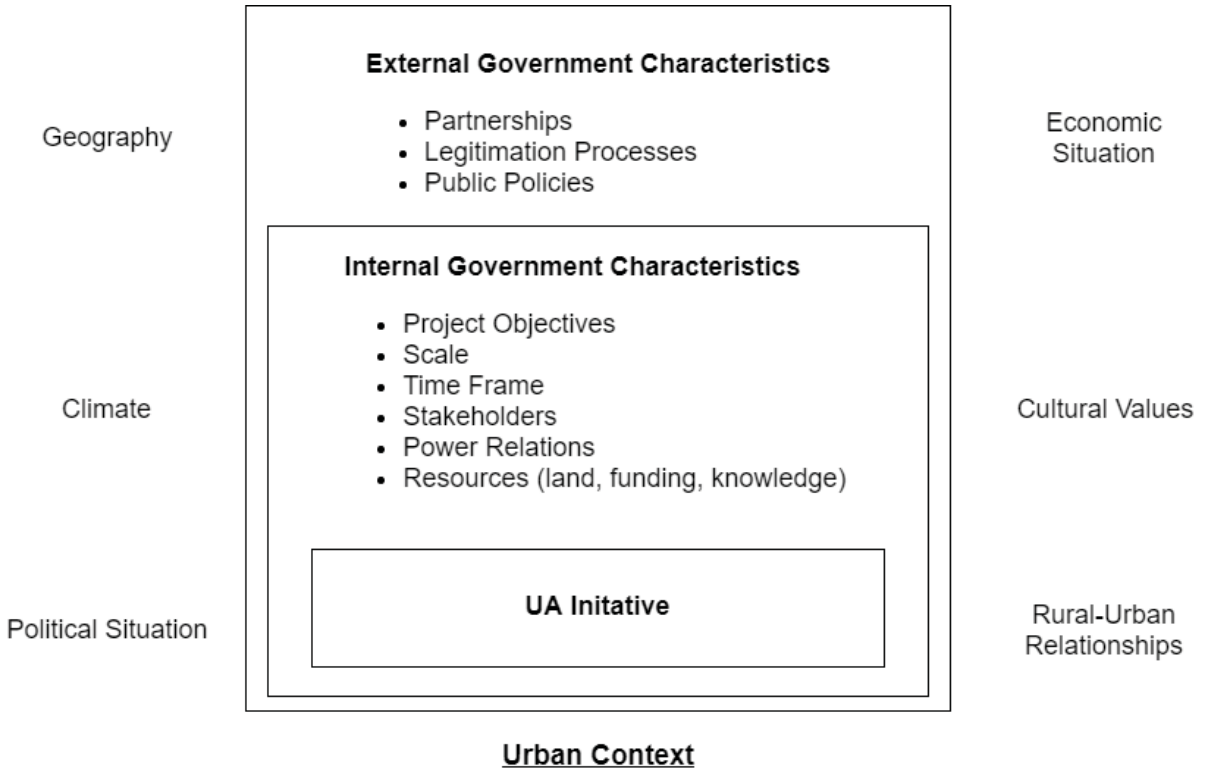

Figure 2. A conceptual framework for urban agriculture governance processes, source: Lohrberg et al., (2016).

This framework has three levels of complexity which influence governance processes: (1) the wider urban context, (2) external governance characteristics and (3) internal governance characteristics, which is detailed below. The framework has a dialectical component, and the characteristics defined in it are interdependent and have a reciprocal effect on one another. To gain a holistic understanding of the governance processes, these characteristics should be evaluated parallelly. This framework was chosen because it is comprehensive and can be applied across different contexts. The three levels of complexity are explained below (Lohrberg et al., 2016).

4. 1. Urban context regarding agriculture in the city

The context can be understood as the circumstances or factors that influence the development of Urban Agriculture. The framework identifies the following as the most predominant factors: “climate, political situation, geography, economics, cultural values and urban-rural linkages” (Lohrberg et al., 2016). Climate and geography control the types of products that can be grown in the urban agriculture initiative. The political situation and cultural values determine the amount of support and level of institutionalisation this initiative can obtain. Economics of the context impacts funding or profitability while urban-rural linkages can guide spatial factors (Lohrberg et al., 2016).

The framework also notes a distinct variation between Northern and Southern Europe. Preservation or development of green spaces is the most critical element in Northern European countries whereas

Southern European countries see the value of urban agriculture in ensuring food security and countering poverty or social exclusion (Lohrberg et al., 2016). This is explained by Soulard, Perrin, & Valette (2017) as the practice of urban agriculture to ensure food security is more popular with residents in cities with populations vulnerable to urban poverty. In cities with fewer at-risk populations, the practice of urban agriculture is motivated mainly by environmental, social and cultural benefits to sustainability (Soulard et al., 2017). From a general European perspective, this highlights the importance of incorporating the context and complexity while developing governances processes (Lohrberg et al., 2016).

4. 2. External governance characteristics influencing urban agriculture

Different types of stakeholder working in the market, civil society and government launch, guide or manage Urban Agriculture initiatives (see Table 2). Partnerships are crucial to the success of these initiatives and few prosper without it (Lohrberg et al., 2016).

Table 2. Stakeholders in urban agriculture initiatives. Source: (Lohrberg et al., 2016)

Government	**Civil Society**	**Market**
International Level	NGOs	For-profit Farming
National Level	Non-profit Farms/Organizations	Farmers Association
Regional Level	Funders	Private Actors
Local Government	Artists	Entrepreneurs
Government-led Organizations	(Public & private) Educational Institutions	Funders
Government-led Institutes	Religious Institutions	Distributors
	Individual	Vendors
	Volunteers	

The framework concentrates on the partnership of public actors locates in the government as their involvement is pivotal in ensuring legitimation or institutionalisation of the initiatives and obtaining resources. The four types of partnerships are described by Lohrberg et al. (2016) below:

1. Top-down planning initiatives pulled together within the local government. These flourish under the participation and labour of civil society actors.
2. Top-down initiatives in collaboration with market or civil society actors as equal partners. While the initiative is situated within the government, its evolution is an open process that is guided by civil society and market stakeholders. Thus, the local government acts as a support

mechanism for Urban agriculture initiatives by providing access to land, resources or infrastructure.

3. Bottom-up initiatives are dependent on public actors. Here civil society and market stakeholders build the partnership with public actors. The initiatives earn public support because they provide public goods and services -e.g. health and educational services.
4. Bottom-up initiatives without links with public stakeholders. The absence of partnerships can be clarified by lack of needs, competing visions or a policy framework that does not accommodate public interventions.

Greater collaboration between stakeholders like public, government, market and civil society demonstrates the diminishing of the traditional duality between bottom-up and top-down approaches and marks progress toward a blended approach. The materialisation of these cooperative structures produces synergies and should be nurtured (Lohrberg et al., 2016).

Urban agriculture initiatives are not always well received and can be characterised as insurgent or subversive notwithstanding their brisk progress and public support (Press & Arnould, 2011). This can create difficulties if the initiatives are not well accepted by civil society, market and government (Lohrberg et al., 2016; Press & Arnould, 2011). Urban agriculture initiatives can be flourishing within their informal bubble of stakeholders but may not be recognised by the broader public which limits their impact. This drives the importance of legitimising these initiatives within formal institutions to gain support from society at large and ensures the unification of urban agriculture into urban mechanisms (Lohrberg et al., 2016).

Even as policymakers are more conscious of urban agriculture, the official implementation at a policy level is not legally binding. In Europe, even though there are challenges and possibilities in policies, at the national or EU level, local governments are usually accountable for urban agriculture. Lack of a formal framework translates to unofficial, fragmented support which is dependent on the interests of officials at the local government level. A suitable policy framework could offer these initiatives more stability and security. The subsequent actions, if implemented, could have an encouraging influence on Urban agriculture: “adjusting the zoning code (ranging from permitting growing of food in certain areas to introducing Urban Agriculture as a land use zone); acknowledging Urban Agriculture as a development strategy instead of a provisional enterprise; assistance with land access; proactively safeguard farmland; remove restrictions resulting from other policy fields” (Lohrberg et al., 2016). Collaborative action between policy areas like “agriculture, spatial planning, social welfare, environment, economic development, health and safety planning, education and culture” can lead to positive results for Urban agriculture through an intersectional approach (Lohrberg et al., 2016).

4. 3. Internal governance characteristics influencing urban agriculture

Internal governance characteristics identify the heterogeneity in "objectives, involved stakeholders, power relations, scale and time frame of the initiative, and available resources" (Lohrberg et al., 2016). They require specialised policy support and are related to different public departments or agencies; thus, the kind of assistance needed also differs (Lohrberg et al., 2016).

The objective of urban agriculture is not only food production, and its ecological, social and cultural contribution to sustainability should be considered when examining its impact on society (Vásquez-Moreno & Córdova, 2013). Exclusion of other benefits of urban agriculture also runs the risk of losing potential support from other organisations and institutions. As these initiatives develop and become more prominent, the focus often shifts to include economic benefits. This is because, after a certain amount of growth, they can sell excess food products or provide educational services in exchange for remuneration. This can be a potential governance strategy in the growth and support of urban agriculture initiatives. These initiatives are varied in terms of cultivation area and amount of produce grown, determined by the objective of economic or social goals. However, the scale of the project is not deterministic of its societal impact. A smaller community project in the city can be more successful in involving the local community than a larger isolated commercial farm on the city edge (Lohrberg et al., 2016).

The time frame of an initiative determines its purpose and mission. Generally speaking, "initiatives with a temporary or undefined timeframe (like informal projects or urban experiments) can lack formality and legislation, and as a consequence become uncertain" (Lohrberg et al., 2016). Furthermore, unpredictability about the future can discourage stakeholders from expending time and resources in the initiative. Short-term initiatives maybe are quick to rise to the local needs of the closest community and are mouldable whereas long-term initiatives become more woven into the urban fabric and thus can have a deeper impact. Three types of actors are usually connected with these initiatives and to different results and extent: market, civil society and government. Majority of the grassroots work is done by the civil society actors who are pivotal in the role of an innovator or local supporter. They are however limited by restrictions placed by other stakeholders who control essential resources. Thus, there is a need for collaboration between different actors to secure necessary resource even if it leads to complexity during integration (Lohrberg et al., 2016).

According to Lohrberg et al., (2016) "land (public and private), funding and knowledge are three crucial resources in the sustenance of Urban Agriculture initiatives". Purchasing urban land is usually not possible in most cases due to a lack of space in the city or excessively high prices. This makes leasing

the most viable option even though it creates uncertainty about the future and is not an easy process (Lohrberg et al., 2016). Publicly owned land is the most attractive option, and local government should aim to safeguard urban farmland and tackle land access challenges through policies and planning (Mendes, Balmer, Kaethler & Rhoads, 2008). Establishing an initiative is an expensive process and requires initial funding. The process of applying for funding is complex, and there is currently no special financing mechanism for urban agriculture (Lohrberg et al., 2016). Financial support is linked dependencies and vulnerabilities which sometimes forces initiatives to alter their objective to receive funding. "The resource of knowledge has different layer - scientific, lay and professional- which seems to operate in different fields" (Lohrberg et al., 2016). As most initiatives emerge from civil society, they function using lay knowledge while professional and scientific knowledge is more utilised in decision-making processes. While lay knowledge could be claimed to have importance in policy making and planning of local food production strategies, the grassroots initiatives would also benefit from scientific and professional knowledge (Fonte, 2008).

The application of the urban agriculture governance framework is explained below in table 3 The questions related to each governance characteristic that should be utilised in initial phases and during re-evaluation. The framework stimulates "(self)-reflection, goal and agenda setting and the interaction with other initiatives, policy levels and wider overall context" (Lohrberg et al., 2016).

Table 3. Application of the urban agriculture governance framework. Source: (Lohrberg et al., 2016)

	Governance of Urban Agriculture on an Aggregate Level
Objectives	What are or should be the overall objectives within the governance context?
Scale	What is the available acreage, and which populations/social groups are to be targeted?
Time Frame	What time frame should be planned for urban agriculture?
Stakeholders	Whom are the stakeholders involved and what is their background?
Power Relationships	Who participates in the decision-making processes and how are these processes organised?
Resources	What resources can the governance context provide? What land/space can be provided/secured? How is land access facilitated? Within which departments- depending on overall objectives-can financial support be offered? What kind of urban agriculture knowledge is taken into account? What is known about urban agriculture within the governance context?
Partnerships	What partnerships are necessary and should be promoted?
Legitimation	To what extent are initiatives embedded in the policy and planning framework? How are these initiatives understood by the different policy departments? What is done to promote initiatives among the wider civil society?
Public Policies	What public policies are currently hindering or promoting? Which public policies could be formulated to promote urban agriculture?
Urban Context	What are the contextual factors that promote or hinder the support of urban agriculture?

5. Methods

The Urban agriculture governance framework utilised as the conceptual framework to analyse how Malmö municipality can support the development of urban agriculture beyond a niche. To examine contributions of urban agriculture in promoting sustainability in Malmö, a meta-study analysis, detailed in Table 1, is used as the guiding principle. An exploratory research design was chosen because the urban agriculture network in Malmö comprises of microenterprises and dependent not for profit organisations and its practices are not well documented. The exploratory research design allows for flexibility in establishing the role of urban agriculture in the city's sustainability goals. This also enables the inclusion of relevant information uncovered during the investigation (Jaeger & Halliday, 1998).

The case study research method focuses on the contributions of urban agriculture towards promoting sustainability in Malmö and how the municipality can support the development of urban agriculture beyond a niche. This method is the most appropriate because it investigates the intricacies and distinct nature of a particular real-world case which cannot be influenced by the researcher (Stake, 1995; Yin, 2014). Malmö was chosen as a case study since the city has ambitious sustainable development goals and urban agriculture is not included in these goals.

5. 1. Data collection methods and analysis

Data were collected through document analysis (grey documents), secondary data from established research and reports on urban agriculture in Malmö. It also includes semi-structured interviews with two urban agriculture associations and two municipality officials. The description of data collection and analysis is given below.

5. 1. 1. Document analysis

According to Bowen (2009), document analysis is a combination of content and thematic analysis. It requires actions such as skimming, reading and interpretation. Through content analysis, information is arranged into categories and connected to the research objectives. Structures within the data are identified with thematic analysis. Resulting themes then act as categories for investigation. This method was applied in the below documents. In addition to providing information, the documents also guided the design of the questionnaire for the interviews.

The Malmö municipality's environmental program (Malmö Stad, 2019a) was studied to gain an understanding of its priorities and concerns regarding sustainable development in the city. This document exists online as a web page by Malmö municipality. This environmental program was developed to guide the city towards its goal of being "Sweden's most climate-friendly city" (Malmö

Stad, 2017). Themes that are associated with urban agriculture, such as green spaces, foods, agriculture, consumption and procurement, were used as a guiding strategy to identify relevant goals. This was chosen because this was used as a guideline for the city's transition to a sustainable city. It was essential to understand this as it provides insight into existing goals with regards to sustainable development and food.

The *Urban gardening in public spaces in Malmö* was reviewed to gain an understanding of the "vision with goals and strategies" that Malmö municipality have when developing urban agriculture in Malmö. It presents in short existing and future opportunities for urban agriculture in Malmö in 2016. It was developed from a cross-departmental urban gardening group which was formed to discuss the relationship different departments have to urban gardening (Malmö Stad, 2016). Information related to themes such as 'financing', 'role', 'department', 'strategy' and 'resources' was combined to create categories which outlined Malmö municipality motivations. This document is useful in this research as it summarises the investigation for pre-conditions for urban agriculture and identifies how financing should occur for urban agriculture projects in Malmö.

The *Regulations for urban gardening in public spaces in the City of Malmö* acts as guiding rules for urban agriculture projects on public land, as well as the responsibility of Malmö municipality and urban agriculture associations (Malmö Stad, 2019). This document is a basic and practical overview of how projects can operate. Information related to themes such as 'regulation' and 'responsibilities' was identified and categorised to understand how urban agriculture is managed in Malmö. This will in conjunction with the other documents served as a foundation to specify interview questions for the urban agriculture associations. The interview questions for the two Malmö municipalities representatives were based upon the Malmö municipality environmental program.

Bryman (2016) emphasises on the need to authenticate and compare data gathered from documents with other sources such as interviews. This helps ascertain if the description provided in documents matches reality.

5. 1. 2. Semi-structured interviews

Semi-structured interviews were conducted to supplement findings from document analysis to understand the contributions of urban agriculture in promoting sustainability and analysing how Malmö municipality can support the development of urban agriculture beyond a niche. Semi-structured interviews were chosen as they set an exploratory tone, allowing for more details to be uncovered in the process (Harrell & Bradley, 2009). Separate interview questions were prepared for

urban agriculture practitioners (see Appendix A) and relevant municipality officials (see Appendix B and C) as they hold different places in the urban agriculture network.

Selection of potential urban agriculture practitioner respondents was carried out using Stadodling website which lists current urban agriculture practitioners in the city (Stadsodling Malmö, 2019b). The potential respondents were contacted by email with a short description of the thesis and those who expressed an interest were sent a copy of the questions to help them prepare for the interview. Out of sixteen practitioners that were contacted, two agreed to interviews. The municipality official at Environmental Department was contacted personally at an urban gardening event after a lack of response to an email. The municipality official at Department of Public Environments, Development Unit was contacted via email. All four interviews were conducted in English and were in person, recorded and transcribed.

The interviews aimed to gain an in-depth understanding of how Malmö municipality can support the development of urban agriculture beyond a 'niche'. The people contacted to participate in this research were selected based on their relevance to urban agriculture in Malmö. It aimed to encompass all practitioners of urban agriculture in Malmö as well as the urban agriculture-related departments within Malmö municipality.

Interviews conducted were developed from four sessions with Plantparken, Växtvärket, Miljöförvaltningen and Avdelningen för offentlig miljö, who were four of the eighteen actors who obliged our request for participation in this research. In Table 2 the four interviewees are outlined. There were representatives from urban agriculture associations Växtvärket Malmö ideell förening (Växtvärket) and Plantparken and, two representatives from Malmö Municipality.

To analyse the recording of the semi-structured interviews they were transcribed and coded to categorise them and establish patterns. NVivo was used as a tool to open code the interview transcriptions. Initial codes were identified through several iterations of reading the data, for example: 'support', 'funding', 'Malmö municipality' and 'policy', and were used as tentative labels. An additional layer of coding was completed to account for the discrepancy in language use, by include synonym terms. A core variable (longevity) was identified, and this was used as the selective code which was applied to the data (Bryman, 2016).

Information regarding the contribution of urban agriculture towards sustainability was synthesised from the interviews and secondary data. This was used to create a table to visualise information based on the meta-study analysis. Data collected from interviews were analysed using the Urban agriculture governance process framework by using questions outlined in Table 3.

Table 4. Participants in research

Organisation (Department)	**Position of participant**	**Role**	**Intext reference**
Plantparken	Project Leader	Oversees and manages the project.	PLP
Växtvärket Malmö ideell förening	Project Leader	Project leader for the heritage fund project Guldängen Bygglek.	PLV
Malmö Municipality (Miljöförvaltningen (Environment Department))	Strategic Manager and Sustainable 2011-12 food project manager at Malmö växter.	Works with strategic of different issues and focuses on sustainable food and urban gardening. As well as Malmö Growing, an urban agriculture project together with the Department of Public Environments.	SM
Malmö Municipality (Avdelningen för offentlig miljö, Utvecklingsenheten (Department of Public Environments, Development Unit))	*Landskapsarkitekt*	Landscape architect within the parks department in Malmö municipality, main contact point for developments with urban agriculture apart of her responsibilities.	LA

5. 2. Limitations of methods

As the overall research design is exploratory, it prevents from generating conclusive answers and will require further research to impact decision-making processes directly. Also, since the study occurs in spring, there was some difficulty in accessing urban agriculture practitioners which led a small sample size and the need to use secondary data for commercial urban practitioners. The findings of this study cannot be generalised to a larger population. As the study follows a qualitative approach, it can be subjected to the researcher's bias'. While this has been avoided at all stages, it can still impact the internal reliability of the research.

5. 3. Ethical considerations

This research process has attempted to adhere and maintain integrity and quality when it comes to ethical considerations. All participants involved in the research were informed fully about the purpose, methods and intended possible uses of the research. Consent was acquired from the interviewees to record and transcribe the conversations and to use the data for this thesis. Codes have been made and names removed to ensure a level of anonymity.

6. Results

Below are the results which will answer Objective (1): *to examine contributions of urban agriculture in promoting sustainability in Malmö city* and; Objective (2): to i*nvestigate how Malmö municipality can support the development of urban agriculture beyond a 'niche'*.

6. 1. Contribution of urban agriculture to sustainability in Malmö

Urban agriculture in Malmö can be categorised into four types based on their objective: commercial, educational, recreational and community-based. The contributions of each type of urban agriculture in promoting sustainability are discussed below.

6. 1. 1. Contributions of commercial urban agriculture

The main goal of commercial urban agriculture practitioners in Malmö is to grow and sell vegetables, flowers, herbs as well as derived products like herb salts and sauces (Kojonsaari et al., 2018). They sell their products to different types of buyers like individuals, restaurants, cafes, stores and caterers. These sales are conducted through a variety of methods like farmer markets, REKO-Ring Malmö[1], Community Supported Agriculture[2], city stores and direct relations with restaurants (Stadsodling Malmö, 2019a). This strategy of conducting business brings the farmers in direct contact with buyers thereby creating social connections and adding cultural value to the process of urban agriculture. The farmers are also contributing to economic sustainability by creating self-employment opportunities and supplementing their household income. Use of the innovative method of sales like REKO-rings and community supported agriculture help develop and diversify the local economy (Vásquez-Moreno & Córdova, 2013). Commercial urban farms also provide several environmental benefits. Most urban farmers in Malmö follow organic principles of growing, and the use of pesticides is discouraged which also contributes to soil (Malmö Stad, 2019b). These farms also help improve microclimate and air quality while increasing rainwater infiltration (Deelstra & Girardet, 2005 Vásquez-Moreno & Córdova, 2013). Locally grown foods have a smaller carbon footprint because of the lower energy use and greenhouse gas emission, which come from transportation (Van Tuijl, Hospers, & Van Den Berg, 2018). Urban farms have the opportunity to educate city dwellers, who are often far removed from food

[1] The REKO-Ring concept was developed in Finland and is now popular in several Swedish cities. It uses an online platform to connect growers and customers to facilitate sale of local produce within a geographic location. In Malmö, the REKO-ring operates through a public Facebook group where farmers posts quantities of produce and their pricing. Customers comment on posts to place an order and send money immediately through the Swish app. Meetups are organised weekly for exchange of produce (Daving Götberg, 2018).

[2] Community supported agriculture is a business model with a direct agreement between farmers and customers. Customers prepay for a plot for a year and get regular delivers from the farmer. This model ensures mutual benefits as risks and rewards are shared by both farmers and customer (Cone & Myhre, 2000).

production systems, on how their food is grown, processed and transported (Vásquez-Moreno & Córdova, 2013).

6. 1. 2. Contributions of recreational urban agriculture

In Malmö, recreational urban agriculture practitioners are either involved in community allotment projects which are self-organised or private allotments which are managed by Malmö municipality. Plantparken is an example of a community allotment project which caters to hobbyist urban agriculturalists in Vastra Hammen. It was established in 2007, and the future of the project is uncertain as it has only has two years remaining on its land use agreement with Malmö municipality. Plantparken is located between a school and car park on a vacant and unused plot of land. It operates in a space often used by the public as a path to a recreational water's edge, as seen in Figure 3C. Because of the position, the open access to the project is required to be maintained.

The project leader mentioned that the main goals of the project are the pursuit of leisure (particularly in the summer) and to grow to produce for self-consumption. The plot is structured and built as 25 private lots around 8-10$m^{2,}$ which can be seen in Figure 3A and B. People involved in this project lease their private lots for 300 SEK per annum which is used to pay for common expenditures. There are many health benefits associated with gardening, especially for older citizens (which represent most of the demographic here). It provides physical benefits like sensory stimulation, practices of fine and gross motor skills and enhances eye to hand coordination, all of which contribute to improving quality of life for senior citizens (Wang & MacMillan, 2013). There are also psychological benefits associated with these allotment projects as they can act as a focal point for social interaction and community building. It brings together people from different age groups, gender and ethnicities and promotes social cohesion and sustainability (Moller, 2005). There are also many environmental benefits to urban recreational practices. Practitioners at Plantparken, when possible, follow organic growing practices and choose flowers that can support local bee populations and ecosystems. Urban agriculture also helps improve microclimate and local air quality while facilitating rainwater infiltration and circular metabolism of nutrients using household organic waste as manure (Deelstra & Girardet, 2005; Vásquez-Moreno & Córdova, 2013). Recently children from the neighbouring school were invited to Plantparken to learn about gardening and how food is grown thereby providing a connection to agri-systems through learning (Blair, 2009). Further, it promotes economic sustainability through the effective and productive use of a vacant plot of land in the city (Vásquez-Moreno & Córdova, 2013).

A)

B)

C)

Figure 3. A) Plantparken Project in Vastra Hammen; B) Eva Rennten's leased plot at Plantparken; C) Recreational waterfront near Plantparken. Photographs were taken by Cosgrove (2019b).

6. 1. 3. Contributions of educational urban agriculture

Educational urban agriculture practitioners aim to inform mainly children and families about gardening. Växtvärket Malmö ideell förening (Växtvärket) is a non-profit association situated in Guldängen Bygglek and is an example of an educational urban non-profit project that aims to be socially integrative and focuses on education which is environmentally conscience. The project consists of growing spaces of 200m^2 and recreational playgrounds of 2500m^2 for children as seen in Figure 4. The project was established since 2015 and is run by four paid employees and thirty six volunteers who work 20-30 hours and 2-10 hours a week respectively. This varies between November and March where only two paid employees work. The project is promoted through social media (Facebook and Instagram), public events and on posters and flyers, which attract their volunteers. Växtvärket provides many contributions to social sustainability in Malmö and it financially supported by Malmö municipality and Fastighetsägare Sofielund. It provides a space for community building and empowerment across multiple age groups. The financial support has seen the successful operation of the project with its school activities which educate students and families (PLV). This raises awareness amongst city dwellers and particularly children about how food is grown and processed as they tend to be unfamiliar with agri-systems (Vásquez-Moreno & Córdova, 2013). Gardening can foster an improved sense of self, teamwork and community in children while increasing motivation and enthusiasm (Blair, 2009). Currently, the funding for the project has not been renewed or substituted, so the project has the potential to cease. Växtvärket also grows a variety of plants and herbs (see Appendix D) which promotes environmental and cultural sustainability by promoting local biodiversity, traditional practices and local knowledge.

A)

B)

C)

Figure 4. The heritage fund project Guldängen Bygglek. A) The arrangement of the planting raised beds and the recreational playground on containers which are also are used for storage; B) recreational playground and graffiti art; C) Row of planting raised beds w which face a children's day-care centre. Photographs by Cosgrove (2019a).

6. 1. 4. Contributions of community-based urban agriculture

Community-based urban agriculture commonly acts as a facilitator for social integration and overall societal benefits. In the case of Rosengård in Malmö, the urban agriculture project was geared towards providing immigrants and members of the Islamic community an opportunity to engage in a smart climate initiative *Odla Rosengård* (Jimenez et al., 2014). The stakeholders involved in this project were community members (civil society), Malmö municipality (government) and private actors including businesses like Rosengård Centurm and real estate companies like MKB, HSB and Hestia (market). The project existed in multiples location across Rosengård with different functionalities. The organic growing of vegetables for personal consumption promotes food security and lowers vulnerability in at-risk migrant groups while contributing to economic and social sustainability (Vásquez-Moreno & Córdova, 2013). The produce was also used to support educational activities at local schools and Yallatrappan, a work integrated social enterprise and women's cooperative. The project offered a place for people to meet which led opportunities to network and better understand Swedish culture. This provides contributions to social and cultural sustainability. The project officially ceased in 2016, due to lack of funding, management and long-term support strategies despite community interest (Jimenez et al., 2014; SM).

Table 5. Contribution of urban agriculture to promoting sustainability in Malmö. Modified from Deelstra & Girardet, 2005; Pearson et al., 2010 and Vásquez-Moreno & Córdova, 2013.

	Environmental	**Economical**	**Social**	**Cultural**
Commercial	Organic farming; Increased rainwater filtration; Improved air quality and microclimate	Creation of self-employment opportunities; Diversifying local economy	Leads to creation of social connections; Educate city dwellers on how food is grown and processed	Add cultural value to how urban farmers are perceived
Recreational	Organic farming; Support local insect population; Improved air quality and microclimate; Circular metabolism of nutrients	Effective and productive use of vacant land;	Recreational spaces that provide physical and psychological health benefits; Promotion of social cohesion by bringing different groups of people together	Connection to the traditional practice of allotment garden in Sweden
Educational	Environmental education and awareness raising; Promotion of local biodiversity	Efficient use of a small piece of land; Generates employment for full-time workers	Provides space for community building; Improving sense of self, team and community in children; Aesthetic in open spaces "productive parks."	Preservation of traditional culinary practices; Connection to local knowledge
Community-based	Promotion of green spaces in built areas and associated benefits; Environmental education and awareness raising	Food proximity (cost reduction); Coming together of economic stakeholders	Promotion of social cohesion by bringing different groups of people together; community building; Food security and vulnerability reduction for at-risk groups	Maintenance of "food culture and identity" of urban migrant groups; Creating a cultural connection to traditional practises and local knowledge

6. 2. How can Malmö Municipality support the development of urban agriculture beyond a 'niche'?

Malmö municipality is overall very supportive of urban agriculture projects in Malmö. When it comes to the management of public spaces, Malmö municipality tends to rely on mechanised maintenance. Urban agriculture's reliance on manual maintenance is recognised by Malmö municipality as serving the purpose of mobilising "the enthusiasm that exists for the outdoor local environment" (Malmö Stad, 2016). Malmö municipality in the past had developed a cross-department urban gardening group through 2015 and 2016. Currently, the Landscape Architect in Malmö municipality Department of Public Environments is the contact for urban agriculture related matters (LA).

Additionally, the strategic manager for Malmö municipality's Environmental Department is involved in Malmö Växter, a group that aims to provide a space for urban agriculture practitioners in Mamo to

interact with one another. The Strategic Manager indicated that there is strong support for green spaces in the city. However, there is of course competition for these green spaces, and they need to be multi-functional including, recreation, flood mitigation and biodiversity etcetera. Urban agriculture needs to be able to provide this balance between many factors (SM).

6. 2. 1. Existence of regulations and support but no formal policies

Urban agriculture currently exists across the city, and projects carried out on public lands are required to abide by the *Regulations for urban gardening in public spaces in the city of Malmö* document. It is also expected that all urban agriculture on public land follows the laws which regulate food growing in public spaces as per the Swedish Planning and Building Act. Moreover, Malmö municipality stipulates that cultivation should be carried out including the use of organic principles, which stipulate no use of chemical fertilisers, pesticides, herbicides or fungicides or chemicals which do not abide by the Swedish Environmental Code. Any structural changes to the landscape must be approved by the Street and Park Department (Malmö Stad, 2019b). Malmö municipality reserves the right to remove and "dismantle" any urban agriculture projects on public lands if they do not adhere to the specified regulations or if they cause a disturbance to the community adjacent to it.

To date, Malmö municipality has no formal policy on urban agriculture in the city. It only has a strategy for urban agricultures organisation, financing and maintenance. This combined with the regulations for urban gardening act as guiding 'policy' for which urban agriculture associations and projects. From this, it has been ascertained that through Malmö municipality visions, goals and strategies the city can develop existing and future sites of urban agriculture (Malmö Stad, 2016). The current responsibility of Malmö municipality includes preparing the contracts with urban agriculture associations as well as providing a contact person within Malmö municipality Department of Public Environments. It also includes ensuring the locations for urban agriculture is safe, including the soil through soil sampling and testing, access to water and providing essential waste management services (Malmö Stad, 2019b).

Malmö municipality has directly supported both Plantparken and Växtvärket (SM). Plantparken were assisted with the installation of a water line, and tap and Växtvärket are financially supported through the Allmänna Arvsfonden, a grant of 4 500 000 SEK for three years (2017-2019) (PLP; PLV). In addition to this Växtvärket has received land agreements, letters of intent, two containers, *bajamaja* (portable toilet), barbecue area, electricity, water, two building permits, soil samples, garbage bins and garbage collection from Malmö municipality (PLV).

6. 2. 2. Promoting bottom-up approaches through the creation of an umbrella association

Malmö municipality throughout recent years has also supported urban agriculture associations through learning workshops and trips which showcase urban agriculture practices in Europe. The Strategic Manager reiterated that these activities aimed to help inform, coach and encourage the different pathways for urban agriculture. Different areas offer different possibilities based on their context. This acted as inspiration for the urban agriculture associations in Malmö and for them to understand the process of forming an overarching "umbrella" association. Malmö municipality sees that an umbrella association needs to come from the urban agriculture associations, and it is because its value has now been seen. This is not something which was without difficulty as it takes time, there is tension (when there are conflicting ideas), and it is a change to how things have been done for a long time. The trip to Bristol in the United Kingdom for the urban agriculture associations was a significant influence for seeing a new way with urban agriculture (SM).

The Strategic Manager acknowledged that urban agriculture in Sweden is not an easy endeavour. Malmö municipality envisions a bottom-up approach as the only course of action which will strengthen the longevity of the projects within the city, unlike other urban agriculture cases in Helsingborg. There has been a great enthusiasm shown by Malmö municipality towards an umbrella association being formed in order to ease their ability to manage and work with urban agricultural practitioners in the city. This is their view will help connect people and allow for a more coordinated effort and ability to support current and future urban agriculture projects (SM).

As part of their support for an umbrella association for urban agriculture, associations organised and facilitated the educational exchange between urban agriculture practitioners in Malmö to Bristol in the United Kingdom. This saw members of multiple urban agriculture associations travel to Bristol to see not just urban agriculture practices but also how an umbrella association can function and support all those involved (SM).

During research and interviews for this thesis, an umbrella association for urban agriculture was established, Stadsodlarna Malmö ideell förening (STAM). The purpose of STAM is to act as an independent umbrella association for urban growers in Malmö. They are aiming to promote urban agriculture in the Malmö region for the long term, strengthening the support of its members and to develop their projects/business. For Malmö municipality, STAM offers and allows a continuation for the bottom-up approach as well an opportunity for urban agriculture to gain greater autonomy. Something which was highlighted by the trip to Bristol (PLV).

6. 2. 3. Challenges for urban agriculture initiatives

Malmö municipality is limited in the amount of support that they can offer urban agriculture. This is underpinned primarily by financing. Urban agriculture needs 'manpower' or investment which requires money to continue or establish projects. Both the Strategic Manager and the Landscape Architect from Malmö municipality noted that the current budgeting for urban agriculture is not enough to see significant improvements and substantial growth of urban agriculture in the city, but the most is made from the budget of 300 000 SEK (2019). This is less than the suggested annual 500 000 SEK budget needed for the implementation of the vision in the strategy document (LA; Malmö Stad, 2016).

Further funding for urban agriculture projects if conditional to the expectation that each application for money is from a new project. This has caused challenges for existing and well functional projects which need to change or add elements to receive financing (SM). Some projects like *Odla Rosengård* have ceased or face additional challenges when it comes to meeting this condition, including Växtvärket who expressed their reoccurring difficulties with this system (PLV). The Strategic Manager highlighted and summed up how there were these challenges impact the longevity of urban agriculture projects (SM).

> *"…talking about problems and what's needed in the future, its political directive and money basically to create some sort of longevity for the ideas because a lot of it's just that they're projects, so you get funding from if it's Vinnova, Allmän Arvsfond, wherever you get the money from you get it and you do a project and then when the project finishes you then have to apply for more money. And even if you want to continue what you're doing in that project because it was really good, you've now got to come up with a new idea for a new project because you cannot get funding for the project that you've already… the same thing. So you've got to sort of reinvent the wheel all the time, and that's makes it difficult to sort of have some continuity and longevity."* (Strategic Manager, 2019)

Representatives from both Plantparken and Växtvärket were positive towards the role that Malmö municipality has played with the development of urban agriculture overall. The current regulations and requirements stipulated regarding the operation of urban agriculture have proved to be workable for each association to meet their aims (PLP; PLV).

Malmö municipality has played an integral role in the financing of Växtvärket. To them, their project aligns well with the existing targets of Malmö municipality and has acted as a justification of the continuation of the project, but this type of financial 'security' is still not guaranteed. Beyond 2019 it

is uncertain if this community project will continue (PLV). Conversely, Plantparken is self-sufficient and requires minimal support from Malmö municipality but when assistance is needed it is provided promptly. The project leader said that the only support needed thus far was a connection to the water line, and Malmö municipality provided this through the installation of a tap at the project site (PLP).

6. 2. 3. 1. Challenges as seen from Växtvärket

The challenges faced when working with Malmö municipality, from Växtvärket's view, start with communication. At present when it comes to asking for support Växtvärket are passed around to several administrations depending on their relevance at each given approach. Malmö municipality, to Växtvärket, are not used to working with associations and not able to write cooperation agreements with associations. Similarly, current policies make it difficult for administrations to directly contribute to Växtvärket. The need to develop a project with new ideas in order to receive financial support has placed Växtvärket in a situation which risks the project, by trying to fix (or add) something, to something which is not broken (PLV).

Additionally, Växtvärket identified that all urban agriculture associations within Malmö do not have cooperation agreements with Malmö municipality, nor is Malmö municipality equipped at being able to write such cooperation agreements. Malmö municipality is not used to working with these types of association which have led to the use of a supplier agreement. This is insufficient as they are not used to working with associations and not able to write cooperation agreements with associations. Presently the only cooperation agreements which are similar are the supplier agreements, which have been formed for companies which are based on collaboration and business. Supplier agreements at present are not a flexible collaboration tool which Växtvärket and other associations can use, as it majorly lacks the relevant fundamental parameters which are relevant for collaboration/contributions to urban agriculture. Växtvärket wants there to be an *Offentligt Partnerskaps-avtal* (public partnership agreement) for all urban agriculture projects so that they can communicate and cooperate with the administrations within Malmö municipality (PLV).

6. 2. 3. 2. Challenges as seen from Plantparken

Presently Plantparken does not have any challenges when operating with Malmö municipality or within its regulations. For them, the challenges stem from the involvement of people. They are getting people involved, particularly young people. To Plantparken young people want to be involved with urban agriculture but there needs to be a better way to reach out the message. People are involved with their local community so urban agriculture can also become part of this. The project leader said that support for urban agriculture should *"come from the top … many people are not pushing for it … I think*

Swedes … like when they know that this topic is important, I think will come out" if Malmö municipality leads. Plantparken expressed the need for less of a hierarchical structure to the operation of urban agriculture in Malmö. This is to ensure the ease of urban agriculture development but most importantly the involvement of young people, this needs to be easy (PLP).

6. 2. 4. Future pathways for Malmö municipality to mitigate challenges

All interviewed were optimistic about the development of urban agriculture in the future (LA; PLP; Pl-V; SM). According to the Malmö municipality representatives, there are limitations with what their institution can offer there is an opportunity for growth in political support and policy which can help see urban agriculture projects access to finance (LA; SM). Further, it was said by the Strategic Manager at Malmö municipality that urban agriculture projects can access finance through other means for example funding for flood mitigation urban agriculture projects (SM). Plantparken's Project Leader sees urban agriculture acting as a connection point, something which reaches across ages and ideologies, connecting children to nature, a bringing together of people to strengthen a community, but a less hierarchical structure is needed (PLP). Additionally, the Project leader of Växtvärket said that urban agriculture in the future needs more support from Malmö municipality. It should come through an urban agriculture coordinator, an office space and a truck, which could come through the new umbrella association (PLV). It is hoped by the representatives of Malmö municipality and Växtvärket that this umbrella association will help urban agriculture association in the future be able to access more support from Malmö municipality in the long-term (LA; PLV; SM).

7. Discussion

The complexity of the concepts of a sustainable city and urban agriculture requires a context-specific approach (Vásquez-Moreno & Córdova,2013). The results indicate that urban agriculture practices in Malmö are motivated by environmental, economic, social and cultural contributions to sustainability (as demonstrated in Table 4). For Malmö Municipality to support the development of urban agriculture beyond 'niche', there are three main factors at play. Firstly, the results suggest a lack of funding and political will that act as obstacles to longevity and stability of urban agriculture projects. Secondly, it was also found that while Malmö Municipality supports a more bottom-up approach for urban agriculture, organisations like Vaxterverkt would prefer more top-down initiatives, mainly due to uncertainty about finances and duration of the project. Finally, encouragement of bottom-up approaches by Malmö municipality and dialogues between urban agriculture practitioners in Malmö has led to the formation of an umbrella association STAM during the research process. Actors involved in urban agriculture hope that this umbrella association will help create solutions for the aforementioned issues and promote long term development of urban agriculture in Malmö.

The results of this research display an interconnectedness to the concern regarding the longevity of urban agriculture projects. This underpinning is not an expected finding. Concerns regarding longevity were raised by all participants in this research, including the uncertainty about the future and lack of ability to plan for long term sustainability for urban agriculture projects in Malmö.

7. 1. Role of access to funding and land in ensuring longevity

Funding is crucial to ensure the longevity and sustainability of urban agriculture projects as supported by the Urban Agriculture Governance framework (Lohrberg et al., 2016). Projects can only plan their operations within the frame of their guaranteed budget; for example, if funding is guaranteed for one-year, operations can only be planned for that one year. For Växtvärket, this creates the need to finance their operations through sponsorships and grants. To obtain financing through Malmö municipality, it is required that the project application have a new idea or be changed enough that it is not similar to an application for a project that has already been funded. This has forced Växtvärket to evolve their idea each time they apply for funds even though the project was already functioning successfully. In the case of *Odla Rosengård*, lack of funding ultimately led to the dissolution of the official project.

The Governance framework also identifies land (private or public) as another important resource in ensuring the sustenance of urban agriculture initiatives (Lohrberg et al., 2016). Even through Växtvärket currently has a land agreement with Malmö municipality, it needs to be renewed after a certain period, and there are no long-term guarantees. Plantparken can secure finances through

member contributions which are paid annually at the renewal of plot leases. As the land where the project is situated is earmarked for development by Malmö municipality, the land agreement is signed only a limited period which prevents long term planning. The future use of the land is uncertain and will be determined by the municipality.

7. 2. Governance of urban agriculture and the influence of political support

Political support or the lack thereof will influence the future scale and position of urban agriculture projects in Malmö. Politicians can accommodate urban agriculture within policy so that new and existing projects can access more support and funding. According to the Governance framework, the legitimation of these initiatives would also incentivise stakeholders to invest their time and money in them. Policymakers in Malmö have shown interest in urban agriculture and consider it to be a 'great idea'. However, this attention is short-lived and has not translated to inclusion or formation of a new policy. This has also led to a lack of recognition of urban agriculture's potential contribution to Malmö's environmental programs. Malmö municipality pushed for the development of a bottom-up approach because they believe it would create more stable and long-lasting urban agriculture projects. This governance approach is hoped to facilitate a sense of ownership from the community if urban agriculture in Malmö develops this way.

A bottom-up approach is interactive to the role of cultural expression and development and can be a tool for community participation and empowerment (Braden & Mayo, 1999). Since the 1970s Sweden has seen a shift from "government to governance" which has weakened the institutional strength of the state to see more administrative bodies and boards develop (Lindvall & Rothstein, 2006). This led to developing defacto policies which were outside or beside the influence of the Riksdag (the national legislature and the supreme decision-making body of Sweden) and cabinet, which coordinated networks of public, semi-public and private initiatives. This created ideological state apparatuses which focused on ideology production (Lindvall & Rothstein, 2006). As a result, new kinds of public-private partnerships through 'New Public Management' used market mechanisms and the distribution of public services. Ultimately this saw waves of deregulation followed by re-regulation developing a new type of governance (Larsson, Letell, & Thörn, 2012). Malmö municipality currently embodies this position as a branch of governance. As of now, as Sweden is a socialist welfare state (Robson, 2018), it creates the expectation that Malmö municipality would take the lead when it comes to developing urban agriculture in Malmö, as Växtvärket and Plantparken desire. However, this is not the approach which Malmö municipality wishes to take.

7. 3. Role of the umbrella association in the future

STAM reinforces the bottom-up approach in Malmö as its purpose is to promote and strengthen the urban agriculture projects in Malmö (Stadsodlarna Malmö ideell förening, 2019). With STAM, urban agriculture is poised on the path of development and longevity in Malmö. STAM will be an organisational umbrella which will be used to streamline and regulate the public and private relationship between Malmö municipality and urban agriculture associations respectively. Public-private partnerships often utilise organisational hybrids, such as umbrella organisations to carry out efficient and flexible partnerships and support (Andersen, 2004). Both Malmö municipality and the urban agriculture associations hope for the development of a secure support link and dialogue. This is so that urban agriculture related matters receive adequate support on different issues including finance and land agreements. The expanded role capacity of STAM offers the opportunity for local democracy innovation through the integration of new participation avenues for the local community (Andersen, 2004).

The future of Växtvärket and Plantparken is currently uncertain. There is no long-term assurance of finance and land, which are key resources to ensure sustenance of urban agriculture initiatives. Projects are limited by the time-bound availability of finance and land agreements, which means that they cannot establish long-running initiatives. This, in turn, limits their ability to partner with other associations and attract investments from other stakeholders. Political support and participation of local actors can help mitigate concerns of funding and access to land which consequently can solve the concern regarding the longevity of urban agriculture projects. The ability of an urban agriculture project to have longevity matters because it ultimately reduces its capacity to contribute to the urban sustainability of Malmö.

7. 4. Investigating governance processes in global case studies

Accelerated urban densification and increasing valuation of inner-city properties make access to land a problematic issue, especially in cities with high population density (Lohrberg, et al. 2016; Soulard et al., 2017; Thornton, 2018). Urban agriculture projects differ in their aims across cities in the Global North, but they share a similar concern for the longevity of these projects.

Political support for these projects differs across a wide spectrum from institutional integration and policy inclusion to a case with none. In Zurich (Switzerland) and Boston (the United States of America), the local government follows a top-down approach where urban agriculture is included in city policies. Urban farmers in Zurich are a part of the Common Policy (CAP) and receives subsidies for meeting

biodiversity quality requirements through legislature whereas, in Boston, the city has created zoning areas for urban agriculture (Soulard et al. 2017; Thornton, 2018). In Sydney (Australia); however, the local government did not permit urban agriculture project to be established although it met all the health and safety requirements. Thornton (2018) identified conflicting interests and priorities. To be the main justification for the rejection of the project. In Montpellier (France) and Lisbon (Portugal), political support for urban agriculture projects increased as a result of public pressure for further development. In both cases, joint support of the local government and its residents saw the proliferation of urban agriculture projects across the cities. Additionally, the public in Lisbon wanted legitimised permission to continue urban agriculture projects. The city saw value in the project because it proved food security for its disadvantaged citizens and was eventually included the city's social policies (Soulard et al. 2017).

Strong public support is also seen in Berlin (Germany) where activism has supported the continuation of urban agriculture in the city since the allotment gardens developed in the second world war. This activism ties in with the city's identity for "fighting for their rights to the city" (Thornton, 2018). In some cases, the public has had to challenge the local governments for access to vacant public land so that urban agriculture projects can be established. No resources or budgeting is allotted these projects although the local government highly praises these urban agriculture initiatives (Thornton, 2018).

Funding for urban agriculture projects differs according to the purpose of each project. In Boston and Lisbon, urban agriculture is practised for food security which receives governmental support (Soulard, et al. 2017; Thornton, 2018). In the case of Montpellier, a tripartite, between the local government, the neighbourhood committee and the Green Hand association (appointed by the municipality) see to the funding of urban agriculture projects as part of their management and maintenance. The tripartite has facilitated the institutional integration of these projects. There are many types of urban agriculture projects in Zurich. Here the source of funding varies greatly. All urban agriculture practised on public land has the opportunity to make a profit from their projects with some also receiving CAP subsidy payments. The local government additionally funds urban agriculture in community gardens, migrant gardens and allotment gardens (Soulard et al. 2017).

7. 5. Comparing urban agriculture in Malmö to European examples

The results obtained from the interviews agree with other urban agriculture cases studies and the governance framework in highlighting the importance of funding and access to land. Support for these key resources is offered mainly by local governments that follow a top-down approach (like Zurich) or a blended top-down and bottom-up approach (like Montpellier and Lisbon). In the case of Malmö,

some projects receive whole or partial funding from the municipality. It also provides land use agreements for initiatives on public lands. Generally speaking, the municipality does not want to be the sole party to finance urban agriculture projects, but it is, on a case by case basis, willing to try and support projects. This is similar to the blended approach in Montpellier and Lisbon but in Malmö, has weaker public support and involvement in comparison. In Zurich, urban agriculture initiatives on public land are permitted to sell their products or services to generate income. This is currently not an option for urban agriculture initiatives in Malmö as the policies do not permit it.

Incorporation of urban agriculture in institutions and policies is also more evident by local governments that follow a top-down approach or blended top-down and bottom-up approach. This inclusion provides legitimation to urban agriculture initiatives. Malmö municipality displays a willingness to support urban agriculture in the city but has not institutionalised it or included it formally its policies. *Odla Rosengård* exemplifies the situation where the municipality was interested in supporting the project but were unable to because of inadequate funding and lack of formal policy. At the time of its dissolution, the project identified a need for long term support structures which could be provided by the umbrella association and policy inclusion from Mamo municipality. The formation of umbrella association STAM was encouraged by Malmö municipality by arranging a field excursion to Bristol. In 2011, during the second Bristol Food Conference, the Bristol Food Policy Council (BFPC) was established (Moragues-Faus & Morgan, 2015). It was based on a key recommendation from the report Who Feeds Bristol?[3]. The BFPC does not have a formal status or funding committed for its working. During its developmental years, the BFPC tried to form links with all relevant stakeholders in the government, civil society and market. It also developed the Good Food Plan which acts as the guiding strategy to help urban agriculture initiatives work together towards a common goal. Ideally, STAM will occupy a similar place in the urban fabric in Malmö as BFPC does in Bristol, with the exception being greater involvement from Malmö municipality.

7. 6. Limitations of research

This thesis has potential limitations in its ability to answer the research objectives. The methodological choice was restrained due to limited previous research on urban agriculture in Malmö. The reliability of the results is impacted by the inability to interview all relevant stakeholders. Limited previous research created a need for high use of grey literature to fill in the gaps in knowledge, particularly in the context of Malmö. The results do not encompass a holistic view of how Malmö municipality can

[3] Who Feeds Bristol? was a report funded by National Health Services (NHS) Bristol and the Bristol city council, the first sustainable food audit for a city in Britain (Moragues-Faus & Morgan, 2015)

support the development of urban agriculture beyond a 'niche' because of the limited number of interviews. The utmost was done to avoid this by contacting eighteen stakeholders, but only four were able to oblige their participation in the research. A possible explanation for the lack of response could be the overlap of the time of contact with the key operation period for farmers. One way to mitigate this limitation would be to contact the farmers at a more suitable time of year.

7. 7. Recommendations for Malmö municipality and research

For urban agriculture to promote urban sustainability in Malmö and for the municipality to develop urban agriculture beyond a niche, there is a need to create a model system which promotes longevity. Malmö needs to have a defined policy when it comes to urban agriculture. The formation of the policy should be guided by the contributions of urban agriculture initiatives that the municipality wishes to realise. The municipality should investigate which characteristics from mentioned case studies, notably from Zurich and Montpellier, to see what would best the Mamo context. The previous projects in Rosengård were a promising endeavour of urban agriculture in the city but lacked long term planning for funding and management.

There is a serious need to create funding sources for urban agriculture projects in Malmö, either from the municipality or by altering policies which would allow projects on public lands to self-finance. Legitimation of the umbrella association STAM and the establishing of a point of contact within the municipality would help streamline communication for both the municipality and urban agriculture associations. Formal public partnership agreements[4] would be better suited to facilitate cooperation between these actors. A blended governance approach of top-down and bottom-up should be continued in Malmö to increase collaboration and distribute responsibility between these stakeholders.

Further research should be done to investigate the role the umbrella association STAM can play in the development of urban agriculture in Malmö, and further the implications this has on the city's sustainable urban development agenda.

[4] *Offentligt Partnerskaps-avtal*

8. Conclusion

Urban agriculture provides many contributions towards urban sustainability beyond food production and security, including environmental, economic, social and cultural benefits (Vásquez-Moreno & Córdova, 2013). Malmö's sustainable urban development strategy aims to densify the city and the attractiveness of urban agriculture as a land use option is raised due to its multifunctionality. Concerns regarding longevity are currently the biggest hurdle for Malmö municipality to develop urban agriculture beyond a niche. These concerns arise due to problems regarding long term funding and land use agreements. It is hoped that the newly formed umbrella association, STAM will help alleviate these issues by streamlining communication between the municipality and associations. Malmö municipality is already in the process of investing into urban agriculture projects, but it needs to legitimise and institutionalise urban agriculture projects while including it in policy in order to maximise its contributions to urban sustainability by ensuring its longevity.

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10. Appendices

Appendix A. Questionnaire on Urban Agriculture in Malmö (for practitioners)

Part 1. General Information about your organisation and urban agriculture set up.

Name :	Type (circle): Private Community Business Government Non-Profit Other:
Years of operation:	Address:
Total area of operation (m^2):	Growing area (m^2):
Name of crops grown (list) and yield.	Value of production (if applicable):
Source of seeds:	
Source of water:	
Raised beds (circle): Yes No	
Is production organic, inorganic or mixed (you use organic methods where possible but if needed use inorganic methods):	

Part 2. Operation of the organisation

1. What are the objectives of your urban agriculture:
   a. Financially -
   b. Socially -
   c. Environmentally -
   d. Please rank the following objectives (from 1 to 6, 1 being the highest)

Commercial	Self /Family consumption	Education	Environment Protection	Social Integration	Hobby

2. Who does the work?
   a. How many people are involved (usurban agriculturelly) and approximately how many hours work is this weekly?

	Number of people	Hours per week
Paid		
Unpaid/Volunteers		

b. How do the seasons affect this? (describe if possible)

c. How did these people find out about you?

4. How is the organisation financed? Do you receive any funding or support (yes/no)? If yes can you please describe the support type and duration. (Eg. financial investment, land to use with no rent etc).

5. What factors make your farming activities successful or challenging/difficult?

Part 3. Institutional support for the organisation

1. Are you involved in any partnership (agriculture network, professional organisation)? Yes/no, if yes please list.

2. How do the policies/regulations from Malmö municipality:

a. Help you?

b. Create challenges for you?

3. What changes would you like to see from Malmö municipality?

Part 4. Future Pathways

1. What are the current plans for the future of the organisation/operation? Is it going to end, continue, grow, move location etc?
2. What do you think is needed to see urban agriculture grow in Malmö? eg. support from Malmö municipality, funding, changes in regulations etc.
3. What are your thoughts on the idea of creating a formal organization that promotes and helps urban agriculture activities in Malmö?

a. What should this organization look like?

b. What are some difficulties that you see?

Additional Comments

Are there any points of interest, concerns, and comments which you think are important when it comes to urban agriculture in Malmö which was not covered above?

Appendix B. Questionnaire for Malmö Stad (Strategic Manager)

1. What is your role in Malmö municipality and how is it connected to urban agriculture?
2. How popular is urban agriculture in Malmö (is it increasing or decreasing in popularity)?

3. Is urban agriculture a part of the sustainable urban development agenda for Malmö/Malmö City Environmental Program?
4. What are current policies from Malmö Stad regarding urban agriculture, including regulations, permits, fees etc?
5. What help does Malmö Stad provide its partner organizations/groups involved in Stadsodling?

Appendix C. Questionnaire for Malmö Stad (*Landskapsarkitekt*)

1. 1. What is your role in Malmö municipality and how is the streets and parks dept connected to urban agriculture?
2. How long have you been in this position?
3. Can you describe the different Urban Agriculture projects the streets and parks department are involved with, including location, size, structure and age of projects?
4. What is the procedure for the workings of allotment gardens?
5. What is the average size of the plot?
6. What do people usually grow?
7. Do you require them to practise organic farming?
8. What is the cost of renting the plot? How is the entire project financed?
9. What are your thoughts about the popularity of urban agriculture in Malmö?
10. Is urban agriculture a part of the sustainable urban development agenda for Malmö/Malmö City Environmental Program? Should it be?
11. What trends do see for urban agriculture in Malmö?
12. What do you think needs to be done to ensure that urban agriculture develops for the long term and to play an important role in the sustainability agenda of the city?
13. Will the inclusion of urban agriculture in the sustainability agenda help it grow in popularity?
14. Additional Comments: Are there any points of interest, concerns, and comments which you think are important when it comes to urban agriculture in Malmö which was not covered above?

Appendix D. The plants grown at Guldängen Bygglek

- Strawberries
- Hedera helix
- Sage
- Oregano
- Thyme
- Chives
- Tarragon
- Parsley

- Cardoon
- Orache
- Marigold
- Nasturtium
- Black kale
- Chard
- Cabbage
- Cosmos
- Squash
- Aster
- Agastache Foeniculum
- Corn
- Malabar Spinach
- Beets
- Lettuce
- Marjoram
- Rhubarb
- Comfrey
- Sorrel
- Blueberry
- Raspberry
- Autumn raspberry
- Currants
- Orpine
- Horseradish
- Blueberry
- Gooseberry
- Cough
- Artichoke
- Aniseed
- Cabbage
- Fragrance geraniums
- Hollyhocks
- Runner bean
- Cucumber
- Woodruff
- Hablitzia
- Korogi
- NZ spinach
- Clear berries
- Hyssop
- Onion
- Garlic
- Phacelia
- Golden cut
- Daylily
- Sunflower
- Mulberry
- Apple trees (3)
- Potatoes
- Minikiwi