

LAND USE PLANNING FOR SUSTAINABLE DEVELOPMENT OF PERI-URBAN ZONES

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Taking into consideration that growth of urban population has impacts on land use and that managing urban population change is one of the most important contemporary challenges, this paper deals with the sustainable development of peri-urban zones which represent important an environment where employment opportunities are developed and resources exploited (particularly agricultural resources) and environment where important recreational and leisure activities could be pursued. Within the review of current concepts and planning practices, the concepts of multifunctional agriculture and multifunctional landscapes in peri-urban zones are pointed out, as well as EU Developing Periurban Projects. The paper particularly focuses on the current situation in Serbia, where there is no specific legal basis for the planning of peri-urban areas, although there are positive examples of strategies, regulations and planning documents which treat agriculture and greenery in peri-urban zones in a sustainable manner.

Key words: *peri-urban zones, land use planning, sustainable development, multifunctional agriculture, multifunctional landscape.*

INTRODUCTION

In just one decade, from 1990 to 2000, at least 2.8% of the land in Europe changed its use, including a significant increase in urban areas, with large differences between regions – from 0.3% to 10% (EEA, 2006). Statistics show that agricultural land (arable and permanent crops, pasture and mosaics) in 2006 covered about 42% of Europe, while 35% of land is under forests, and 4% is urban land (EEA, 2010). Urban sprawl is the main drive of change and urban areas have increased at the expense of agricultural land, mostly arable. These changes, i.e. urbanization, should be primarily understood as a process of expansion of the urban way of life in agricultural areas, but not only as physical growth of cities.

At a certain stage of development, a part of the city's function will transfer to the environment, but in most cases it means occupation of the land

with the highest quality, agricultural land. In many cases, urbanization has had dramatic effects on peri-urban zones (fringes or areas)²; above all, it initially leads to resource degradation in peri-urban zones due to increased pressure on land resources in terms of destruction of biotopes, fragmentation of ecosystems, consequently diminishing the open space.

The importance of land use planning and land use management as particular tools for sustainable land use in peri-urban zones has to be a strategic issue. Land use planning, as one of the mechanisms that have impact on the reduction of pressure on land resources, is one of the key components of sustainable land management. In accordance with that, this paper will pay special attention to basic natural and production resources in peri-urban areas – agricultural land,

and through some examples of these zones, planning in domestic practice will be emphasized.

PERI-URBAN ZONES – DETERMINATION AND CONCEPTS

Peri-urban zones increasingly occupy the attention of contemporary urban-geographic research and current documents and projects concerning this issue. Some of the concepts originally coined to describe the rural-urban interface in North America or in Europe, as the *peri-urban* concept itself or the more widely used in English literature *urban fringe*, are still in use in the Third World analyses, whereas in the former areas the debate has shifted to the *edge-cities* or *post-suburban landscapes* imagery (Adell, 1999).

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² All of these terms which are, in fact, related to the same phenomenon, can be found in literature. For the sake of easier distinction, the term "peri-urban zone" will be mainly used by the authors in this paper.

The first attempts to achieve conceptual precision in the peri-urban phenomenon was morphological and functional approach to the *urban fringe*, based on the analysis of features such as density, morphology and land uses changing (ibid). Still, mostly rural geographers argued that the transitional landscapes between city and countryside were not necessarily the result of urban driven processes, thus coining terms as *rurban* or *ruralurban*. Following English urban geographer Thomas (Thomas (1978) according to Matijevic, 2005), who analyzed terminological and conceptual determination of a rural-urban zone, various terms were distinguished in geographic literature: *limited fringe* and *extended fringe*, *rural non-farm*, *urban fringe*, *suburbs*, *suburban fringe zone*, *outlying adjacent zone*, *pseudo-suburbs*, *satellites* and *pseudo-satellites*, and *inner* and *outer urban fringe areas*³ and lately *peri-urban interface* (Tacoli, 2003; Allen 2003; etc.).

From the 1970s in particular, considerable research was undertaken in this zone, focusing on the patterns of change in the context of the then dominant conceptual framework, that of the central city and built-up area, the rural-urban fringe, the outer fringe and the urban shadow. Such research became very popular in Canada, for instance, during and after the 1970s when it was recognized that this zone was a central part of the structure and functioning of urban and metropolitan regional systems (Bryant and Charvet, 2003).

In domestic geographical literature, a division into three zones of spatial transition of rural-urban (peri-urban area respectively) can be encountered, different in intensity of the influence of urbanization on rural areas and in the conflicts between the urban and rural life. These are: the *inner zone* closest to the city center, which suffers the most intense urban-oriented transformation; the *outer ring* – basically, this is a rural area that includes urban elements; and *urban shadow* – the area behind the outer ring, in which the presence of urban elements is still sporadic, primarily in the form of commuting to the city.

However, these zones represented and still represent important extensions of the living space of major urban and metropolitan systems – as living environments, as environments with different functions in which (Bryant and Charvet, 2003):

- Employment opportunities were developed and resources exploited (particularly agricultural resources);

Table 1. Determinations and characteristics of peri-urban zones

<ul style="list-style-type: none"> • Peri-urban zones are fringe zones around cities where new urban land uses and activities are being imposed on a rural landscape; they are <i>impermanent</i> – in that as cities grow, their peri-urban areas move outwards; • The peri-urban zone is the area between an urban settlement and their rural hinterland. Larger peri-urban zones can include towns and villages within an urban agglomeration. Such areas are often <i>fast changing</i>, with complex patterns of land use and landscape, fragmented between local or regional boundaries; • Peri-urban zones are transition or interaction zones, where urban and rural activities are <i>juxtaposed</i>, and landscape features are subject to rapid modifications, inducing by human activities; • Peri-urban zones are critical zones of land cover change, leading to transformations often <i>neglected</i> by both rural and urban administrations; • The peri-urban zone constitutes an “uneasy” phenomenon, usually characterized by either the loss of “rural” aspects (loss of fertile soil, agricultural land, natural landscape, etc.) or the lack of “urban” attributes (low density, lack of accessibility, lack of services and infrastructure, etc.); • The peri-urban zone is not only a zone of direct impact experiencing the immediate impacts of land demands from urban growth and pollution, but is also a wider <i>market-related zone</i> of influence that is recognizable in terms of the handling of agricultural and natural resource products; • Peri-urban zones include prime agricultural lands, valuable protected areas, forested hills, preserved woodlands and important wetlands, and can provide essential <i>life support services</i> for urban residents; • They are generally places of rapid <i>ecosystem change</i>, sometimes deliberate and sometimes spontaneous, although they may contain relicts of old rural ecosystems and some protected natural areas; They are often far more <i>environmentally unstable</i> than either urban or rural settings.

(after: Allen, 2003; McGranahan et al. 2004; Fang et al., 2005.; Douglas, 2006; Simon et al., 2006.; Douglas, 2008; Priorr et al.(eds), 2011).

- Important recreational and leisure activities could be pursued and provided; and

- As environments destined to receive many important infrastructural developments (e.g. transportation infrastructure), or local important industry, particularly in the processing of agricultural products (food industry) etc.

Today, a premise for any kind of development is sustainability. Therefore, this is also the main course for peri-urban zones development. In Table 1, as a result of literature review, the most commonly used current *determinations* and *characteristics* of peri-urban zones are outlined.

Anyhow, each of these definitions is related to city influences on the surrounding area and spatial changes which characterize each city. However, the fact is that in these areas there are numerous conflicts, primarily related to the land use.

Within the new approaches to researching the development of peri-urban areas, one project stands out – **PLUREL (Peri-urban Land Use Relationships)**, a large research project developed during 2007–2011 within the 6th Research Framework Programme of the European Union, which gathered 31 partner organisations from 14 European countries and China.

PLUREL’s main subject of study is the Rural-Urban Region (RUR). This is based on the concept of a Functional Urban Region – an urban core and its surrounding commuting ring – which can extend to include both the rural and peri-urban regions. The RUR, however, extends beyond today’s rings of intense interaction with the core city and includes areas of recreational use, food supply and nature reserve functions in predominantly rural areas (Figure 1).

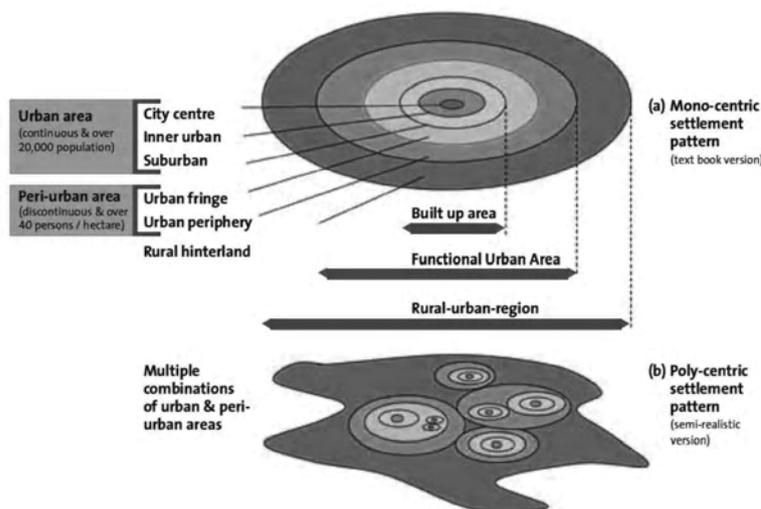


Figure 1. Peri-urban areas and the 'rural-urban region' – Geographic concepts and definitions as used in the PLUREL project. (Source: Priorr et al., 2011. Source: Loibl et al., 2011:25)

³ See more in Thomas (1978) (according to Matijevic, 2005).

Though most land designated for agricultural use is located in rural areas, the functions of agriculture have to be seen as a complex exchange between urban and rural regions (Figure 2).

There are regions in Denmark, north-western Germany, the Netherlands and Belgium where the land is mainly used for agriculture while also containing an above average share of peri-urban areas. This is also the case in large parts of Poland, the Atlantic coast of France, eastern Italy, parts of Hungary and the south of the United Kingdom. Some are run in a highly intensive manner, often with horticultural production and high economic productivity (e.g. the Netherlands, Denmark, Spanish and French Mediterranean coast, as well as northern and southern Italy). Other regions have a traditionally strong crop or grassland production.

The final recommendations of the PLUREL project stated, among others, “the need for strong government in the shape of legislation and an efficient spatial planning system” and outlined the importance of the green infrastructure and forestry and agriculture within future development in the urbanised city.

LAND USE PLANNING OF PERI-URBAN ZONES – THE ROLE OF MULTIFUNCTIONAL AGRICULTURE AND MULTIFUNCTIONAL LANDSCAPE

Due to its significant economic, environmental and social impacts, the issue of peri-urban zones, the peri-urban agriculture development (as an activity that implies a number of interaction in these areas) and landscape planning are the subject of discussions in many European forums and documents. However, the majority of these documents generally provide constataions regarding the situation in these areas and some recommendations⁴.

In order to preserve the peri-urban agricultural zones from the city’s constant need for land (for urban growth, industrial and territorial development and infrastructure), some guidelines should be followed: a) applying the instruments for land use and land tenure in peri-urban zones (which will be a result of the instruments of regional and urban planning in the European Union, at national and regional levels); b) reinforcing the principle of subsidiarity (the responsibility of local authorities) at the municipal level planning; c) introducing an obligatory study

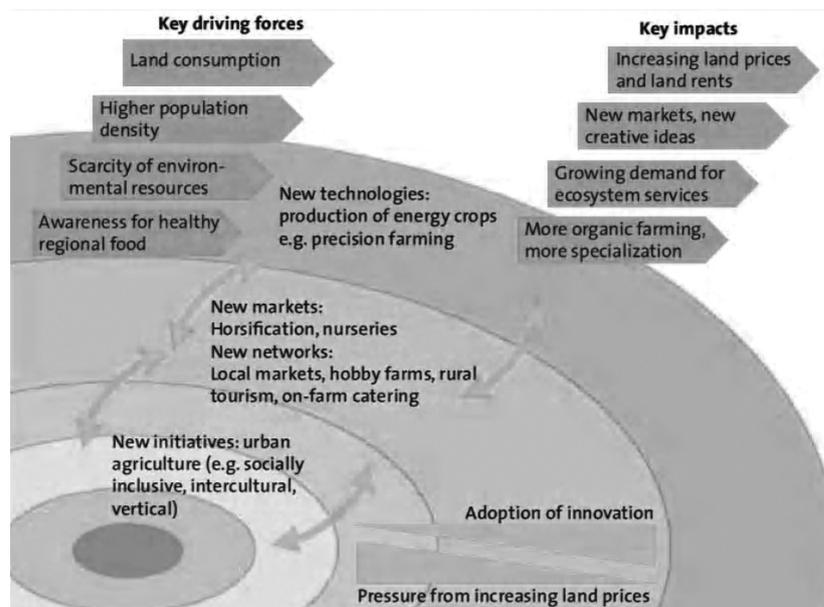


Figure 2. Spatial dynamics of agriculture in peri-urban zones
Source: Priorr, 2011:65.

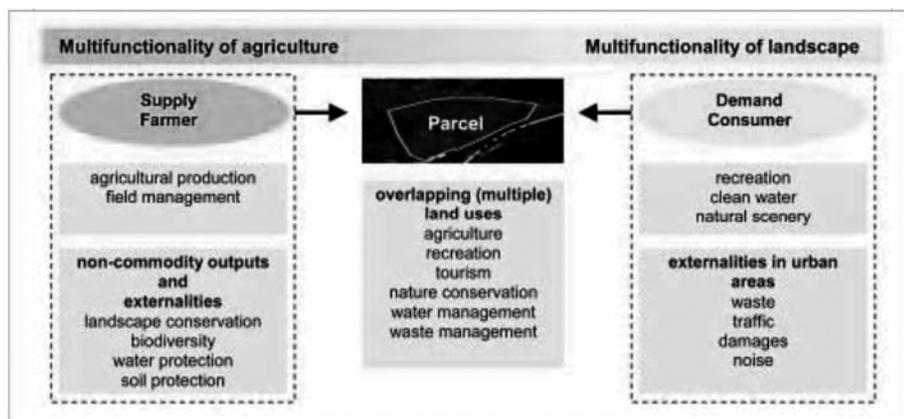


Figure 3. Relationship between multifunctionality of agriculture and landscape
Source: Silber and Wytzens, 2006:29

on the agricultural impact, which will consider all the planned land use changes in peri-urban zones (EESC, 2004).

Although international conventions, declarations and resolutions addressing problems of peri-urban areas are not binding in terms of adoption, in both the developed and developing countries researchers and planners are increasingly focusing on the role of agriculture in those areas. The positive effects of urban and peri-urban agriculture and its basic perspectives can generally be observed and reflected primarily through the facts that this specific kind of agriculture provides safety and quality food, increases incomes and preserves natural resources and environment.

EU documents define agriculture as a multifunctional, which aims to accomplish the sustainable development in providing food and other “non-market” functions, such as rural

development, high living standard and environmental protection. In recent years, multifunctional agriculture, multifunctional landscape and multifunctional land use have been a common subject of scientific research⁵. In most cases, researchers were focusing on developing strategies concerning the preservation of multifunctional urban agriculture and diversification activities on multifunctional farms, but less on the impacts of multifunctional use of agricultural land (Živanović Miljković et al., 2012).

A study conducted for the Linz/Urfahr region in Upper Austria supports the idea of multifunctionality of agriculture in intensively used urban regions. It is considered that agriculture is one of multifunctional landscapes (Silber and Wytzens, 2006). Figure 3 shows that the spatial unit of an agricultural parcel is the link between

⁴ Sustainable Agriculture and Rural Development (SARD); European Economic and Social Committee (EESC); International Council on Agriculture, Science and Technology (CAST)

⁵ See more in: Silber and Wytzens (2006); Van Huylenbroeck et al. (2007); Wilson (2009), etc.

the supply of multifunctional agriculture and social demands for multiple uses of the farms.

The study conducted in Belgium starts from the fact that the agricultural sector is becoming increasingly faced with the pressures of population, environmental policies or spatial planning, but still farming in peri-urban areas undoubtedly has a role in preserving the landscape, improving local socio-economic quality of life, filling the ecological function and so on. In order to maintain this role, it is necessary that "urban areas in agriculture be sustainable" (SPSD II, 2005). This research on the example of Brussels showed that agriculture in peri-urban zones is faced with numerous difficulties (more than it is the case with 'rural' agriculture), which makes the sustainability of these farms vulnerable, so farmers have to deal with the opportunities and threats brought about by the city.

There is a special situation in peri-urban areas due to the fact that they are characterized by overlapping of different land uses as a result of competing interests. As urban areas sometimes have problems to maintain sustainable multifunctional use of agricultural land as desired by population, it is necessary to know how to approach, how to preserve and how to support the aspects of multi-functionality of agriculture and landscape (Živanović Miljković et al., 2012).

Recognizing the fact that green spaces in peri-urban zones are environments with important recreational and leisure activities and that they thus provide beneficial goods for urban community (so called "ecosystem goods" or "quality of life" factors – biodiversity, air quality, water, health, recreation), their potential for adaptation to climate change is also notably emphasized within green infrastructure development.

A negative consequence of urban growth in Europe, which may have serious consequences on human health and well-being, is landscape fragmentation, which is especially concentrated in the central part of Western Europe, where only small patches of open space have remained, while the same situation/pattern is also seen in the recreational capacity (Zasada et al., 2010). This situation is, as it can be noted, a reflection of the fact that existing international conventions, declarations and resolutions⁶ that have an indirect influence on the planning of green infrastructure in peri-urban zones, still do not provide more extensive and specific guidelines.

Further, there is a wide range of regulations covering green infrastructure, such as environment, land use planning, forestry etc., and, as it was stated, mostly specific legislation at the national level is missing, while "...at the municipal level, however, by-laws on tree protection are quite common, even though most of them only provide for partial protection of trees, depending on their dimension or location..." (Knuth, 2005).

The current concepts for the development of peri-urban zones are aiming to satisfy human living preferences – clean air, clean water, green spaces and safe environment for children. Therefore, special attention is given to green infrastructure. In respect to that, two concepts, already commonly applied in practice, can be outlined. The first one is making the compact cities more attractive (The Compact City), where the main challenge is to combine the necessity for a compact city with the people's need for green spaces close to their residence, and, as already stated, "the overall strategy is to counter the suburbanization process by enhancement of the city and improving the quality of life in order to retain residents in the city" (PLUREL, 2011). Examples of this concept are "green metropolis by the seaside in The Hague and a variety of urban renewal and social

regeneration projects in Leipzig" (ibid). The goal of the second concept is "preservation and development of green and blue corridors for energy-saving means of transport such as walking and cycling, biodiversity and human health and well-being". The green belt of Leipzig, involving 13 municipalities in a spatial, environmental and recreational strategy, and the Red Rose Forest, covering the 6 western districts of Greater Manchester, are noted as reference examples (ibid).

STAKEHOLDER NETWORKING IN PERI-URBAN LAND USE PLANNING AND DEVELOPMENT – EU PRACTICES

A participatory and multi-level approach to land use planning and management, with the aim of promoting sustainable development of land resources in peri-urban areas, is essential. Following these approaches, in some EU countries there is a practice of stakeholder networking in peri-urban planning and development.

PURPLE network (*Peri-Urban Regions Platform Europe*) was set up in 2004 and it brings together 16 EU peri-urban regions (Figure 4).



Figure 4. PURPLE network
(Source: <http://www.purple-eu.org/about/members/>)

⁶ UN – Habitat Agenda, Istanbul declaration on human settlements, Agenda 21, United Nations Framework Convention on Climate Change, Convention on Biological Diversity etc.

In its Resolution, this network calls upon the institutions and EU member states to "recognize the importance of peri-urban regions" which play a vital role in planning and directing the changes that lead to multifunctional land use and the multifunctional role of agriculture, regarding both the global competitive production and local sustainable agriculture.

PURPLE is striving for sustainable rural and agricultural development in peri-urban regions. General objectives of PURPLE are related to: successful socio-economic transition in peri-urban areas and their agricultural sectors; influence on European regional and rural policy making; acting as the primary interlocutor with EU institutions and stakeholders on issues of special relevance to peri-urban regions; and acting as a platform for peri-urban regions to share knowledge and good practice, allowing connections between existing projects, as well as promoting new trans-European initiatives in this field⁷.

Arco Latino Network was established in 1999 and officially inaugurated in 2002, and it covers the western Mediterranean and includes the provinces and local administration level of four EU countries—Spain, France, Italy and Portugal. It is a geographical region with 70 million people, spread over coastal regions, islands and border regions⁸.

Arco Latino is a space for cooperation between territorial units in which integrated actions in different strategic spheres can be carried out, with the aim of strengthening economic and social cohesion in EU regions, which is crucial for the process of balancing between northern and southern Europe. Arco Latino meets the needs of local authorities, often unknown and undermined at the EU, national and regional levels.

Terres en Villes is a network of local bodies involved in agriculture in peri-urban areas of France. As such, the network also supports all forest and uncultivated land in peri-urban areas. The network is particularly interested in the sustainability of the built and urban areas, and currently has 27 agglomerations in France, and, for each agglomerations, a board for inter-municipal agglomerations and local agricultural chambers, or similar bodies.

Many members – generally representing chambers of agriculture, conurbation councils or urban authorities in Grenoble, the Voiron region, Lille, Lorient, Lyon, Nantes, Rennes, Saint-Étienne, etc... – and the network itself



Figure 5. ARCO LATINO network
(source: <http://en.developing-periurban-projects.eu/index.php?id=16>)

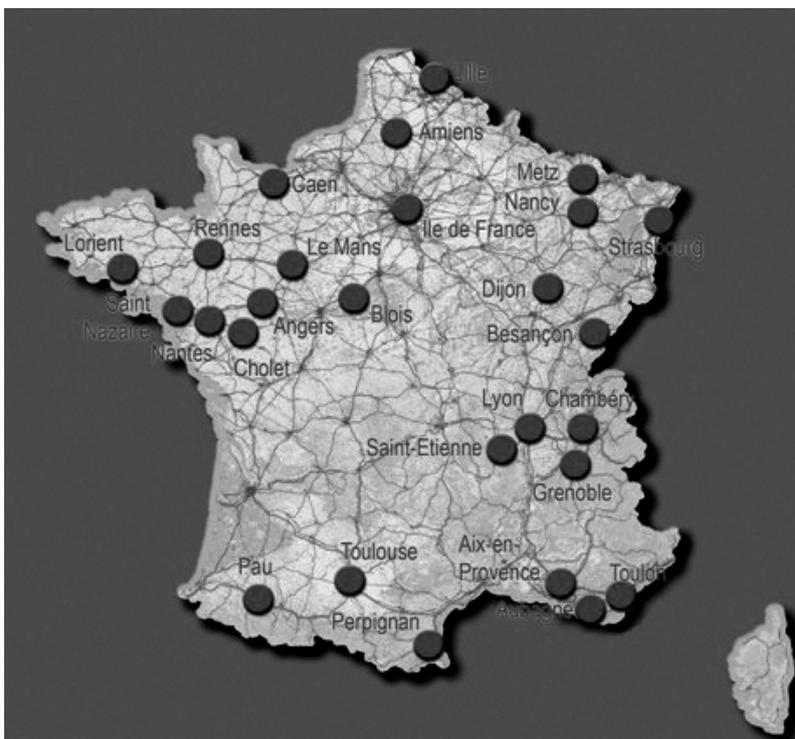


Figure 6. TERRES en VILLES agglomeration network
(source: <http://www.terresenvilles.org/agglomeration.php?PHPSESSID=36565047d2ba12300dd5a71db5117205>)

(the Leonardo program) have taken part in cross-border or transnational European programmes, and work in close collaboration with European bodies actively involved in peri-urban areas and farming.

The network and its members are actively involved in collaborative drawing up of peri-urban agricultural policies: protection and successful exploitation of agricultural, wooded and natural peri-urban areas and contributing to the development of European policies in peri-urban farming and uncultivated areas⁹.

LAND USE PLANNING IN PERI-URBAN ZONES IN SERBIA

The regulatory and planning framework of the development of peri-urban areas in Serbia is outlined in the Law on the Spatial Planning of the Republic of Serbia, which defines these zones as "zones of transition, in which interactions between urban and rural activities overlap or conflict, and the characteristics of the area are subject to rapid modification caused by human activity" (RS Official Gazette, No. 88/2010). In this framework, peri-urban areas are treated primarily through the prism of agricultural land protection and the specific character of urban-rural areas, that is the

⁷ <http://www.purple-eu.org/about/>

⁸ <http://www.arcolatino.org/index.php?method=section&id=2012>

⁹ <http://en.developing-periurban-projects.eu/index.php?id=16>

control and the implementation of appropriate urban and spatial planning measures for preventing overall taking of fertile land in peri-urban areas for non-agricultural purposes (as a result of illegal and unplanned construction). Therefore, the guidelines for resolving conflicts in this respect (between non-agricultural activities' needs for space and the importance of the continuous course of agricultural production for the preservation of natural and landscape values of the city and its surroundings) are provided by the restrictive measures of urban planning, while imposing standards on use of agro-technical measures that do not threaten the environment and the safety and quality of food.

Therefore, there is no specific legal basis in Serbia for planning peri-urban areas, but the positive examples of strategies and regulations are present (though insufficiently), mostly at the local level, which treats, in a sustainable manner, agriculture (e.g. Strategy for agricultural development of Belgrade) and greenery (protection of forests in Vrnjačka Banja) in peri-urban areas.

The problem of peri-urban areas in Serbia, especially in Belgrade, which has a large swathes of agricultural land in its hinterland (Живановић Миљковић, 2009), has not been given enough attention in the social and legislative sense, in terms of unplanned, unregulated and uncontrolled construction. Often, present individual housing is not sufficiently rational regarding population density or infrastructural and suprastructural equipment. The impacts of agricultural soil occupation are magnified by unplanned and inadequate human activities, including insufficient safety measures. Advanced and integrated land use, planning and natural resource management have a critical role in reducing non-adequate soil use (Živanović Miljković, 2008). In addition, rural areas are not only relevant for the users of urban areas, but also indirectly for suppliers to the city. Although Serbia is not a member of any European project regarding the development of peri-urban zones, this fact does not constrain the existing practice of using modern development frameworks for peri-urban zones. In this sense, an example of good practice can be seen in the extract from the Detailed Regulation Plan for Block 23 in Bela Crkva. The peripheral position of this block, in the peri-urban zone with agricultural hinterland, with its planning solutions promotes the development of peri-urban agriculture in the scope of green spaces (Манић *et al.*, 2011).

From the point of view of green infrastructure

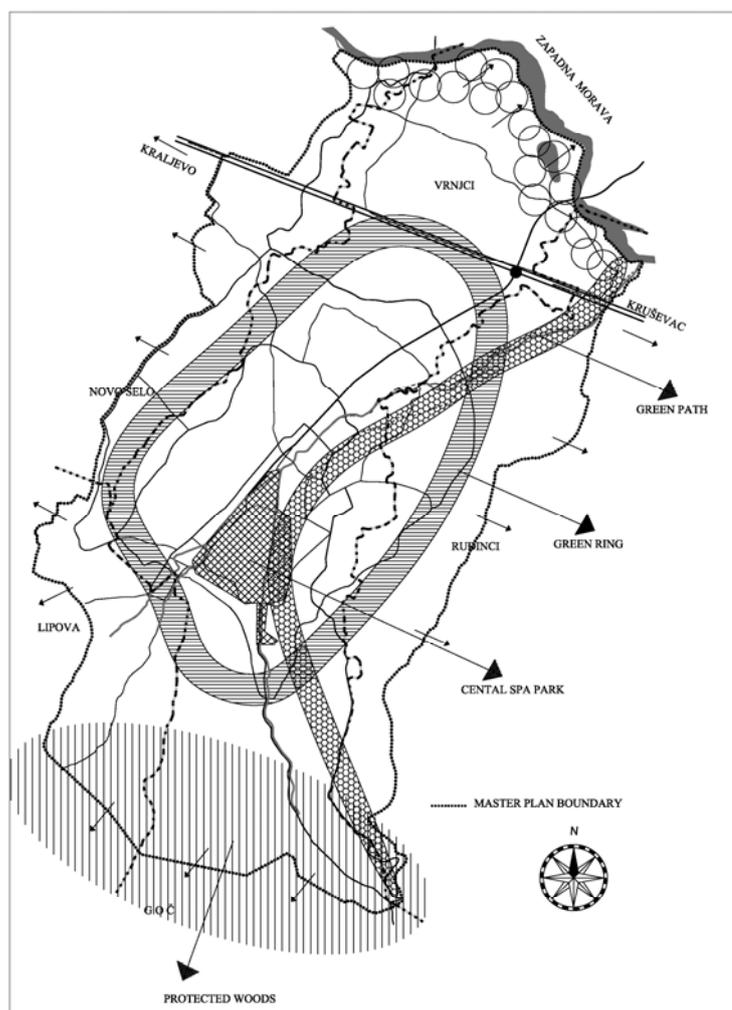


Figure 7. Green infrastructure in a function of peri-urban zone development
Source: Crnčević, Živanović Miljković, 2010

planning, it should be stated that current legal framework does not give adequate support (Draft version of the Law on planning and management of green spaces is still in the adoption procedure (Манић *et al.*, 2011)). However, the situation in practice indicates that special attention is given to the sustainable development of green infrastructure within peri-urban zones. Thus, the Master urban plan for Vrnjačka Banja (spa), as it was pointed out (Marić *et al.*, 2005; Црнчевић and Бакић, 2005; Crnčević and Bakić, 2008; Црнчевић *et al.*, 2010) promotes the concept of establishing the conditions for the development of green rings around the constructed areas and dislocation of the construction areas from the centre to peri-urban zones (Figure 7). The concept of green spaces expansion in peri-urban zones is conditioned by impossibility of Banja's park growth.

On the other side, the concept enables the prevention of uncontrolled development and stimulation of planned construction of the spa and its peri-urban zones, as well as the activation of these zones by linking the forests

of Vrnjačka Banja and Mount Kopaonik (over Željina and Goč mountains) with the aim of preserving landscape features, microclimate, protection and development of tourist and recreational values. Furthermore, it can be noted that in the Master urban plan for the city of Valjevo, which promotes the development of green corridors along the rivers (Kolubara, Gradac, Obnica, Jablanica and Ljubostinja), they are multifunctional (cultural, historical, environmental and economical aspects) and they connect the area of the Master plan with the Spatial plan of the municipality, urban, peri-urban and rural area, protected zone Brankovina in the north, Valjevo mountain nature park, Hydropower Stuborovni and the area of Petnica and Mount Divčibare in the southeast (Црнчевић and Бакић, 2006).

CONCLUSIONS

Peri-urban zones in Europe, as well as in Serbia, are faced with over-pressure. The necessity to re-establish the balance between

sustainable agriculture and urban, spatial and economic dynamics has been emphasized. For those living and working in peri-urban regions there are opportunities as well as challenges which should be reflected in strategic policies and strategies. Management of peri-urban zones requires an integrated approach to all the activities and land uses occurring within them.

So far, both in European institutions and in Serbia there has been a lack of recognition of the need for specific policies or support to peri-urban regions in particular. In this regard, this review came to certain conclusions which can be a recommendation for domestic urban and spatial planning practices, with particular attention directed towards the planning of peri-urban zones. In this sense, we provide certain recommendations, which are mainly related to those parts of the environment which we focused on in this paper – to agriculture and agricultural land and the greenery:

- Agriculture and green spaces in peri-urban areas should have the perspectives which will make the whole zone sustainable; it is necessary to promote the concept of multifunctionality in the planning process of peri-urban zones, as the basic concept which supports the sustainable development of numerous interactions in these zones. The contribution of local planning practices in this area would be in the planning commitments that provide flexible instruments favouring multifunctional agricultural use of agriculture and conservation of the attractive and functional rural landscape in a ring around the city, instead of creating rigid spatial planning solutions;
- On the regional and local levels there should be encouraging initiatives for the remaining agricultural production in peri-urban zones as the main potential of the city, which does not require high transport costs and shortens the distribution chain of food products;
- Establishing the network of local bodies involved in agriculture in peri-urban areas should be considered, which can gather all municipalities targeted with inter-urban spreading, with the aim of protecting and successfully exploiting agricultural, forested and natural peri-urban areas;
- Encourages bottom-up initiatives and further development of strategies and legal framework which will contribute to preserving agriculture, as well as to green spaces which provide beneficial goods for the urban community (biodiversity, recreation, air quality, water, health), taking into account their importance in mitigating the impacts of climate change; and
- Support current concepts in planning

practice and research covering sustainable urban-rural relationships.

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