



Climate Change Adaptation within Urban Planning in Serbia

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Background

The Republic of Serbia, aligned with international and EU policies that promote the issues of sustainable development and climate change has adopted and signed all related international and European agreements¹. Within recent decades climate change has become a global issue, which can be seen in impacts such as temperature extremes, droughts, floods and increased risk of fires. It should be stressed that Serbia is also facing changes in climate conditions such as strong and extreme precipitation, an increase in the duration of heat waves, as well as a decrease in the number of frosty and icy days (RS, Ministarstvo zivotne sredine, 2017). Additionally, Eastern Europe is recognized as already having an “adaptation deficit”, as “the region’s vulnerability is dominated by non-climatic factors, including socioeconomic and environmental issues” (Fay et al., 2010: XIX).

The following three ways of integrating the climate change issue and adaptation measures into national policies have been identified: 1) as a separate part of the national adaptation strategy; 2) mainstreamed throughout the national adaptation strategy and 3) thematically integrated by sectors (building and construction, spatial planning, health, transport, disaster risk management and water management) (EEA, 2016). In Serbia, as noted, the current planning framework², “foresees the inclusion of climate change issues, primarily by representing the use of renewable energy, energy efficiency, prevention and protection against natural disasters, elimination of climate change causes, the conservation and sustainable use of natural resources and, in particular, the promotion of the ecological network NATURA 2000” (Crncevic et al., 2016:167). Further, after the *Second National Communication of the Republic of Serbia to the UN Framework Convention on Climate Change*, adaptive measures have been provided within the fields of forestry, health and hydrology, water resources and agriculture, for which the implementation has been recognized throughout the application of certain measures (investments in irrigation systems, changes in agricultural crops and their varieties, reduction of soil cultivation and improvement of soil structure and others) (RS, Ministarstvo zivotne sredine 2017).



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In planning, the decision making is based on the legal and planning frameworks that climate change issues are indirectly included in: by promoting energy efficiency and promoting the goals of improving infrastructure as well as green infrastructure and, especially, by delivering the additional document on the Strategic Environmental Assessment. The inclusion of climate change issues in the decision-making process is still mostly dependent on a plan's methodology, which varies from plan to plan. The General Regulation Plans of Požarevac are good examples of introducing elements which highly contribute to the legitimization of the adaptation measures, and consequently to the overall improvement of planning practice in Serbia.

Methodology

The aim of this paper is to provide insight into the presence of adaptation measures within urban planning in Serbia. The paper summarizes the results obtained from research done for two selected case studies, the Plans of general regulation of the city of Pozarevac, which include the General Regulation Plan "Požarevac 1" (GRP1) that encompasses the central part of the city and the General Regulation Plan "Požarevac 4" (GRP4) that encompasses the non-central, northern part of the city. After a review of the literature and relevant documents,³ adaptation measures that promote *Future Cities Adaptation Compass* (2010) was chosen as it was found to be the most appropriate framework for the analyses of the selected Plans in Serbia. These measures cover green infrastructure (green roofs, green walls, green open spaces, the water system (water retention, water drainage, urban water spaces -- flowing and standing), energy efficiency and mitigation (increased energy efficiency, renewable energy) and urban structure (the urban setting and texture).

Main Results

In both cases of the general regulations plans for the central (GRP1) and non-central zone (GRP4), the measures for increasing and preserving quality open and green spaces are given, including the greening of flat roofs of objects and surfaces above the underground garages. Green walls are recommended for the central zone (GRP1) within the regulation of public areas.

In the case of the planned central zone (GRP1), the problem of the high percentage of built-up area is identified. Significant new green areas are envisaged, several new squares, and the transformation of the old industrial corridor into a green line. The rules for planning and designing of green roofs and green walls are given, with the proposition to include green roofs in the calculation of the total green area on a lot.



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In the case of the planned non-central zone (GRP4) where the agricultural and non-developed land dominates, special effort has been made to preserve green space from over-development in the future. The measures of the reserved green areas on the vacant plots and on the individual housing plots are given. Also, the green infrastructure is proposed as a tool for tighter connections between the city center and the outskirts.

Besides the green and open spaces, the plans provide guidelines and recommendations for using renewable energy and increasing energy efficiency. The measures for extending the network of the water drainage system network and introducing elements of still water into the urban space in the center are proposed.

Conclusions

Taking into consideration that “adaptation strategies vary from sector to sector, community to community and place to place” (Monirul Alam et al., 2018), the results of the analysis of the General Regulation Plans of the City of Požarevac show that even in the low regulative and planning capacity regarding adaptation, the Plans are achieving significant results in its promotion. By supporting measures at the local/urban level within green structures, the water system, energy efficiency and the urban structure Plans represent a “bottom-up” approach. As a result of the adoption and

implementation of the planned measures, a significant contribution will be achieved towards making the city of Požarevac more resilient. With the adoption of the *National Climate Change Strategy* together with the *Action plan*, the needed strategic framework to combat climate change and promote adaptation will be established.

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