Ecological Urban Agriculture from the Point of View Basic Elements of Sustainability

Terezia Posivakova ¹*, Jozef Svajlenka ², Rudolf Hromada ¹, Peter Korim ¹

¹ University of Veterinary Medicine and Pharmacy in Košice, Department of the Environment, Veterinary Legislation and Economy, Komenského 73, 041 81 Košice, Slovak Republic
² Technical University of Košice, Faculty of Civil Engineering, Department of Construction Technology and Management, Vysokoškolská 4, 042 00 Košice, Slovak Republic

*corresponding author’s e-mail: terezia.posivakova@uvlf.sk

Abstract. Population grows fastest in the world's urban and metropolitan cities, the number of inhabitants in so-called metropolitan cities and in urban and suburban zones are expanding into the surrounding natural landscape. Consequence of these changes is the gradual displacement of natural greenery and nature from cities and newly created residential satellites designed to build residential and public amenities. In recent years, is more commonly used sustainable development phenomenon which has become as a responding trend to of cities and municipalities and the implementation of so-called urban gardens intended for growing crops within the communities of the population. In view of mentioned facts the presented article focuses on ecological urban agriculture in terms of the main components of sustainability as an element contributing to the sustainable development of cities and suburban zones.

1. Introduction

In recent years, not only in the Slovak Republic there have been changes in rural areas, urban and suburban agglomerations, particularly in terms of their size and function. The gradual increase in the number of inhabitants in the so-called metropolitan cities leads to logical growth and expansion urban and suburban zones into the surrounding natural landscape. Consequence of these changes is the gradual displacement of natural greenery and nature from cities. These changes are gradually extruding out the natural greenery from cities and newly created so-called satellite homes, designed for housing and civic amenities. The absence of green or ecological landscape elements does not contribute to the sustainable development and sustainability of towns and municipalities.

Urbanization is a major driver of land cover change worldwide and affects the biophysical and socioeconomic landscape. It is estimated that by 2030 > 60% of the global population will live in urban areas Furthermore, in many parts of the world, human development is expanding rapidly at the edge of urban areas and the quality of rural habitat is declining owing to agricultural intensification.

Sustainable development by Huttmanovej [1] and Mederlyho [2] is a concept that has incorporated into many spheres of economic and social life. Many heretofore evaluated dimensions development or growth, have begun to be lately supplemented also about the sphere of sustainability. However, the
sustainability of development is relatively difficult to quantify. Therefore, it is difficult to judge the individual processes whether in society or in the context of sustainability. The aim of sustainability is not to limit the development, slow the growth or development, but is to find models of company development that will not be limiting for future generations. It is about finding a new type of healthier development that will be preserved long-term, therefore sustainable development. It was defined as a state of global equilibrium in which the population of the Earth and the capital are kept at a more or less constant level and the tendency for growth, or the decrease in these quantities, must be under close scrutiny. The trend of sustainability is confirmed by the fact that this concept has also incorporated into regulations and legislation. Act no. 17/1992 Coll. on the environment [3] defines sustainable development as a development that present and future generations the opportunity to meet their basic living needs, and does not diminish the biodiversity of nature and preserve the natural functions of ecosystems.

The concept of sustainability is not defined or unambiguously interpreted, so that both its principles and criteria are not easy to define precisely. Many of the sources published so far [4-9], after summarising, were likely to generalise aspects that most often appear in formulating the principles and criteria of sustainable construction and can be divided into three areas: an environmental, social and economic one. Responding to the trend of sustainable development of the ever-expanding cities and municipalities in recent years, is more common used phenomenon and the implementation of so-called urban gardens intended for growing crops within communities. In view of the above, the presented article focuses on ecological urban agriculture in terms of the basic components of sustainability as an element contributing to the sustainable development of cities and suburban zones.

2. Ecological urban agriculture from the point of view of the basic components of sustainability

Sustainability can be defined by three basic environmental, social and economic elements. Among the basic components of sustainability and mutual interaction is the specific philosophy of sustainability of any human activity. One of the alternatives for implementing sustainable solutions is the implementation of environmental elements within urban and suburban agglomerations. The concept of urban gardens designed for growing crops is certainly one of the green alternatives. The priority of urban gardens is to define them in certain parts of towns and villages designed for communities of citizens, in order to achieve their own efforts to care for themselves in their free time to beautify the environment in an environmentally friendly way. It is a social movement for sustainable communities, where organic growers, for sustainable urban development. From an environmental point of view, agricultural production is the basis for food production, at the current time in much larger quantities and also more intense than in past. Agricultural production is a conscious and systematic use of natural forces and resources that exploits the biological properties of certain plants and animals to provide food and other raw materials needed to satisfy the basic living needs of human. In addition to the productive role of agriculture, it is getting to the fore also the non-productive functions of agriculture, which consisting from maintaining the cultural landscape and in the care of its ecological, aesthetic, productive, residential and nowadays the more popular recreational values. At present, however, agriculture also performs outside production functions as a landscaping, settlements is also a sector providing either directly or indirectly a considerable number of jobs, so it also fulfills the social function. From socio-economic aspects, the main contribution of urban agriculture is to give people the opportunity to get their own fruits, selected crops type or herbs respectively to enrich the surroundings with floral planting or to otherwise improve the defined the environment. Ultimately, citizens themselves can actually see the whole process of growing a particular crop. In addition, such a method of cultivating and enhancing the environment provides access to the jointly grown crops, it also provides activities which self-employment is carried out, relations within the community of the population are improved, which only strengthens the perception of the sense and need of the community and the strengthening of relations to the environment [10]. The economic character is projected into other spheres of ordinary life, such as
self-satisfaction and self-realization projected into the civilian life in performing more effective performances and better mental well-being. Ultimately, urban agriculture has a significant impact on the sustainable development of the landscape.

3. Examples of urban agriculture

Within Slovakia, the number of urban gardens, is increasing over time not only for crop production, but also for growing flowers and ornamental trees to extend the defined zones and many other benefits as already mentioned. The current state of the number in Slovakia is in the range of dozens of such projects. An example of a successfully implemented philosophy of creating urban gardens for farming is the project in the capital of Bratislava entitled Water community garden. Another successful project within this city is the project Ružinov - Ostredky.

![Figure 1. Water community garden (Bratislava, Slovakia) [11].](image)

![Figure 2. Ružinov - Ostredky (Bratislava, Slovakia) [12].](image)
Within the surrounding countries, this way of introducing environmental solutions within urban areas has been very successful for years in neighbouring countries such as Germany (Fig. 3), Holland (Fig. 4), France (fig. 5) and others.

**Figure 3.** Prinzessinnengärten in Kreuzberg, Berlin - organic urban farm [13].

**Figure 4.** Kitchen gardens at Wippolder, Delft, The Netherlands [14].
Successful projects of larger urban gardens represent a project from the United States of America in Detroit (Figure 6). This project literally describes the concept of urban agriculture with all aspects of sustainability as such.

Authors Warren et al. [17] describe urban agriculture as a phenomenon of today, which is increasingly appearing in many urban settlements. The above-mentioned authors attribute to this phenomenon, in particular, the economic and social dimension, where the inhabitants involved in these projects benefit from these aspects. As other benefit for the population, shows a better availability of crops and increased sales revenues as well as the social dimension of self-realization. Author Colding [18] focused his work on the ecological dimension of land use in urban areas for agricultural purposes. The abovementioned author states that land use within urban agricultural areas contributes to biodiversity. Furthermore, the author states that it is desirable to implement more environmentally friendly solutions for urban planning and design solutions within the Agenda 21. Authors Lin et al. [19] in their research present about urban agriculture and biodiversity. These authors state that urban areas devoted to agricultural activities are largely limited. They also add that urban areas used for agricultural
purposes are in various forms, from common farms, gardens and roof gardens to edible landscaping and urban orchards. These named forms can be productive elements of places and provide important environmental services. As highly managed plant communities of urban agriculture can show a high level of biodiversity, often exceeding the level of other areas of green areas in the city. In addition many variations in vegetation coverage, diversity and structure are likely can affect not only the biodiversity in urban agriculture but also the quantity and quality of ecosystem services supported by these systems. The biodiversity services and urban ecosystems can have a major social and environmental benefit for cities, such as increased food security, air quality and water regulation. With these conclusions, our thoughts also coincide. As already have been mentioned in the implementation of urban agglomeration projects, it is possible to achieve a more sustainable and greener public space in cities and urban agglomerations.

4. Conclusion

The present article outlined principles for developing more specific, current and discussed topic in nowadays about an urban agriculture. Based on the above, the indisputable benefits of implementing urban agglomerations as a whole in terms of the sustainability of cities as a whole are indisputable. The main goal of implementing such projects is to getting more greenery to towards to the fullest extent possible and thus point out the ever-dying greenery of the cities. Such ecological activities have a direct impact on all the related sustainability components. In addition the variations in vegetation coverage, diversity and structure are likely to affect not only biodiversity in urban agriculture but also the quantity and quality of ecosystem services supported by these systems. Biodiversity and urban ecosystem services can have a major social and environmental benefit for cities, such as increased food security, air quality and water regulation.

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