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Research Article

Green infrastructure and planning procedures – experience of creating an unofficial network of green spaces as an NGO

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Article focuses on recognizing valuable green spaces and strategic positioning of new green infrastructure elements in space from the perspecitve of a non-governmental organization. It questions the limitations, roles, and possibilities of non-governmental organizations (NGO's) in the establishment of publicly accessible and environmentally significant areas in the urban matrix. The article considers personal experiences in the implementation of such projects, their influence on the daily livelihood of citizens and how an NGO can contribute bypassing current absence of legal basis for its implementation. The methods presented in the paper are described as informative guidelines and are not scientifically backed, although they do rely on scientific knowledge of the members of NGO and previously tried methods of earlier finds. This work represents a factual outcome of actions delivered by the NGO ZIPS (Zelene i plave Sesvete) and do not have to be replicative on other showcase examples, considering their legal, cultural, and other backgrounds.

Keywords: green infrastructure, strategic planning, NGO, tree planting, public participation

1 Introduction

Creation of resilient landscapes and connecting them into a continuous and uniterrupted grid might be one of the best low-tech solutions for our adaptation to climate extremes. As individuals, people might not have the ability to act on a global scale, but they can most certainly try to improve the microclimactic conditions in the area of our living, such as preventing the creation of heat islands.

Article will primarily focus on the quad helix approach, since it has been the basis of defining relations among various stakeholders throughout many of the projects conducted by the NGO ZIPS and suits as a proper frame in the transfer of knowledge. It imposes as a starting point for presenting achievements done by the NGO in the spatial implementation of green infrastructure elements such as: recognizing key stakeholders and devising an appropriate approach in the realization of downright communication; envisioning the level of expected involvement in decision-making and co-designing; reaching decisions on the spatial location of the solutions and the reach of their influence.

To put the local level in perspective, it is important to gradually descend from a global context so this article will primarily focus on societal perspective of the issue.

1.1 Conditions and course

Society is made up from many interest groups, all acting at the same time and have rather different views on development. This is a condition in which finding a solution for anything is never easy, especially with a problem as comprehensive as climate change. European union and its member states are decisively steering the development of the continent towards a more sustainable future and, by doing so, is continuosly seeking for solutions that are applicable on various scales. At this point in time, European Union (EU) is leading in the creation of directives and programs of immeasurable importance on a global scale. Although often criticized in literature, one such comprehensive document is the European Green Deal the European Council, The Council, The European Economic and Social Committee and The Committee of The Regions the European Green Deal (2021).

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Among other, it implements green infrastructure (finding its roots in the landscape architecture) as one of the best tools for climate change mitigation (Barcelona City Council, 2013), emphasising the importance of proper rainwater managment (European Parliament and European Council, 2003).

EU has strategies and regulations regarding sustainable development, involvement of the citizens (UN, 1998) and mitigation of ecological problems (European Commission, European Environment Agency, 2021). However, what the EU sometimes lacks is the pace of action and implementation. That is most certainly result of a cautious democratic decission-making among 27 of its member states, many of its various referential organizations and desire for a wide public participation. If we are to nourish our democratic values in the future and respect all the given processes, it will certainly have implications on appropriate reactions towards our changing environment. By saying so, it is not the intention to promote non-democratic decission-making (because the past has taught us many times that totalitarian systems can bring even greater environmental disasters) but to point out that we should find other fields in which we can allow greater freedom of quicker decission-making and implementation of solutions that haven't necessarily been peer-reviewed or examined before. Such are different stakeholders in our society, among which NGO's stand out in particular (European Parliament, The Council, The European Economic and Social Committee and The Committee of The Regions Green Infrastructure (Gi), 2013).

2 Material and methods

At the end of 2021, pushed by the public, Croatian government adopted a Program for the development of green infrastructure in urban areas for the period 2021 to 2030, with the aim of establishing sustainable, resilient, safe, comfortable and orderly cities and municipalities in the Republic of Croatia (Republika Hrvatska, Ministarstvo prostornoga uređenja, graditeljstva i državne imovine, 2021). What is concerning about the given situation is the pace of the implementation of the given program, since it was first developed in 2019 and not many cities have adopted plans for green infrastructure. In parallel, multiple European cities have had green infrastructure plans on the disposal for decades (Amati, 2008; Barcelona City Council, 2013; Vienna City Administration, 2015).

Being aware that the climate change is inevitably coming, NGO commited to adaptive strategies – building green infrastructure before the valorisation and ratification through plans on the decision-making level. However, powers of the NGO are limited, so its position is to lobby, point out problems, promote, dissiminate or co-design space. Final decissions, regarding planning and decission-making, are always made by democratically elected representatives that do not have to necessarily share one's points of view.

People act by an example or by models. If something is proven to be feasible or popular, people will gladly copy it over time – be it political parties and firms in their campaigns or average citizens in their private gardens. That is the main reason why the NGO pursues projects that directly change the physical environment, wanting to create a showcase. These types of projects have far-reaching implications in the future and can accelerate shifts in planning trends. Greater freedom in decission-making (or rather not being bureaucraticly limited) and finding peculiar site-suitable solutions is one of the main advantages of NGOs, as well as the ability of a quick reaction – recognizing the moment and appropriately acting. Most of the time it is brought down to "catching curves" with a continuos agenda as a common driver, since there is no single solution for all of the problems.

Therefore, through time NGO prepared program or a strategic approach for different acting levels, as follows.

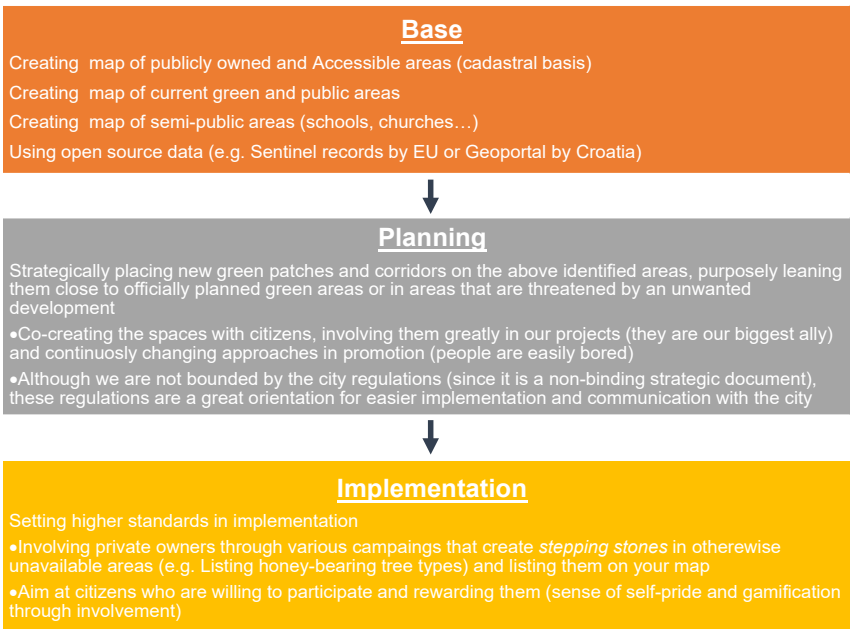


Figure 1 Graph of steps

2.1 Strategic approach to spatial development

Since the point of this article was to summarize the methods and activities of our NGO in the tendencies to accomplish a program for the implementation of a plan for green infrastructure, it is important to list some of the steps in order to carry out goals, as shown in the Fig. 1.

3 Results and discussion

As a result, in the sense of strategical planning of green infrastructure, by implementing regreening projects so far, a central triangle of publicly available spaces in the central part of Sesvete was created, overall spanning estimated 9 ha of land. Most of this space was planted with native trees and shrubs in a conventional way (no understory or solutions based on beneficial relations between the plants and its surroundings). Around 0.5 ha was realized as a therapy garden, financed through the ProGIreg project. It contributes to the welfare of the citizens and natural environment. Most of these projects were developed in otherwise marginalized areas that lack public services and are considered ghettoized (fallen industries and low social status).

3.1 Collaboration with the institutions of local, national and international significance

During last five years the NGO managed to establish partnership with the Department of Ornamental Plants, Landscape Architecture and Garden Art, and thus carried out three partner projects on the EU level: LE: Notre Landscape Forum 2019, Learning Landscapes (Fig. 2) and ReGreen Croatia – all co-funded by the Erasmus+ fund. Furthermore, ZIPS cooperates with the Faculty of Architecture on two EU projects – ProGIreg (Productive Green Infrastructure for post-industrial urban regeneration) and Centrinno. ProGIreg is an internationally recognized project regarding productive green infrastructure and it greatly enabled to position ZIPS as a referential organization. NGO is working on a project within the STEM field together with the Faculty of Electronics and Computing, lasting 18 months. These cooperations, besides for the financial stability, opened doorways to vast number of other project opportunities, learning possibilities and other partnerships.



Figure 2 Learning landscapes, NGO ZIPS, taken in 2021

3.2 Small-, medium- and large-scale projects

Collaboration with these and many other institutions has enabled realisation of large-scale projects. However, to keep the continuity of work, it is important to deliver projects of smaller scales. By doing so, NGO managed to plant around 550 trees around the central and easten-most part of Sesvete from 2019 to 2021 (Figs. 3 and 4) through various projects.

Latest project aims at the preserving two 500-year-old linden trees and their genome by cloning them and replanting a hundred of their clones Sesvete-wide (kindergartens, schools, churches, public spaces...). For this project Croatian Forestry Institute was hired which will deliver certified seedlings in the following autumn.

One of the projects in 2021 was a development of a "honey meadow" in a place that used to be a landfill. This area showed a great potential of becoming a public space for the citizens of the neighbouring Novi Jelkovec but also a great sanctuary for the bees and other pollinators.

All these combined projects contributed to the creation of a green program and a green network. NGO intends to continue with other projects in the future, finding new sources of finance. All these projects and the results can be viewed on the official NGO website (www.zeleneiplavesesvete.com)

3.3 Collaboration with the citizens and their education

The NGO owns a Facebook page, followed by more than 6,000 people (www.facebook.com/uzeleneiplavesesvete) and a Facebook group, counting almost 17,500 members (www.facebook.com/groups/117450558982945). These two Facebook pages are a great source of information and people

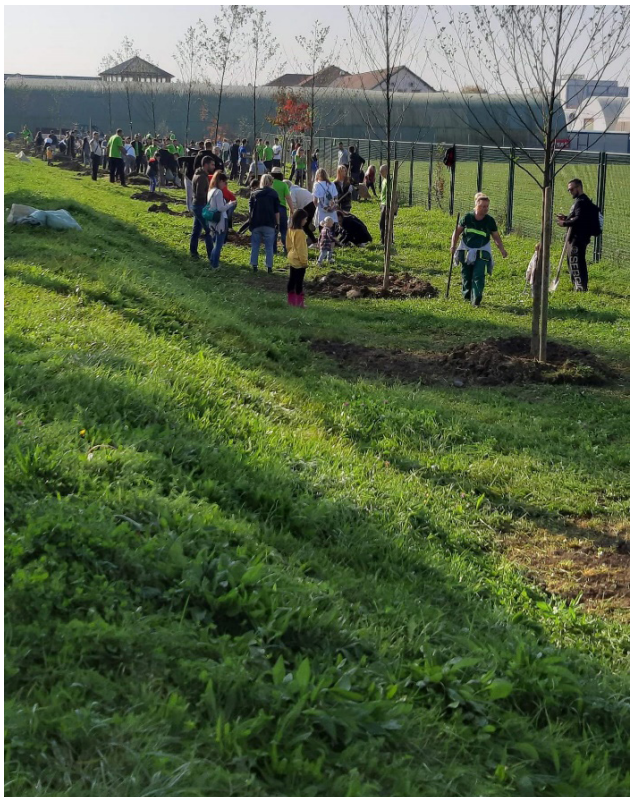


Figure 3 Tree planting, NGO ZIPS, taken in 2019



Figure 4 Tree planting – St. Francis Arboretum, NGO ZIPS, taken in 2020

use it as a form of communication and for debating. Most of the local governmentals also use this group as a form of communication with the citizens.

However, it is important to reach out to the people and involve them in the decision-making (The European Parliament and of the Council, 2003, page 1), especially to the younger generations (Table 1). That is one of the reasons why the NGO organized a whole variety of public and semi-public events connected to the topic, as seen in the Table 1.



Figure 5 Kindergarteners – Green city, NGO ZIPS, taken in 2019

4 Conclusion

In addition to create green infrastructure before the official plan is adopted, it is important to act in different fields that might not neccessarily be directly connected to the common goals. It is important to realize that work cannot be linear because everyday life is not linear either. If it is not possible to achieve projects of greater scale, it is enough to improve the livelihood of a smaller group of people (Clark & Taplin, 2012). Greater projects will come in time but should not be an obstacle in realizing smaller and simpler tasks. These will eventually develop into a complex structure that has naturally grown with people. It might not be a perfect realisation of

Table 1 Table of events

Event	Example/description
Open discussions	– various topics with presenters from the fields (traffic, demographics, environmental protection, culture...)
Workshops	– international, local, for children – presentations of work
Exhibitions	– student, professional and art works
Public events	– concerts – harp concert, singers, local music school – film festivals – documentaries about nature protection
Lectures	– school or faculty students, kindergarteners (Fig. 5), general public
Surveys	– online questionnaires and public initiatives
Public acting	– demonstrations against pollution, clean-ups, tree-planting
Media	– continuous collaboration with the media and presence through social networks

a vision but, in some situations, it might have prevented a far worse option of development. However, in doing so it is important not to settle with little, but to stride for the greatest. To quote one member of the NGO: "If you want a boat, ask for a spaceship. Also, tell them it's a temporary solution. There's nothing standing in the world longer than the temporary solutions".

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