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Recreational areas on challenging terrains: concepts and global experience

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Abstract. The presence of recreational areas in urban structures positively influences the emotional well-being of individuals and constitutes a key element of urban planning. Diverse terrain, including mountain slopes, ravines, and marshy areas, transforms into natural parks, serving as rich sources of inspiration and leisure. These natural formations provide unique opportunities for landscape design but, unfortunately, are often overlooked in urban development plans. A shift in urban planning strategy towards selecting such complex landscapes for recreational zones could significantly enhance the cityscape and improve the quality of life for its residents. This article explores the principles of selecting recreational areas with intricate terrain to meet the recreational needs of the population.

Keywords: recreational areas, urbanism, complex terrain, health.

1. Introduction

The study places special emphasis on developing relationships with resources, considering the necessity of valuing and caring for the land. One effective method of nature conservation in the urban environment is the meticulous landscaping of complex terrains, including abandoned and disturbed lands, their regular cleaning, and the secure protection of water protection zones from harmful impacts on humans.

An ecological approach to the planning and uses of abandoned lands ensures an improvement in the quality of urban life and a transformation of the cityscape towards freedom. In turn, residents gain the opportunity to enjoy a higher level of happiness and health. Addressing the ecological condition of ravine areas, marshy landscapes, and steep slopes, preventing accidental disposal of waste and water runoff, contributes to the preservation of the water table. This, in turn, provides fields with clean mountain water for healthier irrigation.

Active measures in working with the slopes of ravines and gullies, stabilizing them, and preventing soil erosion, aim to halt the growth of adverse climates at altitudes near the tops of ravines. The unique forms of relief with sharp elevation changes offer exceptional opportunities for creating interesting design solutions and atypical landscape structures. This, in turn, attracts tourists, adds a special charm to the city, and makes it appealing for visits.

Research Topic: The importance of having recreational areas in the city structure, the utilization of complex terrains for recreational purposes, global experience in utilizing areas with complex terrains for organizing parks, squares, and other recreational spaces.

Objectives and Tasks of the Article: To emphasize the significance of creating recreational zones, to review global practices in establishing and utilizing recreational zones on complex terrains.

1.1. Subsection

Complex terrains are an encompassing term used to describe land areas with significant elevation changes, slopes, and other geomorphological features that make them challenging for development. It includes various forms, categorized by the steepness of slopes, height of peaks, and depth of valleys: hills, mountains, valleys, gorges, ravines, and escarpments. Thus, terrain can be divided into three groups: relief of positive territories, relief of negative forms, and relief of neutral forms.

The first group includes mountain ridges, hills, mountains, and slopes (above the established reference point). The second group comprises valleys, gorges, ravines, valley floors, and slopes (below the established reference point). The third group consists of areas with slightly sloping relief (~5-7°), primarily large flat plains. During the study of the terrain, it's essential to identify small flat areas (horizontal planes), which are integral elements in both positive forms (e.g., watersheds) and negative forms (bottoms of valleys), as well as horizontal platforms on slopes [1]. Relief is the most stable and enduring component of the landscape; it forms the ecological and plastic foundation, significantly influencing various aspects of the environment and revealing the geological and homological history of specific regions.

In urban planning and landscape architecture, complex terrain poses a considerable challenge. The intricate geology presents certain difficulties for urban planning, such as designing residential streets and laying out roads and railways. However, for landscape architecture, such forms are generally considered positive factors. Relief features can be utilized to create interesting multi-level compositions, ensuring harmonious interaction between users and the environment, satisfying their aesthetic and psychological needs.

Areas such as ravines, gorges, valleys, and swamps evoke an unconscious fear and a sense of danger in people, as these

structures can look frightening without proper care and attention to the relief. Nevertheless, ravine and gorge landscapes possess high scenic characteristics, with particular value in their promontories at the confluence of ravines, providing a wide-angle view of the surroundings. This allows for the perception of the ravine composition from an elevated point in an open space. Even the most repulsive place can be transformed by emphasizing scenic spots and adding a comfortable structure, including lighting, pathways, and recreation areas.

The relevance of designing recreational spaces in urban environments is driven by several factors. Firstly, as urban populations grow, providing an adequate number of places for relaxation and recreation becomes increasingly challenging. High population density and limited space necessitate careful planning and utilization of available resources. Secondly, urban life is accompanied by high levels of stress and moral pressure on individuals. Despite the automation and simplification of many processes, people still face daily challenges, striving to meet societal expectations and make complex decisions. This impacts people's psychoemotional well-being and requires the provision of adequate places and conditions for rest and relaxation.

In this context, the creation of quality recreational spaces in cities becomes a crucial aspect. Such spaces should offer opportunities for people to rest and rejuvenate, allowing them to emotionally unwind and release tension. They should be accessible, comfortable, and provide various forms of both active and passive recreation. Additionally, recreational spaces contribute to improving the psychophysiological state of individuals. They create opportunities for physical activity, sports, and games, positively impacting health and overall well-being. Beautiful and well-maintained natural environments, greenery, and spacious parks help reduce stress levels, improve mood, and contribute to psychological well-being, considering the complicating influence of social media consumption on an individual's well-being.

Numerous studies have explored the relationship between nature and the psychophysiological state of humans, a field known as environmental psychology or eco-psychology. Some studies indicate that contact with nature and the environment has a positive impact on our mental and physical well-being. For instance, walks in natural parks or forests can reduce stress levels, enhance mood and concentration, and contribute to attention restoration and fatigue reduction. Other studies highlight the effects of green vegetation on mental well-being. Observing greenery or being in an environment surrounded by green nature can improve mood, reduce levels of depression and anxiety, and enhance sleep quality. Researchers also investigate the influence of nature on physical health and recovery. For example, being in a natural environment can lower blood pressure, accelerate postoperative healing, and improve the immune system. Research in this field employs various methods, including observation, surveys, physiological measurements, and neuroimaging, allowing a better understanding of how nature affects us and the mechanisms underlying this interaction.

Complex terrains play a crucial role in shaping the city structure, offering opportunities for creating unique urban spaces. One key aspect when dealing with such areas is green corridors that not only connect different parts of the city but also enrich its ecosystems. Green corridors traversing complex terrains become an integral part of the urban landscape. They can run along rivers, elevations, or contour hills, form-

ing distinctive pedestrian routes and natural recreational zones. These corridors serve not only as means of transportation but also as environments for recreation, sports, and social interaction.

Moreover, green corridors in complex terrains contribute to the preservation of natural biodiversity systems. They can act as corridors for animal migration, promoting the conservation of natural ecosystems. Such pathways can also be vital elements in urban recreation strategies, providing spaces for walking, cycling, picnics, and other outdoor activities. Thus, the thoughtful integration of green corridors into the city structure on complex terrains not only enhances the urban environment but also contributes to the preservation of natural wealth and the creation of unique urban spaces for residents and visitors.

2. Recreational areas: significance and role in urban environment

Recreational areas hold great significance in the urban environment and serve as a key element enhancing the lives of city dwellers. They provide spaces for relaxation, physical activity, and social interaction, contributing to a healthy lifestyle, improving the physical and mental well-being of urban residents, and stimulating interaction and communication across different segments of society. These positive aspects are indisputable and supported by numerous studies.

For instance, the mental health of children is linked to their mobility and lifestyle; the less active they are, the higher the risks of depression. Research in Kaunas, Lithuania, showed that the more time children spent outdoors in parks, the lower the risk of deteriorating health. Lower greenery in residential areas was associated with a decline in mental and overall health. Another study demonstrated that children living near green spaces had fewer peer-related problems and were less diagnosed with «hyperactivity» [3].

Comparing research results on the impact of green spaces on mental health globally reveals similar situations. In South Korea, among 169,000 surveyed individuals, the likelihood of depression and suicidal indicators was 16-27% higher in areas with low greenery. Individuals with insufficient physical activity had higher chances of depressive and suicidal moods compared to those with moderate physical activity. The average amount of parks and green areas per person was 19.73 m² [4]. In Iran, a study indicated that the frequency of park visits was a significant factor in improving emotional and physical states [5]. In Australia, higher tree density among park vegetation was associated with a lower incidence of cardiovascular diseases. A mere 1% increase in the total area of green vegetation contributed to a reduced likelihood of diabetes [6].

Additionally, a publication in 2019 highlighted the restoration of mental health through the multisensory impact of park vegetation, including visual, auditory, and tactile sensations, emphasizing the substantial contribution of sounds like tree rustling and nature sounds to mental recovery and stress reduction [7].

According to the World Health Organization (WHO), in 2020, outdoor air pollution led to 4.2 million premature deaths worldwide [8]. As part of measures to reduce air pollution at local and global levels, urban greenery is advocated to mitigate the risk of developing cardiovascular and respiratory diseases. Urban greenery, besides reducing noise pollu-

tion and shaping microclimates (temperature, insolation, aeration regimes), purifies the air and contributes to biodiversity conservation [9].

3. Analysis of global experience and its adaptation to the current situation

Global experience in creating recreational areas in complex terrains highlights the importance of adapting urban environments to natural conditions. For instance, in Australia, the preservation of nature and landscape holds a prominent place in state policy. Many cities worldwide successfully integrate recreational zones within ravine and gully terrains, preserving the unique features of the landscape. In Russia, the complex relief of cities in the middle belt attracts young people passionate about extreme sports, envisioning facilities like snow ramps, half-pipes, tubing, sled tracks, cross-country ski trails, ice climbing, snowboarding, tennis, badminton, mini-golf, mountain biking, and rock climbing in winter and summer alike. In some Russian cities, attempts are made to reclaim ravines, shifting from cluttered areas to aesthetics, similar to efforts in other countries. For example, the «Stryi Park» in Lviv, Ukraine, renowned as one of the most beautiful parks in the Second Polish Republic, founded in 1879, organically integrates into the ravine's bottom and slopes, covering an area of 52 hectares, partly on the former Stryi Cemetery grounds [10].

Such a methodological approach constitutes an indispensable basis in the field of ravine territories within the urban boundary, surrounded by residential streets and established infrastructure. One key conclusion drawn from this experience is the potential adaptation of ravines into recreational spaces, creating parks and providing the population with places for post-workday strolls, pet-friendly leisure, and other activities. Implementing such approaches in pre-mountain gorges adjacent to residential complexes becomes particularly relevant.

This methodology also makes sense in addressing the issue of reconstructing the territory of the Central Cemetery, located between Raimbek and Ryskulov Streets. The reconstruction and improvement of this area represent not only a process of physically altering the environment but also an opportunity to create additional resources to expedite natural recovery. By introducing sustainable methods of greening, soil cover restoration, and creating environmentally sustainable water supply systems, the negative impact on nature can be mitigated, ensuring a faster restoration.

Simultaneously, the reconstruction of this territory has a profound socio-cultural aspect. Creating well-maintained and beautiful memorial places and recreation areas will not only draw attention to the nature and history of this place but also provide an opportunity to care for the memory of the departed. Specially designed corners dedicated to memory can serve as places for quiet contemplation, where people can honor the memory of their loved ones and enjoy the surrounding nature.

These places become symbols of respect for the departed and allow people to cope with their losses in harmony with nature. They can also be a source of inspiration for visitors, emphasizing the importance of nature conservation and the value of human life. Thus, the reconstruction of this territory not only contributes to ecological sustainability but also elevates cultural and spiritual values, enriching urban space

and strengthening the connection between humans, nature, and history.

Parks and recreational areas in complex terrains offer diverse opportunities for recreation, including organized walking trails, cycling paths, picnic areas, and sports facilities. One shining example of such a park in mountainous terrain is Griffith Park in Los Angeles, situated on the slopes of the Santa Monica Mountains. The Park features a rich natural diversity, including hills, forests, rivers, and caves [11].

Complex terrain lends a unique character and aesthetic appeal to recreational areas, allowing visitors to enjoy beautiful views and natural surroundings. In Canada, the city of Toronto presents a notable example of park construction – High Park, established in 1876, covering an area of 161 hectares. High Park is a mixed recreational and natural park featuring sports, cultural, and educational zones and institutions, gardens, playgrounds, and a zoo. One-third of the park remains in its natural state with a rare oak savanna [12].

Recreational areas in ravine and gully terrains contribute to improving ecological sustainability, supporting biodiversity, and aiding in the conservation of natural resources. In Canada, the Edmonton region, Alberta, boasts a continuous park system around the North Saskatchewan River Valley, covering a total area of 7.300 hectares. The river valley helps maintain a high level of biodiversity, hosting over 325 plant species, 50 moss species, 40 lichen species, 150 bird species, and 50 mammal species. The river valley also serves as a corridor for animals to move into other preserved areas [13].

Another example is the park system of the Oldman River Valley in Lethbridge, Alberta, Canada, comprising a continuous network of urban parks in the river valley, 100 meters below the prairie level, with a total area of 16 km². The Park areas preserve a high level of biodiversity, hosting various wildlife, including deer, hawks, owls, rabbits, coyotes, badgers, hedgehogs, and pelicans [14].

Such experiences provide insights into the creation of recreational areas, emphasizing the preservation and connection to the natural, cultural, and ecological heritage of the area. An applicable solution is the application of such an approach to ravine systems within which major rivers flow. An example could be the ravine system of the Big Almaty River, which further flows into the First May Lakes. The areas below the level of Bak Street, adjacent to plots of historical and archaeological value, feature historical structures, beautiful landscapes, and unofficial recreation areas, such as horseback riding, outdoor kitchens, and yurt camping.

This approach has the potential to preserve these territories in their pristine state, fostering tourism development by allowing visitors to enjoy the unique nature while preserving natural wealth. This approach contributes to respect for natural resources, stimulates biodiversity development, and enriches the local flora and fauna. Key factors in utilizing complex terrains for recreational purposes include studying the preferences of the local community, preserving cultural heritage, and creating informational educational campaigns to raise awareness of sustainable use of recreational areas and the importance of preserving cultural and ecological heritage.

Beyond preserving ecological values, parks in complex landscapes provide opportunities to introduce innovative approaches, such as landscape design, drainage, and water drainage systems, to maximize the benefits of complex terrain in creating recreational spaces. An interesting modern project is the «Sportplaza Mercator Health Center Sports

Complex» located in the Jean Van Galenstrat area in Amsterdam, Netherlands. The sports complex is situated in a park on complex terrain, with a fully green façade harmoniously blending with the surrounding space [15].

Creating a recreational area of this type can be applied to the improvement of the territory along the Esentai River, near the First Station in the city of Almaty.

3.1. Perspectives and recommendations

Integrated planning. One crucial step toward the sustainable development of complex relief areas is the creation of comprehensive plans that consider not only ecological aspects but also social needs. Integrated planning will enable the optimal use of space, considering its natural features.

Education and awareness. Effective educational programs targeting the population can significantly influence attitudes toward ravine areas. Shedding light on the importance of preserving and appropriately using these natural corners through campaigns and events will help shape an ecological culture among city dwellers.

Community engagement. Actively involving the urban community in the decision-making process regarding the management of complex relief areas will provide diverse perspectives and foster a sense of responsibility for the environment. The public can become a key partner in the sustainable development of these zones. Joint efforts to improve the social and environmental conditions of ravine areas will make the city more resilient, vibrant, and environmentally conscious. Highlighting the importance of preserving and correctly using these natural spaces through campaigns and events will help form an ecological culture among city dwellers.

Management and monitoring. Implementing effective management and monitoring systems to track the state of ravine areas is necessary. This will enable timely responses to changes, support their ecological balance, and prevent negative impacts.

Innovations in landscape design. Developing innovative landscape design methods for ravine and swamp areas contributes to the creation of unique and functional spaces. This may involve installations for relaxation, educational platforms, and sustainable vegetation zones.

Implementing these perspectives and recommendations requires coordinated efforts from authorities, the public, and urban planning specialists. The sustainable development of complex relief areas will be a crucial step toward shaping an ecologically healthy and comfortable urban space.

4. Conclusions

This study has highlighted the importance of recreational areas in the structure of the city and the various approaches of different countries to the creation, improvement, and utilization of recreational spaces. Numerous studies consistently demonstrate the unequivocal significance of having recreational zones in the urban structure, the favorable impact of nature on the overall and psychological health of the population, on child development, and on the ecological condition of the city.

The prospects for using natural areas with complex terrains for recreational purposes involve close interaction with nature, the application of natural materials, the use of land improvement and reclamation methods, and the encouragement and development of local flora and fauna. It is also crucial to plan for the safe use of the park, including the construction of reliable

fences, proper lighting, collaboration with specialists from different fields to consider climate change factors and the possibility of soil erosion, rising water levels, in order to create comprehensive and sustainable solutions and prevent accidents.

An important aspect is the integrated application of various approaches to zoning and organizing park spaces, the implementation of which will create a comfortable multifunctional environment for urban residents, where everyone will find something to their taste and interest. The result of comprehensive work on abandoned city territories will be unique recreational spaces embodying a harmonious blend of nature and urban life, contributing to the health and well-being of the urban community.

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Күрделі рельефтердегі демалыс аймақтары: тұжырымдамалар және әлемдік тәжірибе

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Андатпа. Қалалық құрылымдарда рекреациялық аймақтардың болуы адамдардың эмоционалдық әл-ауқатына оң әсер етеді және қала құрылысының негізгі элементі болып табылады. Таулы беткейлерді, сайларды және батпақты жерлерді қоса алғанда, әртүрлі рельефтер шабыт пен бос уақыттың бай көзі ретінде қызмет ететін табиғи саябақтарға айналады. Бұл табиғи құрылымдар ландшафт дизайнының бірегей мүмкіндіктерін ұсынады, бірақ, өкінішке орай, қала құрылысы жоспарларында жиі назардан тыс қалады. Қала құрылысы стратегиясын рекреациялық аймақтар үшін осындай күрделі ландшафттарды таңдауға өзгерту қала пейзажын айтарлықтай жақсартып, оның тұрғындарының өмір сүру сапасын жақсартуы мүмкін. Бұл мақалада халықтың рекреациялық қажеттіліктерін қанағаттандыру үшін күрделі рельефі бар рекреациялық аймақтарды таңдау принциптері қарастырылады.

Негізгі сөздер: демалыс аймақтары, урбанизация, күрделі рельеф, денсаулық.

Зоны отдыха на сложных рельефах: концепции и мировой опыт

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Аннотация. Наличие рекреационных зон в городских структурах положительно влияет на эмоциональное благополучие людей и является ключевым элементом городского планирования. Разнообразный рельеф, включая горные склоны, овраги и болотистые местности, трансформируется в природные парки, служащие богатыми источниками вдохновения и досуга. Эти природные образования предоставляют уникальные возможности для ландшафтного дизайна, но, к сожалению, часто упускаются из виду в планах городского развития. Изменение стратегии городского планирования в сторону выбора таких сложных ландшафтов для рекреационных зон могло бы значительно улучшить городской пейзаж и повысить качество жизни его жителей. В этой статье рассматриваются принципы выбора рекреационных зон со сложным рельефом для удовлетворения рекреационных потребностей населения.

Ключевые слова: зоны отдыха, урбанизация, сложный рельеф, здоровье.

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