

From grey to green squares. Fighting climate change.

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INTRODUCTION

City squares have been the fundamental component of the **cities'** structure since the ancient times. They are reflections of society, more than just open urban places and their design has been adapted over the years to the changing demands of the users (van Melik, 2008), often at the expense of green areas. From the second half of the 20th century till now, some of the city centre squares deteriorate the quality of life because they acquired unattractive images of empty paved spaces or traffic islands (Giddings *et al.*, 2011). Due to urbanization and climate change, there is, more than ever, a need to enrich urban environments with greenery. So, now is the right moment to turn these “grey” squares into green in order to improve the local microclimate and to create a wider effect on a large scale by mitigating climate change effects such as urban heat island.

METHODOLOGY

Study area: The subject of research are six historical squares in two countries: The Square of liberty, **Trifković** square and Gallery square in Novi Sad, Serbia and Macedonia square, Karposh uprising square, and Old train station square in Skopje, North Macedonia (*Figure 1*). The mentioned squares were chosen as examples of the reduction of greenery.

Data analysis: After collecting historical data, field observation was conducted with the implementation of checklists on spatial features, user activity, and vegetation which yielded data on the quality of the analyzed area. As the final step, in order to improve the microclimate and mitigate the effects of climate change, this paper proposes a green design model applicable to similar squares that deal with the lack of greenery.

NOVI SAD

SKOPJE



Figure 1. Location of analyzed squares

DISCUSSION AND CONCLUSION

As these locations are on important city points, implementing a green design would increase their eligibility for the **city's** greenery system and improve their ecological role. The green model is widely applied because transforming “grey” to green squares and including them into the cities greenery system (*Figure 4*) is a step to fight climate change and increase the quality of life in the city.

Figure 4. Proposal for connecting squares into greenery system



RESULTS



Figure 2. Past and present appearance of the squares

Location	Novi Sad, Serbia			Skopje, North Macedonia		
	Square of liberty	Trifković square	Gallery square	Macedonia square	Karposh uprising square	Old train station square
Distance from city centre	<10 min walk	<10 min walk	<10 min walk	0 min walk	<5 min walk	<10 min walk
Shape	open	partially open	closed	open	open	open
Accessibility	accessible	partially accessible	partially accessible	accessible	accessible	accessible
Observability	yes	partially	partially	yes	yes	partially
Illumination	sufficiently	insufficiently	insufficiently	sufficiently	sufficiently	sufficiently
Grey/green ratio (%)	99-1%	79-21%	60-40%	95-5%	86-14%	97-3%
Parking lots surface area (%)	/	28%	26%	/	/	16.5%
Noise presence	to a small degree	to a large degree	to a large degree	to a small degree	to a small degree	to a large degree
Exhaust gases presence	to a small degree	to a large degree	to a large degree	to a small degree	to a small degree	to a large degree
Pedestrian zone	yes	no	no	yes	yes	no
Urban furniture equipment	good	bad	bad	medium/bad	medium	bad
Water presence	no	no	no	yes	yes	no
Blending of architectural styles	partially	no	partially	yes	yes	yes
Expressed height difference of objects	no	partially	yes	yes	yes	yes
Intensity of use	very intense	intense	intense	very intense	very intense	intense
Time of most frequent use	in the evening	during the day	during the day	all the time	all the time	during the day
The most frequent users	middle age population	middle age population	middle age population	young and middle age population	young and middle age population	middle age population
Traffic	pedestrian	car/pedestrian	car/pedestrian	pedestrian	pedestrian	car/bicycle/pedestrian
Staying or passing	passing and staying	passing	passing	passing and staying	passing and staying	passing
% of high, medium and low vegetation	0%-50%-50%	75%-21%-4%	65%-35%-0%	76%-21%-3%	3%-17%-80%	10%-1%-89%
Deciduous/evergreen	100% deciduous	100% deciduous	31%-69%	79%-21%	15%-85%	88%-12%
Wide or narrow tree crown	Narrow (<i>Robinia pseudoacacia</i> "Globosa")	Wide (<i>Celtis australis</i> L.)	Wide (<i>Cedrus</i> sp.)	Wide and narrow	Wide and narrow	Wide
Flower decorative species	/	<i>Rosa</i> sp.	<i>Prunus serrulata</i> Lindl.	/	Seasonal flower	/
Thick or airy crown	airy	airy	thick	thick and airy	airy	thick and airy
Lawn/paving ratio	0/100%	21%-79%	40%-60%	1%-99%	12%-88%	3-97%

Table 1. Results of check lists on space, activity and vegetation

All six squares are “grey” – have a high share of impermeable paved surface and low amount of greenery.

The scarce vegetation does not fulfill their ecological role.

GREEN MODEL

- Decrease of air temperature, increase of air humidity and increase of shade - planting resistant trees in sunlit areas (species with wide and dense canopy)
- Increase of air flow - planting grass areas that allow unhindered wind movement through the square
- Increasing of water and heat permeable surfaces (lawns instead of paved surfaces)
- Improvement of biodiversity (attraction of pollinators, continuous blooming, perennials, native species)



Figure 3. Grey/green values of analyzed squares

References: Van Melik, R. G. (2008). Changing public space. The recent redevelopment of Dutch city squares. Utrecht: Koninklijk Nederlands Aardrijkskundig Genootschap/Faculteit Geowetenschappen Universiteit Utrecht.
Giddings, B., Charlton, J., & Horne, M. (2011). Public squares in European city centres. *Urban Design International*, 16(3), 202-212.