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**“WOMEN IN INNOVATION AND SCIENCE”
XALQARO ILMIY-AMALIY KONFERENSIYA VA FORUMI
ILMIY ISHLARI TO‘PLAMI**

Toshkent davlat transport universitetida 2026-yil 27-mart kuni “Women in Innovation and Science” xalqaro forumi ilmiy ishlari to‘plami chop etildi.

Mazkur nufuzli tadbirlar O‘zbekiston Respublikasi Oliy ta’lim, fan va innovatsiyalar vazirligi hamda Transport vazirligi hamkorligida tashkil etilib, mamlakatimizda ilm-fan, innovatsiyalar va zamonaviy texnologiyalarni rivojlantirish, shuningdek xalqaro ilmiy hamkorlikni yanada kengaytirishga qaratilgan muhim platforma hisoblanadi.

Konferensiya ochilish marosimida davlat organlari, xalqaro tashkilotlar va yetakchi oliy ta’lim muassasalari vakillari ishtirok etdi. Jumladan, Toshkent davlat transport universiteti rektori G‘ulomov Abdulaziz Abdullayevich, O‘zbekiston Respublikasi Transport vazirligi vakili Ulmasova Lobarkhon Adilovna, Osiyo taraqqiyot banki eksperti Claire Charnac, Istanbul Aydin universiteti vasiylik kengashi raisi Mustafa Aydin, Belarus davlat transport universiteti rektori Kazakov Nikolay Nikolayevich hamda Qirg‘iziston Respublikasi Transport vazirligi vakili Dinara Moldokalieva ishtirok etdilar.

Konferensiya ilmiy dasturi doirasida plenar va panel sessiyalar, shuningdek ilmiy ma’ruzalar taqdimoti o‘tkazilib, ularda sun’iy intellekt va raqamli texnologiyalarni iqtisodiyot va ta’limga joriy etish, transport va aviatsiya sohasida innovatsion yechimlar, sanoat va IT sohasida texnologiya transferi, shuningdek ta’limda raqamli platformalar va intellektual tizimlar kabi dolzarb masalalar yoritildi.

2026-yil 27-mart kuni o‘tkazilgan “Women in Innovation and Science” xalqaro forumi ayollar yetakchiligi, innovatsiyalar va STEM sohalariga bag‘ishlangan bo‘lib, mamlakatimizda ayollarning ilm-fan va texnologiya sohalaridagi ishtirokini kengaytirish, ularning yetakchilik salohiyatini rivojlantirish hamda xalqaro hamkorlikni mustahkamlashga qaratilgan strategik maydon sifatida tashkil etildi.

Forum doirasida ayollar yetakchiligini rivojlantirish va rag‘batlantirish, xalqaro tajriba almashinuvi va ilmiy tarmoqlarni kengaytirish, yosh tadqiqotchi ayollar va PhD talabalarni qo‘llab-quvvatlash hamda innovatsion ekotizimlarda gender tenglikni ta’minlash kabi ustuvor vazifalar amalga oshirildi. Shuningdek, forumda ayollar yetakchiligi va STEM, gender tenglik va ilm-fan institutsional rivoji, ayollar tadbirkorligi va innovatsion startaplar, innovatsiya ekotizimlari va xalqaro hamkorlik, yosh ayol tadqiqotchilarni rivojlantirish, mentorlik va akademik tarmoqlar yo‘nalishlarida tematik sessiyalar tashkil etildi.

Forumda davlat organlari, xalqaro tashkilotlar, yetakchi oliy ta’lim muassasalari va ilmiy markazlar vakillari, jumladan “OLIMA” uyushmasi raisi Murtazayeva Raxbar Hamidovna, “Sharq ayoli” xalqaro ayollar jamoat fondi raisi Tursunbayeva Saodat Gafurovna, Osiyo taraqqiyot banki eksperti Claire Charnac, O‘zbekiston Respublikasi Transport vazirligi vakili Ulmasova Lobarkhon Adilovna, Toshkent davlat transport universiteti rektori G‘ulomov Abdulaziz Abdullayevich, Qirg‘iziston Respublikasi Transport vazirligi vakili Dinara Moldokalieva hamda Indoneziyadan universitet dekani Yoga Prihatin ishtirok etdilar.



Shuningdek, forumda Yevropa va Osiyo davlatlaridan yetakchi olimlar, ekspertlar va yosh tadqiqotchilar keng qatnashdi.

Forum dasturiga ochilish marosimi, panel muhokamalar, ilmiy chiqishlar hamda professional rivojlanish bo'yicha workshoplar kiritilgan bo'lib, ular doirasida gender tenglik, ayollar karyerasini rivojlantirish, ilmiy tadqiqotlar va innovatsion boshqaruv bo'yicha amaliy seminarlar tashkil etildi.

Mazkur tadbirlar Osiyo taraqqiyot banki (ADB), "OLIMA" — O'zbekiston xotin-qizlar olimlari uyushmasi, "Sharq ayoli" xalqaro ayollar jamoat fondi, Germaniya xalqaro hamkorlik jamiyati (GIZ), shuningdek Rossiya, Turkiya, Indoneziya va Qirg'iziston oliy ta'lim muassasalari hamda Belarus Milliy fanlar akademiyasi ilmiy institutlari hamkorligida o'tkazildi.

Mazkur xalqaro ilmiy-amaliy konferensiya va forumning ahamiyati shundaki, ular xalqaro ilmiy hamkorlikni mustahkamlash, innovatsion ishlanmalarni amaliyotga joriy etish, raqamli va barqaror rivojlanishni ta'minlash, shuningdek ayollarning ilm-fan va innovatsiya sohalaridagi rolini kuchaytirishga xizmat qiladi. Shu bilan birga, mazkur tadbirlar yosh olimlar va tadqiqotchilarni qo'llab-quvvatlash, ilmiy tajriba almashish hamda global ilmiy makonga integratsiyalashuvni jadallashtirishda muhim ahamiyat kasb etadi.

Mazkur xalqaro ilmiy-amaliy konferensiya va forumning maqsadi zamonaviy ilmiy tadqiqot yo'nalishlarini muhokama qilish, innovatsion yondashuvlar va ilg'or texnologiyalar bo'yicha ilmiy natijalar almashuvini ta'minlash, shuningdek xalqaro ilmiy hamkorlikni rivojlantirishdan iboratdir.

Tadbirda O'zbekiston Respublikasi hamda xorijiy mamlakatlarning oliy ta'lim muassasalari va ilmiy-tadqiqot institutlari olimlari, shuningdek amaliyotda muhim natijalarga ega bo'lgan mutaxassislar o'z ilmiy ishlari bilan ishtirok etdilar.

Ushbu ilmiy to'plamda muhandislik, transport, raqamlashtirish, sun'iy intellekt, innovatsion boshqaruv, gender tenglik va barqaror rivojlanish sohalarida faoliyat yuritayotgan yetakchi olimlar, professor-o'qituvchilar va tadqiqotchilarning ilmiy ishlari jamlangan. To'plamda dolzarb ilmiy muammolar, zamonaviy yechimlar, nazariy va amaliy tadqiqot natijalari yoritilib, ushbu yo'nalishlarning bugungi holati va istiqboldagi rivojlanish tendensiyalari aks ettirilgan.

Mazkur nashr mamlakatimizda ilm-fan va innovatsion rivojlanishni ta'minlash, xalqaro ilmiy aloqalarni mustahkamlash hamda yosh olimlar va tadqiqotchilarni qo'llab-quvvatlash yo'lidagi muhim qadamlardan biri sifatida e'tirof etiladi.

Shuningdek, mazkur ilmiy to'plamda keltirilgan natijalar kelgusida ilmiy tadqiqotlar samaradorligini oshirish, amaliyotga yo'naltirilgan innovatsion yechimlarni keng joriy etish hamda sohalararo integratsiyani chuqurlashtirish uchun muhim ilmiy asos bo'lib xizmat qiladi. To'plam materiallari nafaqat ilmiy jamoatchilik, balki ishlab chiqarish sohasi mutaxassislari, doktorantlar va talabalar uchun ham foydali manba hisoblanadi.

Mazkur nashrda yoritilgan ilmiy g'oyalar va ilg'or yondashuvlar asosida yangi ilmiy izlanishlar olib borilishi, xalqaro ilmiy aloqalarning yanada rivojlanishi hamda innovatsion rivojlanish strategiyalarining takomillashishiga xizmat qilishi kutilmoqda.



International engineering and landscape approaches to the planning of coastal territories in a sustainable urban environment

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Abstract: Coastal territories are increasingly recognized as key components of a sustainable urban environment due to their ecological, social, and engineering functions. However, climate-related risks and increasing anthropogenic pressure make coastal zones highly vulnerable and require integrated planning approaches. The aim of this study is to analyze international engineering and landscape approaches to coastal territory planning and to identify an integrated conceptual model ensuring ecological resilience, engineering stability, and social functionality. The methodology is based on qualitative and comparative analysis of scientific publications, analytical reports, and case studies, supported by a system approach. The results show that the most effective planning solutions are achieved through the coordinated implementation of green infrastructure, engineering adaptation, ecological regeneration, and social integration. The proposed conceptual framework can be applied in landscape and urban design practice, especially in arid and climate-vulnerable regions.

Keywords: coastal territories, sustainable urban environment, green infrastructure, landscape architecture, climate adaptation, nature-based solutions

1. Introduction

In the context of rapid urbanization, coastal territories are increasingly recognized as strategic zones of interaction between natural and anthropogenic systems. These areas perform essential ecological functions, including microclimate regulation, erosion control, and biodiversity conservation [1].

In recent decades, the impact of climate change and the growing anthropogenic pressure on urban ecosystems have significantly increased. Coastal zones are particularly vulnerable to flooding, shoreline degradation, and ecosystem instability, which necessitates the development of new approaches to their planning and management [2], [5].

Modern research emphasizes the importance of integrating engineering solutions with landscape-based approaches, particularly through the implementation of green infrastructure and nature-based solutions [3], [6], [11]. Such approaches contribute to improving ecological resilience, reducing environmental risks, and enhancing the quality of urban environments [3], [6].

However, despite the growing number of studies on coastal territory development, most existing research tends to consider engineering protection, ecological restoration, and public space organization separately. Insufficient attention is paid to their integrated application within a unified spatial and planning framework, particularly in the context of sustainable urban development and climate adaptation.

The relevance of this study is determined by the need to develop sustainable and adaptive models for coastal territory development, particularly under increasing climate risks. The integration of engineering and landscape approaches makes it possible to create multifunctional coastal environments that combine ecological, protective, and social functions.

The aim of this study is to analyze international engineering and landscape approaches to the planning of coastal territories and to identify an integrated conceptual model that ensures ecological resilience, engineering stability, and social functionality in a sustainable urban environment.

2. Research methodology

The research is based on a combination of qualitative and comparative methods. A review of international scientific publications, analytical reports, and case studies on coastal territory development was conducted.

The comparative analysis focused on identifying key approaches to coastal planning, including green infrastructure, engineering adaptation, ecological regeneration, and social integration. These approaches were evaluated according to the following criteria: ecological effectiveness, engineering resilience, adaptability to climate change, and contribution to the quality of the urban environment.

A system analysis method was applied to identify the relationships between the considered approaches and to develop an integrated conceptual model of sustainable coastal territory planning

3. Results and discussion

The analysis of international practices and theoretical approaches has made it possible to identify key engineering and landscape strategies for the sustainable planning of coastal territories. The results demonstrate that effective coastal development requires the integration of natural and engineering solutions aimed at enhancing ecological resilience, reducing anthropogenic pressure, and increasing the adaptive capacity of urban environments.

The main approaches identified in the study are summarized in Table 1.

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Table 1
Key Approaches to Sustainable Coastal Territory Planning

Approach	Main Characteristics	Expected Effects
Green Infrastructure	Use of vegetation, permeable surfaces, and natural systems	Reduction of environmental load and improvement of microclimate
Engineering Adaptation	Shoreline stabilization, drainage systems, flood protection	Increased resilience to erosion and climate risks
Ecological Regeneration	Restoration of natural ecosystems and habitats	Enhancement of biodiversity and ecosystem services
Social Integration	Development of public and recreational spaces	Improvement of urban environment quality and social accessibility

The analysis indicates that each of the identified approaches performs a distinct and complementary function within the overall system of coastal territory development. Green infrastructure contributes to microclimate regulation, water retention, and the reduction of surface runoff, thereby improving environmental performance. Engineering adaptation ensures protection against erosion processes, flooding, and other climate-related risks, providing structural stability and safety. Ecological regeneration supports the restoration of natural habitats and strengthens ecosystem services, while social integration ensures accessibility, functionality, and long-term sustainability of public spaces.

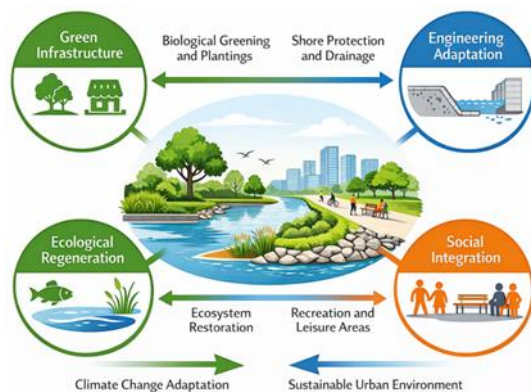


Fig. 1. Conceptual Model of Sustainable Coastal Territory Planning

The study further demonstrates that the highest effectiveness is achieved through the combined and coordinated implementation of these approaches. Their integration enables the formation of a resilient, multifunctional, and adaptive coastal environment capable of responding to contemporary environmental and climatic challenges. This is particularly important for arid and climate-vulnerable regions, where the balance between ecological processes and engineering interventions plays a decisive role in ensuring long-term sustainability.

The interrelation and interaction of the identified approaches are presented in Figure 1.

DISCUSSION

The results obtained confirm that the effective development of coastal territories requires a comprehensive approach that integrates engineering solutions with landscape-based strategies.

In contrast to traditional engineering methods focused primarily on structural protection, modern approaches emphasize the role of green infrastructure and nature-based solutions [3], [6], [8]. These approaches not only reduce environmental risks but also contribute to improving ecological stability and enhancing the quality of urban environments.

The findings of this study are consistent with current research trends in sustainable urban development, which highlight the importance of adaptive and flexible planning strategies in response to climate change and increasing anthropogenic pressure [4], [5]. These results also correspond to current approaches to urban climate adaptation and resilience planning described in international analytical reports [4], [9], [10]. Particular relevance of the identified approaches is observed in arid and semi-arid regions, where water resource management and landscape sustainability are critical factors. In such conditions, the integration of ecological and engineering solutions becomes a key factor in ensuring long-term resilience of coastal territories.

Thus, the study demonstrates that the transition from traditional engineering practices to integrated landscape-engineering approaches represents a necessary step toward sustainable urban development.

These findings are also supported by studies on spatial safety and landscape resilience in urban environments [7].

The proposed approach extends existing studies by structuring coastal planning strategies into an integrated model that combines engineering protection, ecological restoration, green infrastructure, and social functions. This synthesis allows for a more comprehensive understanding of sustainable coastal development and provides a basis for practical application in urban planning and landscape design.

4. Conclusion

The study has demonstrated that coastal territories play a significant role in the formation of a sustainable urban environment and require an integrated engineering and landscape approach.

The analysis made it possible to identify key principles for the planning of sustainable coastal territories, including the integration of green infrastructure, the application of engineering protection measures, and the implementation of nature-based solutions.

It has been established that the combination of ecological and engineering strategies enhances environmental resilience, reduces the impact of climate-related risks, and improves the overall quality of urban space.

The results of this study may serve as a conceptual basis for the development of integrated coastal planning and landscape design projects, particularly in arid and climate-vulnerable regions.



References

- [1] Beatley T., Green Urbanism: Learning from European Cities. Washington, DC: Island Press, 2000.
- [2] Gill S.E., Handley J.F., Ennos A.R., Pauleit S., "Adapting cities for climate change: the role of green infrastructure," Built Environment, vol. 33, no. 1, pp. 115–133, 2007.
- [3] Benedict M., McMahon E., Green Infrastructure: Linking Landscapes and Communities. Washington, DC: Island Press, 2006.
- [4] Newman P., Beatley T., Boyer H., Resilient Cities: Overcoming Fossil Fuel Dependence. Washington, DC: Island Press, 2017.
- [5] Drobchenko N., Olimova O., Karimova D., Khamidova D., Kayimov L., "Vegetation Cover as an Indicator of Degradation and Restoration of Ecosystems in the Aral Sea Region," E3S Web of Conferences, vol. 661, 06001, 2025.
<https://doi.org/10.1051/e3sconf/202566106001>.
- [6] Drobchenko N.V., "Landscape design as an element of climate and technogenic safety," XXI Century. Technosphere Safety, vol. 10, no. 4, pp. 365–374, 2025.
<https://doi.org/10.21285/2500-1582-2025-10-4-365-374>.
- [7] Drobchenko N.V., Karimova D.E., "Spatial safety in public landscapes," XXI Century. Technosphere Safety, vol. 10, no. 3, pp. 293–300, 2025.
<https://doi.org/10.21285/2500-1582-2025-10-3-293-300>.
- [8] Drobchenko N.V., "Economic efficiency of implementing green infrastructure into the historical environment of Samarkand," Economy and Ecology of Territorial Educations, vol. 9, no. 3, pp. 53–60, 2025.
<https://doi.org/10.23947/2413-1474-2025-9-3-53-60>.
- [9] European Environment Agency, Urban Adaptation to Climate Change in Europe. Luxembourg: Publications Office of the European Union, 2016.
- [10] World Bank, Enhancing Urban Resilience. Washington, DC: World Bank, 2020.
- [11] United Nations Environment Programme, Nature-based Solutions for Climate Adaptation. Nairobi: UNEP, 2021.

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