

Architectural Education in the Light of Climate Change – Case Study: Agrarian Landscape as a Resource for a New Sustainable Lifestyle

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Abstract—This article represents Master students’ research on situating a housing complex in the context of the agrarian landscape of Vojvodina, Serbia, considering it as a resource for a new urban lifestyle. Students have had a task to explore potentials of shrinking the city of Belgrade throughout the agrarian landscape, as to affirm the role of place and its culture in contemporary everyday life. They were expected to explore the possibilities and limitations of networking nature and architecture, how various architectural approaches harmonize with natural environment and balance the impact of built environment onto the landscape. This article shows that sustainable architecture means reaching a higher quality of life and designing through adaptive involvement and in accordance with nature.

Keywords—agrarian landscape, place-based pedagogy, architectural education, climate change, housing, Vojvodina region

I. INTRODUCTION

OVER the past few decades, the theme of protecting and adapting natural landscape in shrinking cities shifted from theoretical to practical discourse focusing on the effects of climate change. City edges are in a sensitive phase of development, where economic parameters have widened to the fields of ecology and culture, significantly changing the balance between demands and values of the place. Our social conscience has become aware of how human actions are progressively devastating natural environment [1]. The most dramatic change is related to the relationship between built and natural landscape and is most obvious in shrinking cities. In these circumstances, seeking for new architectural paradigms when designing in disappearing agrarian landscape represents a particular challenge.

Series of extreme weather events in Europe and worldwide has shed light on the vulnerability of natural environment. The urgency of the problem caused by environmental change posed

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a number of new architectural challenges. In addition it must be kept in mind that the issue of climate change is essentially a super wicked problem, as the achievement of sustainability cannot be approached from one angle and through one scientific or professional discipline, but rather it is necessary to engage oneself in a holistic way. This situation shows that environmental problems demand consideration of all professions involved in the production of space, which includes architecture too [2].

Therefore, in architectural schools all around the world the issue of climate change has been set as an essential goal in faculty teaching. Regardless of the all-encompassing agenda of this project, the implementation of these ideas in architectural education is coming about in a different way than expected. The main problem lies in the inefficiency of faculty curriculum to methodically implement the proclaimed objectives.

One of the seductions of modern architectural education is that it can be understood as context-free activity. The knowledge students acquire in architectural schools is generally unrelated to their place – it is universal expertise of no-place. In recent years many publications have argued the need to replace traditional patterns of architectural education with the more flexible models. Some authors argue that architecture cannot and should not be taught in the abstract only, but knowledge and skills must be shaped through students’ involvement in real problems and with places [3].

The “place based” pedagogy is a response against a conventional education that keeps students in classes and thinking about reality in the abstract sense. It is manifested in the research on how learning and school communities are conditioned by the natural environment. Gruenewald thinks that this idea is radical because current educational discourses seek to standardize the experience of students from diverse geographical and natural backgrounds [4], [5]. Sobel thinks about “place-based” education as a paradigm: more as a mindset than as a specific kind of curriculum. According to this author, “place-based” education is „*the process of using the local environment as a starting point to teach concepts*“ [6]. “Place-based” education is not just motivated by a desire to overcome the divide between conceptual knowledge and lived experience – it seeks to address some of the varied ways in

which we are connected to our places.

As a reaction to these pre-conditions, the goal of this paper was not to describe how architectural education can respond to the issues of climate change impacts on agrarian landscape in general terms, but to examine the relationship between men and nature, climate change and particular landscape via architecture in the context of agrarian landscape and irrigation channel network in Vojvodina, where place-based pedagogy represents effective teaching strategy for exploring the issues of climate change impacts on soon to be transformed agrarian landscape and its protection and adaptation strategies [7].

II. THE APPROACH TOWARD ARCHITECTURAL DESIGN

Mark Wigley considers that environmentally responsible design is one of the ways of thinking about architecture [8]. According to this argument, the new concept of "true architecture" is no longer based on the architecture that is spectacular and insensitive to the surrounding, but is directed towards architecture that lives in harmony and protect the environment. When talking about understanding of the city, Lopez sees it as a dialogue between man and nature, where natural circumstances can and should be registered through interpretation and evaluation experience and perception that residents are achieving through daily use of architectural space [1] Therefore, architectural design that ignores local context and community, risks to produce environmental problems rather than to solve them [2]. In this sense, the term "sustainable" in architectural design is used with the motif of longevity and lasting benefits when applying a specific model or approach into space. Therefore, sustainable architectural design is one of a holistic approach towards landscape using it as a starting point in creation.

The focus of this kind of architectural intention is not to incorporate landscape as a part of architectural creation, but to observe and translate landscape as an appropriate tool for thinking about architecture. The main principle behind this kind of approach is that architecture can be guided by people's experience of landscape. We can be guided by observing places that are dominantly formed and evidently caused and variable in relation to natural forces, such as sun, wind, rain and seasonal cycles; but also by vegetation and shapes that are the consequences of geological changes that were created by the changes during the long period. We can learn from landscape lessons about interconnectedness, growth, decay and stability, about continuous adaptability to climate change and of course about the subtle strength [9].

In short, the role of the architect is to incorporate this dialogue into the project by listening-understanding-responding to the "voices of the natural and cultural context" and interlock it with the experience of the users of the real place. Architects should incorporate the natural in a fundamental manner into their project in order to affect mind and body as a way to improve and intensify our relationship with nature, through architecture - an experience that might increase society's awareness and responsibility of the urgency

to preserve and respect nature [10].

One of the ways in which architecture can engage itself in the process of sustainable development is in finding new ways of negotiating between the values of natural landscape and everyday life, through housing. As a form of artificial structure, it can provide infrastructure able to engage the local community and involve the general public through an experience that might also increase society's awareness of the urgency to preserve and respect nature [11].

III. CASE STUDY: AGRARIAN LANDSCAPE IN KOVILOVO, THE REGION OF VOJVODINA, SERBIA; A RESOURCE FOR A NEW SUSTAINABLE LIFESTYLE

This article represents Master students' research on situating a housing complex in the context of the agrarian landscape of Vojvodina, considering it as a resource for a new urban lifestyle. Students have had a task to explore potentials of shrinking the city of Belgrade throughout the agrarian landscape, as to affirm the role of place and its culture in contemporary everyday life.

The Process: Learning from the Landscape

Students have had the task to examine the position of new housing typologies in the context of the agrarian landscape and irrigation channel network of Vojvodina. The aim of this design studio was to explore how various architectural program/spatial models harmonized with the environment can contribute to the use of management strategies in minimizing negative impact of built structures on the landscape. Students were expected to find new possibilities and limitations of networking nature and architecture by researching the impact and prospect that various housing models have on degradation of the agrarian landscape.

During the semester, students were expected to thoroughly learn and accept a wide range of options that promote the idea of sustainability, including environmentally responsible design, protection and enhancement of natural resources. As to enhance different forms of research the overall theme entitled Learning from the Landscape was chosen. The intention was to examine the significance and position of the landscape in the process of architectural design in the light of climate change. Therefore, the task consisted of three steps:

The first step was the examination of the agricultural landscape with the aim to provide different requirements for the new program framework of modern living, on one side, and the definition of a theoretical framework through the concept of place-based pedagogy and climate change. This phase was long and exhausting as students had a task to read various articles on the relation between men and nature and at the same time to explore phenomenological side of the particular context, in all its character and through its structure looking for specificities that make it a unique place. These two fields were then, for the purpose of making a final architectural approach, examined simultaneously as to emphasize critical notions towards a particular context and provide viable

resources for setting the future individual design concepts.

The second step was the formation of spatial and program basis for re-defining the role and character of the residential function in harmony with the agrarian landscape. This step was a kind of negotiation process between nature and architecture, where the main concerns were a misbalance between preserving agrarian landscape and protecting its changing naturalness, questioning the role of housing typology and the fact that nature and architecture represent distinct phenomena in permanent collision.

After this step, we have discussed the relationship between architecture and the interpretative potential of the sensual experience we have from the landscape and concluded that instead of creating mere objects of visual seduction, architecture relates, mediates and projects meanings [12]. Anselm helped us in understanding achieving nature's integral design lies in understanding the natural environment (topography, terrain, management of climate and energy) and entailing Ecosystem by its interactions with building design [13]. We agreed that designing with nature begins with an intimate understanding of place, careful management of local climate condition and incorporating its characteristics (winds, orientation, sun reflections) into architecture.

The third step was the spatial interpretation of the previous two steps through the preliminary architectural project. Students were looking for an appropriate shape, intensity and modality of architectural interventions in the limits of the physical, program and thematic framework and also were looking for new models of binding nature of the city which resulted in changing the identity of the urban landscape, and the alignment of the new intervention with the values and potentials of the city.

The intention was that students' research examine the importance and role of the landscape in the process of architectural design, and later through the analysis of complex problems related to urban lifestyle as well as to the natural landscape invent housing models which should translate their analogies in imaginative architectural interventions, extreme in its relation of the body and man to the context.

IV. THE PLACE: AGRARIAN LANDSCAPE ON THE OUTSKIRTS OF BELGRADE

Before reporting results of student's research we have to say a few words about this particular landscape, on the outskirts of Belgrade in the region of Vojvodina, as well as reasons to choose this particular landscape as our case study.

This region of Vojvodina is a vast agrarian landscape, wide open and almost perfectly horizontal. Therefore climate is the most notable item in it. It has a network of beautiful irrigation channels, with strong agricultural tradition pointed with small settlements in accordance with the fact that the highest wind tides in Serbia are here. This particular place is in no way different than any other agrarian landscape in this region but for two things. The first is that it is a perfect viewpoint for the skyline of Belgrade, and the second far more important and

less romantic is that the highway bridge across the river Danube is about to be inserted in the middle of it, forming a second circle around the city of Belgrade and bringing closer places that never in its history have been connected before. It will soon become an intersection of the inner city driveway Belgrade-Zrenjanin and a mentioned ring highway. This particular challenge made us believe that this is a right choice as to rethink shrinking possibilities planned for a new housing development in accordance with agrarian landscape.



Fig. 1 Aerial view of three macro-urban parts of Belgrade (City Centre, New Belgrade and Third Belgrade), source: Bing Maps

Looking at the wide perspective, the reason to choose this place was two-folded. First the insufficient awareness of the values natural resources have for the contemporary everyday life, and the fact that in circumstances where landscape and man have to intertwine architectural intervention requires acts of translation, challenging a new creative perspective in creating a new cultural landscape.

V. STUDENT'S WORK: NEW HOUSING OPPORTUNITIES, NEW LIFESTYLES

At the conceptual level, student's designs differ in terms of program and space. Dominating over the nature at one moment and leaving the natural surroundings to live its own life in changing natural conditions in another, architectural solutions embraced the irrigation channel, the fact that wind should be a part of architectural creation, that mud and land in itself offer a new perspective for a better lifestyle, all in respect to providing a unique landscape adaptable to future life.

Three distinct relations towards the landscape are to be distinguished. The first approach was named the Interlocking Model. It stresses the importance of intertwining landscape and urban lifestyle, mainly through the content nature can offer as a viable resource. The second was named The Focal Model. It emphasizes the distinctiveness of nature on one side and built structures on the other, leaving for both enough space to develop and change in their own rhythm and pace. The third was named The Dispersed Model. It accentuates the landscape as a resource for the housing.

Interlocking Model

Linear spatial approach insists on layering and overlapping of natural and housing environment. The structure follows the coastline through linear sequence of spatial contents and forms, having the quality of the event. Intervention embraces the channel and soil with all its fluxes with the ability to live in the accordance with nature, stressing the importance of being in the balance with nature.

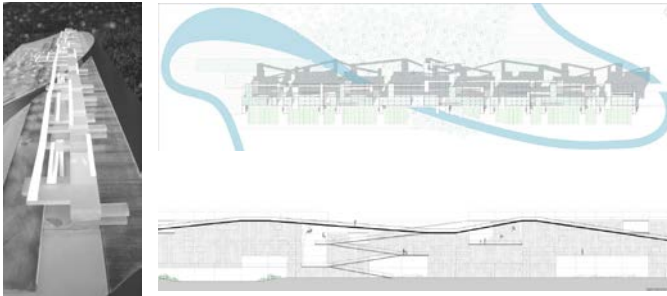


Fig. 2 Interlocking Model, project: Playing Landscape

_linear sequences of spatial contents and forms, overlapping and intertwining;

_emphases is on the sequence and change of domicile ambient, providing diverse logics of space from individual and intimate to public and wide open;

_playing with landscape would be an appropriate way to explain spatial and content articulation of activities provided through housing;

_makes a man to be a part of the living landscape, a witness of its cyclic rhythm and character;

_dynamic relation between housing units and the uniqueness of the landscape, particularly the agriculture, the channel and the forest.

Focal Model

Focal spatial approach is based on the notion that intervention must be unique in its character, visibly and structurally. Protecting natural landscape and minimizing its transformation means keeping it as much intact as possible. Underground or as a superstructure it creates a sensation of revitalizing previous, valuing agricultural as a heritage in a new powerful way. In linking nature and architecture through their concept, content, structure, meaning and identity artifacts fight for supremacy. Opposed attitudes shape the form of suburban city lifestyle through their mutual denial, supporting or complementary juxtaposing.



Fig. 4 Focal Model project: Urban Forest,

_intervention has to be unique in its character, plausibly high density and high rise structure with a particular identity which mimics the character of the landscape;

_protecting natural landscape and minimizing its transformation means keeping it as much intact as possible;

_emphases is on the distinctiveness of both structures and on the link between which is not perceptible from far away, but only on the level of the man;

_dreaming landscape would be an appropriate way to explain its ambient articulation and above all a liberal uniqueness in character;

_looking through the lens of landscape, looking above or even looking for the landscape explores the relation between the two on the mental level.

Dispersed Model

Dispersed spatial concept shows that it is possible to use nature as a structural element of creation and that building in accordance with nature means above all shaping it in human scale and through human interaction. The focus of these interventions is to position the natural resource (land and water) as the main organizing element of the living structure. Instead of building housing, it proposes building cultural landscape which will inevitable affirm the environment and inhabit it subsequently. With just a few newly-placed architectural elements organized in the net of events in accordance with the eco system and upcoming climate change, the principle of vitality and viability in the transformation of nature could be achieved.



Fig. 4 Dispersed Model, project: Sownscape,

_landscape is a mentor

_instead of structuring the housing, open-space is structured as a net of events in which housing play an possibility role (when and where is not given but only infrastructural provided

_emphases is on reconciliation of the relationship between river and land, or wind and land

_living landscape would be an appropriate way to explain spatial and content articulation of activities

_makes a man to be a part of the living system

All solutions encourage awareness and learning about ways to preserve and encourage a high degree of urbanity through rethinking the structure of landscape, the development of its

vitality, attractiveness and accessibility, and also through the respect for the inherited values of the place.

VI. DISCUSSION

None of the designs should be considered only for the picture it represents, but for the spectrum of various events it offers, which bears relation to the inherited structure, degree of animation of natural scenery, and the importance of establishing dialogue between the need for protecting the landscape. Exploring the relationship between nature and architecture and emphasizing their dichotomy we concluded that the ultimate meaning of any building is beyond architecture. Architecture is seen as a supplement of the nature by which our abiding in it is enabled. It is a reconciling element that enables human survival in nature.

By accepting the way in which argues sustainable and good design as being simultaneously logical (scientific, technical, functional), ethical (security, low impact, protection, good use) and aesthetic (beauty, meaning, emotion) we concluded that sustainability could become a means of achieving a better quality of life, not a goal in itself [1]. Bearing this approach in mind, we concluded, as Van Hol suggests, that being smart means thinking ahead, building an environment that adapts cleverly and works interdisciplinary, stressing out the quality of it, not mere ecology [14].

Designing cultural landscape begins from the landscape as a major instrument of creation, as landscape urbanism proposes, where architect understands its diverse conditions, but also has to take into account the potential of built structures, as well as our own needs and aspirations, as to be able to find answers to how and by what means it is possible to comply with it [15], [12].

Agrarian landscape could become a valuable resource for contemporary edge-city living. High density housing typology can offer protection for the agrarian site in harmony with its natural surroundings. Transformed and naturalized architecture summarize elements and processes that can provide a balance between man, city and everyday life, on one side, and preferences of natural landscape as water, soil and other natural resources, on the other. As architecture has the ability to communicate with the environment, we concludes that sustainable architectural design means reaching a higher quality of life and active involvement of people and their everyday life through agrarian landscapes in which changes in their relations are dynamic and therefore adaptive and transparent.

We think that it is possible to balance landscape and architecture through responsibility, as a way of thinking as a part of the architectural concept. Through incorporating the new architectural paradigms as an integral approach toward vital and smart architecture it is possible to form a socially responsible place. New paradigms include sustainability as a resource, where nature together with architecture makes a unique place-based system in which it is not the context or background, but its structural component. Its cyclic nature

makes space flexible and adaptable while architecture gives a platform for including man into its everyday life; the life of nature. Those results showed that the design in the natural environment, with the right approach, guided by the synergy between nature and architecture brings a new and better architecture, which also emphasizes the quality of that from which it drew inspiration from and was created for – a living landscape.

VII. CONCLUSION

When curriculum mimics education in the surrounding environment, the boundaries between schooling and life become more obscure; and therefore, more integrated. This type of research contributes not only to solving of problems concerning the landscape of Vojvodina and contemporary architectural intervention, but it also participates in raising appropriate general awareness on the subject of adaptive quality of places seen in the prospect of global climate change. As architecture has ability to communicate with the environment, the article concludes that sustainable architectural design means reaching a higher quality of life and active involvement of people and their everyday life through agrarian landscape in which changes in their relations are adaptive and transparent.

Results of this study reveal that place-based pedagogy has elements that enable teaching of context-specific knowledge, skills and abilities that are essential for facing with the issues of climate changes impacts on landscape. The research pointed the necessity for introducing the concept of place-based pedagogy and issue of climate change at the lower levels of faculty education, and that it is necessary to implement goals of this teaching approach into all aspect of the architectural curriculum.

Universities in Serbia are slowly becoming polygons for the implementation of curricula in harmony with sustainable development, and in line with climate change. Following the imperative of sustainability, Faculty of Architecture in Belgrade encourages research on the complexity of relationship between society, technology and the environment by means of rethinking architectural models. This is a new way of thinking, which is reflected in the re-design of what we mean by nature and man's place in it. As housing is constantly seeking new havens, agrarian landscape can become a resource of modern life in the city.

Anyone who teaches architecture knows that educating students to become architects involves more than just inculcating the knowledge, skills and abilities reified in the school curricula. The responsibility of architecture, as professional and pedagogical practice is to create conditions for greater integration between built environment and natural landscape. In the end, this paper suggests that it is necessary to initiate future professional study of the potentials and possibilities for the protection of similar sites, as a basis for preventing further degradation of protected landscape in the time of climate change.

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