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REVITALIZATION OF (POST-) SOVIET NEIGHBOURHOOD WITH NATURE-BASED SOLUTIONS

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The neighbourhoods in the former Soviet Union were after the World War II often planned according to the self-consistent microdistrict concept similar to Clarence Perry's neighbourhood unit. Each residential district was based on the walkable community centre in the middle whereas the area itself was surrounded by arterial streets as the main transport routes with basic services. However, the recent situation of many of those neighbourhoods is rather dim – the bad condition of housing, faded public spaces and unorganised greenery systems are between the most crucial issues. The results of the research made on the case study of the Jubilejny district in the city of Mogilev, Belarus, show that population ageing is the main threat for these areas. Residents are dissatisfied with uncertain housing situation besides inappropriate parking options and lack of opportunities to spend a leisure time outside. Therefore, our proposal to the future development of the Jubilejny district includes short term improvements such as leisure activities within the public spaces or regeneration of green spaces as well as long-term designs regarding a community garden and other nature-based solutions.

Keywords: nature-based solutions, khrushchyevka, microdistrict, urban greenery

After the World War II, the scale of industry has grown rapidly. As a need for housing for industrial workers grew, the former state of the USSR responded by building industrial and prefabricated housing units. The so-called Khrushchyevkas consist of concrete-paneled or brick three- to five-storied apartment buildings built from the late 1950s to the early 1980s, mainly because of their low construction costs (Bohn, 2008). The residential neighbourhoods that consist of Khrushchyevkas were often planned according to the Soviet's microdistrict concept, influenced by Clarence Perry's neighbourhood unit (Perry, 1929). The latter concept, originally developed from Howard's Garden City model (Howard, 1898; Choguill, 2008), was Clarence Perry's vision of a self-contained neighbourhood as a reaction to an increasing motorised transport in the metropolitan areas of capitalist cities (Perry, 1929; Maxim, 2009). The idea of the neighbourhood unit comprises a residential area for up to 6,000–10,000 inhabitants surrounded by arterial streets with retail and services (Perry, 1929). The microdistrict concept might be thus perceived as a Soviet type of the neighbourhood unit sharing the same basic principles (Perry, 1929; Maxim, 2009). As the time went by, Khrushchyevkas were demolished or renovated in many parts of the former Soviet Union. However, in Belarus, and Mogilev in particular, they are still in place and subject to a gradual degradation, both physically and socio-economically. The buildings are in poor condition due to the low-quality construction works and materials and the lack of insulation. In addition, Belarus might be affected by climate changes in the near future. Heat waves and other extreme events (e.g. floods or droughts) are expected to increase, putting urban areas at high risk (Kabisch et al., 2016). The Belarusian economy will be impacted mostly in three sectors – agriculture, forestry and water management (Communication, 2015). For that reason, the adaptation to climate changes is extremely important for the country, especially because 41 % of GDP in Belarus is produced in sectors dependent on weather conditions (Communication, 2015). The Republic of Belarus has already set up different policy programmes and strategies for climate mitigation and adaptation: "The National Programme of Measures to Mitigate the Effects of Climate Change for the Period of 2008–2012 years", "The Strategy for Reducing Emissions and Enhancing Removals of Greenhouse Gases by Sinks in the Republic of Belarus for the period of 2007–2012" and "The National Strategy for Introduction of Integrated Environmental Permits for the period of 2009–2020" aiming to reduce and absorb greenhouse gas emissions and develop the programme of synergic measures for various sectors of the national economy (Zenchanka, 2016). According to Choguill (2008), the concepts of garden cities or neighbourhood units were, albeit unconsciously, based on sustainable solutions. Therefore, the suggestion is to re-establish these concepts and adapt them to the new challenges. Sustainable neighbourhoods include economic, social, technical, and environmental dimensions (Choguill, 2008). Neighbourhoods have to be limited to accessible and walkable areas. Local shops, markets and cafés can be used to expand social opportunities. The number of streets and cars in the neighbourhoods should be reduced to ensure

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safety for children and older members of the society. In addition, parks and other green and open spaces play an important role in common meeting places (Choguill, 2008; IUCN, 2018). Also, the conservation of species diversity is a factor in the sustainability of biotic cycles and, accordingly, the sustainable development of the biosphere (Haliuzhyn et al., 2017). Nonetheless, the development of urban green spaces is a complex process due to the involvement of long-term natural processes including growth and maturation of living elements (McMichael, Woodruff and Hales, 2006). Likewise in other places in Europe, the degradation of urban green spaces has been observed in Mogilev. However, without sufficient political and financial support from national or local authorities, funding agencies or private investors, their further development is not possible (Górniak and Costa, 2008).

Thus, the objectives of the paper are:

- to develop a complex approach to microdistrict space organization using environmentally friendly solutions;
- to optimize the microdistrict concept, taking into account modern approaches in urban planning and the interests of the of the community (youth in particular);
- to examine the prospects for development of microdistrict with Khrushchyevkas without their demolition.

Material and method

The paper is mainly based on the information from primary sources – a non-participative observation and the information collected through interviews with city officials, planners and experienced architects, and questionnaires with the residents of the neighbourhood. The current situation in the study area was analysed using Internet maps Mapy.cz (Fig. 1).

For the purposes of this paper, we have only focused on the space outside the buildings. Generally, the area has lots of unattended green spaces, some of them with the dense growth of trees. Fig. 1 shows all urban green areas in the study area (marked in green), kindergartens and schools (marked in orange). Among the green spaces, few plots have also been developed for playgrounds, which are now rather unkempt and unused.

Most of the urban green spaces are not particularly used by the citizens; however, three spaces were identified as the playgrounds of a decent condition.

Based on the observation, the services available in the area were mapped using The AutoCAD program. The interviews were conducted using an open-ended guided questionnaire while the residents were asked to fill out a structured questionnaire. The structured questionnaires were conducted with youths, adults and older people according to our perception of the respondent's age. This approach covers various perspectives across age groups. A total number of 30 surveys was conducted among the residents in August 2018. The SPSS program was used for analysis of the responses from the residents. It comprises the non-parametric Mann-Whitney and Kruskal-Wallis tests that are appropriate for ordinal data.

Results and discussion

According to the statistical analysis of questionnaires, the residents of the Jubilejny district are generally not satisfied with the housing and parking options in their neighbourhood. On the other hand, they are rather satisfied

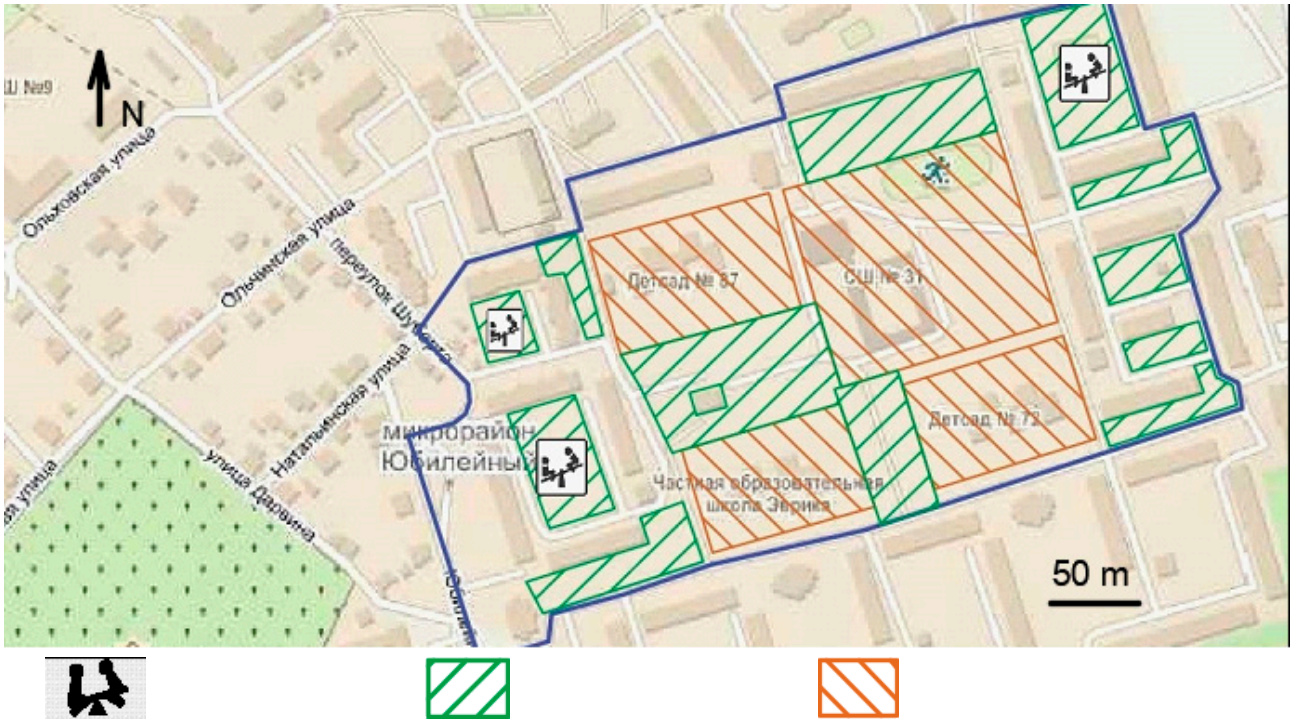


Figure 1 Urban green spaces and playgrounds

Table 1 Satisfaction of residents with housing and neighbourhood

Indicator	Average satisfaction (1–5)	Result
Housing	2.6	weaknesses
Car-parking	2.9	
...	3.0 to 4.0	–
Air quality	4.1	strengths
Public transport	4.1	
Schools	4.1	
Natural environment	4.2	
Grocery stores	4.3	

Table 2 Differences between age groups in residential satisfaction

Tested variable	Used method	Average rank			Sig.
					
Overal satisfaction	Kruskal-Wallis	18.70	15.60	10.22	0.049
Satisfaction w. neighbors		10.80	16.65	19.05	0.082
W. play-grounds		11.00	17.90	17.60	0.099
Importance of rest./cafes		16.28	18.00	8.83	0.032
Of leisure clubs		17.33	16.20	9.78	0.088
Residential stability		10.39	13.06	17.50	0.061

Table 3 Intentions to move out according to the current housing situation

Tested variable	Used method	Average rank		Sig.
		old 	new 	
Intention to move out	mann-whitney	11.39	11.39	0.548

with the natural environment, greenery and air quality (Table 1).

However, there are some particular differences in satisfaction with different factors within the age groups – youths, adults and seniors (Table 2). Youths are significantly less satisfied with neighbours and playgrounds than the other groups. The services in the neighbourhood such as restaurants, doctors, leisure clubs and public transport are more important for youths and adults in comparison to seniors. Grocery stores are equally important to everyone. All in all, older people are significantly less satisfied than youths and adults.

Youths and adults plan to move out in the next few years whereas older people will probably stay due to the lack of funds which might cause a further population ageing threat. Nevertheless, the intention to move is not influenced by the age of apartment houses (Table 3). Therefore, the characteristics of the neighbourhood might also play a crucial role in determining the attitude of residents to their future housing plans.

According to the spatial plan which is based on the delimitation of functional zones, the Jubilejny district should stay as a residential area. Urban planning proposals have to adhere to the general master plan of Mogilev and confirmed by the head of

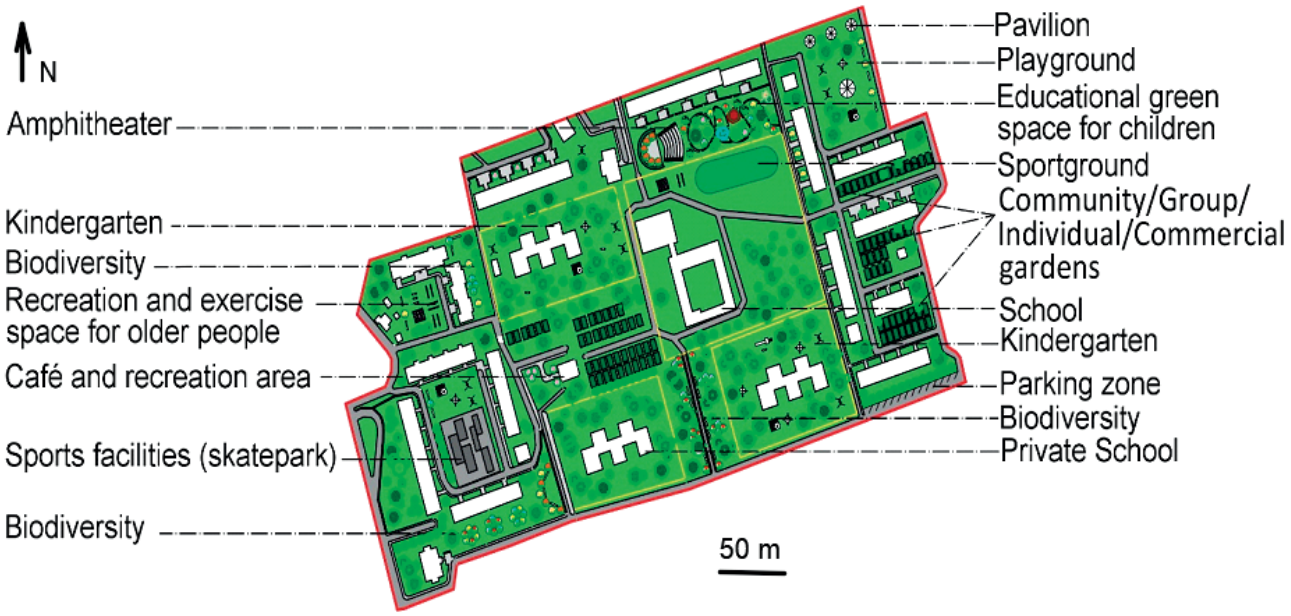


Figure 2 Proposal of implementations in the Jubilejny district

the government. Consequently, it is possible to build new apartment buildings in this area as long as the area keeps its functional zone. However, the local experts are uncertain what happens with the Khrushchyevkas in the future. There are no immediate intentions for their reconstruction or demolition even though there are serious doubts about the concordance of buildings with the requirements of thermal conductivity and fire safety as well as to their overall condition.

Our vision includes the revitalisation of the Jubilejny district by the development of open spaces as per the needs of the local population in a sustainable manner (Fig. 2).

Community/Group/Individual/Commercial gardens

To make better use of the space available, people can be encouraged to grow seasonal food products in urban gardens. Urban agriculture refers to the growing and raising of food crops and animals in an urban setting for the purpose of feeding the local population (Deelstra and Girardet, 2000). It should be noted that there is some lagging behind the advanced countries in the consumption of fruits and vegetables in Belarus (Lobikova, Lobikova and Haliuzhyn, 2017). The cultivation can take place either in large community gardens or in smaller plots allocated to individuals or in commercial gardens. The rental income will benefit the community. A local entrepreneur group could also establish a commercial garden.

Educational green space for children

In the study area, there are two kindergartens and two schools. It is proposed to develop a garden exclusively for the use of school children for an educational purpose. Education for sustainable development is one tool to reconnect populations to green areas and nature. The garden will also develop a sense of belonging to the area and establish a connection to the neighbourhood.

Recreation and exercise space for older people

One of our main target groups is older people because this group stays in the area and spends there a lot of time. It is therefore proposed to address the need of this group on the priority basis and develop recreational and exercise spaces for them to encourage them to spend time outside and being physically active. This will contribute to their health and well-being.

Café and recreation area

It is proposed to have one or two small cafés in the area which people can visit and, thus, the social exchange would be promoted. The products in the café could come from the neighbourhood garden.

Amphitheater

The faded community space of the neighbourhood can be rejuvenated by cultural activities. A small amphitheater is proposed in which the community can gather. The wall of the amphitheater can be used for demonstration of a green wall, which can encourage people to develop vertical gardens or green walls at their own apartments.

Sports facilities

The neighbourhood lacks facilities for outside sports or they are in bad condition. Especially teenagers are very dissatisfied with their playgrounds. Therefore, it is proposed to go beyond the development of urban greenery and also develop special sports facilities. The established playgrounds should be improved, and a new skating park developed.

Safety & Security

Some of the senior people have also expressed safety and security as a concern. While this may not be an issue for the younger residents, it is proposed to develop the security and safety for all by installing solar powered street lights along the neighbourhood streets, pathways and gardens.

Biodiversity

The area already consists of many green spaces. However, a lot of monotonous and invasive species are presently dominating. Therefore, it is proposed to enrich the biodiversity by introducing a variety of local species of vegetation by using a permaculture design.

Car-free zone

The centre of the Jubilejny district is almost without cars. Nevertheless, especially since a lot of people live in the area, it is proposed to make the inner area as a car-free zone. Elderly can then move about without any barriers and children can play on streets without a risk. However, this intervention is costlier, and it should be accepted as a long-term solution. Nevertheless, as residents are rather unsatisfied with parking options in the neighbourhood, it is proposed to develop a small parking area as a compensation for removals of the others.

To implement these nature-based solutions, it is essential to start a dialogue with the local community and the public authorities. Community development will be an essential pillar of the proposal while for some activities, funding from sponsors or public authorities will be important. It is also proposed to invite local entrepreneurs to be a part of this process, thus generating some local jobs and income. To focus on the development of inner areas, it is proposed to reuse the microdistrict concept.

Conclusions

The Jubilejny district in the city of Mogilev, formerly built in concordance with the microdistrict concept in the 1960s, is recently many years after its planned longevity. Nowadays, a number of inhabited apartment buildings, including famous Khruschyevkas, are in almost deteriorated condition with faded public spaces between them. Fortunately, according to the research, the concept of microdistrict and its inner structure persists as the residents have a good access to basic services and public transport.

However, there are several threats besides an uncertain future of Khrushyevkas which might further contribute to a decay of the Jubilejny district. Firstly, the locality is bounded by population ageing since predominantly younger generations have intentions to move out. Therefore, in our proposal, we considered better leisure infrastructures mainly for youths such as the renovation of sports grounds or other outside activities as well as brand new implementations for adult and older people such as an amphitheater or a community garden that may support the active way of life inside the neighbourhood. Secondly, even

though the centre of the Jubilejny district is almost without cars and walking belongs to the most used type of transport therein, the residents perceive the parking as one of the main problems of the whole area. Thirdly, the locality enjoys the abundance of greenery; however, trees often consist of monotonous and invasive species and several green spaces are unkempt. Thus, our proposal mainly comprises nature-based solutions which enrich the biodiversity and better utilise the empty green areas. Overall, the Jubilejny district needs to be handled with immediate solutions as well as the long-term visions that consider also potential solutions for apartment buildings and their future development. Since the Jubilejny district is a typical representative of microdistricts in the Post-Soviet region, the research results could be applied in other similar conditions. However, in each individual case, in order to make the most rational use of space, climatic and urban planning features should be taken into account.

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