STUDY

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Research for AGRI Committee - Urban and Peri-urban Agriculture in the EU

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Abstract

This study presents a state of the art overview on urban agriculture and peri-urban agriculture (UPUA), the diversity of phenomena, motivations, distinctive features, benefits and limitations. UPUA is contextualized in relation to societal and economic transformations, EU strategic objectives, policies and regional food system approaches. Using best practice examples, the study demonstrates the need for an improved integration of UPUA into the policy agenda across sectors, domains and governance levels.

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CONTENTS

LIST OF ABBREVIATIONS

CAP	Common Agricultural Policy
CLLD	Community-Led Local Development
COP 21	21st Conference of the Parties (United Nations Climate Change Conference Paris)
CoR	Committee Committee of the Regions
CORDIS	Community Research and Development Information Service
CPUL	Continuous Productive Urban Landscapes
CSA	Community Supported Agriculture
EAP	Environment Action Programme
EESC	European Economic and Social Committee
EIP-AGRI	European Innovative Partnership Agricultural Productivity & Sustainability
ELC	European Landscape Convention
EPG	Ethical Purchasing Group
EPRS	European Parliamentary Research Service
ESDP	European Spatial Development Perspective
ERDF	European Regional Development Fund
EU	European Union
FAO	Food and Agriculture Organisation of the United Nations
FG	Focus Group
GI	Green Infrastructure
HSA	Humanitarian Support Agency
ICLEI	Network “Local Governments for Sustainability”
LEADER	Programme “Links between actions for the development of the rural economy”
MUFPP	Milan Urban Food Policy Pact
NGO	Non-Governmental Organisation
OF	Organic Farming
PDO	Protected Designation of Origin
PGI	Protected Geographical Indication
PHC	Power-Heat-Coupling
PUA	Peri-urban Agriculture
R&D	Research and Development
R&I	Research and Innovation

RUAF	Resource Centres on Urban Agriculture and Food Security
SDG	Sustainable Development Goal
SFSC	Short Food Supply Chain
TSI	Traditional Speciality Guaranteed
UA	Urban Agriculture
UNEP	United Nations Environment Programme
UNHCR	United Nations High Commissioner for Refugees
UPUA	Urban and Peri-urban Agriculture
US	United States of America
UN	United Nations

LIST OF MAPS

LIST OF FIGURES

LIST OF PHOTOS

LIST OF TABLES

EXECUTIVE SUMMARY

Background

Over the last decades urban and peri-urban agriculture (UPUA) in the Global North has gained increasing awareness and interest by society, policy and research. On the one hand, it is due to the good connectivity of the topic to public and stakeholder debates on food issues (quality, transparency, traceability, security, regional production, organic production, sovereignty, short food supply chains). On the other hand, due to large societal and economic transformations the debates (on sustainable land use and urban development, economic competitiveness, ageing and migration, quality of life, adaptation to climate change and resilience) are taking place in a less integrated way. More than in the past UPUA is perceived as a multifunctional solution, partly because civil society is involved in the co-development of innovative practices and governance models.

Main findings

UPUA comprises food production in and around urban areas, ranging from leisure to commercial activities. Scale, intensity, use of technology and output vary considerably depending on the type and the focus of UPUA. Distinctive features are explained through location factors and different degrees of professionalism. UPUA developed from a means of self-supply in times of crises to a multifunctional land use resulting in manifold benefits on a social, economic, ecologic and cultural level. Although, especially in peri-urban areas highly productive commercial farms exist, the commercial potential has not fully unfolded yet and is facing several constraints. However, business strategies such as diversification, differentiation and specialisation depict promising opportunities to create economic value from the multifunctionality of UPUA.

Ageing, gender issues, migration and social inclusion are societal transformations and drivers for UPUA. As examples illustrate, UPUA can offer solutions like new models for generational renewal, improved gender balance in agriculture, inclusion of refugees and intercultural community action. However economic transformations like global markets and competitiveness affect UPUA due to its location in urban proximity and affect farm structure and specialisation of UPUA. Access to land is a serious challenge and is starting to rapidly gain attention in governance. Societal acceptance for UPUA in general is high, but a certain preference for traditional small-holder systems, whereas technology-driven urban, zero-acreage solutions are also seen critical.

UPUA is widely acknowledged and gains more attention by policy makers and scientists from global to local level. Research funding through the European Framework Programmes and Horizon 2020 has supported the generation and spreading of knowledge and innovation for UPUA with highly increasing budgets and recognising and exploiting the functional diversity and capability for integrated system approaches.

Despite the growing interest the existing policies usually do not sufficiently target UPUA and are not very feasible for the specific situation and for the diversity of urban and peri-urban farms operating at the urban-rural interface. Especially the Common Agricultural Policy (CAP), which is the main policy for farming and food production in the EU does not match the specific needs of UPUA due to their particular characteristics in terms of actors, scale, diversity and location in urban areas and their surroundings. Especially those policy and planning approaches are promising, that integrate UPUA into more holistic, cross-sectorial perspective on (local) food systems or ecosystems like urban food policies (food as entrance point) or the green infrastructure and productive landscapes, which make use of the multifunctional character of UPUA as provider of ecosystem services and public goods.

There are manifold benefits from UPUA that justified a more targeted consideration in policies and supportive intervention mechanisms. For the future development of policies that aim at particularly addressing UPUA it is however important to emphasize the fact that the specific location where UPUA produces food production and provides services is undergoing rapid and strong land use changes creating pressures, that do not occur in rural regions. The new, more diverse and more explicitly expressed societal demands on UPUA typical for the urbanised areas make it even more difficult to match food and services supply and demand. Here the intervention logic should take a starting point and make use of governance approaches that integrate sectorial boundaries and responsibilities and activities of administration, stakeholders and civil society. This report makes suggestions for appropriate policy levers and accompanying measures.

INTRODUCTION

Urban agriculture (UA) both inside the built-up city and in the peri-urban hinterland has become a growing phenomenon worldwide over the last decades and comprehend a large variety of different **food production** activities: the production of herbs, as medicinal and ornamental plants for both home consumption and for the market; the provision of fresh locally produced food; the greening of the cities; the productive reuse of urban waste; the provision of recreational, educational and social services.

Besides the provision of food, UA has various functions in the global urban systems. In the developed countries of the north, it provides urban dwellers rather with **public goods** than with agricultural raw materials. The objectives for pursuing UA in Europe are mostly **linked to environmental and social objectives**, the preservation of biodiversity, tackling (food) waste, reducing energy consumption and addressing the demand for more quality foods. There are great varieties of types and forms, both between and within countries like community gardens, allotments, backyard gardens, rooftop gardens, vertical gardens, urban farms or city farms or so-called ZFarming (zero-acreage farming).

Although in recent years the issue of **urban and peri-urban agriculture** (UPUA) attracted increasing attention by a wider range of global and European policy makers and researchers, the phenomenon had been **largely neglected by EU policies** and especially in the CAP. As a consequence, policy makers at EU level realised the lack of appropriate treatment and in-depth knowledge on both urban and peri-urban agriculture and asked for meaningful research expertise.

This study provides an overview on the **current state of the art knowledge** from European research on UPUA. It delivers appropriate definitions for UPUA, demonstrates the diversity of phenomena, motivations behind, and its distinctive features and types in the European Union. It describes the historic background and evolution over the last decades; presenting case studies from selected EU research projects (**chapter two**).

In **chapter three**, the study contextualizes UPUA in relation to the societal and economic transformations and discusses and **assesses performances, benefits and unexploited development potentials** in relation to the relevant EU policy objectives and related strategies.

In **chapter four**, the analysis compares the policy design with the spatial and economic reality of UPUA. It takes into consideration different food system approaches for production and regional governance in the urban-rural gradient across sectors and policy domains and discusses their value as learning cases for future policies.

The final **chapter five** draws conclusions and recommendations for policy levers that better target UPUA through **policy integration across sectors, domains and governance levels**.

In each chapter short case studies and stories are presented in order to illustrate the statements made (see Map 1).

Map 1: Overview about presented case studies

Source: own elaboration

1. AGRICULTURE IN THE URBAN CONTEXT: PHENOMENA, BENEFITS AND ECONOMIC PERSPECTIVES

KEY FINDINGS

- UPUA comprises food production in and around urban areas, ranging from leisure to commercial activities. Scale, intensity, use of technology and output vary considerably depending on the type and the focus of UPUA.
- UPUA developed from a means of self-supply in times of crises to a multifunctional land use resulting in manifold benefits on a social, economic, ecologic and cultural level.
- Although, especially in peri-urban agriculture (PUA) highly productive commercial farms exist, the commercial potential has not fully unfolded yet and is facing several constraints. However, business strategies such as diversification, differentiation and specialisation depict promising opportunities to create economic value from the multifunctionality of UPUA.

1.1 Urban and peri-urban agriculture (UPUA): Definition and characterisation

In this section we address the following questions:

- *What is urban and peri-urban agriculture?*
- *How is it defined and characterized?*

UPUA have gained interest within the political and academic domain. Although the occupation with the topic is century-old (e.g. the famous model by agricultural economist Heinrich von Thünen, 1826), it is only (re-)entering the contemporary debates on sustainable land use and urban development, economic competitiveness, quality of life, food security and sovereignty, adaptation to climate change and resilience. Driven by continuing **urban and metropolitan growth** (and the related urban pressure on open spaces, especially farmland), **environmental consciousness** and **critical reflection on modern agriculture and food production**, **societal transition** (e.g. changing relationship between and integration of work and free time) and **new forms of economic activities** (e.g. informal, non-profit or sharing economy) and **innovation** (e.g. social innovation), the societal and political interest in UPUA has regained.

Simultaneously and as a result of these societal interests and demands, the agricultural practice within an urban context itself – including the peri-urban – is undergoing a **major transition process**, making UPUA increasingly distinguishable from its counterparts in rural areas regarding its **heterogeneity in farming types and systems, activities and practices** and the involvement of the **urban and peri-urban communities**. They also differ in the way they are influenced by the **proximity to urban areas**, being part of functional **urban-rural linkages**, urban pressures and opportunities, benefits they (can) provide to urban societies and consequently the way they have to be addressed by the political and regulatory regime.

For the comprehension of the phenomenon and a targeted political action it is indispensable to understand the **spatial context,** UPUA is embedded in and interacts with. Consisting of a built environment of continuous and discontinuous human settlements, technical and transportation infrastructure and green spaces, urban areas are characterised by a concentration of population (three quarters of the EU's population is living in urban areas). In that sense, the urban is traditionally distinguished from the rural realm.

The notion of the "peri-urban", however, which has been first coined by the OECD (1979) cannot be easily defined or delineated through unambiguous criteria, as the authors formulated back then. It continuingly suffers from a **certain fuzziness and the lack of a widely acknowledged definition** due to a parallelism of the different approaches and models, such as urban fringe, urban-rural interface and transit zones, suburban area and sprawl (Briquel and Collicard, 2005; Meeus and Gulinck, 2008; Simon, 2008; Ravetz et al., 2011).

The Council of Europe of Ministers Responsible for Spatial Planning (CEMAT, 2010, p.295) combined these elements in their definition of peri-urban areas: they are "*in some form of transit from strictly rural to urban. These areas often form the immediate urban–rural interface and may eventually evolve into being fully urban. Peri-urban areas are places where people are key components: they are lived-in environments. The majority of peri-urban areas are on the fringe of established urban areas, but some are clusters of residential development within rural landscapes. Peri-urban areas are most frequently a result of suburbanisation or urban sprawl*." However, despite its intangible nature "*the **peri-urban is also recognised as a spatial type and territory in itself***" as the European research project PLUREL (Piorr et al., 2011, p.24) has put forward. But although the peri-urban can and needs to **play a key bridging role in the relationship between city and countryside**, through its administrative and political fragmentation, the peri-urban is compromised by a lack of planning and coordination, municipal competition, NIMBYism ("Not In My Back Yard") and conflict of objectives.

Reflecting the spatial and functional complexity and dynamism of urban and peri-urban areas, also the definition of urban agriculture (UA) and peri-urban agriculture (PUA) is ambitious. What all definitions of UA have in common is that they are a **form of food production in boundaries of urban areas in close proximity to urban dwellers** (Mougeot, 2006; Pearson et al., 2010; Opitz et al., 2016).

Urban agriculture and gardening cover a **heterogenic landscape of phenomena**, such as domestic and traditional allotment gardens dating back to the 19th century, community gardens often linked to schools, neighbourhoods and migrant communities (Simon-Rojo et al., 2016) to economic and technology-driven and partly highly intensive food production in and on buildings, such as rooftop, indoor and glasshouse production (Specht et al., 2014). Due to the dynamics of the sector that is often organized in **informal structures** and temporally limited as **interim use** of urban brownfields, the **broad variety of practitioners** – which are usually not regarded as "farmers" – and their motivations, the diverse cultivation practices and side-line activities, it is challenging to precisely characterize UA as a whole (Van Veenhuizen and Danso, 2007; Veijre et al., 2016).

Photo 1: Agriculture in the peri-urban sphere

Source: I. Zasada

In contrast to the usually small-scale structures of UA, which are narrowly integrated into the urban fabric, peri-urban agriculture shares more commonalities with agriculture in rural areas, i.e. it is usually considered as part of the primary sector with larger farm sizes, legal agricultural status and entitlement to farm payments by the European Common Agricultural Policy (CAP). However, the peri-urban location and the functional integration into the urban system with respect to structural, social, cultural economic and ecologic aspects (Pearson et al., 2010; Veijre et al., 2016) have led to considerable deviations from its rural equivalents. The **competition on regional land and labour markets, nuisance and conflicts** with other urban functions on the one hand, but also the **proximity to urban consumer markets and trends, creative milieus and innovation clusters** on the other have triggered the emergence of very different adaptation strategies and business models, which also occur in rural regions, but far less pronounced (Zasada, 2012). As a result, specialised and high quality food and vegetable production, on- and off-farm diversification of agricultural and non-agricultural activities, direct marketing or the provision of recreational and social services, such as keeping of horses or care farming are far more frequent in the peri-urban agricultural landscape then they are in the rural (Præstholm and Kristensen, 2007; Zasada et al., 2013; Pölling et al., 2017).

However, as the **boundaries between urban and peri-urban agriculture are rather fluent** with specific forms and characteristics occurring in both domains (Opitz et al., 2016), a strict delineation is difficult and obscures one's view on the common urban context-related forces, mechanisms, potential role and benefits, but also needs and requirements UPUA is subject to and which require political attention.

1.2 Farm type, business models and cultivation practices

To depict the variety of scale from home gardening to commercial farming, the diversity of models and activities provided, and the intensity of land use that different UA and PUA types can comprise, we suggest a **consideration of UA and PUA from three different perspectives**, i.e. operational and business models, the type of community involvement and cultivation and land use practices. This section addresses the following question:

– *Which different forms of UPUA can be distinguished?*

1.2.1 Farm types and farm business models

Urban and peri-urban farms with commercial orientation **adapt their operation models** to urban demands and the preconditions and influences that prevail in cities. Different strategies are used to create economic business opportunities, enabling farmers to avoid the struggle of growing or giving way that many farms in rural areas are facing (Pölling and Mergenthaler, 2017). Van Der Schans et al. (2016) specified three different marketing strategies for (peri-)urban farmers: specialisation, differentiation and diversification.

Specialisation on a few specific products can reduce production costs and is tailored to the interconnection with urban infrastructure (Pölling and Mergenthaler, 2017). An example from urban areas is the production of perishable leafy vegetables or herbs that cannot be stored for a long time and depend on short transportation distances (Van Der Schans and Wiskerke, 2012). In peri-urban areas the specialisation on **horse husbandry** is another frequent phenomenon (Zasada et al., 2013).

The **differentiation** strategy refers to the focus on the farm practices, which clearly differ from those from conventional agriculture, shifting away from mass production (Marsden and Smith, 2005). Distinguishing features can involve high quality, exotic or old varieties but also self-developed new crop varieties. Differentiation can also cover vertical integration processes in which additional value is added to a product by processing it or direct marketing and distribution to customers.

Diversification represents a strategy to create additional economic benefits by expanding the range of activities of a farm, for example when farmers are not only selling foodstuff but also offer social services, conserve landscapes (Van Der Schans, 2010), offer **horseback riding** additionally and agro-touristic activities or open boarding kennels. Apart from this on-farm diversification, there are also forms of off-farm diversification. More and more peri-urban farmers are working part-time on their fields and generate off-farm income in the nearby city in a job not related to agriculture (Busck et al., 2006).

Story

Horsification in Europe

The keeping of horses, either for work or leisure purposes represents a frequent phenomenon in European agriculture with around 7 million equines across the EU. Although overall numbers are lacking, regional case studies suggest, that equine-related activities are particularly common in peri-urban areas. These occur either as diversification activity of grazing livestock farms or as highly specialised equine service farms, such as horse boarding and riding schools. Responding to the demands of urban consumers, especially in the vicinity or urban and metropolitan areas, horse-keeping has been established as a recreation-oriented type of agriculture. Generating considerable value added and employment (estimated 100 billion euros annually, 900 000 jobs for the equine sector), horse-keeping represents a gainful alternative to food production. Although it helps to contribute to the vitality of peri-urban farming, the concentration of horse-farms, stables and related infrastructure led to a negative connoted "horsification of the countryside".

Photo 2: Horse boarding situated in the urban fringe

Source: R. Köster

In some types of UPUA, gardeners are focused on leisure rather than self-supply with food or the creation of income. This is particularly the case for allotment gardens, which were originated with the aim of food self-sufficiency, but which are increasingly transformed towards a recreational character (Simon-Rojo et al., 2016). In Poland for example the people applying for allotment plots are increasingly young families who want to use them for recreational purposes (Pawlikowska-Piechotka, 2011). Peri-urban hobby and part-time farmers in Northern Europe often commute to urban centres to create their income which means that farming is not an economic activity for them. They follow a lifestyle-oriented interpretation of agriculture and rather practice hunting or horse keeping as leisure activities (Busck et al., 2006). The recreational values of the open spaces of peri-urban farmlands in proximity to the city are also recognized by urban dwellers. Even though in this case agricultural activities themselves are not recreational but contribute to the provision of natural landscapes that can be easily accessed by visitors and build a relaxing contrast to densely populated and built cities (Zasada, 2011).

1.2.2 Community involvement

In many UA initiatives, food production is not the main focus, but only a starting point for community-building, educational or cultural activities. This applies especially for **community gardens** which are usually self-organized and often emerge from grassroots movements. Community gardens often follow a joint political agenda based on solidarity and horizontal decision making (Mudu and Marini, 2016). Hence, the garden is becoming a space to meet like-minded people with a collective character (Simon-Rojo et al., 2016). In Greece allotment gardens are an emerging phenomenon with similar goals. As a result of neo-poverty more and more people engage in allotment gardens not only for self-supply with food but also with the aim to strengthen the local community and to enable social inclusion (Partalidou and Anthopoulou, 2017).

Photo 3: Community garden in Berlin

Source: I. Zasada

Intercultural gardens also mostly emerge at grassroots level from the needs of marginalised population groups such as migrants or refugees. They bring together people from different countries and cultural backgrounds. The principles of such gardens are based on mutual respect and tolerance. Usually the area is composed of a common area for joint activities and individual plots. Cultivating the land and producing their own food makes the gardeners aware of their capabilities and gives them self-respect, self-esteem and self-confidence. Furthermore, intercultural gardens aim at fostering communication between different groups while maintaining cultural diversity (Moulin-Doos, 2014).

Educational gardens are used to teach their participants about growing plants, handling food and raising awareness about the environment and nutrition. This form is often connected with schools, kindergartens or other educational institutions. **Therapeutic gardens** focus on the treatment of people with mental diseases, traumatized persons or patients with physical disabilities (Simon-Rojo et al., 2016). In Berlin, Germany the project "soulgardenberlin" uses gardening as a low-threshold activity to help refugees to get to know their living environment and locals. In addition to integration, the gardening activities are also supposed to help the people who are often traumatized to relax and to relieve stress.[1]

Another form of community involvement, mainly practiced in collaboration of farming professionals and consumers in UPUA are the concepts of **Community Supported Agriculture (CSA), Ethical Purchasing Groups (EPG)** or **box schemes**, where consumers are on a regular basis included into the production and distribution process, such as working on the farm or help with the direct delivery (Opitz et al., 2017a). These forms have in common, that they are arrangements, built upon social ties of direct personal collaboration.

In peri-urban areas the concept of social farming pursues similar objectives but usually on a bigger scale. **Social farms** comprise a broad range of activities and interactions with the natural environment

[1] https://soulgardenberlin.com

addressing different target groups and can co-produce social services. Therapeutic farms offer treatments for both people with mental and physical problems. Therapy including animals can teach empathy and improve social interaction skills and make patients feel appreciated (Garcia Llorente et al., 2016). The therapeutic use of horses can train motor sensory skills (Simon-Rojo et al., 2016). In the Netherlands green care farms as an alternative to traditional nursing homes have shown to have positive effects on residents with dementia regarding their social interaction and physical activities (de Boer et al., 2017). Furthermore, social farms can help with the re-integration of disadvantaged people. Taking care of animals, plants or food processing can improve the participants self-esteem and helps to readjust to a structured daily routine (Garcia Llorente et al., 2016).

CASE STUDY

Social Farming at Camphill Community Clanabogan

Being part of a worldwide distributed network the 52 hectares of land outside of Omagh, a city of 21,000 inhabitants in Northern Ireland, belong to Camphill Clanabogan a farm that offers therapeutic services in a "life-sharing" community and support for people with learning disabilities and mental health problems.

Based on anthroposophical theories of Rudolf Steiner the movement was founded 70 years ago, aiming to integrate adults and children with special needs through living, learning, and working in the agricultural sector.

The farm includes crop production as well as livestock farming, a vegetable garden, a bakery, and shops for weaving and wood-working. Sustainability and the use of renewable energy constitute a core value in this community, which led to Ireland's first biomass heating system set up in Clanabogan in 1998.

Source: Harbison (2010), Camphill Community Clanabogan (2018)

1.2.3 Cultivation methods and land use

Photo 4: Allotment gardens in Berlin

Source: pixabay.com

Crop selection and cultivation decisions in UPUA are depending on several factors. Consumption patterns and the subsequent demand for specific products are determined by culture and socio-economic circumstances. The possible range of cultivated products is further limited by soil quality and climate conditions (Van Veenhuizen and Danso, 2007). Hence, a wide **diversity of different cultivation methods** is applied in UPUA, ranging from low-tech hobby gardening to high-tech intensive vegetable or livestock production. Hobby gardeners conduct **UA** on a **micro-scale** by simple means in **pots, seed beds or on balconies**. Community gardens often do not have permanent rental agreements and hence, no planning security for several growing seasons is granted. Furthermore, the

soil of vacant urban land is often contaminated. As a consequence, community gardens use raised beds, plastic boxes or rice bags to cultivate their food, since they are relatively mobile, can be easily brought to a new location and the cultivation above the ground ensures safe food (Lee-Smith, 2009).

The gardening activities of **allotment gardens** are typically land based and often subject to local bylaws and regulations that require for example that a minimum of one third of the plot has to be dedicated to non-commercial food production. A case study in Leipzig suggests that strict garden codes like stipulated weeding lead to a high degree of garden management intensity compared to community gardens (Cabral et al., 2017). An innovative subtype of UA called **zero-acreage farming** comprises all types of building-related food production, such as rooftop gardens, rooftop greenhouses, edible walls or indoor farming and does not require additional land (Specht et al., 2014). These cultivation methods range from low-tech approaches such as using facades as support for climbing plants to high-tech solutions such as soil-less hydroponic growing systems or rooftop greenhouses that create synergies with buildings, for example by reusing waste heat and water from them (Specht et al., 2014).

Photo 5: Rooftop garden in Paris

Source: C. Legenne[2]

[2] C. Legenne (IAU île-de-France) - Cultures sur le toit de l'AgroParisTech à Paris (75). (Link: https://www.flickr.com/photos/iauidf/38699505021/in/photolist-StqEam-TaXuey-TGkSNd-TKZvaD-TKZtar-21XK5zc-TKZveB-TGkSiL-TKZpWn-StqNJA-Sw8U5a-Sw8M96-TaXAGo-StqLFN-TKZt6D-Tyvok4-eCZJTi-nBoKqS-qdhsJv-nmWH6i-StqDQJ-4G5sYe-nDqB43-4G9CXh-79izzU-4G9CWN-nBo3SC-nmWb4v-4voQst-hbqhiP-nmWCfg-4G5t2B-4G9D69-nmWgRd-nmWwpa-4G5sKB-Tyvo1M-Sw8MLD-TGkRPj-79eMTa-TGkSg1-LbnhK-StqFoU-Tyvn2c-4G9CVC-TKZvs2-TGkRSL-79jkmY-TyvmFc-nmWjzr)
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The intensity of peri-urban agriculture can be very different, depending on the land use method (Zasada, 2012). One example for **high intensity** is **livestock production** in the Netherlands, where many farms are close to urban landscapes. On the one hand this is due to high stocking densities and high population density on generally scarce land. On the other hand, by being close to the city farmers are also in proximity to economically important infrastructure such as the port of Rotterdam and the surrounding markets. However, the high animal density also intensifies the production of forage, the use of inputs such as fertilizers and the overall environmental impact of livestock production (Vellinga et al., 2011). Extensive peri-urban agriculture usually focuses more on **lifestyle farming** or environmental goals such as preservation of open space (Zasada, 2012). However, there are also commercial farms that use rather **extensive production methods**. Newly emerging alternative food networks which are characterized by short food supply chains and proximity between producers and consumers are often linked with sustainable land use and approaches to lower the environmental impact of food production (Forssell and Lankoski, 2015) and many farmers that are involved in community supported agriculture exhibit a high degree of environmental awareness (Oberholtzer, 2004).

Peri-urban food cultivation is usually soil-based (Opitz et al., 2016). However, for example in the UK especially commercial farms that depend on a high agricultural output often apply soil-free practices such as hydroponics (Lee, 2012). This enable a more efficient use of water, lower the risk of soil-borne diseases and are not dependent on local soil quality. Nevertheless, the initial investment costs are high and the successful maintenance of these systems requires specific knowledge, experience and engineering skills (Jones Jr, 2005).

1.3. Benefits of urban and peri-urban agriculture

This section addresses the following question:

– *Which benefits are the different forms of UPUA able to deliver and where are the limits?*

As mentioned before, the production of food is a unifying element of the different forms of UA and PUA. However, beyond the **provision of fresh and healthy fruits, vegetables, milk, eggs and meat** (De Zeeuw, 2011), various other services are rendered as well. UPUA as an element of the urban green infrastructure conserves the **heterogeneity of landscapes** that perform important ecologic functions. As other types of urban green spaces, urban farms and gardens contribute to biodiversity through **habitat fragments** with a wide diversity of different flowering plants (Lin et al., 2015).

Especially soil-based cultivation methods where large areas are used as flower beds, vegetable patches or green spaces help to **prevent soil degradation**. Further, UPUA represents a **nature-based solution** for **climate change adaptation and mitigation**, as it preserves unsealed surfaces for the **infiltration of surface run-off** (Lin et al., 2015), reducing the urban heat island effect through increased evapotranspiration and collecting dust (De Zeeuw, 2011). The more large-scale PUA provides green buffers around cities, filtering and cooling air. Near rivers grasslands are important water retention areas for flood prevention to inner cities and hence reducing potential economic disasters.

Local food production resulting in short transport distances potentially **lowers emissions and energy demand** for cooling perishable products. Furthermore, the **application of UA and PUA creates possibilities to** reuse organic waste or urban wastewater (De Zeeuw, 2011). Social benefits comprise for example the provision of spaces for **leisure, recreation, social interaction, education** (Paradis et al., 2016) and **social inclusion** (Simon-Rojo et al., 2016). Especially UA further contributes to **human**

health, providing spaces for physical activity (green gym) as well as for spiritual experience and lifelong learning.

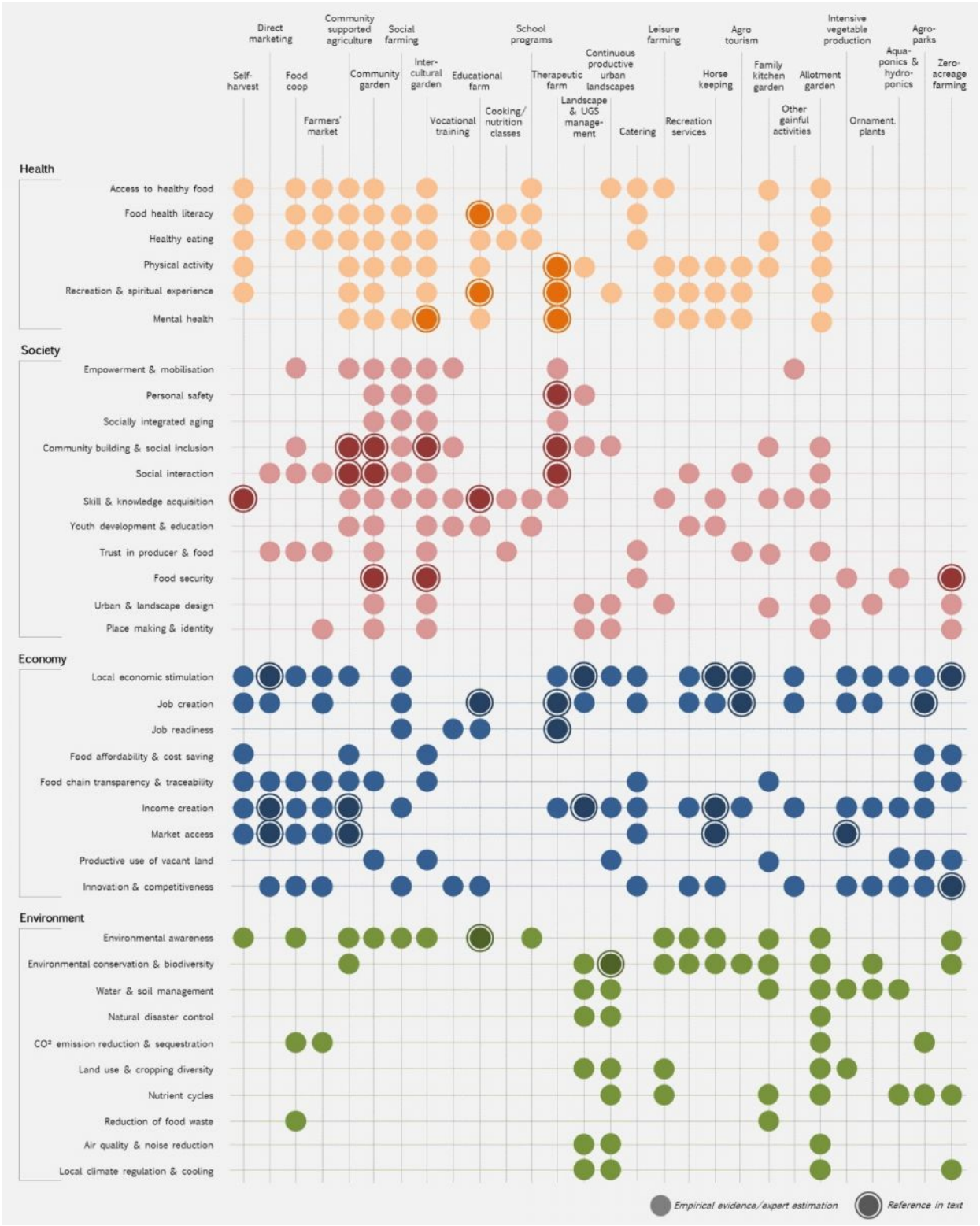
Photo 6: Social engagement and physical exercise in a community garden in Ljubljana

Source: G. Gobec

Food cultivation within or close to cities can furthermore reconnect consumers and producers and may create a relationship based on **solidarity** between them (Van Der Schans and Wiskerke, 2012). Little evidence exists of specific economic benefits. Nevertheless, a diversity of business strategy tailored for local demand creates income and employment opportunities for urban and peri-urban farmers (Schulz, 2013). In community-oriented concepts, such as **CSA**s, EPGs or box schemes new marketing opportunities are created, or economic risks can be shared between farmers and consumers.

It is important to note that there is a strong diversity of agricultural practice in urban areas, depending on the scale, intensity and type of food production (Pearson et al., 2010), which in consequence influences the degree to which UA and PUA produce benefits on different dimensions. For a detailed insight of **benefits different UA and PUA types can deliver** see Figure 1.

Figure 1: Potential benefits of different forms of UPUA



Source: own compilation based on literature review and own expert knowledge

1.4 Economic development perspectives

This section addresses the following questions:

- *What are the specific economic development potentials and opportunities?*
- *What are given limitations and threats?*

1.4.1 Potentials

Due to their **legal restriction to non-commercial food production**, the contribution of UA to the creation of jobs and economic growth in the EU is often seen as negligible (Caputo, 2012, Van Der Schans et al., 2016, Zeunert, 2016). Although, especially in UA the commercial sector is not fully developed yet, they bear **substantial economic potentials** as "hidden champions of an urban green development strategy" (Van Der Schans et al., 2016). Compared to inner cities land prices are typically lower and land abundance is higher in peri-urban areas which enables land-based production on a larger scale (Zeunert, 2016). The urban fringe is considered as an **innovative space of agriculture** (Bryant, 1984). PUA is often closely interconnected with non-farm actors which enable **knowledge exchange**, **learning processes** and improve **competitiveness** (Zasada, 2012). The proximity to urban consumers enable to access information on demand, which in turn can create **positive impulses, creative adaptions or stimulate innovations** for UPUA in terms of production methods or products (Beauchesne and Bryant, 1999, Le Grand and van Meekeren, 2008). Also when responding to pressures, such as limited access to land but also the local legal and political requirements can promote innovations tailored to the diverse production environment of cities (Pfeiffer et al., 2014).

Driven by consumer concerns towards industrial food systems which are often associated with anonymous, low-quality products, environmentally harmful production processes, the **demand for local food** – food which is produced nearby and has short supply chains – is growing (Van Der Schans, 2010). Short food supply chains (SFSC) and their social, economic and environmental effects are put into a new perspective and are taken up in urban food strategies and **changing relationships between food producers, retailers and consumers** (Sonnino, 2009). Local production enhances **transparency** about production processes and hence a differentiation from most conventional food producers who face declining trust from consumers due to food scandals and long, incomprehensible food chains (Van Der Schans et al., 2016).

The **changing demand is taken up by new multifunctional business models**, such as differentiation, specialisation and diversification, which are described above. Networks of alternative and local food supply are growing in number (Holloway et al., 2010, Opitz et al., 2016) because consumers seek for proximity to the producers. The involvement of consumers into food production and distribution can create a sense of solidarity between farmers and consumers and the feeling to be connected with each other in a social and economic community (Zoll et al., 2018). Therefore, models such as CSA have the potential to provide small producers who would struggle on a global market with income and economic stability (McLlvaine-Newsad et al., 2004, Möllers and Bîrhală, 2014).

CASE STUDY

CSA in Poland

According to a recent study of URGENCI network on Community Supported Agriculture (CSA) the number of CSA in Europe evolves dynamically with around 2,800 CSA farms operating in Europe and providing food for 474,000 people in 2015. In Eastern European countries like Poland the phenomenon is quite new.

The first Polish CSA (RWS-Rolnictwo Wspierane przez Społeczność) started in 2012 with members of the Warsaw Food Cooperative as a grassroots initiative connecting a rural farm with city consumers in Warsaw. 15 households were provided with food from two organic farmers who aimed at initiating a movement in Poland as a role model. Within the following years the idea spread to other Polish regions. In 2015 eight farms were selling pre-paid food to eleven consumer groups in five large Polish cities (Warsaw, Opole, Wroclaw, Poznan, Szczecin). Differences between the groups occur when it comes to the consumers' responsibilities in the production process, their choice to select their produce and the delivery to the members. Beside vegetables some farms also produce fruit, eggs or even meat. Most farmers transport the food to collecting depots, the products of two groups are delivered to the consumers' doorstep.

Without governmental support possibly not even known by public institutions, most of the operating CSAs exist because of consumer activism sharing financial risks of food production through the interdependence of producers and consumers. However, CSA activities display not the main source of income of participating farms, yet.

Still in its infancy compared to western European countries, Polish CSAs require additional experiences in member communication, network operating, and alternative solidarity-based business strategies in order to build an established connection between peri-urban agriculture and urban food demands.

Source: Olszewska and Sylla (2016), Sylla et al. (2017), Rolnictwo Wspierane przez Spolectnosc (undated)

SFSC can depict another **competitive advantage** because they enable urban and peri-urban producers to offer a range of products that is different from the basic supply from long-chained food systems, such as perishable products like sprouts or leafy vegetables. **Direct marketing** channels aiming at local markets most suitable to be served by UA and PUA (Van Der Schans and Wiskerke, 2012) and can enable producers to obtain premium prices for their products (Hinrichs, 2000). New economic opportunities even attract many newcomers into agriculture who are willing to take alternative pathways and a high willingness to test and adopt **innovative approaches** (Præstholm and Kristensen, 2007).

Even small-scale urban food production within the limited space of the inner cities can allow commercial distribution. **Space-efficient, high-tech, building-integrated food production** methods are used as a specialisation strategy to deliver **niche markets for perishable goods**, which cannot be stored or transported for a long time (Thomaier et al., 2014). While commercial rooftop greenhouses and plant factories are already run successfully in the United States or Singapore, there are only few practical examples in Europe. Large-scale solutions that are technically advanced such as vertical farming still remain in a prototype stage (Specht et al., 2016a). However, there are hints that indicate the **economic feasibility** of vertical farming in the form of a "farmscraper". The production potential of such a building might be multiplied compared to the same area used for land-based agriculture since cultivation of fruits and vegetables takes place on multiple storeys and year-round harvests are enabled by controlled growing conditions (Banerjee and Adenaeuer, 2014).

UPUA holds the potential to implement **circular economy** through closing the cycles of organic waste, water and nutrients. Established as organic farming practice, it proves resource efficiency and sustainable production (see also case study "AgroParisTech Rooftop Garden").

In terms of employment, the **multifunctional character of UPUA** has the potential to create various **job opportunities** in different fields (Schulz, 2013). Depending on the farm type different human resources with knowledge beyond primary food production are needed: farms focusing on agro-touristic activities need staff to take care of visitors, social farms are potential employers for therapists, technicians, programmers and architects are necessary to realise building-integrated farming approaches, landscape gardeners are needed to maintain agroparks, and trained personnel has to take care of the students in gardens and farms for environmental education.

1.4.2 Barriers

For the implementation of high-tech indoor farming there are different barriers: First of all, **technical solutions for indoor farming systems are not fully developed** and the variety to choose from is limited as well (Al-Chalabi, 2015). Since plant growth in indoor farms relies mainly on artificial lightning, the energy demand can create high operational costs and decrease competitiveness (Germer et al., 2011). Model calculations from a UK pilot project indicate that the **energy demand** required for vertical farming can only be covered by rooftop solar panels if the building is located in a place with abundant sunlight. Furthermore, a life cycle analysis revealed that the **carbon footprint** of vertical indoor vegetable production is much higher compared to conventional outdoor agriculture (Al-Chalabi, 2015). The potential synergies of combining farming and buildings are also not fully unlocked, yet. Existing buildings are often not suitable for retrofitting them with technology necessary to create energy loops and to close material cycles. **Investment costs** for setting up new buildings designed for farming activities are even higher (Thomaier et al., 2014). Overall, it is necessary that architects, engineers and farm designers come together to jointly expand and refine necessary technology (Germer et al., 2011, Al-Chalabi, 2015).

Photo 7: Greenhouse in Rotterdam

Source: I. Zasada

Often UA actors are not trained in agricultural practices (Opitz et al., 2016). Although, they may possess other skills that can foster innovation, a **lack of agricultural knowledge** can depict a big obstacle for establishing an economically viable operation. If innovators cannot demonstrate a certain degree of agricultural professionalism it negatively affects how they are perceived by other stakeholders (Specht et al., 2016a). This in turn can result in difficulties to find funding or cooperation partners.

The proximity to urban areas provides benefits for the farmers but it also creates pressures. Due to the **growth of housing, industrial or infrastructure areas**, particularly farmland is under pressure and shrinking Farmers face increased land use competition with different interest groups, **rising land prices, limited land availability**, **compromising long-term planning perspectives**. Hence, both access to land and farmland retention become more difficult, especially **for farmers under tenancy** (Vandermeulen et al., 2005). The multifunctionality of UPUA is a key issue for its economic potential and a valuable land use. However, neither the diverse social and environmental functions nor economic efficiency can be maintained if the **agricultural landscapes are fragmented** because of urban expansion (Paradis et al., 2016). Small, disconnected agricultural areas also create both higher manual workload and production costs because the use of large farm machinery is limited. The **contamination of soils** within cities hampers the establishment of commercial horticultural businesses as well. Therefore, areas used by UA are often just available for interim use and remain a temporary activity of social initiatives without economic ambitions (Schulz, 2013). The durability and respectively the potential economic success also highly depend on local policy. However, as sectorial competencies and responsibilities at municipality administration level are unclear and legal frameworks for urban food production are lacking or do not consider their special conditions and requirements, urban farmers are often left alone in a state of insecurity (Specht et al., 2016a).

2. MOTIVATIONS, OBJECTIVES AND POTENTIALS

KEY FINDINGS

- Ageing, gender issues, migration and social inclusion are societal transformations and drivers for UPUA. As examples show, UPUA can offer solutions such as new models for generational renewal, improved gender balance in agriculture, inclusion of refugees and intercultural community action.
- However economic transformations like global markets and competitiveness affect UPUA due to its location in urban proximity and affect farm structure and specialisation of UPUA.
- Access to land is a serious problem and is starting to rapidly gain attention in governance.
- Societal acceptance for UPUA in general is high, but a certain preference for traditional systems against "artificial high tech" systems becomes apparent.

2.1 Societal and economic drivers and characteristics

In chapter three we pursue the following questions:

- *What are societal and economic transformations driving urban and peri-urban agriculture?*
- *What are the motivations and objectives of the actors behind urban and peri-urban agriculture?*

Transformations have been shaping urban and peri-urban areas for decades. But both the speed of **land use change** and the challenges for its improved steering under new paradigms are rapidly increasing. Transition is manifested in particular in the completely **changed demographic distribution** between urban and rural areas, and the **increasing migration to cities** resulted in particular challenges that urbanised areas face.

Specific urban challenges have been addressed in the UN Habitat III process, including climate change adaptation and mitigation, mobility and transport, urban form, and social inclusion. In addition, the accompanying strategic development process at national levels and below have identified further fields of action, partially cross-cutting the above-mentioned ones, such as urban land use (temporary, societal demand driven, multifunctional), circular economy, material flows and urban health.

Over the last decade, societies and economies across the EU and globally have experienced unexpected pressures and crises with impacts on social cohesion and economic development. They highlighted the increased interdependence on global processes, but at the same time they induced a new awareness and power to strengthen the resilience of European economic, environmental and social systems (COM, 2010). Paradigms of production and growth have been questioned and widened, and it was agreed that a transformation and realignment could not be carried out without the involvement of civil society as a whole. Therefore, strategies, initiatives and actions have been launched, supported or observed as good practices that span from European level, down to the level of communities and individuals (COM, 2010).

Photo 8: Community Gardening in Lyon

Source: I. Zasada

The Europe 2020 strategy is the response to the **transformation process** that has gripped Europe since the end of the first decade of the new millennium. It is contextualized with the long-term challenges that are changing faster and more intensively, namely **globalisation, pressure on natural resources, and ageing**.

As a response, three priorities have been defined for reinforcing (Europe 2020):

- **Smart** growth: developing an economy based on knowledge and innovation;
- **Sustainable** growth: promoting a more resource efficient, greener and more competitive economy;
- **Inclusive** growth: fostering a high-employment economy delivering social and territorial cohesion.

In the following paragraphs we will describe how societal and economic transformations are driving UPUA. We will put focus on community and individual levels and present business and cooperation models exemplifying motivations and objectives towards transformation. We will distinguish the description by the perspective of farmers and consumers (including those adopting the hybrid role of prosumers). Their motivations and objectives will be shortly outlined.

2.2 Farmers within UPUA under societal and economic transformations

Within the discourse in politics and among professionals and stakeholders, the challenges and impacts of societal transformations on the agricultural sector are usually framed from a rural development perspective, dealing with the problems of **ageing, outmigration** of young people, deficient farm succession as well as weak rural economic viability and quality of life lagging behind urbanised areas. The pressures that famers in UPUA are confronted with, originate from the same trends, but lead to very different transformations.

Being a problem of the agricultural sector per se, ageing and generational renewal is also a challenge for farmers in UPUA. It is strongly related to farm structure and land ownership conditions. The EUROSTAT farm structure survey (2015) points out that across the EU a majority of 57.0 % of the family farms are managed by persons above 55 years. This is particularly an issue in Southern and Eastern Europe, such as in Romania, Italy or Poland, where family farms prevail. Even though EUROSTAT data do not allow for spatial designation of farms to the urban and peri-urban location, a number of studies indicate structural differences between (peri-)urban and rural farms.

An analysis of census data from 2010 from the Lombardy region indicates a significantly **higher share of younger farmers in urbanised areas**. The ratio between farm manager <40 years old and farm manager >65 years old is 0.61 in urban areas and 0.76 in peri-urban areas compared to 0.71 in rural agricultural and 0.91 in natural areas (Caiani et al., 2015).

However, also for UPUA ageing represents a serious issue, depending on farm structure and farmers adaptive behaviour: **Ageing can be a severe problem in case of unchanged maintenance** of the traditional farming activities under increasing competition and in situation of missing farm succession. Old farmers tend to continue peri-urban farming and live on the farmstead beyond retirement age, under the risk of further unravelling farming profitability. **Various exit strategies** avoid ageing but are often connected with changes in land ownership. In case of adaptation to the peri-urban pressures, farmers may decide to enter earlier into part-time farming or to quit the sector, both options are often accompanied by land ownership shifts and loss of area under family farming conditions. **Proactive business model adaptation in PUA counteracts ageing**. Farmers who early in life and reactively renew their business model, seem to aim at building a new foundation for their heirs to maintain farming in accordance with the advantages of the urban proximity of the farm. Few studies indicate such e.g. for young organic family farms with children in their farm household, who diversified their business, and made investments from what they expect stabilisation of the farm viability (Rivaroli et al., 2017, Weltin et al., 2017).

New entrants into farming are widely recognised as important to the ongoing vitality and competitiveness of the agricultural sector and rural regions in Europe. The **European Innovative Partnership** on Agricultural Productivity and Sustainability (EIP-Agri) established a **Focus Group (FG)** "New Entrants into Farming", who published their findings in a report in 2016, which we will briefly refer to in this paragraph, focusing on the role of new entrants in UPUA. The FG agreed that "new entrants can be of any age". The potential of these newcomers lies as well in individual activity as being part of larger collaborative groups and legal entities. "New entrants tend to be younger, operate smaller farms, are more highly educated and are more likely to be female than is characteristic of mainstream farming, although women still represent a minority. New entrants are more likely to be involved in alternative agricultural systems" (EIP-Agri FG, 2016, p.3). The FG specifies certain types of new entrants, especially "lifestyle farms more common in peri-urban areas, particularly those with high amenity values (e.g. attractive landscapes) and where there is low potential for commercial agriculture

(Pinto-Correia et al., 2015). Diversified farms are also more common in peri-urban areas, and are more likely to involve new entrants" (EIP-Agri FG, 2016, p.10).

In UPUA, new entrants have advantages and disadvantages compared to established farmers. They are assumed "frequently more suited to acting on the opportunities of UPUA" because they own an urban background and related networks, as well as communication and teamwork skills, but also because they are not yet "*embedded in bulk production systems*" (EIP-Agri FG, 2016, p.30). But they also face barriers like access to land, labour and capital. **Cooperative farming and part-time farming** were identified **as "entry model"** for persons interested in urban or peri-urban agriculture (EIP-Agri FG, 2016, p.19). Significant barriers to female new entrants to farming are also shaped by difficulties accessing appropriate training and finance (Shortall et al., 2017).

Specific forms of urban agriculture and short food supply (such as CSA) can be perceived as social innovations by addressing the major societal challenges. Involving new actors (such as consumers, civil society organisations) these forms lead to new practices (e.g. 'prosuming') and governance arrangements in food production and consumption adapted to the local context (Opitz et al., 2017b). For involved farmers not only new skills as networkers are required but above all also the willingness to accept communication, conflict solving and development of new chain organisation models as inherent features of the own professional profile as farmers.

Digitisation is assumed to play an important future role in UPUA (Foodtank, 2016). The internet and its applications are central to facilitating the increase of coordination, communication and marketing tasks in connection with the more direct and more frequent exchange with SFSC actors instead of bulk production processes. E-commerce exists but is a phenomenon of minor importance and if so mostly applied as SFSC marketing cooperation of several farms, e.g. in box schemes and food coops. **Digital technologies play a key role in high-tech UA applications, primarily in zero-acreage systems, and their digital control systems.** Precision farming technologies can be assumed to be less implemented, due to smaller farm and plot sizes in the (peri-)urban locations, but the possible future use of small robotics and sensors might bear large potentials for specialized labour intensive PUA, e.g. in vegetable production. It can be assumed, that the willingness to make use of these technologies and data depend a lot on the respective business model and its related value context, e.g. whether manual work is inherent to it or not.

CASE STUDY

ECF Farm Berlin

Located in an old industrial building in the inner city of Berlin, a start-up called ECF farm systems spreads its produce and knowledge in aquaponics which connects perch farming and vegetable growing.

On 1,800 m^2 the farm intends to lower water, CO2 and feed footprints of their products. They establish a circular system by recycling CO2 and collected rainwater within the process through an innovative technology, developed in narrow collaboration with research.

The fish and vegetables are marketed locally via retailers of a high-quality supermarket trade group. Thus, a shortened food supply chain allows more transparency for the consumers and saves additional carbon emissions from transportation which adds to an eco-friendly system.

More of these projects are planned to be realised on rooftops in Switzerland and Belgium, and other places across Europe.

Source: ECF Farmsystems (2018)

Globalisation of the agricultural markets has challenged farm profitability across most specialisations. As a response, diversification is regarded the main pathway to improve **farm economic stability and resilience in UPUA**. Due to high pressures on production factors (land prices, labour force) the maintenance of the traditional family farm without adaption of the business model to the specific potentials that proximity to cities offer, does not offer the perspective of sufficient future viability of a farm. Therefore farms either adopt specialisation or deepening strategies, based on intensification of production with reduced area demands (e.g. horticulture) or diversification or broadening strategies with increased service orientation (Zasada et al., 2011, Pölling, 2016, Pölling and Mergenthaler, 2017). Which decision is taken strongly dependents on farmers' entrepreneurial skills and on their capacity to renew and redirect their activities towards multifunctionality, but also to the social and institutional contexts where they operate (Henke and Vanni, 2017).

Land markets and access to land are a particular problem for new entrants into farming, as outlined above. Depending on land tenure and on farm succession systems, there exist national and regional differences. Often, within the urban fringe, land is owned by the municipality or by private investors. Thus, comparably short-term renting contracts or only temporary use agreements are signed, making access to loans more difficult and preventing investments. UPUA farmers and their networks therefore adopt more frequently **strategies building upon elements of sharing economy**, e.g. crowd funding and community financing models that make it possible to preserve land resources for small scale agriculture. A recent empirical study on CSA in German metropolitan areas shows that farmers perceive consumer-producer-interaction regarding finance and land as supportive to farm economic stability (Opitz et al., 2017b). In the form of land funds civil society also engage in issues of land grabbing. In the recent years networks and NGOs have been established, coordinating action, strategies and lobbying for land access in UPUA, such as the NEO-AGRI non-profit organisation[3] and the Access to Land Network[4].

2.3 Consumers within UPUA under societal and economic transformations

Amongst the transformation affecting consumers, who adopt a hybrid role towards producers, so-called prosumers, a broad scope of drivers and motivations is discussed: Aiming at **social inclusion**, e.g. intercultural gardens have a long tradition as places for integration, learning from each other and sharing and giving produce, and this trend was strengthened with the economic crisis, growing temporary unemployment and with the wave of refugees. In UA motivations of participants differ depending on the type of UA. It can be assumed, that the inclusion targets are rather distinct and that individuals choose respective initiatives very purposefully, e.g. intercultural gardens for multicultural understanding, CSA out of solidarity with smallholders close to the city, self-harvesting initiatives if gardening success and educational services with like-minded people are the focus (Krikser et al., 2016).

In UA where consumers act as prosumers, the borders **to transition and grass root movements** are fluid, and motivations like experimenting with new consumption patterns, do-it-yourself culture or more politically motivated reasons like citizen empowerment, anti-globalisation and food sovereignty overlap. Common to many non-/semi-professional models are features of experimenting and temporary participation, reflecting increasing individualisation of society (Opitz et al., 2016).

[3] See: http://neo-agri.org/
[4] See: http://www.accesstoland.eu/

Photo 9: "Guerrilla" allotment garden in Ljubljana

Source: M. Glavan

Beyond the comparably few consumers who actively participate in UPUA, more **consumers regularly purchase food directly from UPUA**, mainly fresh vegetables, e.g. on weekly farmers markets, through delivery services like box schemes or in food coops. Dissatisfaction with the globalized food supply systems, with issue of traceability and transparency of production and processing (Renting et al., 2003), with food quality but also related environmental concerns dealing with the ecological footprint and food miles are the main drivers. Motivations for purchasing produce from UPUA relate to trust and identity as features of regional production, with support for organic farming as perceived of pesticide free quality, sustainable land management and ethical aspects of animal welfare, and with changed dietary habits, preferring more fresh, diverse and vegetarian food.

Different to the US, where the situation of so-called food deserts, a phenomenon of increasingly difficult access to fresh vegetables affecting primarily consumers under precarious living conditions, belongs to the most important motivation for practicing UA (Opitz et al., 2016), **economic transformations** are not yet explicitly named in the literature as a main driver for UA and UPUA in Europe. Still, the complexity of global economic, labour market and information trends and their interrelated impacts on the individual consumer and his/her behaviour is often mentioned and regarded likewise a challenge and a chance for transition. In agriculture this complexity seems particularly visible in UPUA, as the example of AgroParisTech Rooftop Garden shows.

CASE STUDY

AgroParisTech Rooftop Garden

In 2012, the French research institution AgroParisTech has initiated a pilot project on rooftop farming. On top of the institute's building in Paris an experimental garden with a size of 800 m^2 was set up on former unvegetated area into a viable urban green space.

Searching for a sustainable way to face the lack of available soil in the dense city the main goal was to find adapted designs of roof cropping systems as this urban food production approach is very common in Paris. Beside vegetables the site accommodates areas with different crops and fruit trees, herbs, and beehives.

Along with the gardening activity, the project serves research and educational purposes, focussing on food production, organic waste management, pollution and urban metabolism questions. This approach would foster short food and waste circuits in urban regions and provide productive soil for urban gardeners at a low cost.

The results support the idea of urban feasibility and resiliency as they show the multifunctional services rooftop farming holds such as regulation of water runoff, recycling of bio-wastes, and local food output.

Source: Grard et al. (2017), AgroParisTech (2018)

2.4 UPUA in the context of food security, traditional farming and transforming urbanising society

This section addresses the following question:

– *Which role can urban and peri-urban agriculture play for food security, acceptance of traditional (rural) farming practices and for a transforming urbanising society as a whole?*

2.4.1 Food security

In various studies, UA has been assessed relevant regarding nutritional self-sufficiency and access to affordable and fresh food especially for socially disadvantaged and food-insecure groups and beyond (Zezza and Tasciotti, 2010, Eigenbrod and Gruda, 2015) improving dietary quality and diversity as well as human health (Armar-Klemesu, 2000). However, long-term monitoring data are lacking as gardeners often do have difficulties in assessing production amounts. There are examples of a studies taking UA production as a starting point. Orsini et al. (2014) for instance calculated that rooftop production using the entire rooftop surface of Bologna, could cover 77 % of the calculated vegetable requirement of the city. A Slovenian study has shown a robust production and economic revenue potential of UA

A different approach for quantification starts from total dietary demand of inhabitants and models the spatial extension of the required production area. It thus takes PUA as the spatial potential for realising a maximised regional food supply for metropolitan areas into account. Zasada et al. (in press) calculated different scenario settings for European city regions (London, Berlin, Rotterdam, Ljubljana, Milan), and found that despite distinct regional agricultural yield conditions, production patterns and dietary variations, the regionalised area demands per capita are within a limited range between a minimum of 1 718 m^2 (Rotterdam) and 2 093 m^2 (Milan).

However, the aggregated area demand values for the overall population, i.e. the spatial extents of metropolitan food sheds, differ tremendously between the Rotterdam-South Holland region with

7,580 km^2 and the region around London, including East and Southeast of England with 42,180 km^2. The authors conclude that for a food policy approach, which takes more integrated, territorially bound food systems into account, the consideration of completely different area sizes, depending on the population is required (Zasada et al., in press).

In contrast, the possibility of considering UA as a strategic method for food planning is regarded limited by due to the fact that subsistence concepts prevail in UA, where the distribution channels are mainly either informal, or those pathways that have not yet been restricted.

2.4.2 Acceptance of traditional (rural) farming practices

There are nearly no insights so far on the relationships between farmers and gardeners in UA and PUA. Tensions between traditional and new style farmers have been reported by McEldowney (2017). More knowledge exists on the role of UPUA in maintaining or improving the acceptance of traditional farming practices on the consumers' side.

Both, in non-profit UA and professional UPUA, in a far majority of initiatives and business organic farming practices are applied. However, it is observable that in many initiatives like Community Supported Agriculture, the organic production is not undergoing any certification, in order to reduce costs. Obviously, mutual trust and shared decision making on quality production between consumers and farmers is **substituting organic certification** (Thorsøe and Kjeldsen, 2016). Often farmers and gardeners are engaged in activities to preserve and reproduce old and **endangered varieties and breeds** and thus contribute to (agro-) biodiversity.

Photo 10: CSA share for participating consumers

Source: Fotolia

The experience of active collaboration in field work and distribution of produce typical for Alternative Food Networks like CSA and food coops as forms of UPUA is reported to generate an improved understanding of consumers for the challenges and risks producers have to cope with. Consumers also

report on an increased valorisation of farmers perspectives and of the complexity of management skills required (Opitz et al., 2017a).

Beyond the rudiments of commercial farming activities at the peri-urban fringes, UA has been increasingly recognized as approach to address multiple urban sustainability and resilience objectives (Mougeot, 2006, Orsini, 2013). These UA types are particularly important as they provide benefits directly in the near living realm of urban dwellers (Gorgolewski et al., 2011). Especially, **aesthetical values of UA** and their design as well as their management potential for housing neighbourhoods are emphasised (Litt et al., 2011). Draper and Freedman (2010) highlight the **physical and mental health as well as recreational benefits** derived from the gardening activity itself.

As managed green spaces, urban gardens provide **multiple ecosystem services**, such as micro-climate regulation, air purification, cooling and reduction of heat-island effects as well as the purification of water and treatment of organic waste (Alexandri and Jones, 2008, Calvet-Mir et al., 2012, Qiu et al., 2013). There are also comprehensive ecological benefits, such as the provision of habitat for species and biodiversity conservation (Das and Das, 2005, Galluzzi et al., 2010, Smith et al., 2010). A recent empirical survey from the EU project GREENSURGE could prove that **"interacting with biodiversity"** is an important activity field for 12 % of visitors from grassland areas in parks in cities, named twice as often as jogging (Palliwoda et al., 2017).

While the above said, refers mainly to soil bound systems of UPUA, there is some indication that for **high-tech systems** acceptance is not always given. From a social perspective, modern cultivation technology often **struggles with consumer acceptance**. Many consumers have a romanticized image of agriculture being low-tech and traditional (Specht et al., 2016b) and thus, often reject modern methods such as hydroponics for being "not natural" (Al-Chalabi, 2015, Specht et al., 2016b). Particularly for zero-acreage models like rooftop farming or indoor farming, a recent study from Berlin and Barcelona, reports acceptance problems due to anticipated low quality of the products and potential health risks associated with urban contamination, but also the gentrification potential and competition (Specht and Sanyé-Mengual, 2017). Furthermore, most soil-less growing systems **cannot be certified as organic** yet (Thomaier et al., 2014). In the EU only plant production that is primarily based on a soil ecosystem is eligible for organic labelling, which explicitly excludes hydroponics (EC, 2008) and could hamper an increase in acceptance and diffusion for such methods. Especially those forms of UA that show a high production potential face low acceptance due to their technological and production intensity. A case study in Berlin revealed that a majority of consumers rejected the idea of agriculture inside a multi-level building, aquaponics and animal husbandry (Specht et al., 2016b).

Photo 11: Container farm prototype producing fish and vegetables

Source: A. Piorr

Intensified peri-urban farms also face social acceptability problems. Especially perceived **negative environmental impacts** in terms of nitrate and phosphorus leaching and animal welfare issues due to the high stocking densities raise public scrutiny (Vellinga et al., 2011). Mass plant production in greenhouses is also rejected being in **conflict with open landscapes** (Paradis et al., 2016). Furthermore, **noise and odour** resulting from agricultural activities can lead to conflicts with neighbours (Vandermeulen et al., 2005).

2.4.3 Transforming an urbanising society as a whole

As an environmental movement UA is also recognised for its strong community orientation (Mok et al., 2014). Urban gardeners as local stewards of their living environment (Andersson et al., 2007) encourage social interaction and civic engagement (Sumner et al., 2010) and can also play an important role for social integration, e.g. of minority or migrant groups (Mazumdar and Mazumdar, 2012). Local governance is thereby considered to involve a broad variety of stakeholders and civil society actors across educational levels and cultural backgrounds (see case study from Lesbos). Within social networks around the UA activities, human and social capital is created (Macias, 2008), knowledge and management capacities from socio-cultural memories are established and conserved, enhancing resilience of the urban social-ecological system (Barthel et al., 2010, Leys and Vanclay, 2011).

CASE STUDY

Community Garden in Kara Tepe refugee camp Lesbos (Greece)

During the years of enormous refugee influxes to the Greek islands, a community garden project has been established in the central refugee camp of the Greek island of Lesbos, by Humanitarian Support Agency (HSA) – a small non-profit organisation in cooperation with UNHCR. Refugees and volunteers cooperate in growing vegetables (green beans, tomatoes, eggplants, green peppers, watermelons, onions).

The garden started in 2016, with the intention to create the opportunity for refugees to invest in the place where they live for a while and to experience plants growing and picking the harvest. The harvest was donated to local Greek families in need. By this way refugees have the possibility to giving back to Greek society for hosting and helping them. A typical week's harvest produced enough for about 10 Greek families.

In 2017 more land was taken in cultivation in order to produce food to be shared among the refugees and asylum-seekers themselves. The initiative provided tools, seeds and basic horticultural training.

Permanent skilled support and coordination of activities over the vegetation period is crucial in gardening work. In initiatives of that size, depending strongly on volunteer work, it is however not always sufficiently realisable. Due to task shifts of staff the gardening activities in Kara Tepe Camp could not be maintained.

Still, the Kara Tepe example undoubtedly holds an upscaling potential for other initiatives: it shows that community gardening provides a path to empowering residents for more sustaining conditions, moving away from assistance, and improving nutritional quality as well as quality of life.

Source: Karas (2016)

Education and awareness building from the very early age on are important cornerstones for societal transformation. That also the CAP can play a significant role in this context through strengthening SFSC and restoring the value of food to greater attention in society. In the public consultation on 'Modernising and simplifying the CAP' this issue has been raised, and therefore quoted as relevant idea: *"Special attention should also be given to the production of nutritious food and the promotion of healthy diets, which is currently not the case. This could be achieved by setting up short supply chain mechanisms, nutritional education in schools and local projects in urban areas" (ECORYS, 2017, p.178).*

3. POLITICAL AND INSTITUTIONAL ENVIRONMENT FOR URBAN AND PERI-URBAN AGRICULTURE IN EUROPE

KEY FINDINGS

- UPUA is widely acknowledged and gains more attention by policy makers and scientists from global to local level.
- Despite the growing interest the existing policies usually do not sufficiently target UPUA and are not very feasible for the specific situation for the diversity of urban and peri-urban farms operating at the urban-rural interface.
- Especially the Common Agricultural Policy (CAP), which is the main policy for farming and food production in the EU does not match the specific needs of UPUA due to their particular characteristics in terms of actors, scale, diversity and location in urban areas and their surroundings.
- Promising are policy and planning approaches that integrate UPUA into more holistic, cross-sectorial perspective on (local) food systems or ecosystems like urban food policies (food as entrance point) or the green infrastructure/productive landscapes (addressing multifunctionality of UPUA as provider of ecosystem services).

3.1. Institutional settings and arguments for policy intervention regarding UPUA at European level

Responding to the grand challenges (chapter three) the EU designed many targeted and cross-cutting policies that influence urban and peri-urban farming or the urban and peri-urban space directly and indirectly. This section addresses the following questions:

- *Who is doing what on the EU level on urban and peri-urban agriculture (state of research, institutions, and thematic foci)?*
- *What are the major arguments and interfaces for policy intervention?*

Chapter 4.1 gives an overview about the relevant policy fields and programmes covered as well as the key strategic processes and documents. This includes also positions and opinions of different bodies at European level. For the screening of the political framing conditions for UPUA we also included local food systems and short food chains.

Chapter 4.2 and 4.3 further follow the exploration by addressing which processes and initiatives at global and local are affecting local and regional strategies for UPUA.

3.1.1 EU Agricultural and Rural Development Policy

The European Common Agricultural Policy (CAP) and the related regulations of the European Parliament and Council do not mention urban and peri-urban agriculture (COM, 2013b, COM, 2013c, COM, 2013d, COM, 2013e).

Though in the last and the current programming period of the CAP there were/are no measures specific for urban or peri-urban farms, some of the measures are **potentially feasible for peri-urban agriculture**. These include in the programming period 2014-2020 measures with specific relevance for young farmers, small farms and short food supply chains (like co-operation, producer groups, quality schemes for agricultural products and food, business start-up aid, investments in physical assets) as well as support for organic farming, income diversification, agri-environmental measures, EU school

fruit vegetable and milk scheme or LEADER (COM, 2013b, COM, 2013e). On the other side **peri-urban areas** can be excluded from eligibility for LEADER projects, due to the population density. The community-led local development (CLLD), financed by the Structural and the Rural Development Funds offers **chances for linking urban and rural areas** by the possibility to apply the LEADER approach in urban, peri-urban or rural areas (McEldowney, 2017).

The situation for urban farming is even more complex. For the programming period 2007-2013 it was stated that "*urban farms could be subject to support … insofar as they were located on land fulfilling eligibility criteria by the Member States"* and that *"support for urban farms was available under both pillars of the CAP so long the eligibility conditions were met"* (McEldowney, 2017, p.24). According to a statement by Mr Cioloş on behalf of the Commission the Member States decide on a case by case basis if urban agriculture complies with the CAP.

However, others such as the members of the Cost Actions Urban Agriculture in Europe see urban agriculture "*as largely neglected in Europe's policies and especially in the CAP*" (COST Action UAE, 2013) for two reasons: first, urban farms are usually too small and diffuse for Pillar I, second they are located in urban areas, which exclude them formally from Pillar II funding, which is purely designated to rural areas. As far as the Member States define their rural areas and orientate on OCED or EUROSTAT definitions it might be the case that urban farms are located in areas eligible for support (COST Action UAE, 2013, Curry, 2015).

Photo 12: The Hackney City Farm in London is struggling with declining funds

Source: I. Zasada

With the programming period 2014-2020 more and diversified schemes for young farmers support came into force. As well young farmers as new entrants are possible beneficiaries of Pillar I and Pillar II young farmers support schemes. An European Parliament study on young farmers asks for more explicitness on the grants beneficiaries, young farmers and new entrants beyond age of 40, and whether the restriction in access for those having held a business holding number for less than five years, creates a disincentive for business start-up and investments before they have secure access to land (Zagata et al., 2017).

All in all, the conditions for UPUA depend on how the individual Member States implement the CAP (which measures they program, which budget they plan for the measures and how they define rural)

and the size and location of the farms that are affected by the agricultural policy. Despite the many benefits of UPUA and its potential contributions to goals of the Europe 2020 strategy and the CAP, one can only speculate, if and how urban and peri-urban agriculture will gain more relevance in the period (2020-2024). In the public consultation process for the coming CAP the issue of urban and peri-urban farms was not addressed. Asking the question where the CAP may improve its contribution to rural areas, only 7 % of the consulted people named "*Contributing to societal and cultural capital for rural areas to stay vital living spaces and* ***to establishing mutually beneficial rural-urban linkages***", which indicates still a strong rural perspective on rural-urban-linkages (ECORYS, 2017).

EU Regional and Cohesion Policy

The **European Spatial Development Perspective** (ESDP) defines the policy objectives and general principles of spatial development that ensures "*sustainable balanced development of the European territory which respects its diversity*" (EC, 1999). The ESDP has selected four priority areas:

- The development of urban areas;
- the development of rural areas;
- transport;
- the natural and cultural heritage.

The document highlights the necessity to integrate the surrounding countryside in the spatial development strategies of urban areas to improve the efficiency of land use planning and the **strategic relevance of new urban-rural-relationship that overcomes the dualism between city and countryside**.

CASE STUDY

INTERREG-Project "AgriGo4Cities"

Municipalities, NGOs and research institutions from eight countries (Slovenia, Slovakia, Bulgaria, Romania, Montenegro, Hungary, the Czech Republic, Germany) within the INTERREG Danube Transnational Cooperation Area are cooperating in the "AgriGo4Cities" project with the aim to adopt participatory urban and peri-urban agriculture practices and governance models as a tool to improve public institutional capacities to tackle major societal challenges.

The models target is to engage marginalized social groups like the elderly, unemployed, poor, or homeless people into decision-making processes to build a strengthening bridge between public authorities and citizens and therefore work against growing disparities in the cities' development. In the pilot areas citizens should be allowed to take action in the discussion of spatial plans, strategies and management.

UPUA serves its purpose through offering a meaningful occupation that functions as recreational activity and socially interactive form of food production. Other potentials include economic and environmental aspects of UPUA like the support of the local economy or an eco-friendly garden management.

In the diverse region some examples have been found which already integrate vulnerable groups using agricultural activities. However, the idea is to establish further opportunities and motivate participants to independently manage their projects, eventually take more responsibilities and join the political discourse of spatial governance.

Source: Kozina et al. (2017), Interreg (2018)

EU Urban Agenda

The European Commission adopted a Communication titled 'Towards an urban agenda in the European Union' (COM, 1997) almost 20 years ago. In 2016 the Urban Agenda for the EU was established with the Pact of Amsterdam, which is the basis for an integrated and coordinated approach to deal with the urban dimension of EU and national policies and legislation. By focussing on concrete priority themes 16 partnerships have been established so far. Cities, Member States, the European Commission and stakeholders (incl. NGO and business) work on a volunteer basis and develop and implement concrete actions that contribute to smart, sustainable and inclusive growth. Some of the partnerships (e.g. sustainable land use, public procurement and circular economy) already set up orientations paper or actions plans. Here the **Circular Economy Action Plan** (2018) provides some interesting positions on the integration of urban and rural functions, reliable supply and value chains that connect urban and rural supply and demand and urban and territorial planning, that consider the urban–rural continuum, although UPUA or food production is mentioned explicitly.

The main instrument of Regional Policy – **the European Regional Development Fund** (ERDF) aims to foster competitiveness and create jobs in all EU regions and cities. Special focus lies on sustainable urban development with 50 % of ERDF investment into urban areas (2014-2020) promoting for example low-carbon strategies, improving the urban environment, including the regeneration of brownfield sites and the reduction of air pollution, **which offers chances for urban agriculture.** Around 20 % of the budget will be used for integrated projects **for urban and rural regeneration** and to education, health, childcare, housing and other social infrastructure. Besides this the ERDF support also cross-border, transnational and interregional **cooperation** covering for example **urban-rural-linkages** (EC, 2014). For a more integrated approach, which goes beyond the urban rural divide, the EU created in 2010 a preparatory action named **RURBAN** (**Partnership for sustainable urban-rural development**), which aims to:

- analyse territorial partnership practices for towns/cities and rural areas;
- achieve better cooperation between different actors in developing and implementing urban-rural initiatives;
- promote territorial multilevel governance;
- assess possible economic and social gains from enhanced rural-urban cooperation;
- identify the potential role of urban-rural partnership for improving regional competitiveness and regional governance[5].

3.1.2 Research and innovation policy

The research and innovation programme **Horizon 2020 reflects the policy priorities of the Europe 2020 strategy** and addresses major concerns shared by citizens in Europe and elsewhere, addressed as Grand Societal Challenges:

- Health, demographic change and wellbeing.
- Food security, sustainable agriculture and forestry, marine and maritime and inland water research, and the bio-economy.
- Secure, clean and efficient energy.

[5] See: http://ec.europa.eu/regional_policy/de/policy/what/territorial-cohesion/urban-rural-linkages/

- Smart, green and integrated transport.
- Climate action, environment, resource efficiency and raw materials.
- Europe in a changing world – inclusive, innovative and reflective societies.
- Secure societies – protecting freedom and security of Europe and its citizens.

Special relevance for future research on UPUA and food systems might have activities around the **Food 2030** conference in 2016, where a process started that seeks to build a coherent research and innovation policy framework for "Food and Nutrition Security". **Responding to international political drivers** such as the Sustainable Development Goals, the COP 21 climate commitments and the Milan Urban Food Policy Pact (MUFPP), the conference document takes stock of the achievements and developments in the R&I policy that address Food and Nutrition Security. Urban agriculture is mentioned here as an example for innovation in the food sectors which comes from other sectors and as a social innovation that contributes to a viable society. The policy recommendations identify among others the need for a food system approach and for strengthening policy coherence and coordination (De Cunto et al., 2017, Fabbri, 2017).

3.1.3 Environmental policy

The 7th Environment Action Programme (EAP) is guiding the EU environmental policies until 2020. It claims to develop the path towards achievements to be realized in 2050. Building blocks are three strategies: Halt of biodiversity decline, low carbon, circular economy (no waste), whilst two horizontal priority objectives refer to the issues of "sustainable cities" and "effectively addressing **international environmental and climate challenges**". UPUA is not namely mentioned in the documents, but it appears in policy approaches implemented with regards to these strategic objectives.

In 2013 the European Commission has adapted a **Green Infrastructure Strategy**, which is seen as a cornerstone for the successful implementation of the EU 2020 Biodiversity Strategy. Green infrastructure (GI) is considered to have the potential to contribute to all targets of the Biodiversity Strategy. Special relevance for UPUA has the target 6 of the Biodiversity Strategy which aims to **enhance the biodiversity in the "wider countryside" by means of a more sustainable agriculture and forestry**. The background study (EC, 2012) to the Green Infrastructure Strategy underline the high interdependency between the maintenance of ecosystem services and biodiversity and a **sustainable and profitable agriculture**, and state also the potential of GI e.g. for minimising the urban sprawl, improving urban-rural connections or mitigating and adapting to climate change, which demonstrate that GI "*is much more than a biodiversity conservation instrument*" (EC, 2012, p.3). In the context of the strategy Green Infrastructure is defined as "*natural and semi-natural areas in urban, rural and marine areas, as well as man-made elements, such as green roofs…*" and provide environmental, economic and social benefits through natural solutions (EC, 2012, p.3).

Due to the multifunctionality of the concept and the fact that GI will be promoted within up to six other policy areas such as regional and cohesion policy, climate change and environmental policies, disaster risk management, health and consumer policies and the Common Agricultural Policy, GI needs to become a "*standard part of spatial planning and territorial development*" and "*integrated into the implementation of these policies*", which include the support with their funding mechanism (COM, 2013a, p.6). All in all, this will be quite challenging also due to the fact that GI projects tend to be very complex and therefore risky (COM, 2013a).

STORY

Productive Landscapes and Green Infrastructure

Continuous Productive Urban Landscape (CPUL) is an urban design concept developed by the landscape architects Andre Viljoen and Katrin Bohn. Within the last 15 years they have been explored and tested the concept through design research, fieldwork, exhibitions and prototypes in many countries around the world. Focus of their research was to study the **role of urban agriculture in urban design** and the overarching question of how architecture and urban design can contribute to **more sustainable and resilient urban food systems** by reducing the ecological footprint while also improving the urban environment.

Key element of CPUL concept is ***"the coherent integration of urban agriculture into inter-linked multifunctional – productive-open space networks*** that complement and support the build environment" (Viljoen and Bohn, 2014, p.480). In this context urban agriculture means mainly fruit and vegetable production for different purposes including community gardens and commercial activities ranging from small-scale to large-scale. The space for food growing is integrated into leisure and commercial outdoor spaces shared by people, natural habitats and ecological corridors.

The idea of integrating productive landscapes into cities is acknowledged in Europe, but until now it is not an essential element of urban infrastructure and planning. There exist few cases in which elements of the concept have been integrated in municipal strategies and applied in urban gardening projects (e.g. Berlin, London).

The CPUL concept is interlinked with a broader discussion about local planning and design practices **for biodiversity preservation and green infrastructures.**

Sources: Viljoen and Bohn (2009), Bohn and Viljoen (2010), de Oliveira et al. (2010), Viljoen and Bohn (2014)

3.1.4 Positions and opinions of different institutions at EU level

European Economic and Social Committee (EESC)

Already in 2004, the EESC draw up an own-initiative opinion on "*Agriculture in peri-urban areas*". In the EESC's view, **peri-urban agriculture** undoubtedly faces **specific constraints** stemming directly from characteristics make peri-urban areas to "*areas affected by specific handicaps*" (EESC, 2004, p.3).

For conserving and developing agriculture in peri-urban areas the EESC defined 3 major objectives (pp.4-6):

1. Social, political and administrative recognition that peri-urban areas with agricultural activity are rural areas facing specific constraints.
2. Preventing peri-urban agricultural areas from becoming part of the urban process through regional planning, urban planning and municipal initiatives.
3. Ensure the dynamic and sustainable development of peri-urban agriculture and the areas in which it is practised.

The committee made also suggestions for specific instruments and measures such as networks of cities, rural-urban projects, use of legal regional and urban planning instruments as well as the "*promotion of production and marketing systems that **meet market demands**, with special attention to the **promotion of food diversity** by encouraging **sustainable farming** which respects the environment, cultural identity and animal welfare*" (p.9).

European Committee of the Regions (CoR)

Bringing food and agriculture in the broader context of the **Europe 2020 strategy**, the Committee of the Regions (CoR, 2011) highlight in their opinion the role of local food systems for the local and regional economy, especially in less-favoured regions and vulnerable areas, including **peri–urban territories**. Although the document does not mention UPUA explicitly, there are many implicit connections made. The originators of the opinion argue for example, that in industrialized countries the growing metropolitan areas need to increase their local and urban food production in order to improve the **global food security**. Beside the local agricultural production, the policy document emphasizes the **social, economic and environmental benefits of short food supply chains**, which lead to greater interaction and trustful connections between producers and consumers – a basic **element of food sovereignty**, more sustainable production systems by reduced food miles and the opportunity to create circular systems as well as better income for farmers and regions (through multiplier effects).

For implementing local food systems (with local food production and short food supply chains) the CoR recommends establishing a Local Food Scheme in addition to the existing schemes for traditional specialities, quality and organic food (TSI, PDO, PGI, OF) due to the fact that not all local food products need a registration or are feasible for these schemes. They propose to use the Rural Development Strategy as a feasible tool, in which local and regional authorities implement local food schemes supported by the national authorities and the EU. **This would require a comprehensive and integrated perspective on regional development and planning policy**.

EU Parliament and its Services

Among the members of the European Parliament a growing interest especially for **urban agriculture** can be noticed. The activities range from parliamentary requests e.g. about **city farms** (PQ, 2010), **urban farming** (PQ, 2012), the situation **of urban and sub-urban farmers** confronted with urbanisation and land pressure (PQ, 2014) as well as **urban and peri-urban agriculture** as rural-urban linkages (PQ, 2015) to promoting detailed studies. In this context the European Parliament agreed the 'Partnership for sustainable urban-rural development' (RURBAN), which is managed by the European Commission.

In response to repeated queries over the recent years EPRS (European Parliamentary Research Service) has recently undertaken a study **focussing on urban agriculture**. The In-Depth Analysis on "*Urban agriculture in Europe Patterns, challenges and policies*" was published in 2017 (McEldowney, 2017). The study gives a comprehensive and up-to date overview on the contributions and **socio-economic benefits** of urban agriculture (employment and development of small-scale rural entrepreneurs; improved health and education; social inclusion) as well as to **environmental benefits** (biodiversity, potential to reduce 'urban heat-island effects' and flooding risks). **The main barriers UA** is facing are identified (competition on land, access to skills, finance and the risk of exposition to pollution and soil contamination). The study highlights that, despite the capacity to a potential positive contribution to a range of policy areas, the UA is inadequately covered through existing policies, because it falls between different sectorial policies and sometimes does not sufficiently match eligibility conditions due to its particular characteristics.

The EPRS uses also **new formats** like blogs for providing information for the European Parliament, its committees and the wider public, which include the topic of **urban and peri-urban agriculture** (EPRS, 2014) and **urban-rural linkages** (Moran Vidal, 2014).

3.1.5 International treaties

Council of Europe: European Landscape Convention ("Florence Convention")

The **European Landscape Convention (ELC)** is an international treaty that is devoted to European landscapes and is aiming at the protection, management and planning of all landscapes, raising awareness of the value of a living landscape and organisation of international co-operation on landscape issues. The ELC acknowledges:

- the need to "*integrate landscape into its regional and town planning policies and in its cultural, environmental, agricultural, social and economic policies, as well as in any other policies with possible direct or indirect impact on landscape*" (CoE, 2000, Article 5d) and
- the diversity of landscapes including **natural, rural, urban and peri-urban areas**, landscapes that are outstanding well as every day or degraded landscapes in land, inland water and marine areas (Article 2).

Following the logic of the ELC urban and peri-urban farming can be perceived as land management practice, whereas the use of land(scape) is influenced by landscape polices and planning measures.

3.2. Initiatives and processes at global level promoting urban and peri-urban agriculture or sustainable/local food systems

Also, in the international arena the issues of UPUA and food systems gain more relevance within the last years, which becomes visible in ongoing political processes and the formulation of strategic documents and programmes as well as the formation initiatives and networks. These global processes and initiatives can serve as drivers and reference frame for national and local policies such as UN SDG, UN-HABITAT or the MUFPP, although they are not binding for the actors. **Table 2 in the Annex** provides an overview about these processes, strategies and programmes and the addressed key challenges respectively arguments for policy intervention.

Taking the example of the **Milan Urban Food Policy Pact (MUFPP)** we elaborate the relevance of such global processes for UPUA. The MUFPP is an international pact on urban food policies. Since 2015, 163 mayors from all over the world have signed the Milan Urban Food Policy Pact committing to developing sustainable and resilient food systems. The majority of cities (84) are located in Europe, that's why the MUFPP has high importance for Europe (MUFPP, 2017).

Map 2: The European cities of the Milan Urban Food Policy Pact

Source: https://www.milanurbanfoodpolicypact.org/

For UPUA two statements in the pact have high relevance:

- *"Acknowledging that **urban and peri-urban agriculture** offers opportunities to protect and integrate biodiversity into city region landscapes and food systems, thereby contributing to synergies across food and nutrition security, ecosystem services and human well-being."*
- *"Recognizing that family farmers and smallholder food producers, (notably women producers in many countries) play a key role in feeding cities and their territories, by helping to maintain resilient, equitable, culturally appropriate food systems; and that reorienting food systems and value chains for sustainable diets is a means to reconnect consumers **with both rural and urban producers"** (MUFPP, 2017, p.1).*

In addition to the political commitment the pact includes also a framework for action on a volunteer basis and touch six thematic fields: (1.) governance, (2.) sustainable diets and nutrition, (3.) social and economic equity, (4.) **food production**, (5.) food supply and distribution, (6.) food waste (MUFPP, 2015).

The recommended actions are based on practical experience of cities that already implement food policies and can work out as a guideline for cities that seek to change their food system. Many already existent city networks are collaborating with the MUFPP such as ICLEI, C40 Food System Network and EuroCities (see **Table 2 in the Annex**) which promise some synergies for the networks. For developing

a monitory framework that assesses the progress of the participating cities towards more sustainable food systems, MUFPP cooperates with the FAO and the city of Milan. Twelve other contributed also to the finalization of the framework which refers to the United Nations Sustainable Development Goals (MUFPP, 2017).

Beside these global/international policy processes that influence policy making at national and local level, many cities and regions are engaged in translocal networks and partnerships that aim at cooperation and knowledge exchange between urban areas, lobbying or research on urban agriculture and sustainable local food systems in the Global North and South (**see Table 2 in the Annex**).

3.3 Institutional setting at local and regional level supporting UPUA

In the following paragraphs we will explore the question:

- *What is the institutional setting at local and regional level supporting urban and peri-urban agriculture?*

3.3.1 Actors and institutions

For decades, the food issue has been understood as being subject to higher governance levels, and national and supranational institutions like the Food and Agriculture Organization (FAO) or the European Union with their instruments like the CAP. Today, **city administrations and civil society initiatives** are starting to put food policy on the municipal agenda, aiming to improve food security, health and social integration, local economies, where national and supra-national sectorial policies (e.g. agriculture, health, environment) have partially failed (Barling et al., 2002, Sonnino, 2009).

To implement food strategies that strengthen the urban food systems, cities can use programmatic, planning/regulatory and policy mechanism (Raja et al., 2008). Programmatic approaches are often site-specific programs focussing on single problems like access to food and promoting for instance the establishment of farmers markets, school meal programs or **urban agriculture** (Raja et al., 2008). To introduce food issues into urban planning there exist three major options: first, independent or stand-alone food plans (as informal planning instruments), second, the inclusion of food issues into comprehensive plans and third the consideration of food issues in planning decisions (Koc and Dahlberg, 1999, Pothukuchi and Kaufman, 1999, Raja et al., 2008, Stierand, 2014). Furthermore, cities can modify institutional and public structures, and create for example city departments for food or food policy councils (Pothukuchi and Kaufman, 1999, Derkzen and Morgan, 2012).

According to Ilieva (2016) more than 90 urban and regional food strategies have been developed and implemented in the Global North within the last ten years. In Europe this includes stand-alone plans that address the whole food system (e.g. London, Amsterdam) or plans that focus specific on urban agriculture (e.g. Rotterdam) as well as thematic sections on food and agriculture within long-term sustainable development plans (e.g. Malmö). **Driven by the Milan Urban Food Policy Pact** many cities wish to follow these examples and plan to release also food strategies or establish in top-down or bottom-up processes food policy councils (e.g. Rome, Zaragoza, Berlin).

A very recent study on food innovations in European cities identified based on input of the MUFPP signatory cities and EUROCITIES members following **arguments for developing urban food strategies** (De Cunto et al., 2017, p.17):

- Enhance food security and nutrition.
- Improve the livelihood of urban and peri-urban food producers, and promote job creation and economic development.
- Protect and restore the local ecosystem, reduce climate impact, and increase climate adaptation by increasing green areas.

Due of the multifunctionality of food and the different local needs and capacities, the coordination food system related activities of the cities is localized in different department ranging from environment, economic development, urban planning, social and health department (De Cunto et al., 2017). Cities can use various instruments to promote UPUA, short food supply chains or more sustainable local food systems (incl. food production, processing, distribution, consumption and waste disposal). There exists already good overview e.g. from various European research projects and from pioneering municipalities about which instruments cities and regions can apply (Guiomar, 2010, Dubbeling, 2013, Moragues et al., 2013, Baker and de Zeeuw, 2015, De Cunto et al., 2017). To lesser extent they are assessed concerning their effectivity and feasibility for different forms of UPUA. Exemplary we present in the following some examples related to the management of urban and peri-urban land.

Photos 13 & 14: Strengthening of the local community via "Incredible Edible" Initiative in Todmorden, UK

Source: I. Zasada

Nonetheless also at the local various barriers for the implementation of urban food policies or strategies exist. They concern:

- Missing integration of the work across and between city departments;
- Unclear division of competences between local authorities and the regions and national level;
- Lack of multi-level governance and policy coherence;
- Missing links between research, practice and policy;
- Difficulties in inclusion of critical actors in food policy, such as citizen associations (De Cunto et al., 2017, p.8).

3.3.2 Formal and informal planning instruments: Laws, zoning, agricultural parks

In countries such as Germany allotments have a long history and offer many benefits. To preserve these environmental and social assets in times of increasing land prices **specific laws** exist that prevent a transformation into residential areas (Cabral et al., 2017). In other countries like Czech Republic where

such laws do not exist, a drastic loss of allotment gardens can be observed, neglecting their social and ecological value (Spilková and Vágner, 2016).

To reduce the pressure of increasing urbanisation on urban and peri-urban green spaces in general and on multifunctional agricultural spaces in particular, land is designated for protection and preservation in the form of **agricultural parks** in cities all over Europe such as Dublin, Milan, Sofia or Warsaw (Scazzosi, 2016). Agricultural Parks are a planning approach with a clear area designation. The designation is usually coupled with a more project-based approach to develop the area and in order to mobilise fragmented resources in a targeted manner. Advantage of the park concept is the strong identity-building and place making, which contributes to public awareness-raising of the value of UPUA.

CASE STUDY

Parc Agrari de Baix Llobregat (Lower Llobregat Agricultural Park)

The agricultural park is located in the Southern peri-urban fringe of Barcelona, covering an area of nearly 3,000 hectares in 14 municipalities. The area is characterised by a diverse natural and agricultural landscape with traditional farming practices and the production of regionally typical crops (e.g. artichoke), which should be preserved as cultural heritage.

Initiated through a funding of an EU Life project in 1998, the park represents one of the first conservation areas in Europe, which specifically focus on the protection of farmland from urban pressures.

The main instruments consist of a managing body consisting of a consortium of local and regional authorities, experts and farmers, a legal territorial designation by a special plan and a management and development plan, defining objectives and strategies and implementation measures.

The development objectives cover issues of farm and infrastructure improvement and modernisation, such as irrigation systems, promotion and marketing of the local produce for income generation (e.g. through an established regional label), environmental protection, and awareness-raising of the natural and culture value.

Source: Consorci Parc Agrari del Baix Llobregat: Management and Dev. Plan of the Parc Agrari Del Baix Llobregat

In Geneva the green belt surrounding the urban area which is strongly characterised by agriculture has been safeguarded through **spatial planning and zoning** for a long time (Cavin and Mumenthaler, 2016). In Barcelona the government of Catalonia developed a plan for the protection of non-urban open spaces for environmental reasons. It specifically includes the interests and values of agriculture as well as the special protection of viniculture (Giacchè and Tóth, 2013). In the Cuenca Alta del Manzanares National Park extensive agricultural activities that promote the conservation of the landscape are encouraged (Paniagua, 2014). Overall, these examples show that urban and peri-urban agriculture can play an important role in urban planning processes, but they are still highly under pressure.

In Germany we could identify three examples, where cities apply **agricultural (development) plans** as informal planning instrument (Hanover, Leipzig and Hamburg) in order to steer the land use and promote regional value adding of agriculture in their city regions (Doernberg et al., 2016).

Regional planning and inter-municipal cooperation can support UPUA through inter-municipal management and cooperation as well as regional planning and coordination. The need for

participatory approaches and a managerial body has to be taken into account for these formal and informal instruments (EESC, 2004).

3.4 European research on urban and peri-urban agriculture

In order to review the history and state of European research funding on UPUA for this study, a full search on the EU research database CORDIS[6] has been carried out, starting from the year 2000. The search terms were "urban + agriculture"; "urban + farm*"; "peri-urban + agri*"; "Alternative + Food +Network*". The list resulted in 19 projects. From the extended literature and internet surveys carried out during this study, 22 additional projects have been identified, that can be clearly contextualized in the research area UPUA, but have not been covered by the CORDIS keyword search. **Table 3 in the Annex** presents the full list. Results indicate:

- In **FP5** (200-2006) rd. **EUR 3.25 million** were spent for five projects on UPUA, mainly in the INCO (international cooperation) context of peri-urban farming systems and their sustainability. One larger project (EUR 1 million) focussed on urban-rural relationships in the EU funded through the Life Quality Programme.
- In **FP6** (2006- 2011) rd. **EUR 15.6 million** were spent for two projects in UPUA, with more than 90 % of the budget coming from the SUSTDEV (sustainable development) work programme, focussing on a large water management project.
- In **FP7** (2011-2017) rd. **EUR 27 million** were spent for thirteen projects. EUR 9.9 million came from the KBBE (knowledge-based bio economy) work programme, dealing within five projects UPUA in the context of transition, knowledge systems and innovation as well as short food chain organisation in metropolitan regions. EUR 11.3 million came from the Environment programme, dealing with transition pathways to improving sustainable urban-rural linkages through linking governance and planning approaches with civil society engagement. EUR 5 million were spent from the SSH (Social Science and Humanity) programme for research on UPUA and green lifestyles. Rd. EUR 750 000 came from the People programme to support four UPUA projects on urban sprawl, alternative food networks and community action in cities.
- In **H2020** (2014-2022) rd. **EUR 94 million** were spent for 18 projects in the context of UPUA. EUR 75.4 million are spent for eight projects assigned to the programme EU 3.5. Climate action, environment, resource efficiency and raw materials. Among those are large demonstrator projects for nature-based solutions in cities as approach to "fighting and adapting to climate change" (EU 3.5.1), "Protection of the environment, sustainable management of resources and biodiversity" (EU 3.5.2) and transition to "green economy and society through eco-innovation" (EU 3.5.4), where UPUA is not the only focus, but one type of solutions that is under transdisciplinary co-development amongst others. EUR 13 million are spent under the funding programme "Food security, sustainable agriculture…and the bio-economy" (EU 3.2.) where UPUA is addressed as unlocking rural-urban synergies and Sino-European innovative development of green cities. Rd. EUR 4.5 million are spent within the "Industrial leadership and innovation in SME" programme, for small highly specific technological innovations, related to new greenhouse technologies particularly feasible to UPUA, and to soil fertility improvement technologies and vertical farming. Finally two excellence science grants (MSCA) are funded with rd. EUR 1 million dealing with antibiotics in wastewaters, and ageing of EU urban population contextualized with UPUA.

[6] https://cordis.europa.eu/projects/home_en.html

Two additional funding strands were found to bring together UPUA initiatives and the knowledge behind:

- The INTERREG "**Danube Transnational Programme**" dealt with UA for changing cities and focussed on governance and institutional models while the "IVC Regional Initiative Project" put a focus on UPUA and the model of peri-urban parks. Total funding was rd. **EUR 3 million**.
- The Cost Action TD 1106 on "**Urban Agriculture Europe**", funded from the programme "Transport and Urban Development", was a highly regarded initiative (2012-2016) of 25 participants, who e.g. provided an online atlas of 253 projects, and publications of practical relevance.

The analysis of EU R&D expenditures mirrors the changing thematic placement of UPUA – from a development and learning phenomenon of the developing countries context (FP5) to the exploration as a phenomenon in response to urban-rural pressures (FP6, FP7), to a problem and potential oriented view regarding sustainability transition and food chain innovation (FP7) and finally to a solution oriented co-development and upscaling perspective to climate change related nature based solutions in cities, innovation of farming in city regions, and up-speeding technological progress for future cultivation practices as well as regionalized multi actor governance models.

On the one hand the continuously enlarged thematic scope of funded research on UPUA is obvious, reflecting the broadened perception of its multifunctional benefits and potentials as reported from scientific literature, societal experience and in media. On the other also the rapidly expanding amount of expenditures illustrates in an impressive way that UPUA is regarded an area of large and under-exploited potentials that require public research and development support. As well as the alone standing solution addressing multiple purposes, but increasingly and mainly also as one multifunctional element within a portfolio of measures to be selected and adopted in a site and problem specific manner.

4. RECOMMENDATIONS FOR ACTION

4.1 Synthesis and conclusions from the Policy Analysis

The study shows that the different types of UPUA provide multiple benefits for society, environment and economy and can therefore address societal needs. It becomes also obvious that UPUA represents an issue of multi-level governance and encompass different sectorial and cross-cutting polices and involve a wide range of (new) actors in the field such as cities, city and research networks as well as civil society organisations at different levels.

In this sense, **Figure 2** highlights two main aspects: First, a **variety of policy domains** can influence UPUA directly and indirectly and the necessity for policy integration. Second, within these policy domains **multiple perspectives on UPUA** exist, which mirror the different functions and perceived benefits of UPUA and which deliver also arguments for policy intervention. These perspectives range from "more traditional" views on agriculture such as food production (agricultural policy) over views that see farming in urban and peri-urban spaces as one element of green infrastructure (e.g. environmental policy, landscape planning), farming in urban and peri-urban spaces as specific economic activities or land uses (e.g. regional policy, urban planning) and new more integrated/systemic perspectives which consider UPUA as one element of urban/regional food systems and/or food systems as cornerstone for a more sustainable development of cities and regions (e.g. urban food policy and planning).

Despite the different perspectives on UPUA, the **scope and regulatory/governance capacity** of the different policies affecting UPUA can be a critical factor for the feasibility of the policy instruments. (McEldowney) (2017, p.1), for instance highlights, that *"urban agriculture appears to fall between different policy areas, despite assurances from the European Commission that Member State rural development programmes can be used for the benefit of urban agriculture. To some, it may not be sufficiently agricultural in nature to secure support under Pillar I of the Common Agricultural Policy (as typified by more conventional agriculture). To others, it is not considered sufficiently rural to secure support under the above-mentioned rural development programmes. Looking to the future, the challenge for urban agriculture is how to achieve the necessary integration across all EU policy areas over the next programming period, post-2020"*.

Beyond the financial support instruments, Game and Primus (2015) give a number of policy recommendations, which takes especially the nature of urban agriculture perspective, including the setting of specific **environmental requirements** or **standards**. The authors also highlight the need for food policies, which takes urban types of agriculture into consideration and links it with the conventional forms of rural agriculture.

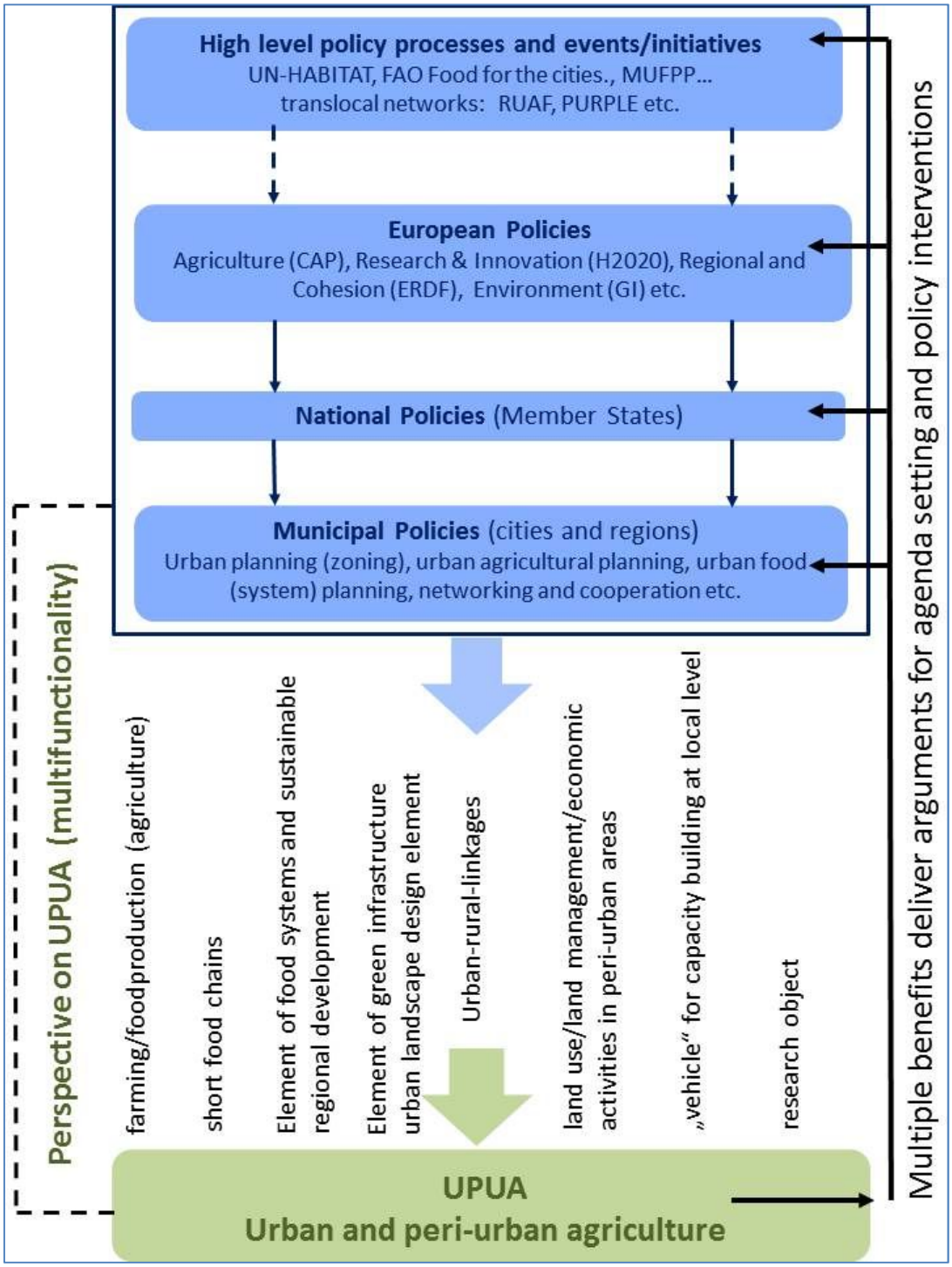
Another policy challenge occurs from the need of a **multi-level interaction** of European funding and regulatory mechanisms especially with the regional and municipal level to consistently link these policies with locally executed **land use planning** instruments and processes to conserve farmland and to set local framework conditions under which UPUA can thrive.

For the upcoming period of the CAP after 2020 stronger responsibility in policy design and implementation of appropriate measures will be dedicated to the Member States, also in order to be able to better respond to **regional needs and potentials**.

In summary, UPUA is a very multifaceted phenomenon, whereby individual initiatives and farm structural and management adaptations to the conditions of (peri-)urban areas are often very specific in their implementation. Many areas of societal relevance (nutrition, public goods, education, quality

of life) are addressed and **local approaches** towards transforming the agri-food sector and towards sustainable land management are co-developed and implemented in order to meet the conditions and needs of densely populated areas. This in turn means that many policy areas influence the effectiveness of UPUA. All in all, the diversity of **UPUA requires more political recognition**. Policies from the different areas need to be **better coordinated and tailored to specific UPUA conditions** in order to fully exploit its manifold benefits.

Figure 2: Policy domains and perspectives on UPUA



Source: own elaboration

4.2 Policy recommendations

There are two major strategic pathways for policies affecting UPUA: direct interventions and indirect interventions. Direct interventions apply or (re-)design policies that specifically address UPUA as the concrete subject of steering, while indirect interventions use **UPUA as a "vehicle" to achieve broader policy objectives** (e.g. like improving social life in cities). Shaped in a right way, UPUA can represent a forceful tool and approach contributing to a sustainable and resilient development of urbanised and metropolitan regions, which improve food security and sovereignty, human health and well-being, many environmental and social functions as well as income and employment. Especially this **multifunctional potential** of UPUA to deliver of societal-demanded functions and services derives emphasises the political **legitimation** for public support. In principle, three thematic areas can be distinguished, in which a political debate should take place.

1. Territorial integration
2. Sectorial integration
3. Integration of societal demands in policy action

4.2.1 Territorial integration

In order to exploit the potentials of UPUA, **territorial integration** is a key. It will be required to shape a **common policy arena**, covering the area of the central city and the peri-urban surroundings on the basis of functional interrelationships and reconnecting **urban–rural relationships** to overcome fragmented administrative and decision-making entities with frontlines of separation, competition and conflict between the urban and rural spheres. The territorial integration and interface between urban and rural areas enables a comprehensive understanding of integrated system approaches and the development of holistic steering mechanisms. **Spatial development strategies** supported by **territorial governance approaches** are required, which cover urban and peri-urban areas to improve the efficiency of land use planning at the regional level.

4.2.2 Sectorial integration

Cross-sectorial approaches such as urban food strategies exemplify the integration of multiple objectives like environment, food production, labour, education or health by taking a system perspective. Integrated agri-food-systems are therefore promising policy approaches integrating different food system actors through strategies and measures for food production, food chains and the consumption side. There are already existing initiatives to implement them at EU, Member States and local level.

Policy coherence is a critical issue that can be supported through tools for policy formulation and ex ante policy impact assessment like foresight. Mainstreaming of food issues seems to be a positively perceived and shared topic what facilitates bringing together existing policy and planning approaches with sensitive planning approaches (zoning).

The **Nexus approach**, interpreted as rural-urban-nexus, food-water-energy-nexus or food-environment-health nexus, represents a promising concept for UPUA as it allows for territorial and sectorial integration at the same time. They require identification and utilisation of interfaces of UPUA with other urban resource systems, such as water and energy realise synergy effects (e.g. food waste to energy; power-heat-coupling (PHC) with greenhouses) as well as "system-relevant" actors. There is little experience with such approaches in practise so far.

4.2.3 Demand-driven policy action

Demand-driven policy requires the development of a common policy and planning agenda, which is based in a regional debate and consensus about the **demands and potential contributions of UPUA**. However, the opportunities of urban consumer proximity and innovation potentials urban-rural and consumer-producer-relationships are only marginally captured yet. **Improvement of the knowledge base** about societal demand for goods and services and the potential supply from UPUA to enable targeted political regulation/planning is needed. Such would allow considering in policy design at programme level the UPUA specific ex-ante targets and expectations. Therefore, also new **tools and knowledge platforms** are needed to identify these demands and unexploited potentials for UPUA. They are important to enhance policy and decision-making processes and to support and promote newcomers (mainly on a regional and local level).

The shaping of policy strategy making should include **visioning** what policies and instruments are supposed to target specific types of UPUA and accordingly which kind of actors and which degree of professionalism are to address in order to reach UPUA type specific objectives:

- Particular potentials and risks only apply to specific types/groups of UPUA, e.g. (non-)compliance of (mainly informal) organisation structures of UPUA with legal frameworks (e.g. health: risks from air or soil pollution in case of proximity to dense traffic or hygienic risks, both a potential issue in non-professional types of UA that produce informally and beyond official quality control systems; labour: safety issues in consumer-producer cooperation, environment: compliance of (even organic) fertilisation practices to environmental laws; tax issues). Risk management, and possibly new standards for hybrid roles are urgent steering requirements.
- Evaluation and revision of the conditions to become beneficiary of financial support is another requirement. Also, here a distinction by type, structure and (legal) status of UPUA is advised, in order to ensure matching of intervention logic, target groups and the particular conditions of the (peri-) urban location. It should be considered that (in contrast to conditions in rural areas) a significant share of UPUA activities takes place on rented public land and in community action.
- UPUA is currently not identified in data monitoring and statistics. Its development and impacts are therefore not traceable. Widening the monitoring framework or establishing a separate one should be considered.
- Maintaining the dialogue with the public (consultations etc.) should become an integral part of policy opinion making in order to deliberate on formal requirements versus informal initialising action.

4.2.4 Thematic fields for policy action, policy levels and related instruments

Adaptation of funding schemes and planning approaches should respond to the specific conditions and pressures that emerge from the (peri-)urban location in order to fully unfold the benefits and economic potential resulting from the multifunctional character of UPUA. **Access to land** is a major constraint for UPUA. Protection of the remaining urban and peri-urban farmland from urban encroachment should be a primary action field. Local land use planning and zoning for urban containment and farmland preservation is prerequisite for the development of UPUA. The land use planning and zoning practice, however, requires an acknowledgment of the multifunctional character of UPUA. Creation and implementation of new spatial instruments, such as agricultural protection areas; designation of cultural values to UPUA and local food is a further requirement.

For reforming of the **CAP specific policy measures** and instruments can be considered in order to:

- Improve of the economic viability of UPUA and enable it to compete with other sectors on land and labour markets (analogue to LEADER)
- Facilitate the conditions for new entrants to enter faster into young farmers schemes, in order to speed up their investment activities
- Implementing bonus payments for UPUA within young farmers schemes
- Markets access / short food chains?
- New consumer-producer-alliances
- Targeting voluntary measures where specific impact is expected from the specific group of UPUA farmers through defining prioritisation shares within the overall group of applicants should be considered at national and programming level.

Levering the market logic of the **(peri-)urban land market** needs to be addressed, what includes:

- Limitation of land market mobility and restriction of agricultural land purchase
- Disincentives for "golden harvest" for agricultural land owners
- Restrictions in skimming of land value gains through zoning
- Creation of farmland pools owned by the state to offer land to farmers (even under certain preconditions, such as organic farming, short food supply chains).

REFERENCES

- AgroParisTech (2018). *Origine du projet et signification de T4P*. Available: http://www.agroparistech.fr/Origine-du-projet-et-signification-de-T4P.html [Accessed 21.02.2018].
- Al-Chalabi, M. (2015). *Vertical farming: Skyscraper sustainability?* Sustainable Cities and Society, 18, 74-77.
- Alexandri, E. & Jones, P. (2008). *Temperature decreases in an urban canyon due to green walls and green roofs in diverse climates*. Building and environment, 43 (4), 480-493.
- Andersson, E., Barthel, S. & Ahrné, K. (2007). *Measuring social–ecological dynamics behind the generation of ecosystem services*. Ecological applications, 17 (5), 1267-1278.
- Armar-Klemesu, M. (2000). *Urban agriculture and food security, nutrition and health*. Growing cities, growing food. Urban agriculture on the policy agenda, 99-118.
- Baker, L. & de Zeeuw, H. (2015). *Urban food policies and programmes*. In: de Zeeuw, H. & Drechsel, P. (eds.). Cities and agriculture. London, UK.
- Banerjee, C. & Adenaeuer, L. (2014). *Up, up and away! The economics of vertical farming*. Journal of Agricultural Studies, 2 (1), 40-50.
- Barling, D., Lang, T. & Caraher, M. (2002). *Joined–up Food Policy? The Trials of Governance, Public Policy and the Food System*. Social Policy & Administration, 36 (6), 556-574.
- Barthel, S., Folke, C. & Colding, J. (2010). *Social–ecological memory in urban gardens—Retaining the capacity for management of ecosystem services*. Global Environmental Change, 20 (2), 255-265.
- Beauchesne, A. & Bryant, C. (1999). *Agriculture and Innovation in the Urban Fringe: The Case of Organic Farming in Quebec, Canada*.
- Bohn, K. & Viljoen, A. (2010). *The Edible City: Envisioning the Continuous Productive Urban Landscape (CPUL)*. Field Journal, 4 (1), 149-161.
- Briquel, V. & Collicard, J.-J. (2005). *Diversity in the Rural Hinterlands of European Cities*. In: Hoggart, K. (ed.) The city's hinterland: dynamism and divergence in Europe's peri-urban terretories. Aldershot, UK.
- Bryant, C. R. (1984). *The recent evolution of farming landscapes in urban-centred regions*. Landscape Planning, 11 (4), 307-326.
- Busck, A. G., Pilgaard Kristensen, S., Praestholm, S., Reenberg, A. & Primdahl, J. (2006). *Land system changes in the context of urbanisation: Examples from the peri-urban area of Greater Copenhagen*. Geografisk tidsskrift, 106 (2), 21-34.
- Cabral, I., Keim, J., Engelmann, R., Kraemer, R., Siebert, J. & Bonn, A. (2017). *Ecosystem services of allotment and community gardens: A Leipzig, Germany case study*. Urban Forestry & Urban Greening, 23, 44-53.
- Caiani, G., Guastella, G., Pareglio, S., Pozzi, F. & Solero, E. (2015). *Periurban agriculture in Lombardy between urban sprawl, multifunctionality and new lifestyles: towards a territorial approach for rural development*. Aestimum, 89-100.

- Calvet-Mir, L., Gómez-Baggethun, E. & Reyes-García, V. (2012). *Beyond food production: Ecosystem services provided by home gardens. A case study in Vall Fosca, Catalan Pyrenees, Northeastern Spain*. Ecological Economics, 74, 153-160.
- Camphill Community Clanabogan (2018). *Welcome to Camphill Community Clanabogan*. Available: http://www.camphillclanabogan.com/index.php?Welcome-55 [Accessed 21.02.2018].
- Caputo, S. (2012). *The purpose of urban food production in developed countries*. In: Viljoen, A. M. & Wiskerke, J. S. C. (eds.). Sustainable food planning. Wageningen.
- Cavin, J. S. & Mumenthaler, C. (2016). *Geneva: Agriculture Integrated into Urban Planning? A Challenge*. In: Lohrberg, F., Licka, L., Scazzosi, L. & Timpe, A. e. (eds.). Urban Agriculture Europe. Berlin.
- CEMAT (2010). *Council of Europe Conference of Ministers responsible for Spatial/Regional Planning (CEMAT). Basic texts 1970-2010*.
- CoE (2000). *European Landscape Convention*. Florence. Available: https://rm.coe.int/1680080621 [Accessed 14.02.2018].
- COM (1997). *Towards an urban agenda in the European Union (Communication from the Commission)*. Brussels.
- COM (2010). *Europe 2020: A European strategy for smart, sustainable and inclusive growth (Communication from the European Commission)*. Brussels.
- COM (2013a). *Communication from the Commission of the European Parliament, the council, The European Economic and Social Committee and the Committee of the Regions: Green Infrastructure (GI) — Enhancing Europe's Natural Capital* Brussels.
- COM (2013b). *Regulation (EU) No 1305/2013 of the European Parliament and of the Council of 17 december 2013 on support for rural development by the European Agricultural Fund for Rural Development (EAFRD) and repealing Council Regulation (EC) No 1698/2005*. Brussels.
- COM (2013c). *Regulation (EU) No 1306/2013 of the European Parliament and of the Council of 17 december 2013 on the financing, management and monitoring of the common agricultural policy and repealing Council Regulations (EEC) No 352/78, (EC) No 165/94, (EC) No 2799/98, (EC) No 814/2000, (EC) No 1290/2005 and (EC) No 485/2008*. Brussels.
- COM (2013d). *Regulation (EU) No 1307/2013 of the European Parliament and of the Council of 17 december 2013 establishing rules for direct payments to farmers under support schemes within the framework of the common agricultural policy and repealing Council Regulation (EC) No 637/2008 and Council Regulation (EC) No 73/2009*. Brussels.
- COM (2013e). *Regulation (EU) No 1308/2013 of the European Parliament and of the Council of 17 december 2013 establishing a common organisation of the markets in agricultural products and repealing Council Regulations (EEC) No 922/72, (EEC) No 234/79, (EC) No 1037/2001 and (EC) No 1234/2007*. Brussels.
- CoR (2011). *Opinion of the Committee of the Regions on 'Local food systems' (outlook opinion)*. Brussels.

COST Action UAE (2013). *CAP and Urban Agriculture: CAP relevance to urban agriculture*. Available: http://www.urban-agriculture-europe.org/mediawiki/index.php/WG_1:_Urban_Agriculture_definitions_and_Common_Agriculture_Policy_(CAP) [Accessed 15.02.2018].

- Curry, N. R. a. R., Matt and Keech, Daniel and Maye, Damian and Kirwan, James (2015). *Urban agriculture and the policies of the European Union: the need for renewal*. Spanish Journal of Rural Development, 5 (1), 91-106
- Das, T. & Das, A. K. (2005). *Inventorying plant biodiversity in homegardens: A case study in Barak Valley, Assam, North East India*. Current science, 89 (1), 155-163.
- de Boer, B., Hamers, J. P. H., Zwakhalen, S. M. G., Tan, F. E. S., Beerens, H. C. & Verbeek, H. (2017). *Green care farms as innovative nursing homes, promoting activities and social interaction for people with dementia*. Journal of the American Medical Directors Association, 18 (1), 40-46.
- De Cunto, A., Tegoni, C., Sonnino, R., Michel, C. & Lajili-Djalaï, F. (2017). *Food in cities: study on innovation for a sustainable and healthy production, delivery, and consumption of food in cities,* Brussels.
- de Oliveira, J. A. P., Balaban, O., Doll, C., Moreno-Peñaranda, R., Gasparatos, A., Iossifova, D. & Suwa, A. (2010). *Cities, Biodiversity and Governance: Perspectives and Challenges of the Implementation of the Convention of Biological Diversity at the City Level,* Yokohama.
- De Zeeuw, H. (2011). *Cities, climate change and urban agriculture*. Urban Agriculture Magazine, 25, 39-42.
- Derkzen, P. & Morgan, K. (2012). *Food and the city: the challenge of urban food governance*. In: Viljoen, A. & Wiskerke, J. S. C. (eds.). Sustainable food planning: evolving theory and practice.
- Doernberg, A., Voigt, P., Zasada, I. & Piorr, A. (2016). *Urban food governance in German cities: actors and steering instruments*. IFSA 2016 Social and technological transformation of farming systems. Newport, UK.
- Draper, C. & Freedman, D. (2010). *Review and Analysis of the Benefits, Purposes, and Motivations Associated with Community Gardening in the United States*. Journal of Community Practice, 18 (4), 458-492.
- Dubbeling, M. (2013). *Cityfood: Linking Cities on Urban Agriculture and Urban Food Systems*. RUAF Foundation.
- EC (1999). *ESDP - European Spatial Development Perspective. Towards Balanced and Sustainable Development of the Territory of the European Union,* Luxembourg.
- EC (2008). *Commission Regulation (EC) No 889/2008*. Brussels.
- EC (2012). *The Multifunctionality of Green Infrastructure: In-Depth Report*.
- EC (2014). *Regional Policy: Making Europe's regions and cities more competitive, fostering growth and creating jobs,* Brussels.
- ECF Farmsystems (2018). *ECF Aquaponik-Farmsysteme. Kosteneffizient und ressourcenschonend hochwertige Lebensmittel produzieren*. Available: http://www.ecf-farmsystems.com [Accessed 01.02.2018].
- ECORYS (2017). *Modernising and Simplifying the Common Agricultural Policy. Summary of the Results of the Public Consultation,* Brussels.
- EESC (2004). *Opinion of the European Economic and Social Committee on Agriculture in peri-urban areas (own-initiative opinion)*.

- Eigenbrod, C. & Gruda, N. (2015). *Urban vegetable for food security in cities. A review*. Agronomy for Sustainable Development, 35 (2), 483-498.
- EIP-Agri FG (2016). *New entrants into farming: lessons to foster innovation and entrepreneurship: final report,* Brussels.
- EPRS (2014). *Urban and Peri-urban Agriculture*. Available: https://epthinktank.eu/2014/06/18/urban-and-peri-urban-agriculture/ [Accessed 19.02.2018].
- EUROSTAT (2015). *Farm structure survey 2013 - main results*. Available: http://ec.europa.eu/eurostat/statistics-explained/index.php/Farm_structure_survey_2013_-_main_results [Accessed 26.02.2018].
- Fabbri, K. (2017). *FOOD 2030: Future-proofing our food and nutrition systems*. ERRIN – Bioeconomy WG Meeting Brussels.
- Foodtank (2016). *Open Agriculture Initiative: Is Digital Farming the Future of Food?* Available: https://foodtank.com/news/2016/05/open-agriculture-initiative-digital-farming/ [Accessed 27.02.2018].
- Forssell, S. & Lankoski, L. (2015). *The sustainability promise of alternative food networks: an examination through "alternative" characteristics*. Agriculture and Human Values, 32 (1), 63-75.
- Galluzzi, G., Eyzaguirre, P. & Negri, V. (2010). *Home gardens: neglected hotspots of agro-biodiversity and cultural diversity*. Biodiversity and conservation, 19 (13), 3635-3654.
- Game, I. & Primus, R. (2015). *Urban Agriculture*. New York.
- Garcia Llorente, M., Rossignoli, C., Di Iacovo, F. & Moruzzo, R. (2016). *Social Farming in the Promotion of Social-Ecological Sustainability in Rural and Periurban Areas*. Sustainability, 8, 1-15.
- Germer, J., Sauerborn, J., Asch, F., de Boer, J., Schreiber, J., Weber, G. & Müller, J. (2011). *Skyfarming an ecological innovation to enhance global food security*. Journal of Consumer Protection and Food Safety, 6, 237-251.
- Giacchè, G. & Tóth, A. (2013). *COST Action Urban Agriculture Europe: UA in Barcelona Metropolitan Region: Short Term Scientific Mission Report,* Barcelona.
- Gorgolewski, M., Komisar, J. & Nasr, J. (2011). *Carrot City: Creating Places for Urban Agriculture.,* New York.
- Grard, B. J.-P., Chenu, C., Manouchehri, N., Houot, S., Frascaria-Lacoste, N. & Aubry, C. (2017). *Rooftop farming on urban waste provides many ecosystem services*. Agronomy for Sustainable Development, 38 (1), 2.
- Guiomar, X. (2010). *Peri-urban agriculture and local authorities: which policies for which proximities? Example of local policies in Île de France*. In: Galli, M., Lardon, S., Marraccini, E. & Bonari, E. (eds.). Agricultural management in peri-urban areas: The experience of an international workshop. Ghezzano.
- Harbison, A. (2010). *Social Farming: An Opportunity for Northern Ireland*.
- Henke, R. & Vanni, F. (2017). *Drivers of on-farm diversification in the Italian peri-urban agriculture*. Rivista di Economia Agraria, 72 (1), 79-100.
- Hinrichs, C. C. (2000). *Embeddedness and local food systems: notes on two types of direct agricultural market*. Journal of rural studies, 16 (3), 295-303.

- Holloway, L., Cox, R., Kneafsey, M., Dowler, E., Venn, L. & Tuomainen, H. (2010). *Are you alternative? "Alternative" food networks and consumers' definitions of alterity*. In: Fuller, D., Jonas, A. E. & Lee, R. (eds.). Interrogating alterity: alternative economic and political spaces.
- Ilieva, R. T. (2016). *Urban food planning: Seeds of transition in the Global North,* Milton.
- Interreg (2018). *AgriGo4Cities. Urban agriculture for changing cities: governance models for better institutional capacities and social inclusion*. Available: http://www.interreg-danube.eu/approved-projects/agrigo4cities [Accessed 22.02.2018].
- Jones Jr, J. B. (2005). *Hydroponics: a practical guide for the soilless grower,* Boca Raton.
- Karas, T. (2016). *Afghan garden keeps idle hands busy, produces food for hosts* Lesvos Island, Greece. Available: http://www.unhcr.org/news/stories/2016/10/5809b9af4/afghan-garden-keeps-idle-hands-busy-produces-food-hosts.html [Accessed 26.02.2018].
- Koc, M. & Dahlberg, K. A. (1999). *The restructuring of food systems: Trends, research, and policy issues*. Agriculture and Human Values, 16 (2), 109-116.
- Kozina, J., Tiran, J., Poljak Istenič, S., Repolusk, P., Ercegović, J., Krušec, K., Kladnik, D., Hribar, M. Š., Ferk, M., Kumer, P. & Rus, P. (2017). *AgriGo4Cities - Inventory report on the state of the art of relevant public institutions, vulnerable/marginalized groups and UPA in pilot areas,* Ljubljana.
- Krikser, T., Piorr, A., Berges, R. & Opitz, I. (2016). *Urban Agriculture Oriented towards Self-Supply, Social and Commercial Purpose: A Typology*. Land, 5 (3), 28.
- Le Grand, L. & van Meekeren, M. (2008). *Urban–rural relations: Dutch experiences of the leader+ network and rural innovation in areas under strong urban influences*. Rurality near the city—Proceedings of the international conference and workshops held in Leuven, Belgium.
- Lee-Smith, D. (2009). *Carrot City: Designing for urban agriculture*. Urban Agriculture Magazine, 22, 43-44.
- Lee, H. C. (2012). *How food secure can British cities become?* In: Viljoen, A. & Wiskerke, J. S. C. (eds.). Sustainable Food Planning: Evolving Theory and Practice. Wageningen.
- Leys, A. J. & Vanclay, J. K. (2011). *Social learning: A knowledge and capacity building approach for adaptive co-management of contested landscapes*. Land use policy, 28 (3), 574-584.
- Lin, B. B., Philpott, S. M. & Jha, S. (2015). *The future of urban agriculture and biodiversity-ecosystem services: Challenges and next steps*. Basic and Applied Ecology, 16 (3), 189-201.
- Litt, J. S., Soobader, M.-J., Turbin, M. S., Hale, J. W., Buchenau, M. & Marshall, J. A. (2011). *The influence of social involvement, neighborhood aesthetics, and community garden participation on fruit and vegetable consumption*. American journal of public health, 101 (8), 1466-1473.
- Macias, T. (2008). *Working Toward a Just, Equitable, and Local Food System: The Social Impact of Community-Based Agriculture*. Social Science Quarterly, 89 (5), 1086-1101.
- Mazumdar, S. & Mazumdar, S. (2012). *Immigrant home gardens: Places of religion, culture, ecology, and family*. Landscape and Urban Planning, 105 (3), 258-265.
- McEldowney, J. (2017). *Urban agriculture in Europe: Patterns, challenges and policies.*
- McLlvaine-Newsad, H., Merrett, C. D. & McLaughlin, P. (2004). *Direct from Farm to Table: Community Supported Agriculture in Western Illinois*. Culture & Agriculture, 26 (1-2), 149-163.

- Meeus, S. J. & Gulinck, H. (2008). *Semi-Urban Areas in Landscape Research: A Review*. Living rev. Landscape Res., 2 (3).
- Mok, H.-F., Williamson, V. G., Grove, J. R., Burry, K., Barker, S. F. & Hamilton, A. J. (2014). *Strawberry fields forever? Urban agriculture in developed countries: a review*. Agronomy for sustainable development, 34 (1), 21-43.
- Möllers, J. & Bîrhală, B. (2014). *Community Supported Agriculture: A promising pathway for small family farms in Eastern Europe? A case study from Romania*. Landbauforschung Applied Agriculture and Forestry Research, 3464464, 139-150.
- Moragues, A., Morgan, K., Moschitz, H., Neimane, I., Nilsson, H., Pinto, M., Rohtacher, H., Ruiz, R., Tisenkops, T. & Halliday, J. (2013). *Urban Food Strategies. The Rough Guide to Sustainable Food Systems*.
- Moran Vidal, I. (2014). *From urban-rural linkages to urban-rural relationships in the EU*. Available: https://epthinktank.eu/2014/02/13/from-urban-rural-linkages-to-urban-rural-relationships-in-the-eu/ [Accessed 23.02.2018].
- Mougeot, L. J. A. (2006). *Growing better cities: Urban agriculture for sustainable development,* Ottawa.
- Moulin-Doos, C. (2014). *Intercultural gardens: the use of space by migrants and the practice of respect*. Journal of Urban Affairs, 36 (2), 197-206.
- Mudu, P. & Marini, A. (2016). *Radical Urban Horticulture for Food Autonomy: Beyond the Community Gardens Experience*. Antipode, 50 (2), 549-573.
- MUFPP (2015). *Milan Urban Food Policy Pact*. Available: http://www.milanurbanfoodpolicypact.org/wp-content/uploads/2016/06/Milan-Urban-Food-Policy-Pact-EN.pdf [Accessed 03.01.2018].
- MUFPP (2017). *3rd Annual Gathering and Mayor Summit*. Available: http://www.milanurbanfoodpolicypact.org/wp-content/uploads/2018/02/3rd-MUFPP-Annual-Gathering-REPORT.pdf [Accessed 02.02.2018].
- Oberholtzer, L. (2004). *Community Supported Agriculture in the Mid-Atlantic Region: Results of a Shareholder Survey and Farmer Interviews. Small Farm Success Project,* Stevensville.
- OECD (1979). *Agriculture in the planning and management of peri-urban areas,* Paris.
- Olszewska, J. & Sylla, M. (2016). *Poland*. In: European CSA Research Group (ed.) Overview of Community Supported Agriculture in Europe.
- Opitz, I., Berges, R., Piorr, A. & Krikser, T. (2016). *Contributing to food security in urban areas: differences between urban agriculture and peri-urban agriculture in the Global North*. Agriculture and Human Values, 33 (2), 341–358.
- Opitz, I., Specht, K., Piorr, A., Siebert, R. & Zasada, I. (2017a). *Effects of consumer-producer interactions in alternative food networks on consumers' learning about food and agriculture*. Moravian Geographical Reports, 25 (3), 181-191.
- Opitz, I., Specht, K., Piorr, A., Siebert, R. & Zasada, I. (2017a). *Effects of consumer-producer interactions in alternative food networks on consumers' learning about food and agriculture*. Moravian Geographical Reports, 25 (3), 181-191.

- Opitz, I., Specht, K., Piorr, A., Siebert, R. & Zasada, I. (2017a). *Effects of consumer-producer interactions in alternative food networks on consumers' learning about food and agriculture*. Moravian Geographical Reports, 25 (3), 181-191.
- Orsini, F., Gasperi, D., Marchetti, L., Piovene, C., Draghetti, S., Ramazzotti, S., Bazzocchi, G. & Gianquinto, G. (2014). *Exploring the production capacity of rooftop gardens (RTGs) in urban agriculture: the potential impact on food and nutrition security, biodiversity and other ecosystem services in the city of Bologna*. Food Security, 6 (6), 781-792.
- Orsini, S. (2013). *Landscape polarisation, hobby farmers and a valuable hill in Tuscany: understanding landscape dynamics in a peri-urban context*. Geografisk Tidsskrift-Danish Journal of Geography, 113 (1), 53-64.
- Palliwoda, J., Kowarik, I. & von der Lippe, M. (2017). *Human-biodiversity interactions in urban parks: The species level matters*. Landscape and Urban Planning, 157, 394-406.
- Paniagua, Á. (2014). *Perspectives of Livestock Farmers in an Urbanized Environment*. Land, 3 (1), 19.
- Paradis, S., Cieszewska, A., Tóth, A. & Suklje-Erjavec, I. (2016). *Agriculture in Urban Space*. In: Lohrberg, F., Licka, L., Scazzosi, L. & Timpe, A. (eds.). Urban Agriculture Europe. Berlin.
- Partalidou, M. & Anthopoulou, T. (2017). *Urban Allotment Gardens During Precarious Times: From Motives to Lived Experiences*. Sociologia Ruralis, 57 (2), 211-228.
- Partnership on Circular Economy (2018). *Urban Agenda for the EU: Circular Economy (Draft Action Plan)*. Available: https://ec.europa.eu/futurium/en/system/files/ged/ua_ce_draft_action_plan_-_final_09.02.2018.pdf [Accessed 23.02.2018].
- Pawlikowska-Piechotka, A. (2011). *Active recreation space 'for all': family gardens in Poland*. Studies in Physical Culture and Tourism, 18 (4), 351-360.
- Pearson, L. J., Pearson, L. & Pearson, C. J. (2010). *Sustainable urban agriculture: stocktake and opportunities*. International Journal of Agricultural Sustainability, 8 (1-2), 7-19.
- Pfeiffer, A., Silva, E. & Colquhoun, J. (2014). *Innovation in urban agricultural practices: Responding to diverse production environments*. Renewable Agriculture and Food Systems, 30 (1), 79-91.
- Pinto-Correia, T., Gonzalez, C., Sutherland, L.-A. & Peneva, M. (2015). *Countryside consumption: transition towards lifestyle land management*. In: Sutherland, L.-A., Darnhofer, I., Zagata, L. & Wilson, G. A. (eds.). Transition pathways towards sustainability in European agriculture. Wallingford, UK.
- Piorr, A., Ravetz, J. & Tosics, I. (2011). *Peri-urbanisation in Europe: Towards a European Policy to Sustain Urban-Rural Futures. A Synthesis Report.*, Frederiksberg.
- Pölling, B. (2016). *Comparison of Farm Structures, Success Factors, Obstacles, Clients' Expectations and Policy Wishes of Urban Farming's Main Business Models in North Rhine-Westphalia, Germany*. Sustainability, 8 (5), 1-23.
- Pölling, B. & Mergenthaler, M. (2017). *The Location Matters: Determinants for "Deepening" and "Broadening" Diversification Strategies in Ruhr Metropolis' Urban Farming*. Sustainability, 9 (7), 1-19.
- Pölling, B., Sroka, W. & Mergenthaler, M. (2017). *Success of urban farming's city-adjustments and business models—Findings from a survey among farmers in Ruhr Metropolis, Germany*. Land Use Policy, 69, 372-385.

- Pothukuchi, K. & Kaufman, J. L. (1999). *Placing the food system on the urban agenda: The role of municipal institutions in food systems planning*. Agriculture and Human Values, 16 (2), 213-224.
- PQ (2010). *Parliamentary questions 10 June 2010: Subject City Farms. Answer given by Mr Cioloş on behalf of the Commission*.
- PQ (2012). *Parliamentary questions 20 August 2012. Subject: Urban Farming. Answer given by Mr Cioloş on behalf of the Commission*.
- PQ (2014). *Parliamentary questions 12 May 2014. Subject: Subject: Situation of urban and suburban farmers in the face of rampant urbanisation. Answer given by Mr Cioloş on behalf of the Commission*.
- PQ (2015). *Parliamentary questions 15 September 2015. Subject: Fostering of urban and peri-urban agriculture. Answer given by Mr Hogan on behalf of the Commission*.
- Præstholm, S. & Kristensen, S. P. (2007). *Farmers as initiators and farms as attractors for non-agricultural economic activities in peri-urban areas in Denmark*. Geografisk tidsskrift, 107 (2), 13-27.
- Qiu, G. Y., Ll, H. Y., Zhang, Q. T., Wan, C., Liang, X. J. & Li, X. Z. (2013). *Effects of evapotranspiration on mitigation of urban temperature by vegetation and urban agriculture*. Journal of Integrative Agriculture, 12 (8), 1307-1315.
- Raja, S., Born, B. & Kozlowski Russell, J. (2008). *A planner's guide to community and regional food planning: transforming food environments, building healthy communities,* Chicago.
- Ravetz, J., Fertner, C. & Nielsen, T. A. S. (2011). *The dynamics of peri-urbanization*. In: Pauleit, S. & Bell, S. (eds.). Peri-urban futures: Scenarios and models for land use change in Europe & China. Berlin.
- Renting, H., Marsden, T. K. & Banks, J. (2003). *Understanding alternative food networks: exploring the role of short food supply chains in rural development*. Environment and Planning A, 35 (3), 393-411.
- Rivaroli, S., Ghelfi, R., Bertazzoli, A. & Piorr, A. (2017). *Diversification pathways and farming systems: Insights from the Emilia-Romagna region, Italy*. Outlook on Agriculture, 46 (4), 239-247.
- Rolnictwo Wspierane przez Spolectnosc (undated). *RWS-y W POLSCE*. Available: http://wspierajrolnictwo.pl/rwsy-w-polsce [Accessed 03.03.2018].
- Scazzosi, L. (2016). *Urban Agriculture for Europe's Metropolitan Areas: Barcelona, Dublin, Geneva, Milan, Ruhr, Sofia, and Warsaw*. In: Lohrberg, F., Licka, L., Scazzosi, L. & Timpe, A. e. (eds.). Urban Agriculture Europe. Berlin.
- Schulz, K. (2013). *Urbane Landwirtschaft und "Green Production" als Teil eines nachhaltigen Landmanagements,* Müncheberg.
- Shortall, S., Sutherland, L.-A., McKee, A. & Hopkins, J. (2017). *Women in Farming and the Agriculture Sector,* Edinburgh.
- Simon-Rojo, M., Recasens, X., Callau, S., Duzi, B., Eiter, S., Hernandez-Jimenez, V., Kettle, P., Laviscio, R., Lohrberg, F., Pickard, D., Scazzosi, L. & Veijre, H. (2016). *From Urban Food Gardening to Urban Farming*. In: Lohrberg, F., Licka, L., Scazzosi, L. & Timpe, A. e. (eds.). Urban Agriculture Europe. Berlin.
- Simon, D. (2008). *Urban Environments: Issues on the Peri-Urban Fringe*. Annual Review of Environment and Resources, 33, 167-185.
- Smith, R., Thompson, K., H. Warren, P. & Gaston, K. (2010). *Urban domestic gardens (XIII): Composition of the bryophyte and lichen floras, and determinants of species richness*. Biological Conservation, 143, 873-882.

- Sonnino, R. (2009). *Feeding the City: Towards a New Research and Planning Agenda*. International Planning Studies, 14 (4), 425-435.
- Specht, K. & Sanyé-Mengual, E. (2017). *Risks in urban rooftop agriculture: Assessing stakeholders' perceptions to ensure efficient policymaking*. Environmental Science & Policy, 69, 13-21.
- Specht, K., Siebert, R., Hartmann, I., Freisinger, U. B., Sawicka, M., Werner, A., Thomaier, S., Henckel, D., Walk, H. & Dierich, A. (2014). *Urban agriculture of the future: an overview of sustainability aspects of food production in and on buildings*. Agriculture and Human Values, 31 (1), 33-51.
- Specht, K., Siebert, R. & Thomaier, S. (2016a). *Perception and acceptance of agricultural production in and on urban buildings (ZFarming): a qualitative study from Berlin, Germany*.
- Specht, K., Weith, T., Swoboda, K. & Siebert, R. (2016b). *Socially acceptable urban agriculture businesses*. Agronomy for Sustainable Development, 36 (17), 1-14.
- Spilková, J. & Vágner, J. (2016). *The loss of land devoted to allotment gardening: The context of the contrasting pressures of urban planning, public and private interests in Prague, Czechia*. Land Use Policy, 52, 232-239.
- Stierand, P. (2014). *Speiseräume,* Munich.
- Sumner, J., Mair, H. & Nelson, E. (2010). *Putting the culture back into agriculture: civic engagement, community and the celebration of local food*. International Journal of Agricultural Sustainability, 8 (1-2), 54-61.
- Sylla, M., Olszewska, J. & Świąder, M. (2017). *Status and Possibilities of the Development of Community Supported Agriculture in Poland as an Example of Short Food Supply Chain*. Journal of Agribusiness and Rural Development, 43 (1), 201-207.
- Thomaier, S., Specht, K., Henckel, D., Dierich, A., Siebert, R., Freisinger, U. B. & Sawicka, M. (2014). *Farming in and on urban buildings: Present practice and specific novelties of Zero-Acreage Farming (ZFarming)*. Renewable Agriculture and Food Systems, 30 (1), 43-54.
- Thorsøe, M. & Kjeldsen, C. (2016). *The Constitution of Trust: function, configuration and generation of trust in alternative food networks*. Sociologia Ruralis, 56 (2), 157-175.
- Van Der Schans, J. W. (2010). *Urban agriculture in the Netherlands*. Urban Agriculture Magazine, 24 (1), 40-42.
- Van Der Schans, J. W., Lorleberg, W., Alfranca, O., Alves, E., Andersson, G., Branduini, P., Egloff, L. D., Giacche, G., Heller, A., Herkströter, K., Kemper, D., Koleva, G., Mendes-Moreira, P., Miguel, A., Neves, L., Paulen, O., Pickard, D., Prados, M. J., Pölling, B., Recasens, X., Ronchi, B., Spornberger, A., Timpe, A., Torquati, B., Weissinger, H. & Wydler, H. (2016). *It Is a Business! Business Models in Urban Agriculture*. In: Lohrberg, F., Licka, L., Scazzosi, L. & Timpe, A. e. (eds.). Urban Agriculture Europe. Berlin.
- Van Der Schans, J. W. & Wiskerke, J. S. C. (2012). *Urban agriculture in developed economies*. In: Viljoen, A. & Wiskerke, J. S. C. (eds.). Sustainable Food Planning: Evolving Theory and Practice. Wageningen.
- Van Veenhuizen, R. & Danso, G. (2007). *Profitability and sustainability of urban and periurban agriculture*. Rome: FAO.
- Vandermeulen, V., Verspecht, A. & Van Huylenbroeck, G. (2005). *Perception of Land Scarcity by Peri-Urban Farmers*. 11th Congress of the EAAE 'The Future of Rural Europe in the Global Agri-Food System'. Copenhagen, Denmark.

- Veijre, H., Eiter, S., Hernandez-Jimenez, V., Lohrberg, F., Loupa-Ramos, I., Recasens, X., Pickard, D., Scazzosi, L. & Simon-Rojo, M. (2016). *Can Agriculture Be Urban?* In: Lohrberg, F., Licka, L., Scazzosi, L. & Timpe, A. e. (eds.). Urban Agriculture Europe. Berlin.
- Vellinga, T. V., Bannink, A., Smits, M. C. J., Van den Pol-Van Dasselaar, A. & Pinxterhuis, I. (2011). *Intensive dairy production systems in an urban landscape, the Dutch situation*. Livestock Science, 139 (1), 122-134.
- Viljoen, A. & Bohn, K. (2009). *Continuous Productive Urban Landscape (CPUL): Essential infrastructure and edible ornament*. Open House International, 34 (2), 50-60.
- Viljoen, A. & Bohn, K. (2014). *Second Nature Urban Agriculture: Designing Productive Cities,* London.
- Weltin, M., Zasada, I., Franke, C., Piorr, A., Raggi, M. & Viaggi, D. (2017). *Analysing behavioural differences of farm households: An example of income diversification strategies based on European farm survey data*. Land Use Policy, 62, 172–184.
- Zagata, L., Hrabák, J., Lošťák, M., Bavorová, M., Ratinger, T., Sutherland, L.-A. & McKee, A. (2017). *Research for AGRI Committee – Young farmers - policy implementation after the 2013 CAP reform,* Brussels.
- Zasada, I. (2011). *Multifunctional peri-urban areas – A Review of societal demands and agricultural provision of goods and services*. Land Use Policy, 28 (4), 639-648.
- Zasada, I. (2012). *Peri-urban agriculture and multifunctionality: urban influence, farm adaptation behaviour and development perspectives.* TU München, Fakultät Wissenschaftszentrum Weihenstephan.
- Zasada, I., Berges, R., Hilgendorf, J. & Piorr, A. (2013). *Horsekeeping and the peri-urban development in the Berlin Metropolitan Region*. Journal of Land Use Science, 8 (2), 199-214.
- Zasada, I., Fertner, C., Piorr, A. & Nielsen, T. S. (2011). *Peri-urbanisation and Multifunctional Agriculture around Copenhagen, Denmark*. Geografisk Tidsskrift-Danish Journal of Geography, 111 (1), 59-72.
- Zasada, I., Schmutz, U., Wascher, D., Kneafsey, M., Corsi, S., Mazzocchi, C., Monaco, F., Boyce, P., Doernberg, A., Sali, G. & Piorr, A. (in press). *Food beyond the City – Analysing Foodsheds and self-sufficiency for different Food System Scenarios in European Metropolitan Regions.* City, Culture and Society.
- Zeunert, J. (2016). *Urban agriculture up-scaled: economically and socially productive public green space*. In: Roggema, R. (ed.) Sustainable urban agriculture and food planning. Abingdon.
- Zezza, A. & Tasciotti, L. (2010). *Urban agriculture, poverty, and food security: Empirical evidence from a sample of developing countries*. Food Policy, 35 (4), 265-273.
- Zoll, F., Specht, K., Opitz, I., Siebert, R., Piorr, A. & Zasada, I. (2018). *Individual choice or collective action? Exploring consumer motives for participating in alternative food networks (AFN)*. International Journal of Consumer Studies, 42, 101-110

ANNEX

ANNEX Table 1: UPUA relevant policy processes and programmes at global level

UN-UNEP and UN-FAO: Sustainable Food Systems (SFS) Programme	
Short description of the policy/ program/ initiative and involved actors and partners	o Is integral part of the 10-Year Framework for Programmes on Sustainable Consumption and Production Patterns (10YFP) launched by UNEP and FAO in 2014 and aim to accelerate the shift towards sustainable production and consumption in developed and developing countries o SFS has 70 public and private partners worldwide o In Europe France (Ministry of Ecology, Sustainable Development and Energy), Netherlands (Ministry of Infrastructure and Environment), German Development Institute, Switzerland (Federal Office for Agriculture) are participating o Works as a platform for existing initiatives and partnerships
Key challenges	o Hunger and malnutrition, obesity, food waste o Climate change, land degradation and biodiversity loss o Food systems are contributing and are affected by these major challenges
(Policy) objectives /priorities and arguments for (policy) action	o Promote sustainability along the food value chain "from farm to fork" o SFS has four major objectives: awareness raising, capacity building, facilitating access to knowledge and information, and strengthening partnerships o Priority activities: promotion of sustainable diets and the reduction of food losses and waste
Perspective on UPUA and potentials for UPUA	o UPUA is not mentioned o Focus is mainly on small holder farms in developing countries. o Specific forms of UPUA can potentially contribute to the objectives e.g. by raising awareness about healthy diets and food waste or applying simplified and harmonized sustainability information schemes for food products, to enable consumers to make better informed choices also in developed countries
Key documents and sources	o http://www.scpclearinghouse.org/sites/default/files/10yfp-sfs-programmedoc.pdf o http://web.unep.org/10yfp/programmes/sustainable-food-systems-programme o http://www.scpclearinghouse.org/sites/default/files/10yfp-sfs-brochure-en.pdf
UN-FAO / Urban agriculture	
Short description of the policy/ program/	o FAO "supports the transformation of UPA into a recognized urban land use and economic activity, integrated into national and local agricultural development

initiative and involved actors and partners	strategies, food and nutrition programmes, and urban planning" (http://www.fao.org/urban-agriculture/en/). o "It helps national and regional governments and city administrations optimize their policies and support services for urban and peri-urban agriculture, and improve production, processing and marketing systems." o The technical programmes support the practical in cities and urban areas. Some of the FAO projects are funded at national level (e.g. Belgium or Spain).
Key challenges	o Food security
(Policy) objectives /priorities and arguments for (policy) action	o Improve food security and reduce poverty
Perspective on UPUA and potentials for UPUA	o FAO acknowledge the role of UPUA for food security, employment, recycling of urban waste and creation of greenbelts o Differentiate between urban farming, urban and peri-urban horticulture and forestry o Focus is on urbanising areas in low-income countries
Key documents and sources	o http://www.fao.org/urban-agriculture/en/ o http://www.fao.org/urban-food-actions/en/ o http://www.fao.org/ag/agp/greenercities/en/projects/index.html
UN-FAO and RUAF / Food for the cities programme	
Short description of the policy/ program/ initiative and involved actors and partners	o Already in 2001, the FAO started a multidisciplinary initiative called "food for the cities" that addresses the "*challenges that urbanization brings to the urban and rural population, as well as the environment*" (http://www.fao.org/fcit) o FAO and RUAF are partners of the ongoing "Food for the cities" programme, which is funded by the German Federal Ministry of Food and Agriculture and aims to strengthen capacity of local actors within a local food system o FAO and UN-HABITAT are increasing their collaboration for example on rural-urban linkages and land tenure issues. o FAO launched also a platform on urban food policies and actions which provide information for the different national and local actors
Key challenges	o Food security o Urbanisation
(Policy) objectives /priorities and	o Strengthening rural-urban linkages for more inclusive, efficient and resilient activities of small-scale agriculture; o Fostering participatory multi-stakeholder dialogue process to build ownership of actors;

arguments for (policy) action	o Scaling up practices.
Perspective on UPUA and potentials for UPUA	o FAO acknowledge the role of UPUA for food security, employment, recycling of urban waste and creation of greenbelts o Differentiate between urban farming, urban and peri-urban horticulture and forestry o Focus is on urbanising areas in low-income countries
Key documents and sources	o www.fao.org/fcit
UN-Habitat II and III (New Urban Agenda)	
Short description of the policy/ program/ initiative and involved actors and partners	o Habitat is the United Nations Conference on Housing and Sustainable Urban Development at which the countries renew their commitment for sustainable urban development and identify and address new and emerging challenges.
Key challenges	o massive sustainability challenges in terms of housing, infrastructure, basic services, food security, health, education, decent jobs, safety and natural resources
(Policy) objectives /priorities and arguments for (policy) action	o Food security and nutrition and strengthening of urban-rural linkages were recognized as key elements for sustainable development.
Perspective on UPUA and potentials for UPUA	o In Habitat III the precepts of the urban-rural linkages were established. o In its report **on urban-rural linkages the HABITAT III** refers to the risk that city expansion "*may appropriate prime agricultural land as a result of low density expansion, blocks green and blue corridors that maintain ecosystem health and connectivity, disrupts rural livelihoods, affect food supplies and threatens the environment through increased carbon emissions, pollution and energy use*" (p.2)
Key documents and sources	o Implementing the new Urban Agenda by strengthening Urban-Rural Linkages (https://unhabitat.org/books/implementing-the-new-urban-agenda-by-strengthening-urban-rural-linkages/ o HABITAT III Issue Paper on urban-rural linkages: http://habitat3.org/wp-content/uploads/Habitat-III-Issue-Paper-10_Urban-Rural-Linkages-2.0.pdf

ANNEX Table 2: Overview about translocal networks

RUAF Foundation-Global partnership on sustainable urban agriculture and food systems	
Short description of the initiative/network and involved actors and partners	o RUAF is a leading Centre of Expertise and Global Partnership on sustainable Urban Agriculture and Food Systems. o Since 1999 RUAF has worked in 50 cities in over 40 developing and developed countries in the world
Activities	o Works as platform for research projects, advisory services and training and seeks to contribute to the development of sustainable cities by facilitating awareness, knowledge generation and dissemination, capacity development, policy design and action planning for resilient and equitable urban agriculture and urban food systems. o Published RUAF published a series of guidelines for Municipal Policymaking on Urban Agriculture • Its activities focus on 5 areas: 1. Planning Resilient urban food systems 2. Short food chains and local economy 3. Food security and social inclusion of the urban poor 4. Productive reuse of wastes & wastewater 5. Urban agriculture and city adaptation to climate change
Perspective on UPUA	o RUAF focus specifically on UPUA
Links / References	o http://www.ruaf.org/
Selected key documents referring to UPUA	RUAF Policy Guidelines for urban agriculture: http://www.ruaf.org/publications/guidelines-municipal-policymaking-urban-agriculture-urban-management-programme-lac-2003
ICLEI-RUAF CITYFOOD Network	
Short description of the initiative/network and involved actors and partners	o ICLEI Local Governments for Sustainability is the leading global network of more than 1,500 cities, towns and regions committed to building a sustainable future. o The city food network is managed by ICLEI and RUAF and designated for local and regional governments o The purpose of this network is to: 1. Raise awareness on resilient city-region food systems and urban and peri-urban agriculture. 2. Create an advocacy platform for cities to gain political recognition and support from national governments and international support organisations. 3. Provide information to cities around the world, stimulate exchange of experiences, identify and disseminate important lessons, good practices, practical guidelines and toolkits.

	4. Provide cities with training and technical and policy assistance and guidance in managing their food systems and in engineering resilience. 5. Facilitate cooperation between cities worldwide and between local governments and civil society in this important policy area. 6. The CITYFOOD network will collaborate with organisations already working in the field of sustainable city-region food systems such as FAO, UNEP and C40 food systems network and governments implementing the MUFPP.
Activities	o Provides training, policy advice as well as technical assistance e.g. for the mobilisation of funds for food system projects including urban agriculture, short food chains, enterprise development in the food system o organize networking, exchange and learning among the cities
Perspective on UPUA	o Focus on urban agriculture and local food systems
Link / references:	o http://www.iclei.org/ o www.iclei.org/cityfood o http://www.iclei.org/fileadmin/user_upload/ICLEI_WS/Documents/CITYFOOD_Network/
Selected key documents referring to UPUA	o none
PURPLE– peri-urban regions platform Europe	
Short description of the initiative/network and involved actors and partners	o The platform was established in 2004 and brings together regions and local authorities from across the EU (currently 12 regions). o "*PURPLE is striving for greater recognition of Europe's peri-urban regions in European policy and regulation, to ensure long term sustainability for these important, complex, multifunctional territories*" *(mission statement).* o General objectives are: 1. Influence European regional, urban and rural policy making 2. Develop a distinctive role as the primary interlocutor with Brussels-based institutions, and with politicians and stakeholders across the EU on issues of special relevance to Europe's peri-urban regions Act as a platform for peri-urban regions to share knowledge and good practice, allowing connections and productive cross-fertilisation between existing projects, as well as promoting new trans-European initiatives in the field
Activities	o Lobbying for peri-urban regions

	o Publication of declarations, resolutions and position papers on policy areas of particular relevance to peri-urban regions (e.g. for EU CAP, Cohesion policy).
Perspective on UPUA	o PURPLE suggests its regions to act as a laboratory for developing smarter ways of using the space and managing growth – including more integrated policy making. e.g. traceable short food supply chains, support to improved approaches for spatial and temporal integration of European and regional distribution networks (food hubs). o The peri-urban charter mentions explicit food production close to the cities: *„Food production close to large populations with a range of well-established land-based services – agriculture, horticulture, forestry".* o And "Recognise that peri-urban areas have particular needs/requirements in terms of governance and policy to take account of their diversity, complexity and potential" (peri-urban charter, p.1)
Link / references:	http://www.purple-eu.org/
Selected key documents referring to UPUA	PURPLE Position Paper (2004): o http://www.purple-eu.org/uploads/Public%20Policy%20Documents/PURPLE%20Founding%20Position%20paper%202004.pdf Peri-urban charter: o http://www.purple-eu.org/uploads/downloads/charter/charter%20EN%20-%20PURPLE.pdf Topic paper on food and nutrition security: o http://www.purple-eu.org/uploads/Topic%20Papers%20updates/food%20security%20v3%20-%20purple%20topic%20paper.pdf
C40 food systems network	
Short description of the initiative/network and involved actors and partners	o C40 is a network of the world's megacities committed to addressing climate change. o European members are: Amsterdam, Athens, Barcelona, Basel, Berlin, Copenhagen, Istanbul, London, Madrid, Milan, Moscow, Oslo, Paris, Rome, Rotterdam, Stockholm, Tel Aviv, Venice, Warsaw o The Food Systems Network supports city efforts to create and implement comprehensive solutions that reduce carbon emissions and increase resilience throughout the urban food system.
Activities	o Priority areas are: o Food procurement - using city procurement for schools' canteens, hospitals, elderly homes, civic buildings etc. to foster

	more sustainable and healthy diets with local, seasonal and fresh food. o Food production - **promoting urban agriculture** to decrease food miles, mitigate urban heat island effect, reduce building energy demand (through roof and wall gardens), and support local producers. o Food distribution - supporting sustainable food transportation and logistics planning to develop or strengthen a safe and energy efficient municipal public market system, including wholesale markets. o Food waste - raising awareness of and addressing food loss and waste, including by facilitating recovery and redistribution for people in need (food banks) or animal feeding and implementing collection for composting
Perspective on UPUA	o Food production (urban agriculture) as one element of urban food systems
Link / references:	o http://www.c40.org/ o http://www.c40.org/networks/food_systems
Selected key documents referring to UPUA	o none
Cittá del Bio (Organic Cities Network)	
Short description of the initiative/network and involved actors and partners	o The association bring together municipalities and regional bodies, which want to promote organic farming not only as an agricultural model, but also as a cultural project. o Supporting organic farming, processing and demand with short transportation distances and regional value adding
Activities	o Public procurement policies that favour organic products o Food education o Establishment of Bio-Districts
Perspective on UPUA	o UPUA is not targeted directly only in terms of short transportation distances o Value chain perspective ranging from food production, processing to food consumption
Link / references:	o http://www.cittadelbio.it/eng-version o https://www.biostaedte.de/ueber-uns/ziele.html
Selected key documents referring to UPUA	o none

ANNEX Table 3: European research projects related to urban and peri-urban agriculture

RECORD NO.		TIME	ACRONYM	TITLE	KEYWORDS	BUDGET
FP5	INCO2	2001		Peri-urban agriculture: evaluation of the state of the art and the potential of cooperation EU - Mercosur + Chile	-	60 000.00 €
	INCO2	2002 – 2003		Seminar: "urban and peri-urban agriculture in economies in transition"	-	9 999.00 €
	INCO2	2003 – 2006	**MiCoSPA**	Microbial pest control for sustainable peri-urban/urban agriculture in Latin America (Cuba and Mexico)	-	898 183.00 €
	INCO2	2002 – 2006	**RURBIFARM***	Sustainable farming at the rural-urban interface-an integrated knowledge-based approach for nutrient and water recycling in small-scale farming systems in peri-urban areas of china and Vietnam	Peri-urban, nutrient recycling, waste water, small scale farming, local knowledge	1 250 000.00 €
	Life Quality	2000 – 2004	**NEWRUR***	Urban pressure on rural areas: mutations and dynamics of peri-urban rural processes	Suburbanisation, suburbia, metropolitan area, urban development, rural area	1 039 647.00 €
subtotal						**3 257 829.00 €**
FP6	SUSTDEV	2006 – 2011	**SWITCH**	**S**ustainable **W**ater management **I**mproves **T**omorrow's **C**ities' **H**ealth	-	14 749 996.00 €

	INCO	2006 – 2008	**INDIGENOVEG**	Networking to promote the sustainable production and marketing of indigenous vegetables through urban and peri-urban agriculture in sub-Saharan Africa	Thematic meetings, small-scale surveys, interdisciplinary research, policy lessons, dissemination tools	849 929.00 €
subtotal						**15 599 925.00 €**
FP7	KBBE	2011 – 2014	**FARMPATH***	Farming Transition: Pathways Towards Regional Sustainability of Agriculture in Europe	Sustainable agriculture, farming, farmers, National Stakeholder Partnership, agricultural innovation	1 498 893.00 €
	KBBE	2012 – 2015	**FOODMETRES***	Food Planning and Innovation for Sustainable Metropolitan Regions	Food chains, urban areas, metropolitan region, agriculture	1 493 671.00 €
	KBBE	2012 – 2015	**SUPURBFOOD**	Towards sustainable modes of urban and peri-urban food provisioning	Food supply chains, multifunctional land use, urban food production, urban and peri-urban agriculture	1 499 651.00 €
	KBBE	2013 – 2016	**GLAMUR***	**G**lobal and **L**ocal food chain Assessment: a **MU**ltidimensional performance-based approach	Food chains, food chain assessment	2 932 328.00 €
	KBBE	2011 – 2014	**SOLISA***	Agricultural Knowledge Systems in Transition: Towards a more effective and	rural development, innovation networks,	2 493 998.00 €

			efficient support of Learning and Innovation Networks for Sustainable Agriculture	sustainable agriculture, knowledge systems learning, transition partner	
Environment	2011 – 2013	**FOODLINKS***	Knowledge brokerage to promote sustainable food consumption and production: linking scientists, policymakers and civil society organisations	healthy foods, sustainable food production, consumption, communities of practice, short food supply chains	1 495 263.00 €
Environment	2013 – 2016	**PATHWAYS***	Exploring transition pathways to sustainable, low carbon societies	-	2 998 498.40 €
Environment	2011 – 2016	**TURaS***	**T**ransitioning towards **U**rban **R**esilience **a**nd **S**ustainability	Cities, sustainable urban living, urban resilience, green infrastructure, urban growth	6 813 819.30 €
SSH	2014 – 2016	**GLAMURS***	**G**reen **L**ifestyles, **A**lternative **M**odels and **U**pscaling **R**egional **S**ustainability	Sustainable lifestyles, green lifestyles, regional sustainability, green economy	4 995 836.00 €
People	2011 – 2014	**DAFNE**	**D**eterminants of **A**lternative **F**ood **N**etworks and **E**xchanges	-	45 000.00 €

	People	2011 – 2013	**LUPUS***	Land Use Processes and Urban Sprawl	Agriculture, urban fringe, smart policies, rural area, land use, urban sprawl	272 480.00 €
	People	2014 – 2017	**MARSUPIA**	A **M**ultifunctional **A**g**R**iculture for **S**ustainable **P**er**I**-urban **A**reas	Fringe farmland, agriculture, sustainable food production, peri-urban areas	258 088.50 €
	People	2011 – 2013	**URBLIV**	Building just and livable cities: Participation and contestation in neighborhood revitalization	marginalised neighbourhood, urban environment, community recovery, resident action, collective identity, environmental gentrification	167 180.80 €
Subtotal						**26 964 707.00 €**
H2020	EU.1.3.2.	2015 – 2017	**ARBUATEM**	Antibiotic resistant bacteria and genes, associated with urban agriculture in Low and Countries: Ecological and medical perspectives	Wastewater, urban agriculture, antibacterial resistance, metagenomic DNA sequencing, bioinformatics pipelines	195 454.80 €
	EU.1.3.3.	2014 – 2018	**GRAGE**	**Gr**ey **a**nd **g**reen in **E**urope: elderly living in urban areas	-	828 000.00 €

	EU.2.3.1., EU.3.2.	2014	**BAG-FS**	**B**iopolus **A**ero **G**reen - **F**easibility **S**tudy	-	50 000.00 €
	EU.2.3.1., EU.3.2.	2015	**JFB**	Jellyfish Barge – A floating greenhouse	-	50 000.00 €
	EU.2.3.1., EU.3.2.	2015	**POLYDOME**	Proposal for innovative and sustainable polyculture greenhouse system Polydome	-	50 000.00 €
	EU.2.3.1., EU.3.2.	2015 – 2018	**SCALING UP NOVIHUM**	A Sustainable Soil Solution: Scaling up Novihum, an innovation to convert bad soil into better, make brown coal clean and barren land green, and profitably advance food security in Europe and beyond	-	2 427 600.00 €
	EU.2.3.1., EU.3.2.1., EU.3.2.2., EU.3.2.4.	2016	**CoolFarm**	The intelligent and flexible system that provides to plants what they need, when they need it!	-	50 000.00 €
	EU.2.3.1., EU.3.2.1., EU.3.2.2., EU.3.2.4.	2016 – 2018	**INFARM**	The vertical farming revolution, urban Farming as a Service	-	1 931 884.50 €
	EU.3.2.1.1., EU.3.2.1.3.	2018 – 2021	**SiEUGreen**	**Si**no-**Eu**ropean innovative **Green** and smart cities	-	6 999 999.38 €
	EU.3.2.1.3.	2017 – 2021	**ROBUST***	Rural-Urban Outlooks: Unlocking Synergies	Spatial development concept, regional	5 999 934.00 €

					development, economic development	
	EU.3.5.1.2., EU.3.5.1.3., EU.3.5.2.1., EU.3.5.2.2., EU.3.5.2.3.	2017 – 2022	**CONNECTING Nature***	**CO**productio**N** with **N**atur**E** for **C**ity **T**ransitioning, **IN**novation and **G**overnance	-	11 394 282.49 €
	EU.3.5.1.2., EU.3.5.1.3., EU.3.5.2.1., EU.3.5.2.2., EU.3.5.2.3.	2017 – 2022	**GROW GREEN***	Green Cities for Climate and Water Resilience, Sustainable Economic Growth, Healthy Citizens and Environments	-	11 224 058.25 €
	EU.3.5.1.2. EU.3.5.1.3. EU.3.5.2.1. EU.3.5.2.2. EU.3.5.2.3.	2017 – 2022	**UNaLab***	**U**rban **N**ature **L**abs	-	12 768 931.75 €
	EU.3.5.1.2., EU.3.5.1.3., EU.3.5.2.1., EU.3.5.2.2., EU.3.5.2.3.	2017 – 2022	**URBAN GreenUP***	New Strategy for Re-Naturing Cities through Nature-Based Solutions	Renaturing, green cities, cities, climate change	13 970 642.25 €
	EU.3.5.1.2. EU.3.5.1.3. EU.3.5.2.2.		**Nature4Cities***	Nature Based Solutions for re-naturing cities: knowledge diffusion and decision support platform through new collaborative models	-	7 499 981.25 €

	EU.3.5.2.3. EU.3.5.4.2.					
	EU.3.5.1.2., EU.3.5.1.3., EU.3.5.2.2., EU.3.5.2.3., EU.3.5.4.2.	2016 – 2020	**NATURVATION***	**NAT**ure-based **UR**ban inno**VATION**	Nature based solutions, cities, governance, innovation, transition, Europe	7 798 296.25 €
	EU.3.5.2.	2016 – 2020	**EKLIPSE***	Establishing a **E**uropean **K**nowledge and **L**earning Mechanism to **I**mprove the **P**olicy-**S**cience-Society Interface on Biodiversity and **E**cosystem Services	-	2 997 272.50 €
	EU.3.5.4.	2016 – 2020	**DECISIVE**	A **DEC**entral**I**zed management **S**cheme for **I**nnovative **V**alorization of urban biowast**E**	Network analysis, micro anaerobic digestion, solid state fermentation, waste prevention, city resilience, eco-innovation	7 755 101.56 €
subtotal						**93 991 438.98 €**
INTEREG	Danube Trans-national Programme	2017 – 2019	**AgriGo4Cities***	Urban agriculture for changing cities: governance models for better institutional capacities and social inclusion	-	1 253 061.64 €
	IVC Regional Initative Project	2009 – 2012	**PERIURBAN***	Periurban Parks - Improving Environmental Conditions in Suburban Areas	-	1 805 604.38 €

subtotal						
COST Action	Transport and Urban Development	2012 – 2016	**UAE***	**U**rban **A**griculture **E**urope	-	**?**
Subtotal						**?**
TOTAL						**142 872 566.00 €**

*projects found through research

This study presents a state of the art overview on urban agriculture and peri-urban agriculture (UPUA), the diversity of phenomena, motivations, distinctive features, benefits and limitations. UPUA is contextualized in relation to societal and economic transformations, EU strategic objectives, policies and regional food system approaches. Using best practice examples, the study demonstrates the need for an improved integration of UPUA into the policy agenda across sectors, domains and governance levels.

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