

# COMMUNITY GARDENING AND URBAN PERMACULTURE DESIGN

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## Abstract

*Urban agriculture, especially intensive commercial production of fresh food reduces food miles, contributes to employment and growth of urban economy. However, intensive agriculture also suffers from numerous ecological risks related to soil, water, air, climate, biodiversity and landscape. Faced with various developments, citizens occupied with new lifestyle's trends toward healthy food and closer contact with nature seek for revival and strengthening of extensive forms of urban agriculture, such as community gardening, especially organic, based on permaculture design principles. In the paper, the authors analyzed trends in community gardening in Europe, particularly in light of their role in the application of permaculture design in the development of smart cities, as well as the possibilities of their establishment and development in the City of Belgrade.*

**Key words:** *urban agriculture, community gardens, organic farming, ecological gardening, permaculture design.*

## Introduction

Urban agriculture has an important role in sustainable urban development. Different production systems represent urban agriculture – from low input production systems in agricultural enclaves within and close to the build-up city to intensive production of fresh food products for city green markets, processing and retail chains (meat, milk, fruits, and vegetables) on large commercial farms in peri-urban area.

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The positive externalities of urban and peri-urban agriculture and its basic perspectives can generally be observed and reflected primarily through the fact that this specific kind of agriculture provides safety food, reduces food miles and increases incomes (Živanović Miljković et al., 2012). Still, intensive agriculture also suffers from numerous ecological risks related to soil, water, air, climate, biodiversity and landscape (Popović, 2009; Popović et al., 2012).

Due to various environmental crises in urban areas, citizens are occupied with new lifestyle's trends for healthy food and environment and closer contact with nature. Thereby, they seek for revival and strengthening of extensive forms of urban agriculture, such as community gardening, especially organic, based on permaculture design principles. That principles seek to enable people to become more self-reliant and to relieve social injustices and ecological degradation (Veteto and Lockyer, 2008), as well as to emphasize designing sustainable agricultural systems.

### **Community gardening – concepts and experiences**

In a broader context, **community garden** includes a plot of land subdividing in a few or up to several hundreds of subplots (allotments) assigned to individuals for non-commercial gardening (*allotment gardening*) and/or single, large piece of land gardened collectively by a group of people (*community gardening in the narrow sense*) (MacNair, 2002).

The development of the *allotment gardening* in Europe is connected with the period of urbanization and industrialization during 19<sup>th</sup> and early 20<sup>th</sup> century, and its significance related to food security became particularly evident during the first and second world war (so-called "victory gardens"). Increased interest in green economy from the 1970s revived demand for allotment gardens which have turned into recreational areas with a number of important environmental, economic and social advantages, although improved access to fresh, healthy (and culturally appropriate) foods should not be neglected, especially for vulnerable social groups (immigrants, unemployed, single parent families, etc.). Individual gardeners are usually organized in a non-profit allotment association interacting with related allotment associations on municipal, regional, national and international levels. The association leases the land, provided with basic infrastructure, by public or private owners, and takes over the administration of the allotment garden by elected board and/or appointed officials.

The gardeners participate in the adoption of common rights and duties by-laws and have to pay small (below market price) rent and membership fee to the association. According to UK Allotments Act (1950) local authorities are required to maintain an adequate provision of land to be subdivided into allotments for individual residents at such rent "as a tenant may reasonably be expected to pay", and the Resolution of the 32<sup>nd</sup> congress of the Office International du Coin de Terre et des Jardins Familiaux – the most important representative of national allotment and leisure garden federations at European level (Lausanne, 2000) – at a "socially acceptable rent". In this regard, financial support to allotment garden movement is essential, and has to be legally regulated and guaranteed (Office International, 2000a).

Allotments tend to be clustered around the built-up area and, due to their accessibility both in terms of location and in terms of rent; there is usually a long waiting list for membership (*Figure 1*).

**Figure 1.** *A typical German allotment scheme*



**Source:** *Bundesverband der Gartenfreunde e.V., (2000) in Drescher, (2001).*

The *community gardening in the narrow sense* is recent phenomenon in comparing with allotment gardening. It relates to collectively cultivating a plot of land by a group of people. Such gardens are usually found on derelict or vacant municipal land or abandoned land of private owners in

a build-up area, and managed by local community members, usually organized in non-profit organization<sup>2</sup>, and wholly or partially budgetary supported. One of the best known projects of this kind is *Princess gardens* (2009), at Moritzplatz in multiethnic Kreuzberg district in Berlin, which has been described as "a kind of miniature utopia, a place where a new style of urban living can emerge, where people can work together, relax, communicate and enjoy locally produced vegetables"<sup>3</sup> (*Figure 2*).

**Figure 2.** *Princess garden at Moritzplatz in Berlin Kreuzberg*



Source: <http://prinzessinnengarten.net/about/>

The non-profit company *Nomadic Green* has leased a site in Berlin/ Kreuzberg and has managed it. The garden is open to the public and provides a space for people to work in the garden, receiving as compensation the possibility to buy organic vegetables and herbs at lower prices than in the local markets, visit the restaurant and enjoy community dinner, based on ingredients from the garden. Everything is grown organically, on transportable vegetable plots, gardeners bring the seeds from trips to their home countries, make their own compost, while bee colonies, situated in the garden, take care of pollination. The *Princess garden*, with its numerous projects and workshops, could become a 'take-away food' model for the cities of the future (Mizani, 2011).

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<sup>2</sup> There is also community gardens managed by other non-profit organization such as churches or other private landowners as well as by city parks departments, schools or universities.

<sup>3</sup> <http://prinzessinnengarten.net/about/>

## Organic and ecological community gardening

The requirements for conversion to organic production of vegetables, fruits, flowers and herbs within urban agriculture, including community gardens, strengthen throughout Europe. Organic production can be a significant source of income for vulnerable social groups and growing number of newcomers in the suburban areas (Filipović et al., 2013).

An interesting concept of **organic farming** on the allotments, known as *Selbsternte* (self-harvest) is established in Vienna 1987 and further developed during 1990s and in the early 2000s<sup>4</sup> not only as a concept but also as a trademark for a consultancy office, which provides *Selbsternte* trade label and technical assistance to farmers involved in the project.

The concept of *Selbsternte* is based on the following: participating organic farmers prepare a parcel of arable land, owned or rented by a third party (tillage, fertilization and fencing and irrigation infrastructure) and sow or plant rows with 18-23 species. In the mid-May, the plot is divided into subplots of 20-80 m<sup>2</sup> that contain 2-6 m of every sown species, and then rented to self-harvesters for one vegetation period. Self-harvesters may plant additional species, respecting the already implemented production system. The rent depends of the subplot size and of the additional management offered by the farmer (irrigation, weeding, winter storage of harvested products, etc.). Farmers pay a license fee to *Selbsternte* Company for using trade label and consulting services.

The concept allows improved interaction between organic farmers and consumers, but its main significance lies in the fact that these subplots can be considered as *small experimental stations where self-harvesters merge traditional horticultural techniques with urban ideas of permaculture, sustainable land use and participatory farming, contributing to the improvement of urban agriculture and organic farming* (Vogl et al., 2004).

The Office International du Coin de Terre et des Jardins Familiaux promotes **ecological gardening**. According to Cushing and Brown

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<sup>4</sup> In 2002 there are 15 *Selbsternte* plots in Vienna and neighboring cities with 861 subplots of a total area of 68,740 m<sup>2</sup> managed by 12 organic farmers and 861 registered self-harvesters. The University of Kassel-Witzenhausen and city authorities of Munich, Germany also started the concept (Vogl et al., 2004).

(2005), ecological gardening goes beyond organics into a deeper ecology of gardening to understanding *the big environmental picture that our small gardens are a part of, and gardening in a way that maximizes the garden's positive contribution to the well-being of that wider environment. It means seeing our garden as a piece of the global landscape that interacts constantly with the ecology both within and beyond our fence lines.*

The question of how to transform a garden into a perfectly balanced ecosystem (including plant choices, climate, water, soil types, insects, soil biota, etc.), enters into the domain of **permaculture design** of which will be discussed in more detail in one of the later sections.

### **Community gardening – benefits and challenges**

According to Vienna survey (Vogl et al., 2004) the self-harvesters were between 30 and 50 years old, have a family and high education level. Most of them helped in the home garden or on the farm of their parents or grandparents at some period of their lives. Some other analysis from Germany and Canada point the rising share of elderly people and immigrants in community gardens (Drescher, 2001, Wakefield et al., 2007). Other vulnerable social groups such as unemployed, single parents and disabled also have benefits of gardening engagement.

The main **benefits** of community gardening (Office International du Coin de Terre, 2000 and 2000a; Vogl et al., 2004; Wakefield et al., 2007) can be summarizing as follows:

- **Health benefits**
- *Improved nutrition* – the community gardens enable better access to fresh and culturally appropriated food to gardener families. These vegetables and fruit are usually organic, tasty, harvested at the good moment and not transported over long distances and made ripened artificially.
- *Improved physical and mental health* – the gardening help keep people, especially elderly people, physically and mentally active while provide relaxation to employed people after everyday business. Gardeners are more balanced and content, learn patience and have an improved sense of well-being.
- **Economic benefits**

- *Reduction of household food costs* – substituting store-bought food with garden grown products in the most cases means significant cost saving, especially for organically produced fruit and vegetables. This is of great importance for the low-income families, immigrants and unemployed.
- *Contribution to sustainable urban food security system* – although community gardening is no substitute for social programs for urban poor, it can significantly contribute to their food security.
- *Increased demand for inputs* – garden tools, seeds, and other production inputs may contribute to the growth of this production and trade sectors.
- ***Ecological benefits***
  - *Soil and water protection* - sustainable, ecological gardening, based on organic and permaculture production techniques (crop rotation, mulching, composting, natural plant protection, etc.) improves soil fertility and protects groundwater.
  - *Biodiversity preservation and improvement* - growing rare and local species and old varieties of fruit, vegetables and herbs as well as using biological pest control in the production process gardeners contribute to preservation and improvement of agro- and total biodiversity in urban areas<sup>5</sup>.
  - *Reduced food miles* - contribute to reducing traffic costs and fuel consumption and improve urban climate.
  - *Green infrastructure maintenance* - the gardeners care community gardens as part of urban green belts enabling the authorities to care for other green spaces.
- ***Social benefits***
  - *Exchange of experiences, education and training* - gardens are meeting places for people of different generations, culture, skills and social backgrounds, improving tolerance, solidarity and community cohesion. The garden management organizations give special attention to children animation and education.
  - *Community mobilization* - gardening often serves as a starting point for broader discussion and mobilization for other important community issues.

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<sup>5</sup> According to Naturschutzbund Deutschland (NABU), in 2011 as the year of the common redbird, the highest population density of this bird species, frequently used by scientists as a parameter to determine the official sustainability indicator for biodiversity, was determined in allotment gardens with 2.2 pairs per ten hectares (Office International, 2011).

➤ **Scientific benefits**

- *Experimental work and outcomes* - as it mentioned earlier, small-scale gardening enables experiments (new species and varieties, pest repellent, mixed cropping, sowing dates, etc.) with the outcomes that potentially can contribute to the improvement of sustainable and climate-smart agriculture in general.

Low technical skills, contamination of soil and air and poor infrastructure are **constraining factors** for the engagement in community gardening. Public support of garden associations to financing advisory services, soil quality analysis and infrastructure facilities are necessary. However, land competition i.e. access to land for renting and security of land tenure remains a **major challenge** for existence and development of community gardening. As Groening (1996) noted, where municipalities had no strategy for the acquisition of municipal real estate, conflicts with allotment associations tended to become harsh, and sometimes lead to organized political protest<sup>6</sup>.

In the Resolution (2000), the International Office call for protection of existing allotment garden sites throughout Europe, including allocation of land for future needs, by their integration in the town planning schemes or by other legal acts, regardless of their size<sup>7</sup>.

Poor access to officially designated allotments may leads to unregulated production of unsafe food on abandoned land, contaminated by past uses. Urban planners and local authorities have a decisive role in avoiding such consequences by identifying zones for community gardening and related infrastructure building (irrigation facilities, etc.) and by protecting tenure rights on such land.

In order to meet new challenges related to sustainable urban design, urban planners are increasingly turning to a holistic approach such as *permaculture*. Community gardens are an important element of the urban permaculture design.

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<sup>6</sup> Kishler (2012) points out to a valuable democratic potentials of community gardening, connects them to the Occupy movement and advocates their role as one of the most powerful responses to developing sane and well-balanced societies.

<sup>7</sup> Land used for allotment gardens in Berlin has been reduced by almost 50% after the World War II due to favoring of the city development and despite the fact that these areas are defined by and integrated into urban planning (Drescher, 2001).



## Urban permaculture design

**Permaculture** is a holistic approach to landscape planning and human culture that conceptualizes prodigious wisdom with modern technology (Kvarda and Mihatsch, 2012).

Starting with ethic and design principles focused on land and nature stewardships, the concept of *permanent agriculture* evolved into wider, more radical concept of *permanent culture* that means the overall cultural shift to sustainable and decent human life. This implies significant changes in the way the people provide not only food but also housing, transportation, energy, economic gains, social connections, education and health and spiritual wellbeing (*Figure 3*).

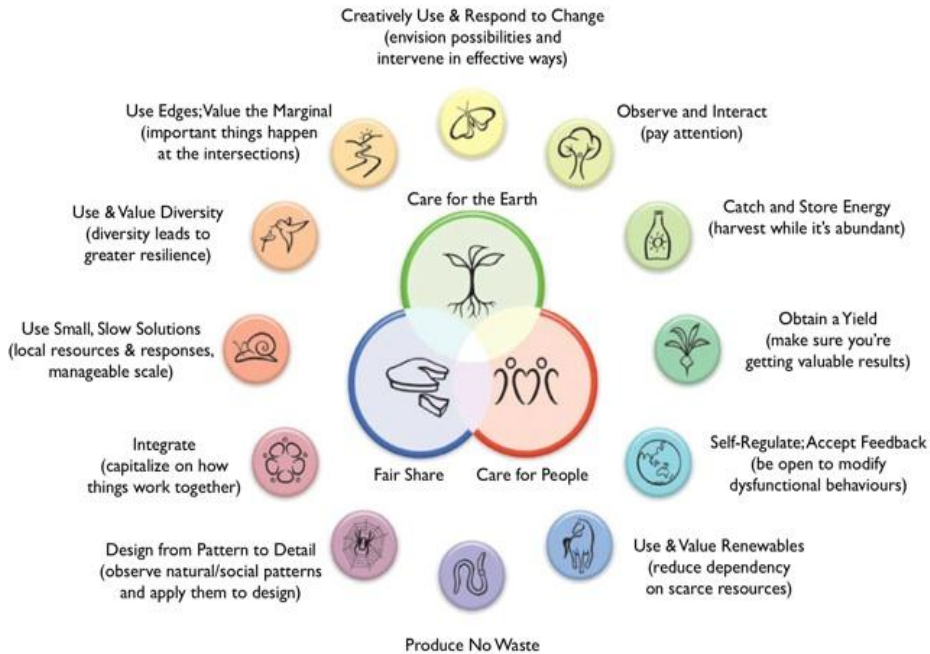
**Figure 3.** *Permaculture flower*



**Source:** Holmgren, (2002).

According to Holmgren (2002), three foundational ethical principles – *Earth Care*, *People Care* and *Fair Shares* – guide the appropriate use of the following key permaculture design principles (*Figure 4*).

**Figure 4.** *Permaculture ethical and design principles*



**Source:** <http://manifoldinc.com/permaculture/>

Above-mentioned principles are universal, but strategies and methods of their application in practice are site-specific, adjusted to local resource, skills and tradition, and specific outcomes projected from the each individual permaculture system/place, ranging from balconies and urban yards to farms, eco-ethno villages and beyond.

**Urban permaculture design** implies any form of design that minimizes resource depletion, preserves water cycles and protects soil, establishes community gardens, and fosters urban metabolism (Kvarda and Mihatsch, 2012).

As we noted earlier, **community gardening**, including vertical house greening, roof gardens, etc., has significant role in modern city planning, especially for city quarters greening. Environmental benefits and social inclusion as the main results of citizens' engagement in this form of multifunctional land use make important contributions to environmental aspect of *smart cities* concept<sup>8</sup>.

<sup>8</sup> A Smart City is a city well performing in a forward-looking way in the following six characteristics: smart economy, smart people, smart governance, smart mobility, smart

The permaculture design project for emerging Seestadt Aspern (*Aspern Urban Lakeside*) city quarter in Vienna's 22<sup>nd</sup> municipal district for approximately 20,000 inhabitants is very instructive (*Figure 5*).

**Figure 5.** *Seestadt Aspern Master Plan - Overall Urbanistic Structure*



**Source:** *Vienna City Administration. District Planning and Land Use. Aspern Airfield Master Plan, 2008.*

The main intention of Seestadt Aspern Permaculture Design Course<sup>9</sup> was to create a sustainable system of small thematic community gardens based on permaculture design principles, with mixture of forest trees, vegetable, fruit, spice and herbs (*Figure 6*).

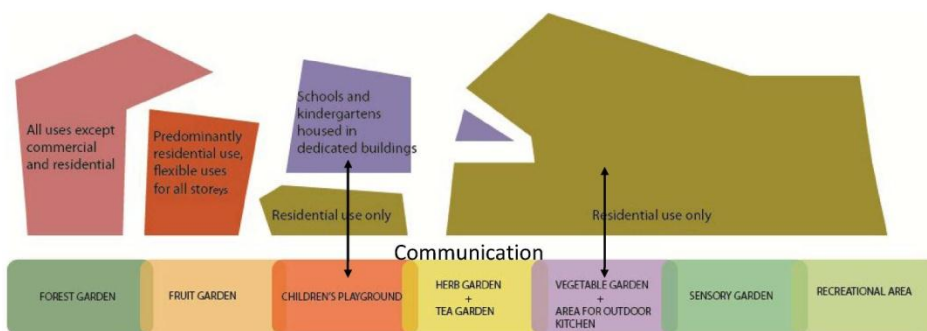
Together with the nearby recreational areas, particularly children's playgrounds, these gardens will form functional green infrastructure connected to the nearby agricultural region of the Marchfeld.

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environment and smart living, and these characteristics are built on the "smart" combination of endowments and activities of self-decisive, independent and aware citizens (Giffinger et al., 2007).

<sup>9</sup> Socrates Erasmus Intensive programme for a Permaculture Design Course, organized in the Seestadt Aspern in Vienna (2012) by the Institute of Soil Science at BOKU in cooperation with the Academia Danubiana and participation of students from the Danube and Western European countries, including Serbia, representatives from the City municipality of Vienna and other local stakeholders (Academia Danubiana, 2012).

**Figure 6.** *Seestadt Aspern thematic gardens' zone area*



**Source:** *Milošević-Štukl et al., 2012.*

### **Community gardening in the City of Belgrade – Possibilities and Experiences –**

The home gardens in Belgrade have a long tradition. Fruit trees of traditional varieties and carefully cherished garden beds of vegetables, spice and aromatic herbs and flowers, for centuries represented an inevitable subject of family home backyards of old Belgrade<sup>10</sup>. Mass apartment construction in the period of socialism not favored existing of gardens in scope of the block settlements, so preferences for growing the vegetables and flowers the wealthy citizens could satisfy in the backyards of their weekend houses, which were built in ecological oasis in the peri-urban area. Crisis 1990s was reflected on Belgrade home gardens in two ways. On the one hand, precious green oasis, backyards and home gardens, along with family houses, disappeared under the wave of illegal and uncontrolled apartment building construction. On the other side, people faced with lack of money, illegally occupied area of urban construction land that were not put to use, and transformed it into small allotments, where they grow basic vegetables without soil quality control and basic infrastructure requirements. The obtained products of suspicious quality and safety often were placed on improvised street stalls nearby.

After difficult years of the crisis, the comprehension about the benefits of engaging in the establishment and cherishing of own little oasis of health,

<sup>10</sup> Master plan of Belgrade 2021 (Official Gazette of the City of Belgrade, No. 27/2003, 25/2005, 63/2009) especially stressed the importance of home gardens in blocks of individual housing formed in the city central zone and the need to valorize these areas by making specific decision for their protection by the city government.

peace, recreation, socializing and enjoying the flavors and aromas of fresh fruit, vegetables, medicinal and spice herbs and flowers had been remained<sup>11</sup>. Today, almost 15 years later, planted vegetables in some housing blocks of New Belgrade and on several other locations in the city (Blok 45, Veliko ratno ostrvo, Žarkovo...) still can be seen<sup>12</sup>.

The priorities have changed over time. Socio-economic reasons are still actual for the certain categories of the population, but among the stakeholders there are the young and educated, employed people, which are willing to devote their spare time to provide healthy food and habits to their family and children, spending time with nature and neighbors in a productive and creative way. In order to provide adequate infrastructure and safety of investments in the community gardening, it is essential to regulate the issue of land tenure. This is no easy task, regarding the strong land competition and the numerous unresolved land tenure issues in the City of Belgrade (Tomić et al., 2009; Popović and Živanović Miljković, 2013). Community gardens are not legally regulated. The Master Plan of Belgrade 2021, in the section on the concept of agricultural development, prescribes a "program for the establishment of allotment gardens, divided into small plots for several years' use by individuals in scope of the agricultural and rural enclaves around the city center and the other predominantly residential areas". In accordance with rational and appropriate use of agricultural land, the Strategy of Agricultural Development of the City of Belgrade (2009) pleads for leasing free of charge the small plots owned by the state to "small and low-income family farms"<sup>13</sup>. The results on operationalization and implementation of these commitments have not been registered so far<sup>14</sup>.

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<sup>11</sup> See more in Cvijanović et al. (2005) and Popović and Savić (2008) about the natural and infrastructural conditions and experiences in the organization of labor-intensive production of spices, medical and aromatic herbs and flowers in small holdings, and their implications to unemployment reduction and social inclusion.

<sup>12</sup> It is estimated that the illegal allotment gardens cover an area of about 100 hectares and usually are handled by retirees for health and economic reasons (Vrbavac, 2013; Eko Kuće, 2013).

<sup>13</sup> Which should involve all interested citizens in the context of community gardening.

<sup>14</sup> According to Aleksandra Tilinger from the Urban Institute of Belgrade "the City does not have answers to the questions of how, where and what the garden does it needs". It is necessary to determine needs for the land, to define the criteria, to conduct the spatial analysis in terms of planning documents and ownership status, to define the ways of funding and informing the citizens. The initiative could come from interested citizens associations and institutions, such as schools, hospitals and social institutions, (Eko Kuće, 2013).

Having in mind above-mentioned European experiences, the available land, natural conditions and structure of the potential participants in the programmes for community gardens of the city of Belgrade, for discussion and further development we suggest organizational models of community gardens with following prevailing benefits:

a) *Community gardens on squares, devastated urban pockets and public green areas in the build-up city, as well as on the properties of schools, kindergartens, student camps and churches.*

Community garden in this sense would imply a plot (fixed or transportable) of land with fruit, vegetable, spices, herbs and flowers cultivated collectively by a group of people, with the active involvement of scientific institutions and advisory services in workshops devoted to the organic farming and permaculture design<sup>15</sup>. Exchange of experiences, education and training and landscape improvement will be the main benefits of this garden type.

b) *Community / allotment gardens in housing blocks of close type (community gardens) and housing blocks of open type (community and/or allotment gardens).*

A range of small thematic gardens on the inner housing block/ city quarter or on its edges will be realized as a part of wider multidisciplinary permaculture design project of living in the related housing block, with dominant health-recreative, ecological (biodiversity improvement, green infrastructure) and social benefits (community cohesion and mobilization).

c) *Allotment gardens clustered around the built-up area, available to the interested citizens, as well as in social housing settlements and in social protection institutions.*

Allotment gardens in this case has primarily health and economical-social functions – the improvement of food, health and family budget for the poor and marginal social groups.

At the end of September 2013, WWOOF Serbia and Belgrade flower festival<sup>16</sup> opened the debate on the future of community gardens in Belgrade with representatives of the city government (Secretariat for Environmental

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<sup>15</sup> Those gardens have special importance for the children in pre-school and primary school age, which learn about the concepts of healthy food, caring for nature and quality of life improvement by common action in the local community (see the results of two-decade lasting project "Children bio-gardens" managed by retired professor Branka Lazić, PhD, Faculty of Agriculture, Novi Sad (Mitrović, 2011).

<sup>16</sup> Those two organizations are the founders of the first community garden in Belgrade, an area of 6 hectares, divided into 12 parcels of 50 m<sup>2</sup> in which organic vegetable production occurs, based on the principles of permaculture (project "Baštalište" in Slanci settlement started in the season 2012/13).

Protection of the City of Belgrade) and the Urban Institute of Belgrade. On this occasion it was emphasized the need to *develop a strategy of development of sustainable community gardens, the institutionalization of developing models and their operationalization through the system of urban planning.*

## **Conclusions**

Numerous positive and promising experiences, both theoretical and applied, could give an input for developing community gardens based on permaculture design concept. Multifunctional land use in permaculture manner provides many environmental benefits, social inclusion and economy benefits. In the City of Belgrade land competition is the major challenge for existing and development of community gardening. Thereby, urban planning documents have a decisive role in *avoiding spatial conflicts* by *integrating* community gardening issues into plans and *regulating* land tenure rights as well as by *initiating* the guidelines for defining the criteria for estimating the real citizens' needs for existing such land inside the City, which are undoubtedly great.

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