PROSPECTS FOR MAINSTREAMING URBAN AGRICULTURE IN KOSOVO IN SUPPORT OF SUSTAINABLE URBAN DEVELOPMENT

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ABSTRACT
Urban areas around the world are attracting more a more people due to increased economic, educational, health, social and cultural opportunities. With the growing urban population, there is a need for undertaking creative measures to strengthen food production and distribution systems, and cities as major consumers can contribute more to this matter. Food production in cities has been a long tradition and a mainstream activity in many countries around the world, and it is experiencing a comeback. While Kosovo has been supporting agricultural development, especially in rural areas, urban areas continue to experience agricultural land loss (specifically, conversion to construction land), degradation beyond repair, and contamination. Institutional support (technical capacities, grant schemes and other investments) is contributing towards increased agricultural productivity in general, but tailored policies and programmes supporting the needs of the urban population (especially the poor) should be undertaken as well. While the extent of urban agriculture in Kosovo is unknown, this research aims to review the current policy environment for urban agriculture development, including agricultural and spatial planning-related legal framework, strategies, and key related reports, studies and official related data. It tries to identify the extent and development trend of small-scale agriculture in Kosovo, barriers hindering its expansion to urban areas, and based on the findings, the paper provides potential policy interventions to utilize the role of urban agriculture on sustainable urban development, as a source of fresh food but also a mechanism for alleviating urban poverty and inequalities, increasing community well-being, environmental performance and climate resilience.
Keywords: community gardens, food security, resilience, sustainable development, urban agriculture.

1 INTRODUCTION

Population and economic growth trajectories influence the patterns of urbanization and infrastructure development, as well as the need for food, energy and other land-based resources [1]. Different shocks and stresses, including social conflicts and wars, economic slowdowns, health emergencies (such as the COVID-19 pandemic) or extreme weather conditions and climate change impacts, can disrupt the food value chains, thus, exacerbating hunger and food insecurity [2]. Food insecurity may cause adverse nutritional and health (increased risk of overweight and obesity, diabetes, coronary heart diseases, and some types of cancer), cognitive (poor schooling performance and lower economic productivity) but also socioeconomic development issues [3].

Sustainable agriculture and food security are considered crucial for achieving the 2030 Agenda for Sustainable Development, contributing towards ending hunger and ensuring access to safe, nutritious and sufficient food for all (SDG 2.1), ending malnutrition (SDG 2.2), and increasing agricultural productivity and incomes of small-scale food producers (SDG 2.3) [2]. Despite these targets, there are still many persons around the world suffering from severe food insecurities (around 26.4% of the world population, about 2 billion persons in 2018) and malnourishment (especially children under 5 years of age) [2]. Since agricultural availability, access and affordability is a precondition for the development of both urban and rural areas, it is essential to ensure sustainable food production systems and to implement

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resilient agricultural practices (SDG 2.4), especially in developing countries (SDG 2.a) [2]. While there is a need to undertake creative measures to strengthen food production and distribution systems, cities as major consumers can contribute more to this matter.

Food production in cities has been a long tradition and a mainstream activity in many countries around the world [4][5]. Following urban development dynamics, advancements in technology, and continuous agrarian-industrial transitions, agricultural production shifted to rural areas; however, the environmental and social justice movements reintroduced it within the cities and their fringes in the late 1960s and early 1970s [1][4][5]. Alternative approaches were also introduced in the late 1970s (initially in Australia and spreading around Central and South America, Asia and Africa in the mid-1980s) through permaculture strategies, where plants, animals and humans comprise an integrated ecosystem and mutually rely on one another. Since then, urban agriculture has made a comeback in many cities around the developed and developing world and is recognized as an important building block for their sustainable and resilient development [6][7].

Cities in many European countries, including Germany, Austria, the Netherlands and Norway, have a longer history and endurance of urban gardening, integrated with health and community development policies. Urban agriculture is prevalent in different scales, such as small commercial farms (where urban farmers directly sell their products in farm stands or farmers' markets) or those supported by non-profit organizations, community gardens (large lots of land in neighbourhoods, public housing or school open areas), and individual backyard gardens (balconies, rooftops, decks) – still small enough to be generally less intense than rural agriculture [4]. These gardens have transformed throughout the past hundreds of years, evolving from food and flower growing spaces only to important gathering places for sociocultural interactions as well [8]. While developed countries (mainly in North America, Western and Northern Europe, and Australia and New Zealand) have integrated urban agriculture in their sustainable development agendas (supporting reconnection with nature, community building and social change), developing countries (including the rest of the world) are still reluctant, stigmatizing it as a rural activity only [4][5].

There is no exact evidence about the current extent of urban agriculture around the world. A study by Game & Primus (2015) estimated that more than 800 million people around the world practiced urban agriculture [9]. Another study by Hamilton et al. (2014) provided a median estimate of 266 million households engaged in urban agriculture (crop production only) in developing countries, out of which 15 million are in Eastern Europe [5]. It is estimated that 70% of food is consumed by urban inhabitants; however, only 25% of them are fed from food grown in urban gardens [7][10]. Even though many cities will continue to depend on imported food (due to related limitations), and urban agriculture initiatives will not solve the world's food insecurity issues, they can still contribute to alleviating them (especially for the urban poor or persons living in vulnerable situations within urban areas), along with other benefits such as biodiversity conservation, improved environmental performance and social cohesion [5].

While there are studies addressing the agricultural land loss [11][12], fragmentation [13] [14], and contamination, as well as the need for moving towards more sustainable agricultural land management and food production practices [15], not much attention has been given to urban agriculture in Kosovo. Urban agriculture has many definitions; however, this research mainly focuses on horticultural (food plant cultivation) activities lying within an urban or peri-urban setting. Urban agriculture in Kosovo (and Western Balkans in general) has not been much explored, neither through national registries, agricultural or spatial development strategies, business models, nor potential revenues [7].

In this regard, this research aims to assess the current policy environment for urban agriculture development and its approximate extent in Kosovo. Upon the assumption that urban agriculture is not much prevalent in Kosovo, this research provides strategic recommendations on introducing urban agriculture into the country's spatial and socioeconomic development discourse as a potential tool to address its food insecurities (due to low arable land and productivity, and high reliance on import), high unemployment (especially among women and youth), as well as other issues (including environmental quality and performance, climate change management, social cohesion and general well-being). The research calls for increased local action towards integrating healthy food production and consumption practices in urban and spatial planning and other socioeconomic development agendas towards the overall country's sustainable development.

2 METHODOLOGY

This research is a policy analysis, reviewing the current policy environment for urban agriculture development, including agricultural and spatial planning-related legal framework, strategies and key related reports, studies and official related data. It tries to identify the development trend of urban agriculture in Kosovo, barriers hindering its expansion, and potential policy interventions to utilize its impact on sustainable urban development.

The policy environment and institutional context were identified by reviewing the draft Law on Agriculture and Rural Development (2018), Law No. 04/L-174 on Spatial Planning (2013), Law No. 04/L-090 on Amending and Supplementing the Law No. 03/L-098 on Agriculture and Rural Development (2012), Law No. 04/L-074 on Agriculture and Rural Development Advisory Services (2012), Law No. 04/L-040 for Land Regulation (2012), Law No. 04/L-085 on Organic Farming (2012), Law No. 03/L-098 on Agriculture and Rural Development (2009), and Law No. 03/L-016 on Food (2009) whether they address urban agriculture, and how if yes. Additionally, the National Development Strategy 2016–2021 and National Spatial Planning Strategy (Spatial Plan of Kosovo) 2010–2020 were also analysed to assess the overall national priorities and focus on agricultural development.

The policy forum and discourse on urban-rural linkages and prospects for potential urban agricultural development were extracted through the outcomes of different multi-stakeholder events and dialogues, including the United Nation's Food Systems Summit 2021 dialogue on "Transforming Kosovo's food system: Opportunities to boost sustainable food production and consumption to build back better from COVID-19" convened by the Institute for Development Policy (INDEP), the Ministry of Agriculture, Forestry and Rural Development (MAFRD) and United Nations Kosovo Team (UNKT) [16], as well as "The future of territorial planning in Kosovo" symposium conducted by the Ministry of Environment, Spatial Planning and Infrastructure (MESPI) and UN-Habitat Kosovo [17].

According to the Kosovo's official records, there is no data on the overall urban land used for agricultural purposes, involved households and types of crops that are grown; hence the exact extent of urban agriculture is difficult to be understood [7]. The closest available variable to small-scale food production other than rural "utilized agricultural area (UAA)" is "kitchen gardens". A kitchen garden is defined as the area used for cultivating agricultural products intended for household consumption [18]. Such areas are usually small, less than 0.5 hectares. Available public information lacks georeferenced coordinates of these kitchen gardens; hence, their urban or rural extent cannot be properly defined.

In this research, the development trend of the area (expressed in hectares) used for kitchen gardens in Kosovo is found using data from the Kosovo Agency of Statistics (KAS) for the period of 2005–2020 (as no earlier data is available) [19]. Additional data obtained from KAS

include the overall arable land area (2005–2020), unemployment rate (2005–2020), and poverty and extreme poverty rates for both urban and rural areas (2012–2017). Data on agricultural production, export and import (2015–2019) were retrieved from the MAFRD [20]. Data on loss of agricultural land due to the expansion of construction areas were obtained from the MESPI for years 2000, 2006, 2012 and 2018 (upon the country's satellite images availability) [11]. Kitchen garden area over the period of 2005–2020 was regressed using STATA with several other variables (including agricultural production, gross domestic product (GDP) per capita, agricultural import, annual household food consumption, unemployment and poverty records) to assess the related relationships; however, due to incomplete datasets for certain variables, there were insufficient observations to obtain significant results. On the other hand, there is lack of data on undernourishment rates (at both national and urban levels), hence no further analysis can be made on food security. In this regard, years presenting a distinct change in kitchen garden area, were further scrutinized to find out what other variables (factors) did significantly change from previous and successive years, which could potentially support such an increase.

Upon the identified challenges and potential of small-scaled food production in urban areas, the research ends with policy recommendations on developing and expanding the extent of urban agriculture in Kosovo's cities, based on international policies and best practices.

3 RESULTS AND DISCUSSIONS

3.1 Agricultural context in Kosovo

Kosovo is one of the poorest countries in the Western Balkans (and Europe), having one of the lowest GDP per capita (4,419 US$ in 2018 and 4,287 US$ in 2020), as well as the lowest share of urban population (38.3% according to the population census in 2011, and an estimated 45% in 2018, as compared to 74.1% in Europe in 2018) [7][14][21][22]. Even though around two-thirds of the total population are of working age (15–64 years old), the country has a high unemployment rate (25.9% in 2020), especially among women (32.3%) and youth (49.1%) [20][22]. In 2017, about 18% of the total population was in poverty, whereas 5.1% in extreme poverty [18].

With around 60% of the population relying on it, agriculture is an important and strategic economic sector in Kosovo; yet, it contributes to the country's GDP by only 7.4% [20][22][23]. Agricultural land comprises around 38% of Kosovo's total territory, out of which 45% is arable, the majority of which (above 80%) is of high quality (I–IV category) [20][24][25]. Despite the high potential for quality agricultural produce, agricultural production and arable land area per capita is still low (0.18 hectares, compared to the average of 0.52 hectares in the EU countries) [24]. Households in Kosovo spend around 39% of their annual incomes on food, with those in rural areas (42%) spending more than those in urban ones (36%) [18].

Following the country's estimated urban population increase trend due to population migration for more economic, educational, health, social and cultural opportunities, urban areas are expanding or becoming denser at the cost of open and green land (including agricultural land) and rural settlements are depopulating [11][14][23]. Recent data on Kosovo's land cover changes (extracted from satellite images according to CORINE Land Cover methodology) show that during the past two decades (2000–2018), construction areas have grown by 51% (from 24,978.47 ha to 51,057.52 ha), whereas agricultural areas have declined by 6.7% (444,320.72 ha to 416,168.22 ha), as shown in Figure 1 [25].

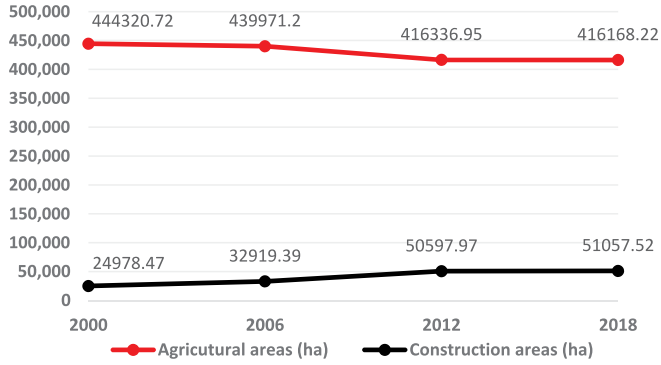

Figure 1: Agricultural and construction areas (ha) changes, Data source: KEPA, 2020.

Kosovo has undertaken several reforms and investment initiatives to increase agricultural growth, market competitiveness, economic diversification, local communities' development, land management and protection (from further fragmentation, pollution, degrading and loss), sustainable food production, and food quality in lieu of EU directives [13][20][12][26]. Some of these measures comprise drafting of laws (on agriculture and rural development, food safety, organic agriculture, public health and land regulation), increased inspection (of illegal land conversion), capacity building (on farm diversification and business development), engagement of youth and women in agricultural activities and agritourism, and financial support (through grant schemes for the provision of agricultural inputs, physical assets, irrigation, as well as loan guarantees, insurances and compensations due to low or high temperatures and rainfall) [13][15][26]. The undertaken institutional measures and support throughout the period of 2014–2019, led to an increased employment in agricultural, forestry and fisheries (comprising 5.2% of the total economic activities as compared to 2.6% in 2014), increased area of land used for agricultural purposes (by 1.75%), increased productivity (by 12%), as well as export of agricultural products (by 38.45%) [18][20]. However, existing agricultural production capacities still do not fulfil the current population needs; the country still relies on imported agricultural products [15][20].

Even though Kosovo has also started mainstreaming environmental and climate change considerations into respective sector policies, strategies and action plans [15], agricultural land continues to be converted to construction land or is degraded beyond repair, whereas the current food production practices remain resource-consuming and inefficient, contributing to loss of biodiversity, water scarcity, increased GHG emissions and pollution of air, water and soil [13][14][17][28]. According to Kosovo's GHG emissions inventory for the period of 2014–2019, agriculture, forestry and other land uses (AFOLU) accounted for 8% of the total emissions [30].

According to the European Commission's report on Kosovo's progress in 2021, additional measures should be taken towards urgently and effectively stopping agricultural land loss and implementing the legislation on spatial planning [31]. Whereas, country-based discussions (preceding the UN Food Systems Summit 2021) among over 50 diverse stakeholders, including government and civil society representatives, farmers, food producers and processers,

restaurant owners, bankers, environmentalists and others show that there is a need on increasing sustainable food production and consumption, minimizing waste and strengthening the overall food systems resilience through government subsidies and entrepreneurship and digital skills development, specifically for small farmers, especially women and youth [16].

As population grows, the demand for land increases; therefore, better land use management and more efficient agricultural production are needed [1][4][15]. With agriculture in Kosovo being a climate-sensitive sector (having a large share of population relying on it) and being highly dependent on irrigation (with the country having low freshwater resources), future projected temperature increases and precipitation changes (reflecting an overall decrease) will add additional challenges to food security, livelihood opportunities and economic development in Kosovo [15][32]. In this regard, there will be a greater need for agricultural yields generated using less water, energy and space on land.

3.2 Small-scale and urban agriculture in Kosovo

Kitchen gardens comprise the second largest area (11.2%) for growing vegetables after open and predominantly rural agricultural fields (83.4%) in Kosovo [19]. Vegetables most grown in kitchen gardens include tomatoes, peppers, onions, cucumbers and cabbage, and they are mainly intended for households' self-consumption.

In 2020, the area in Kosovo used for kitchen gardens (excluded from other rural agricultural lands) was 1,132 hectares, representing less than 0.3% of the total utilized agricultural area [19]. Figure 2 shows that gardens area throughout 2005–2020 has been fluctuating. Kitchen garden area drastically increased in year 2014 (almost doubling in size), followed by a similarly sharp decrease in 2015. Data for the period of 2015–2020, represent a positive 3rd order polynomial trend ($R^2 = 0.9234$), with year 2017 marking the largest area cultivated in kitchen gardens (1,199 hectares).

Years 2014 and 2017 show a more distinct increase of kitchen garden area (1,055 and 1,199 hectares, respectively), but at the same time are characterized with higher unemployment (35.3% and 30.5%), as well as urban and rural poverty rates as compared to the preceding or succeeding years as shown in Table 1. This could imply that people losing their livelihoods and spending more time at their homes may engage more with home gardening

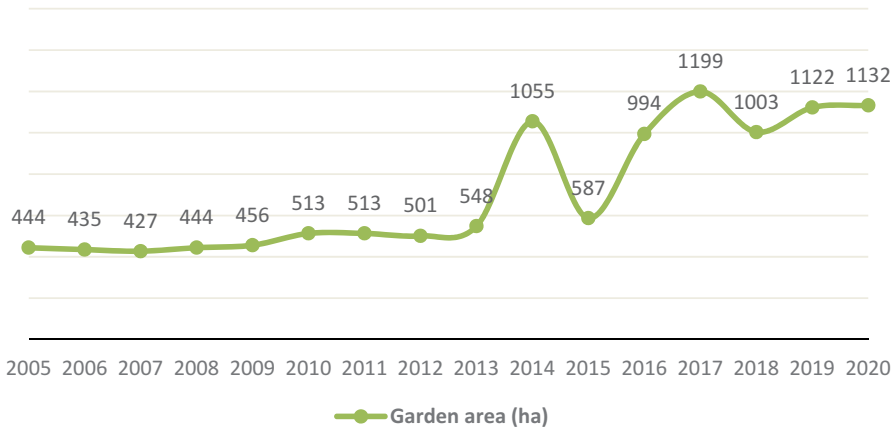

Figure 2: Kitchen garden area (ha) throughout 2005–2020, Data source: KAS, 2021.

Table 1: Kitchen garden area (ha) changes as compared to unemployment and poverty (for both urban and rural areas) rates before and after the peak years (2014 and 2017).

Year	Kitchen garden area (ha)	Population no.	Unemployment (%)	Urban poverty (%)	Rural poverty (%)|
2013	548	1,820,631	30.0	16.1	18.9
2014	***1,055***	***1,804,944***	***35.3***	***21.0***	***21.7***
2015	587	1,771,604	32.9	15.6	18.8
2016	994	1,783,531	27.5	15.0	18.0
2017	***1,199***	***1,798,506***	***30.5***	***15.9***	***19.4***
2018	1,003	1,795,666	29.6	-	-

activities. Urban poverty increase is more distinct in 2014 (21% as compared to 16.1% in 2013), whereas rural poverty in 2017 (19.4% as compared to 18% in 2016); however, due to the limited number of observations (as a result of unavailable public data or incomplete datasets), further significant statistical analysis is difficult to be made to analyse the potential urban extent of kitchen gardens.

Since official data is gathered for private home gardens only, it is assumed that community gardens are not that prevalent in Kosovo. Even though some collective initiatives for growing urban produce have already started emerging, they remain small in scale and are mainly driven by local civil society organizations [15]. One of the most known (if not the only one) and successful community gardens in Prishtina is the "Urban Garden" at the Termokiss Community Center, which serves as a place for community building and empowerment. During the COVID-19 pandemic, Termokiss provided free food for the urban poor in Prishtina, whereas additional community gardens also emerged in other cities in Kosovo (including Mitrovica) and the region (including Albania and Montenegro) [15][33].

While urban agriculture seems to have been reintroduced in Kosovo, it still does not have the required institutional support. National development strategies in Kosovo aim towards sustainable agricultural development in rural areas, with the aim of improving rural livelihoods and reducing rural-urban migration); thus, not specifically encouraging agricultural development in cities. Urban agriculture is not addressed in the Law No. 04/L-090 on Amending and Supplementing the Law No. 03/L-098 on Agriculture and Rural Development, Law No. 03/L-016 on Food, the Law No. 04/L-085 on Organic Farming, nor in the Law No. 04/L-174 on Spatial Planning (besides as a peri-urban activity). There is a lack of food policies, agricultural land lending programs, as well as subsidies for implementing community gardens in cities.

However, even though the national focus is predominately on rural agricultural development, different food systems-related stakeholders are also calling institutions for "supporting innovation in urban agriculture through dedicated funds and programmes" [16]. The need for developing urban and rural areas as a continuum, while reducing inequalities and bridging development gaps is emphasized by different stakeholders while rethinking the future of Kosovo's territorial planning [17]. While the urban population trend continues to grow, opportunities for food production in cities would contribute to increased food security and livelihoods, increased social cohesion (especially through community garden initiatives), and lower food transport-related emissions. And here, policies incentivizing small-scale

agriculture, kitchen or community gardens development could positively contribute to sustainable urban development.

3.3 Benefits of urban agriculture

The debate about the role of urban agriculture in sustainable development is still ongoing due to the lack of sufficient studies on its overall costs and benefits (especially of the social and environmental functions) [10]. With more abundant amenities in general, urban areas have plentiful and robust food options; thus, having less food insecurity issues than rural areas in general. Most of the studies acknowledge that urban agriculture supports the economic, social and environmental sustainability of cities [4][5][10][34].

Urban agriculture can provide direct (agricultural yields or lot renting) and indirect (improved urban environmental quality, human health or social integration) benefits [35]. By growing food within the city borders and shortening the food supply chains, urban agriculture provides increased food security and access for the local population [4][5][36][37]. Several cities in the developed world are growing large amounts of agricultural produce demanded for local consumption by preserving and developing their peri-urban agricultural land [4][27]. Urban agriculture has proved beneficial in tackling food insecurity in many African cities as well, by supplementing urban populations' nutritional needs and reducing food-related costs (cities in Sub-Saharan Africa), by supplying almost all the exotic vegetables consumed within cities (of Ghana), and by providing livelihood opportunities (in Yaounde, Cameroon) [10]. A study by Zezza & Tasciotti (2010) analysing urban agriculture and nutrition in 15 different developing countries around the world found that people involved in urban agriculture consume more food (by 36% in Albania, 11% in Panama and 6% in Guatemala) and have greater dietary diversity (in 12 out of 15 countries) [38].

Properly designed urban gardens can also improve the local biodiversity and microclimate due to the cooling effect, thus reducing the urban heat island effect and its impacts on human health. Community gardens, streets with edible trees, or rooftops also provide space for increased vegetation and urban tree canopy cover, which contribute to increased carbon sequestration, provision of habitat for wildlife, improved local ecosystems and air quality, as well as a reduced rift between urbanization and nature [4][5][8][39][8][35]. Areas used for urban agriculture can also mitigate storm water runoff and increase flooding management (through increased pervious surface for water retention), thus, increasing urban climate resiliency as well [36][37][39].

Community gardens also provide space for educational and community building and empowerment functions (especially of persons in vulnerable situations), which have also proved to contribute towards increased political activism and volunteerism in cities [8]. Even though difficult to quantify, studies on the social benefits of urban agriculture emphasize its potential in increased community ties, social development and cohesion, improved physical and mental health (due to increased access and exposure to green spaces), and overall well-being and public health outcomes (i.e. reduced obesity rates due to increased awareness in healthy food and diets) [4][5][8][34][39][40].

In Kosovo, rural areas have higher unemployment and poverty (and extreme poverty) rates in general; however, urban areas have higher income inequalities (Gini Index 27.8%) compared to rural ones (23.2%) [18]. Considering the income inequalities among different socio-economic groups in urban areas, the urban poor and those in vulnerable situations residing within urban areas may lack equal access to nutritious, safe, diverse, healthy, and affordable

diets [39]. However, there is a lack of data at the city level (including urban population growth trend, urban area used for agricultural development, related food systems, undernourishment rates) to better understand the Kosovo's urban population food security aspects.

4 RECOMMENDATIONS FOR MAINSTREAMING URBAN AGRICULTURE

Sustainable agricultural and food production practices have great potential in addressing hunger, poverty and other sustainability issues through the provision of affordable and nutritious food, strengthening of livelihoods, promotion of inclusive growth, revitalization of rural and urban landscapes, and improvement of environmental performance [15]. One way towards increasing food security and access in urban areas is through the practice of urban agriculture, which at the same time contributes to improved livelihoods and well-being, environmental protection, as well as climate resilience. However, it is the lack of appropriate governance mechanisms and institutional support that has made the urban agriculture sector inefficient and uncoordinated [5]. Urban agriculture in Kosovo's cities can only be sustained if integrated into national food security policies and local spatial planning documents.

Since the extent of urban agriculture is unknown in Kosovo, the first step would be for the local authorities to identify and geo-reference the overall urban area used for cultivating food, including kitchen gardens, balconies, rooftops or other parks. Obtained data could be integrated within a more comprehensive agricultural land database, which at the same time would allow for monitoring and managing related land use changes [12][26]. Furthermore, the mapping of flows in the regional and urban food system, including the flow of inputs, raw food products, processed food and waste is also crucial for understanding the complex relationships, avoiding consequences, and planning for sustainable foodscapes (the territorial dimension of food production and consumption) [27]. More robust data on urban agriculture would enable quantifying its exact impacts, costs and benefits to food security, malnourishment, environmental quality and socioeconomic development in Kosovo.

As Kosovo integrates its development and sustainability considerations in policy and technical changes, it is crucial to strengthen the rural, peri-urban and urban linkages towards ensuring food security and increased community resilience [15][17]. Following examples from other developed cities (in the United States, Canada, Australia, Japan and South Korea), Kosovo should enrich its food policies, linking them with overall health, nutrition and socioeconomic development aspects, increased local food production (including homes, schools, public buildings or other community parks in urban areas) and self-sufficiency [4][8]. Adequate agricultural development and land management policies, food production practices, and institutional and donor support can contribute to achieving Kosovo's potential for ensuring enough food supply for its current and estimated population growth [24]. Urban agriculture should be integrated within the broader sustainable urban development goals [2][4][28] through coordinated food policies (with energy, water, health, transport and waste policies), responsible (local and sustainable) consumption and production, and urban and territorial planning [6]. There is a need for increased awareness on healthy eating through educational programs in schools and kindergartens (where children learn to garden and cook harvested fruits and vegetables), campaigns regarding healthy diets, organic agriculture and reduced food waste, as well as by hosting urban farm open days and guided public tours [4][28][29].

Partnerships and collaboration among farmers, civil society, governments and restaurant owners, as well as the inclusion of vulnerable groups (especially women, youth, and non-majority communities) are essential for ensuring better food livelihoods in both rural and urban areas [16]. Local food strategies should provide means of coordination among food

producers and processors, as well as direct linkages with consumers (e.g. by selling products directly from urban farm shops or local farmer markets) [4][28][29]. Stakeholder discussions in Kosovo suggest enabling "direct selling" by small agricultural producers to local consumers, supported by digital and entrepreneurship skills development and government subsidies), which would support small farmers (especially women and youth) to keep up with their businesses [16]. Therefore, when planning the distribution of food production activities within the urban areas, it is essential to follow inclusive and participatory processes to make sure food is accessible for all (including the urban poor) and to avoid environmental gentrification [39][41].

However, competition over urban land, lack of integrated land use policies, and farmers' entrepreneurship and marketing skills are factors that may further discourage urban agriculture development in Kosovo [42]. Therefore, besides enabling urban agricultural development, additional institutional support is also crucial. Urban agriculture development can be further incentivized through agricultural land lending programs, increased subsidies (on agricultural inputs or infrastructural improvements), tax deductions, or other alternative options (such as public–private partnerships or crowdfunding platforms) [35]. In the United States, many states (including California, Louisiana, Missouri, Kansas, Utah, etc.) have passed the legislation to create Urban Agricultural Incentive Zones, which authorizes cities and counties to enter into contracts with landowners for the usage of urban land for small-scale agricultural production up to five years (in which case landowners of vacant land are taxed at a lower rate as compared to residential or commercial rate) [43]. The District of Columbia, besides encouraging the donation and cultivation of vacant lots for agricultural purposes through tax abatements, it also provides additional financial support for food growers [43].

Sustainable spatial planning approaches (such as concentrated or compact development) and related zoning rules (or growth boundaries and greenbelts) support the preservation of urban agricultural land from converting to other usages [4][14][24][12]. In this regard, urban agriculture should be integrated within the local spatial planning documents (such as Municipal Development Plans and Municipal Zoning Maps), coordinated with other development policies and ecosystem management strategies in Kosovo [15][36][37]. While peri-urban areas can serve for developing commercial agriculture (either in larger lots or in greenhouses), thus increasing livelihoods and employment, those within the city (smaller in size and dispersed) can support local microclimate and community building [4]. Potential areas for urban agriculture development may be parks and open spaces, community gardens, balconies, rooftops, or other vacant or underutilized lots (e.g. around social housing projects, schools or prisons). Due to the lack of free space in many urban areas around the world, architects have explored modular urban farming systems for building flexible mini-gardens (through plywood planters) in underutilized open spaces as well (including abandoned railways in Stockholm and airfields in Berlin) [8]. Land use permits for vacant lots within the urban areas in Kosovo should support low-intensity agricultural activities, as long as they address the potential negative impacts such as soil contamination, fertilizer use, groundwater pollution, etc. [41].

In addition, building codes should be adjusted accordingly regarding the development of green roofs and facades [41]. For example, Toronto mandated new commercial, institutional and residential developments to install green roofs (listing opportunities for local food production among the many environmental benefits) [4]. Studies from Bologna (Italy) show that if all rooftop gardens were utilized, around 77% of the residents' needs for vegetables could be met. In Amsterdam (the Netherlands), around 90% of the population could meet their

needs for vegetables, herbs and fruits if free open spaces, rooftops and underutilized private areas (inside buildings or even underground) were transformed into food productive spaces [42]. Other studies claim that by using water recycling systems and growing appropriate crops (e.g. cereal crops), rooftop gardens can use 75% less water than conventional farms, besides improving buildings energy efficiency [9].

Promotion of small-scale urban agricultural initiatives (in rooftops or underutilized land lots) in Kosovo cities can contribute towards increasing the municipal public and green space area per capita, which is currently low (11.88 m^2) compared to other developed countries (e.g. European Union 18–20 m^2), as well as maximising related benefits [44][45]. The capital city, Prishtina, for example, has around 2.9 m^2 green public space per capita, which could increase to 3.1 m^2 per capita by 2030 if undeveloped spaces (such as those in schoolyards and other green spaces and linear areas in the city) could be utilized and turned into vibrant spaces [46].

Ecosystem-based approaches and sustainable and climate-resilient design principles should be integrated, including nature-based solutions, eco-design techniques, permaculture strategies (to increase biodiversity and to build mutual support among organisms), hydroponic systems, natural drainage, permeable pavement, rainwater harvesting, and zero carbon greenhouses (to reduce community garden's environmental impact and related carbon footprint) [4][15][28][39][47][48]. Related climate risks and potential damages should also be accounted, for example, through the application of appropriate type of vegetation and crops [15]. In this regard, careful planning of food systems (and supply chains), growing local crops (resilient to respective conditions) and continuous life cycle analysis is required to avoid the associated costs and emissions [4][15][9]. The United States has developed publicly available urban agriculture toolkits, which include information on the available technical (e.g., land and water access, soil quality, site preparation, infrastructure and structures, and crop selection) and financial (e.g., grant opportunities and application procedures) resources for urban farmers [49]. Kosovo could also develop context-based guidelines on crop planning for continuous harvest or for non-traditional environments (such as rooftops or aquaponics) further support urban food growers, with careful consideration on the usage of chemical pesticides and fertilizers [50].

5 CONCLUSIONS

Agriculture is largely perceived as a rural activity around the world; however, it has never completely abandoned the city [5]. For various reasons, urban agriculture is making a comeback, and many studies around the world have prooved its benefits, as well as related costs and implementation challenges for both developed and developing countries in the world [4][5][8]. Community gardens (developed in city parks, underutilized areas, rooftops or vertical spaces) in urban areas can help increase access to affordable and nutritious food, local ecosystem, air quality and public health improvements, urban heat island effect and GHG emissions reductions, healthy eating lifestyle awareness raising and strengthened community ties and social cohesion [36][37]. As such, they have a positive impact in a country's sustainable and climate-resilient development.

Few urban agriculture initiatives have also emerged in Kosovo; however, their accurate extent is unknown due to the lack of official data. Kosovo's kitchen garden area for the period of 2005–2020 has been fluctuating, but during the last five years, it shows an increasing trend. Besides the lack of data on urban community gardens, the overall kitchen garden area is still small to make a difference. In addition, due to lack of data or limited observations for different variables (including agricultural production, GDP per capita, agricultural import,

annual household food consumption, unemployment and poverty records) no further statistical analysis could be done. To understand the exact role of small-scale urban agriculture in food security, future studies should use bigger and more complete datasets (once the data is available).

Without appropriate governance mechanisms, urban agricultural activities may develop inefficient and in uncoordinated ways [4][5]. Therefore, there is a need for increased institutional focus and support in urban areas and food security issues. Kosovo has already undertaken some efforts in developing a graduate university program in Urban Agriculture [7]; however, additional technical guidance on implementing community gardens and harvesting crops in urban conditions should also be available for the broader population [4][26][28].

Integrated land use planning with sustainable development policies, as well as the application of nature-based strategies can help optimize synergies and mitigate negative climate change impacts in urban areas, such as urban heat island effect, runoff, and flooding [39] [48]. Furthermore, consumption of local produce supports national economic growth and contributes towards reduced associated food transportation costs and GHG emissions. In this regard, Kosovo should integrate urban agriculture into its food security policies and align it with broader sustainability, health and climate resilience development strategies.

However, following the growing urban population and competition on land and resource, thorough analysis (quantifying related benefits and costs) must be done when optimizing the land allocated for agricultural purposes as compared to other city's functions [4][5]. The balance between urban and conventional agricultural production should be set depending on the local context, based on holistic assessments by scientists, economists, engineers, planners, and the citizens (especially the marginalized communities) [4]. While local food production and consumption provide additional employment opportunities (and poverty reduction) and lower food transportation related costs and GHG emissions, its smaller scale and fragmented nature lead to lower economies of scale and production inefficiencies, meaning that more land and energy would be required to achieve the same production amount [5]. In addition, there is a growing concern on the potential increase of food production-related GHG emissions if growing food in unsuitable urban environments [4][5]. For example, challenging growing conditions in rooftops due to high levels of solar radiation, strong winds, extreme temperatures, and chemical exhaust may increase the need for more energy and water consumption, as well as usage of fertilizers [4][39]. Excessive use of agro-chemicals, wastewater irrigation and soil contamination pose additional health risks from food contamination [4][5] [8]. Therefore, careful consideration should be given to the usage of energy and fertilizers when facing unfavourable environments, so they do not lead to a net increase in GHG emissions or other health issues [4][5].

While urban agriculture alone cannot solve Kosovo's food insecurity issues, it can surely alleviate it within urban areas and provide additional socioeconomic and environmental benefits; hence, it should be seen as a complementary measure for sustainable urban development.

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