CREATING INFRASTRUCTURE FOR SUSTAINABLE DEVELOPMENT OF DEOCCUPIED REGIONS

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INTRODUCTION

Sustainable development of deoccupied regions is one of the most pressing issues for Ukraine at the present stage. After the territories are returned to state control, there is an urgent need not only to restore the destroyed infrastructure, but also to create conditions for the long-term and harmonious development of these territories. This problem includes social, economic, environmental and institutional aspects that require a systemic approach and innovative solutions. In the context of modern global challenges, sustainable development is the basis for ensuring a high quality of life, social justice and ecological balance. However, in the context of deoccupied regions, this approach takes on special importance. The war leaves behind a destroyed infrastructure, environmental problems, social trauma and economic stagnation. Therefore, the restoration of these territories requires not only a return to the «pre-war state», but also the creation of infrastructure capable of ensuring sustainable development in the future.

One of the key elements of this process is the development of infrastructure. Infrastructure plays the role of a foundation for economic growth, job creation, development of social services and integration of regions into the national economy. At the same time, it must meet modern environmental standards and contribute to mitigating the negative impact on the environment. This involves the introduction of energy-saving technologies, the use of renewable energy sources, environmentally friendly transport systems, as well as innovative approaches to resource management. To achieve this, it is necessary to attract international experience, as well as introduce the latest scientific and technical achievements[1].

Infrastructure development in de-occupied regions is also crucial for restoring social capital and citizens' trust in the state. Properly organized reconstruction contributes to the return of the population to their homes, strengthening local communities and creating conditions for their active participation in the development of their own territories. This includes creating jobs, developing education, health care and cultural institutions that will ensure the full restoration of social infrastructure. It is also important to take into account gender and inclusive aspects so that the restored

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[1] Tyukhtenko N., Churkina I., Pavlovych O., Mokhnenko A., Burak V. Foreign market entry strategy as a key to the competitiveness of enterprises // Ekonomika APK, 2024. №31(5). P. 86-98. https://doi.org/10.32317/ekon.apk/5.2024.86

infrastructure is accessible to all groups of the population, in particular for people with disabilities. Such an approach will contribute to social cohesion and equality of opportunities.

The environmental aspect of recovery also plays an important role in creating a sustainable development infrastructure. Deoccupied territories often face environmental consequences of military operations, such as soil, water and atmospheric pollution, as well as ecosystem degradation. To address these problems, it is necessary to introduce environmental monitoring technologies, land reclamation, restoration of natural landscapes and implementation of renewable energy programs. The use of «green» technologies will contribute not only to the environmental but also to the economic sustainability of the regions, stimulating the development of new sectors of the economy.

The institutional aspect is no less important, because effective management of recovery and development processes is impossible without the creation of appropriate coordination mechanisms between state bodies, international organizations, the private sector and local communities. It is necessary to introduce transparent mechanisms for financing, monitoring the implementation of projects, and also to stimulate the attraction of foreign investment. Particular attention should be paid to building the institutional capacity of local authorities, because they will play a key role in the implementation of sustainable development projects.

Looking at the experience of other countries, one can see how important it is to integrate infrastructure rehabilitation into the broader context of national and regional development. For example, after the end of conflicts in Western Europe or the Balkans, a key element was the establishment of effective governance, which included the involvement of a wide range of stakeholders. The success of such programs depended on the active participation of communities, which contributed to increasing trust in state institutions and increasing social stability. For Ukraine, this experience can become a valuable reference point, but it is necessary to take into account the specifics of the national context and the unique challenges faced by de-occupied regions.

In conclusion, creating infrastructure for sustainable development of the deoccupied regions is a complex but vital task. This requires coordinated efforts of all stakeholders, a systematic approach, and consideration of the needs of both current and future generations. The restoration of these territories will not only be a testament to victory, but also the basis for long-term peace, stability, and prosperity in Ukraine. Each step along this path must be accompanied by a clear understanding of priorities, transparency of actions, and accountability, which will allow building trust in institutions and ensuring support from the international community. At the same time, restoration must be aimed at building not only physical infrastructure, but also social capital, which will become the basis for the country's further prosperity.

The development of deoccupied regions was studied by such domestic scientists as V. Alekseenko, T. Bogdan, A. Karnaushenko, O. Magnovsky, V. Makovii, A. Nesterenko, Yu. Orel, V. Petrenko, S. Potapenko, L. Prochan and others. However, theoretical, methodological and practical issues of sustainable development of deoccupied regions have not yet been fully researched and developed.

The purpose of the study is to analyze approaches to creating infrastructure for sustainable development of deoccupied regions, identify key challenges and prospects, and outline recommendations for the formation of effective policy in this area. Involving the experience of other countries, using international standards, and adapting to the Ukrainian context are integral elements of this process. Successful implementation of such initiatives will allow not only to restore the destroyed regions, but also to create a development model that will become an example for other territories of Ukraine and the world.

Let's consider the main steps that can be useful for achieving sustainable development of deoccupied regions:

1. Economic recovery and stabilization

Step 1. Assess damage and prioritize recovery.

Damage assessment and prioritization of recovery is an extremely important first step in the process of recovery of deoccupied regions that have suffered as a result of military actions or other destructive factors. This process helps to create a clear picture of the destruction, determine the scope of tasks and form a strategy for further actions. Thanks to this approach, it is possible not only to assess the scale of the problems, but also to implement rational planning of recovery measures. Damage assessment allows you to determine priorities in the reconstruction of critical infrastructure, housing stock and social facilities that are crucial for the life of the local population[2].

This stage provides a systematic approach to planning, encompassing a comprehensive analysis of available resources, needs assessment and forecasting of future costs. It also facilitates the effective allocation of resources between different areas, including immediate recovery efforts and long-term development projects in the region. Mobilizing international assistance is also a key aspect, as it can significantly accelerate the recovery process through financial, technical and expert support. Successful damage assessment and prioritization provide the basis for coordination between local authorities, international organizations and donors, which in turn ensures sustainable results in the recovery process. Let us consider the key stages of this process in more detail:

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[2] Alekseenko V.Yu. Innovative development in post-war reconstruction at the meso-level // Scientific Bulletin of Uzhgorod University. Series «Economy», 2024. No. 1 (63), pp. 59-65. https://doi.org/10.24144/2409-6857.2024.1(63).59-65

1. Conducting a preliminary assessment: data collection – using satellite imagery, aerial photography and drones to quickly identify the extent of damage; damage mapping – creating interactive maps showing damage to infrastructure, residential buildings, industrial areas and agricultural land; field surveys – organizing mobile teams to visually inspect damaged areas and record the damage.

2. Categorization of damages. Damages are classified by key sectors: infrastructure: roads, bridges, power grids, water mains, hospitals, schools; housing: apartment buildings, private houses; economic assets: factories, warehouses, farms; environmental impacts: damage to soils, water resources, forests.

3. Identification of critical facilities: vital services – hospitals, schools, water supply, power grids; key transport hubs – roads and railways connecting cities and villages; social infrastructure – houses for displaced persons, kindergartens, cultural centers.

4. Economic assessment of damages: calculation of the cost of restoring facilities; analysis of the impact of destruction on the regional economy; determination of the amount of financing required for restoration.

5. Prioritization of restoration. Priority criteria: importance for life support – objects on which the population's access to basic services depends; level of destruction – objects that can be quickly restored with minimal costs; economic effect – objects that stimulate economic development (e.g., enterprises, agricultural zones); social impact – objects that contribute to social stability and community cohesion; environmental safety: territories that may cause additional damage to the environment if they are not restored.

6. Assessment tools: international standards – use of approaches such as PDNA (Post-Disaster Needs Assessment); technologies – GIS systems, drones, 3D modeling; digital platforms – portals for monitoring damage and recovery work.

7. Involvement of stakeholders: local authorities – providing information on local needs; international partners – involving experts from the UN, World Bank, EU; civil society organizations – for data collection and support at the local level.

8. Creating a strategic plan: forming a step-by-step action plan; developing a budget with a clear allocation of funding; determining the timeframe for each stage.

9. Public communication: Regularly inform the population about the status of the recovery; include the community in the decision-making process; provide feedback to clarify needs.

10. Monitoring and adaptation: Continuously monitoring the progress of recovery; adjusting priorities based on new circumstances or needs.

This approach allows for effective coordination of efforts, mobilization of resources, and sustainable development of regions.

Step 2. Restore basic infrastructure.

The restoration of basic infrastructure is the foundation for the sustainable development of deoccupied regions, since the quality of life of the local population, economic stability and further development of the territories depend on the state of the infrastructure. Basic infrastructure includes vital facilities such as transport routes, energy networks, water supply and sewage systems, healthcare, education and social institutions. Its restoration is a key task that allows ensuring the normal functioning of society, reducing the level of social tension and stimulating economic activity.

This process should be systemic, which means coherence of actions at all levels – from local initiatives to state policy. Planning of restoration measures should be based on a clear assessment of damage, analysis of needs and definition of priorities. It is important to take into account the specifics of each region, its geographical, social and economic features. To achieve maximum effect, it is necessary to develop comprehensive strategies that include both short-term measures to overcome urgent problems and long-term plans for infrastructure development.

The effectiveness of recovery depends on the rational use of resources and clear coordination between different participants in the process. This process should involve state authorities, local governments, the private sector, civil society organizations and international partners. An important role is played by the mobilization of financial, technical and human resources, as well as the use of innovative technologies that contribute to improving the quality and speed of recovery. The implementation of environmentally friendly and energy-efficient solutions is especially relevant, which will allow creating a sustainable infrastructure adapted to modern challenges.

The restoration of basic infrastructure should be focused on the long term, which involves not only returning to the previous state, but also creating conditions for further development. This means modernizing existing facilities, building new infrastructure solutions that meet modern standards, and integrating these regions into the national and international economy. This approach ensures sustainable development, contributes to the growth of the region's investment attractiveness and improving the quality of life of its residents, creating the foundation for a stable future. The second step includes the following areas:

1. Energy: repair of power grids – restoration of power lines, substations and transformers; introduction of renewable energy sources: solar and wind power plants for regions with frequent outages, mobile power plants for temporary energy supply; smart grids (Smart Grid): ensuring supply stability, monitoring consumption in real time; modernization of heat supply systems – restoration of boiler houses, replacement of outdated heat mains with energy-efficient ones.

2. Water supply and wastewater treatment: repair of water mains and pumping stations: restoration of pipelines and treatment facilities, provision of backup water supply in case of accidents; water treatment: restoration of

treatment stations, implementation of mobile treatment systems in remote areas; wastewater treatment: restoration of sewage systems, construction of modern treatment facilities to reduce pollution.

3. Transport: road infrastructure: repair of roads, bridges and tunnels, restoration of road markings, signs and lighting; rail transport: reconstruction of railway tracks, stations and depots, modernization of rolling stock (locomotives, wagons); public transport: launch of bus and tram routes, provision of electric buses to reduce emissions; aviation: restoration of regional airports to improve logistics.

4. Communications and digital infrastructure: mobile and fixed communications: restoration of mobile base stations, laying fiber-optic lines for high-speed Internet; digital services: restoration of state online platforms for citizens, ensuring access to the Internet in schools, hospitals and other social facilities.

5. Housing stock: reconstruction of damaged buildings: restoration of apartment buildings and private housing, use of modern ecological and energy-efficient materials; temporary housing: construction of modular settlements for displaced persons, provision of basic living conditions (heat, water, electricity).

6. Healthcare: medical institutions: restoration of hospitals, polyclinics, primary health care centers, equipment of medical institutions with modern technologies; mobile medical centers – organization of mobile clinics to serve remote communities; emergency care systems: restoration of dispatch services, purchase of specialized transport (ambulance).

7. Education: reconstruction of educational institutions: rebuilding schools, universities, kindergartens, equipping classrooms with modern technologies (computers, multimedia boards); inclusive education – creating an accessible environment for children with special needs; digital education – ensuring access to distance learning.

8. Environmental infrastructure: cleaning of territories: disposal of construction debris and hazardous waste, restoration of green areas; water bodies: reconstruction of dams, canals, water tanks, improvement of the drainage system.

9. Financing and partnership: local and state budgets – allocation of funds for recovery; international assistance – grants and loans from international organizations (EU, UN, World Bank); public-private partnership – cooperation with business to invest in infrastructure.

10. Control and transparency: project monitoring – use of digital platforms to track progress; reporting – regular publication of data on costs and results.

The restoration of basic infrastructure is an important stage that lays the foundation for the further development of regions, contributes to the return of the population and economic revival.

Step 3. Ensuring security.

Ensuring security in the deoccupied regions is a key step to stabilizing the situation, restoring public confidence, and creating the foundations for sustainable development. This process is multifaceted and encompasses a wide range of challenges that require a systemic approach and coordinated actions by state authorities, local governments, international partners, and civil society. Without an adequate level of security, it is impossible to ensure the normal functioning of vital systems, restore economic activity, return people to their homes, and guarantee them a basic level of protection.

Physical security is one of the highest priority tasks, which includes demining territories, maintaining public order, combating crime and eliminating the consequences of military actions. Particular attention should be paid to ensuring safe living conditions for people returning to de-occupied areas, as well as restoring critical infrastructure, which is the basis for the normal functioning of the region. No less important is the formation of trust in law enforcement agencies, which is possible only through transparent, fair and effective activities[3].

Social security involves overcoming the consequences of conflict, such as community disintegration, psychosocial trauma, discrimination and social tension. It is important to develop rehabilitation programs, support for the most vulnerable categories of the population and integration of displaced persons. Particular attention should be paid to creating conditions for dialogue between different groups of the population, which will contribute to the restoration of social unity and strengthening the sense of shared responsibility for the future of the region.

Economic security is another important aspect, as it directly affects the stability and development of the region. This includes creating jobs, stimulating entrepreneurship, attracting investment, and fighting corruption. Only a stable economy can ensure the long-term prosperity of the region and increase the well-being of its residents.

Cybersecurity is an integral part of modern security, as digital technologies are becoming increasingly important in the functioning of the state, business and society. Protecting critical information systems, combating cybercrime, countering information attacks and disinformation are important tasks for ensuring the security of regions. Investments in cybersecurity and the development of modern data protection systems will contribute to maintaining stability and trust in the digital infrastructure.

Thus, ensuring security in the deoccupied regions is a complex and multi-level process that requires taking into account physical, social, economic and cybersecurity aspects. Only a systemic approach based on cooperation of all stakeholders can guarantee the successful restoration of these regions and the

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[3] Karnaushenko A.S., Petrenko V.S. Innovative strategies of the European Union for the economic recovery of post-conflict regions: prospects for implementation in Ukraine // Economic Space, 2024. No. 193. P. 66-73. https://doi.org/10.30838/EP.193.66-73

creation of conditions for their sustainable development in the future. Let us consider the main aspects of this process:

1. Demining of territories: priority zones – residential areas, roads, agricultural lands, critical infrastructure facilities; modern technologies – use of drones, robotics and specialized machines for mine detection; education of the population – campaigns to raise awareness of mine danger, distribution of information materials through the media and schools.

2. Restoration of law and order: strengthening local law enforcement agencies – recruiting new employees from the local population, training personnel in accordance with modern standards; patrolling – regular police presence in communities to ensure security, establishing security strongholds in key settlements; combating crime – combating looting, illegal arms trafficking and organized crime.

3. Ensuring physical security: restoring critical infrastructure – repairing and strengthening facilities such as dams, bridges, power plants, installing security monitoring systems (video surveillance, motion sensors); organizing shelters – re-equipping existing bomb shelters, building new shelters in densely populated areas.

4. Cybersecurity: restoration of digital infrastructure – protection of government databases and communication systems, installation of modern antivirus and anti-hacker systems; training of specialists – advanced training courses for IT personnel in government institutions; informing citizens – campaigns on the protection of personal data and the security of online payments.

5. Working with the population: psychological support – organizing assistance centers for war victims, conducting rehabilitation programs for children, veterans, and people with post-traumatic stress disorder; supporting social cohesion – creating public initiatives and volunteer projects to unite residents, conducting events that help restore trust in government structures.

6. Weapons management: collection and destruction of illegal weapons – creation of weapons exchange programs for compensation, control over the storage and use of firearms; training in safety rules – conducting courses for the population on weapon handling.

7. International assistance: cooperation with international partners – involving experts from the UN, OSCE and other organizations to monitor security, obtain technical assistance for demining and cybersecurity; exchange of experience – using best practices of other countries in ensuring security after conflicts.

8. Creation of an early response system: threat prevention – establishment of emergency notification systems; rapid response – formation of crisis centers to coordinate response to threats; preparation of the population – training and education for citizens on actions in case of emergencies.

9. Justice and the rule of law: investigation of war crimes – documenting crimes, cooperation with international courts; restoration of the judicial

system – opening courts in the regions, ensuring legal protection for the population; reconciliation programs – working with communities to reduce social tension.

10. Security monitoring and assessment: creation of monitoring centers – regular collection of data on the situation in the region; adaptation of plans – flexible response to new threats or challenges.

These measures will help ensure comprehensive security, promote the restoration of normal life and the development of the deoccupied regions.

Step 4. Involve the international community.

Involving the international community is a critically important step for the successful recovery and development of deoccupied regions, as it is international cooperation that creates opportunities for the effective use of resources and the exchange of best practices. This process includes establishing close cooperation with international organizations, financial institutions, governments of other states, as well as non-governmental organizations that are ready to support efforts to rebuild the affected territories. Such cooperation contributes not only to overcoming the consequences of the conflict, but also lays the foundation for sustainable development and integration of the region into global economic and social processes. Involving the international community is an integral part of the successful recovery and development of deoccupied regions. It provides access to financial resources, advanced technologies, expert assistance and creates the basis for the integration of these regions into global processes. Thanks to close cooperation with international partners, it is possible to ensure not only the recovery of the affected territories, but also their long-term development, which will contribute to improving the quality of life of residents and ensuring stability in the region. Let us consider this step in more detail:

1. Financial support: grants and loans – involving international financial organizations (World Bank, IMF, EBRD) to finance recovery projects, creating special reconstruction funds with the support of the EU, UN, NATO and other organizations; targeted assistance – preparing project proposals for obtaining grants in the areas of infrastructure, education, medicine and ecology, using technical assistance programs (for example, USAID, GIZ).

2. Humanitarian assistance: provision of necessary resources – involving humanitarian organizations to provide food, medicine, clothing and shelter, creating logistical hubs to coordinate the delivery of humanitarian aid; social support – assistance programs for internally displaced persons, veterans and families affected by the conflict, providing psychological support through international initiatives.

3. Technical expertise: knowledge exchange – involving foreign experts for consultations in the field of infrastructure restoration, resource management and sustainable development, conducting trainings and seminars for local specialists; reform support – partnership with international

organizations to implement anti-corruption and governance reforms, and implementing best practices in post-conflict reintegration.

4. Investments: attracting private capital – developing public-private partnership (PPP) programs for infrastructure and social projects, presenting investment opportunities at international forums; special economic zones – introducing preferential conditions for foreign investors in deoccupied regions, creating industrial parks to stimulate production and exports.

5. Diplomatic support: international coalitions – working with partner countries to build global support for the restoration of regions, organizing conferences to discuss the prospects for reconstruction with the involvement of the international community; sanctions against the aggressor – lobbying to maintain sanctions pressure on the aggressor state, using international legal mechanisms for reparations.

6. International organizations: support from the UN and the EU – use of UN programs (UNDP, UNESCO, UNICEF) for the development of education, medicine, culture and the social sphere, cooperation with the EU within the framework of regional integration and modernization programs; NATO initiatives – assistance in the field of security, demining and stabilization.

7. Education and science: exchange programs – participation in international educational programs such as Erasmus+, Horizon Europe, scholarships for youth and teachers to study abroad, scientific projects – partnership with foreign universities to develop innovative solutions in regional regeneration.

8. Cultural diplomacy: popularization of Ukrainian culture – organization of international cultural events, exhibitions, concerts, cultural exchange programs to promote Ukrainian identity; preservation of historical heritage – cooperation with UNESCO to restore destroyed monuments.

9. Information support: countering disinformation – partnership with international media to cover the real situation in the regions, campaigns to raise awareness about the consequences of aggression and the need for assistance; digital platforms – creation of portals where the international community can track the results of recovery and directions of financial assistance.

10. Coordination of international efforts: special agencies – creation of coordination centers to manage international assistance; action plan – development of a comprehensive recovery strategy agreed with international partners.

Involving the international community is not only a source of resources and knowledge, but also an important tool for establishing Ukraine as a strong partner on the global stage.

Step 5. Monitoring and adaptation.

Monitoring and adaptation are important components of the process of restoring deoccupied regions, as they allow assessing the effectiveness of the

measures taken, adjusting strategies, and ensuring sustainable development in changing circumstances:

1. Monitoring recovery progress: performance indicators – defining clear indicators for each stage of recovery (e.g. number of buildings recovered, level of energy provision, access to health services), using digital platforms for real-time data collection and analysis; assessing the impact of recovery – assessing the impact of recovery on the economy, social sphere, security and environment through regular reports and surveys among residents, determining the social impact of recovery, in particular in the field of employment, poverty level, access to basic services.

2. Monitoring platforms: interactive maps and tracking systems – using maps to visualize the progress of recovery (infrastructure, social facilities, roads, water supply), web platforms where citizens and international partners can track the status of reconstruction and provide feedback; public monitoring – organizing public councils that will monitor the implementation of recovery projects, involving citizens in active participation in collecting information and providing feedback on the quality of the work performed.

3. Assessment of investment effectiveness: financial monitoring – keeping records of recovery costs with a detailed breakdown by area (construction, healthcare, education, social programs), public access to reports on the use of funds, which allows ensuring transparency and reducing corruption risks; assessment of the impact of investments on the local economy – analysis of how investments affect employment, living standards and business development in the regions, determining the effectiveness of public-private partnerships and cooperation with international organizations.

4. Crisis preparedness and adaptation: forecasting possible risks – identifying potential threats to recovery (economic crises, natural disasters, political changes) and developing response plans, taking into account risks related to security, social tensions, or potential disruptions in the supply of resources; adapting to changing conditions – flexibility in planning and adapting recovery programs depending on new circumstances (for example, changing political situations or new challenges due to climate change), conducting regular assessments of recovery strategies and making necessary adjustments.

5. Assessment and adaptation of social programs: social monitoring – assessment of the needs of the population, especially the most vulnerable groups (displaced persons, veterans, people with disabilities, women and children), monitoring changes in the social climate, levels of trust in the authorities and levels of social cohesion; adaptation of social programs – regular updating of social service provision programs in accordance with changes in the situation on the ground, making changes to citizen support mechanisms based on feedback and effectiveness assessment.

6. Adaptation of infrastructure projects: analysis of the effectiveness of infrastructure restoration – monitoring the condition of restored facilities

(roads, hospitals, schools, water supply) to assess their functionality and reliability, use of smart technologies to monitor the condition of infrastructure in real time (for example, sensors to determine the condition of bridges, water pipes, electrical networks); adaptation to environmental conditions – taking into account environmental and climate changes in restoration projects (resistance to floods, droughts, temperature changes), introduction of green technologies and energy-efficient solutions in infrastructure reconstruction.

7. Integration with international standards and practices: involving international partners for monitoring – partnership with international organizations (UN, EU, World Bank) to conduct independent audits and assess the effectiveness of projects, participation in international indices and rankings, such as the competitiveness index, government effectiveness, and anti-corruption index; application of international standards – implementation of international standards in the fields of construction, ecology, and resource management to ensure high quality recovery.

8. Transparency and accessibility of results: public reports and platforms – regular publication of reports on recovery results and monitoring of progress on official websites and through the media, use of platforms to ensure open access to data on the state of recovery by citizens and international partners.

9. Feedback and strategy adjustment: active listening to citizens – conducting surveys among the local population to collect feedback and assess the effectiveness of recovery, organizing public hearings to discuss adaptive changes and adjust strategies in real time; operational adjustment – rapid adaptation of plans and strategies in a rapidly changing situation, taking into account new economic, social or political challenges.

Monitoring and adaptation are essential for ensuring sustainability and reducing risks at all stages of recovery. These processes allow for responding to changing situations, improving management practices, and making effective use of available resources.

2. Economic development and sustainability

Step 6. Economic development.

Economic development in the deoccupied regions is a key stage for restoring the well-being of the population, creating jobs, and attracting investment. To do this, it is necessary to implement comprehensive measures that will ensure stability and sustainable economic growth:

1. Restoration of local businesses: financial support – providing preferential loans and grants to small and medium-sized businesses, compensation for losses for enterprises affected by hostilities; recovery programs – launching special economic zones with preferential taxation, simplifying administrative procedures for business registration; training of entrepreneurs – organizing trainings and courses for advanced training.

2. Attracting investments: regional investment programs – development of projects that will attract foreign and domestic capital, holding investment

forums to promote the region's opportunities; state guarantees – providing risk insurance for investors, implementing transparent mechanisms for resource allocation.

3. Development of the agricultural sector: restoration of agriculture – repair of irrigation systems, restoration of soils and elimination of the consequences of pollution, subsidies for the purchase of seeds, fertilizers and equipment; support for farmers – ensuring access to markets through cooperatives, implementation of training programs in modern agricultural technologies; export potential – support for the export of agricultural products, certification of products to comply with international standards.

4. Industry: modernization of enterprises – investing in modern technologies to restore production, transition to energy-efficient and environmentally friendly technologies; development of new industries – stimulating the development of green energy, processing industry, production of goods with high added value.

5. Infrastructure projects: construction of transport corridors – repair of roads, railways, airports to improve logistics; development of logistics centers – creation of warehouses and transport hubs for storage and redistribution of products; digital infrastructure – expansion of the high-speed Internet network for the development of e-commerce.

6. Tourism: reconstruction of tourist facilities – restoration of historical monuments, natural parks; popularization of the region – holding cultural festivals, exhibitions, development of new tourist routes; ecotourism – creating conditions for the development of outdoor recreation.

7. Labor market: job creation – implementation of projects that promote mass employment (construction, agriculture); retraining of personnel – retraining courses for people who have lost their jobs, training in new professions relevant to the region; support for youth – internship programs and first employment for graduates.

8. Digital economy: development of the IT sector – creation of technology parks and IT hubs, support for startups through grants and accelerators; e-commerce – integration of local manufacturers into e-commerce platforms, training businesses in the use of digital tools.

9. Financial infrastructure: restoration of the banking system – creation of mobile banking branches to serve remote communities; access to finance – microloans for small businesses, launch of financial literacy programs for the population.

10. Transparency and trust: transparent mechanisms for resource allocation – use of digital platforms to monitor the implementation of economic projects; citizen engagement – inclusion of local communities in the economic development planning process; anti-corruption measures – creation of mechanisms for controlling expenditures and combating corruption.

11. Environmentally sustainable development: green economy – support for enterprises that use environmentally friendly technologies, implementation of projects to restore natural resources; development of renewable energy – construction of solar and wind power plants.

The development of the economy of the deoccupied regions requires coordination at all levels – from the local community to international partners. A comprehensive approach will ensure not only economic growth, but also sustainable development and well-being of the population.

Step 7. Education and professional training.

Education and vocational training in the de-occupied regions are an important tool for restoring human potential, stimulating economic development and promoting social cohesion. To achieve these goals, it is necessary to take into account modern challenges and adapt the education system to new conditions:

1. Restoration of educational infrastructure: repair and construction of educational institutions – restoration of destroyed schools, universities, colleges and kindergartens, equipping premises with modern educational materials and equipment; safety in educational institutions – installation of shelters and early warning systems, creation of a safe environment for children.

2. Access to education: inclusive education – ensuring access to education for children with special educational needs, training teachers to work with inclusive groups; digital education – providing schools with the Internet and equipment for distance learning, developing online courses and learning platforms; transport accessibility – organizing school buses for children from remote areas.

3. Training of teaching staff: advanced training of teachers – training of teachers in modern teaching methods, courses on the use of digital technologies in the educational process; psychological support of teachers – organization of trainings on working with children who have experienced traumatic experiences, provision of resources to overcome professional burnout.

4. Modern educational programs: updating the content of education – integration of modern subjects (IT, robotics, ecology), learning languages necessary for integration into the global community; practice-oriented learning – expansion of the professional orientation course in schools, integration of students into local production projects; patriotic education – programs aimed at forming national identity, studying the history and culture of the region.

5. Development of vocational education: restoration of vocational education institutions – renovation of schools and technical colleges, purchase of modern equipment for practical classes; popularization of working professions – campaigns for young people on the prestige of working professions, cooperation with employers to ensure employment of graduates;

training in relevant professions – educational programs in the fields of IT, agricultural technologies, renewable energy, and construction.

6. Adult retraining: vocational training centers – creation of centers for retraining the adult population, courses in entrepreneurship, management, digital literacy; flexible educational programs – short-term intensives for acquiring new professions, evening and online courses for workers.

7. Psychological support for pupils and students: rehabilitation programs – psychological assistance to children who have survived war trauma, training in self-regulation and stress management; social initiatives – support groups for children, youth and their families, integration of displaced persons into local communities.

8. International cooperation: partnership with international organizations – obtaining grants and technical assistance for the restoration of educational institutions, borrowing best practices in the field of education; educational exchanges – organizing programs for training students and teachers abroad, cooperation with foreign universities.

9. Monitoring and evaluation: education quality control – creating a system for assessing the effectiveness of educational programs, involving the public in assessing the state of educational institutions; needs analysis – regular surveys of citizens to identify educational gaps, adapting educational programs to changes in the labor market.

10. Stimulating innovation: technology parks at universities – creating innovation centers for the development of startups and scientific projects; stimulating scientific activity – financing research aimed at solving regional problems; supporting talented youth – competitions and grants to support gifted students.

The development of education and vocational training in the deoccupied regions will contribute not only to the restoration of the region, but also to ensuring its sustainable development, the formation of a competitive economy and social cohesion.

Step 8. Environmental sustainability.

Environmental sustainability is a key component of sustainable development in de-occupied regions. Environmental restoration, prevention of further pollution, and adaptation to climate change are critical to ensuring a quality of life for the population and sustainable economic development:

1. Assessment of environmental damage: environmental monitoring – conducting an environmental audit to assess the level of soil, water, and air pollution, creating interactive maps of environmental risks; ecosystem analysis – identifying damaged natural areas and zones that require urgent restoration.

2. Restoration of natural resources: cleaning of contaminated areas – remediation of soils contaminated with petroleum products and chemicals, elimination of natural landfills and disposal of hazardous waste; restoration of water resources – rehabilitation of rivers, lakes, ponds, implementation of

modern wastewater treatment systems; restoration of forests – large-scale afforestation of areas damaged during hostilities, planting trees with a high ability to absorb CO_2.

3. Green energy: development of renewable energy sources – construction of solar, wind and bioenergy plants, attracting investments in small hydroelectric power plants; energy efficiency – reconstruction of buildings using energy-efficient materials, installation of solar panels on public sector buildings.

4. Sustainable agriculture: environmentally friendly technologies – the use of biological methods of plant protection, the rejection of pesticides and chemical fertilizers in favor of organic ones; rational land use – crop rotation, agroforestry reclamation to preserve soil fertility, and the restoration of degraded lands.

5. Waste management: separate collection and recycling of waste – organization of a household waste sorting system, creation of enterprises for the processing of plastic, metal, glass and organic waste; disposal of hazardous waste – ensuring safe disposal of ammunition, construction waste and industrial waste; educational campaigns – teaching the population the rules of sorting and reducing the amount of waste.

6. Biodiversity and nature conservation: restoration of natural ecosystems – reintroduction of extinct or reduced animal populations, reconstruction of natural habitats; expansion of protected areas – creation of new reserves and national parks, protection of rare species of flora and fauna.

7. Adaptation to climate change: combating flooding and droughts – building drainage and irrigation systems, greening urban areas to mitigate temperature peaks; reducing community vulnerability – educating the population on managing climate change risks, creating local disaster warning systems.

8. Environmental education: raising public awareness – educational programs for schoolchildren and adults on environmental practices, conducting campaigns to promote an eco-active lifestyle; supporting public initiatives – promoting environmental projects of public organizations, organizing volunteer actions to clean up territories.

9. Environmental control: creation of a monitoring system – introduction of technologies for monitoring the quality of air, water, and soil; corporate responsibility – requirement for companies to conduct an environmental assessment of their activities, a system of fines for environmental pollution.

10. International cooperation: attracting international funds – finding partners to finance environmental projects, cooperation with the UN, EU and other organizations to solve environmental problems; exchange of experience – implementing the best global practices of sustainable development.

11. Environmentally sustainable transport: development of public transport – introduction of electric buses and trams into urban infrastructure, construction of bike paths and pedestrian zones; popularization of

environmental solutions – encouragement of the use of electric and hybrid cars, installation of a network of charging stations.

A comprehensive approach to ensuring environmental sustainability in the deoccupied regions will contribute not only to improving the environment, but also to improving the quality of life, increasing tourist attractiveness, and creating new opportunities for economic development.

Step 9. Social cohesion and reintegration.

Social cohesion and reintegration are key tasks for restoring peace, unity and sustainable development in the de-occupied regions. These processes aim to overcome social divisions, maintain inter-group trust and create conditions for the integration of all segments of the population:

1. Restoring trust and dialogue: public dialogue forums – organizing roundtables, public hearings and discussions to discuss the problems of the region, involving different groups of the population, including displaced persons, veterans, youth and women; mediation and peacemaking initiatives – involving professional mediators to resolve conflicts, creating platforms for joint discussion of historical, ethnic or political issues.

2. Integration of displaced persons and return of the population: social security of displaced persons – provision of housing, work, access to medicine and education, simplification of administrative procedures for registration and renewal of documents; reintegration into communities – mentoring and support programs for new residents, encouragement of joint community initiatives for displaced persons and local residents.

3. Support for vulnerable groups: assistance to war victims – psychological rehabilitation for veterans, children, women and families of the deceased, social adaptation programs for people with injuries or disabilities; work with youth – organization of youth centers, camps and trainings to develop leadership qualities – involvement of young people in cultural and volunteer initiatives.

4. Civil society development: support for local initiatives – grants for public organizations aimed at local community development, training of activists and community leaders; involvement in decision-making – expanding citizen participation in budget planning and local projects, transparent feedback mechanisms with local authorities.

5. Patriotic education: education about national identity – integration of historical lessons about national achievements and challenges into the educational program, popularization of national culture and traditions through festivals and exhibitions; support for heroes and veterans – organization of events honoring military personnel and volunteers, creation of memorials and museums dedicated to the history of the region.

6. Volunteer initiatives: community involvement in assistance – supporting volunteer movements to restore infrastructure, help victims, training volunteers in first aid and psychological support; social actions –

organizing events aimed at solving specific problems (cleaning up areas, supporting schools, etc.).

7. Social unity programs: cultural events – festivals, exhibitions, concerts that unite people from different social groups; sporting events – tournaments, competitions and sports sections for youth and adults; joint projects – collective initiatives that contribute to the unification of the community (for example, the development of parks, educational centers).

8. Education and awareness: educational campaigns – informing about human rights, democratic values and tolerance, raising awareness about peaceful coexistence and respect for cultural diversity; media literacy – teaching critical thinking to counter disinformation, creating local media for honest coverage of events.

9. Monitoring social sentiment: public opinion research – surveys to determine the level of trust between population groups, analysis of citizens' needs and problems to adjust reintegration programs; rapid response – development of mechanisms for rapid resolution of social conflicts.

10. International support: cooperation with international organizations – obtaining grants for social projects, borrowing best practices in the reintegration of post-conflict territories, exchange programs – attracting foreign experts to train local communities, organizing cultural and educational exchanges.

Social cohesion and reintegration in de-occupied regions are essential for strengthening societal unity, overcoming the consequences of the conflict, and creating a stable foundation for future development.

Step 10. Digitalization and transparency.

Digitalization and transparency are key elements of modern governance that ensure the efficiency, openness and accessibility of public services for citizens and businesses. In modern conditions, these processes are of particular importance, as they are the basis for building a governance system that meets the requirements of the information society and ensures interaction between the state, citizens and the private sector. For the deoccupied regions, digitalization and transparency are not only tools for modernizing governance processes, but also important factors that contribute to restoring trust in government, overcoming the consequences of the conflict and ensuring sustainable development[4].

Digitalization processes cover a wide range of tasks, including the creation of unified electronic platforms for the provision of administrative services, automation of management processes, ensuring open access to data, as well as the introduction of digital tools for communication between citizens and

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[4] Plaksun A.O. Mechanisms of management of the development of deoccupied territories: problems and prospects // Scientific notes of the V.I. Vernadsky TNU. Series: Public management and administration, 2024. Volume 35(74). No. 2. https://doi.org/10.32782/TNU-2663-6468/2024.2/16

authorities. They allow significantly increasing the efficiency of management, minimizing bureaucracy, reducing the time and resources required to obtain services, and ensuring equal access to them for all citizens, regardless of their place of residence.

Transparency of governance is an important component that allows strengthening citizens' trust in state institutions. In de-occupied regions, where the level of trust in the authorities is often significantly reduced due to the consequences of conflicts, transparency becomes a key tool for restoring social cohesion. This includes publishing information on state spending, conducting open tenders, ensuring access to and discussion of government decisions. Thanks to this, citizens can monitor the activities of the authorities, actively participate in decision-making and feel involved in the processes of restoring the region. For de-occupied regions, digitalization and transparency also have a significant economic effect. The use of digital tools contributes to attracting investment, developing entrepreneurship and creating new jobs. Open data stimulates innovation and creates opportunities for the development of new business models. In addition, these processes are a powerful mechanism for combating corruption, as automation and transparency minimize the impact of the human factor, reduce opportunities for abuse and contribute to increasing the responsibility of officials.

Thus, digitalization and transparency are important elements of modern governance, which in the conditions of deoccupied regions acquire special importance. They contribute to the efficiency of state institutions, restore trust in the authorities, stimulate economic growth and create the foundations for sustainable development. The integration of these processes into the strategy for the recovery and development of regions allows ensuring their competitiveness in the modern world and building the foundation for long-term prosperity. Let us consider the main aspects of this step:

1. Implementation of e-government: unified digital platforms – creation of a public services portal for residents of deoccupied regions (registration, tax services, obtaining certificates), integration of the platform with the national system «Diya»; automation of processes – digitalization of document flow in local government bodies, introduction of electronic signature for citizens and entrepreneurs.

2. Transparency in decision-making: open access to information – publication of data on the use of budget funds, tenders, social programs, creation of interactive maps of recovery projects (infrastructure, medicine, education); electronic voting – implementation of platforms for public consultations and surveys, electronic voting systems in local elections and community meetings.

3. Digital services for citizens: online administrative services – registration of civil status acts, issuance of permits, processing of subsidies, online requests for restoration of documents lost due to occupation; digital medicine – creation of electronic health records for residents, access to online

consultations with doctors through the national eHealth system; educational services – implementation of platforms for distance learning and retraining.

4. Development of digital infrastructure: Internet access – deployment of high-speed Internet networks, especially in rural areas, provision of public Wi-Fi hotspots in public places; information security – protection of residents' data and government systems from cyberattacks, training of personnel in the basics of cybersecurity.

5. Anti-corruption measures: electronic tenders – use of the Prozorro platform for all procurement in the region, ensuring transparency in the selection of contractors for infrastructure restoration; expenditure monitoring – automated reporting systems for local authorities, creation of public councils to verify the implementation of budget programs.

6. Development of the digital economy: business support – creation of platforms for electronic business registration, online services for tax reporting and customs operations; e-commerce – encouraging the development of local online stores and logistics services, programs to train entrepreneurs in digital skills.

7. Education in the field of digitalization: training for citizens – organization of digital literacy courses for all age groups, creation of training programs on the use of government online services; training of specialists – development of training programs for IT specialists, cooperation with universities to introduce specialties in the field of cybersecurity and digital governance.

8. International cooperation: attracting technology and financing – partnership with international organizations and IT companies, participation in international programs for the development of digitalization; exchange of experience – studying successful digitalization practices in other countries, organizing conferences and seminars with international experts.

9. Public control and feedback: interactive platforms – launching services for citizens' appeals, complaints and suggestions, the ability to evaluate the work of public services; social networks and mobile applications – informing citizens through official pages and channels, launching mobile applications for access to public services.

10. Innovative technologies: use of Big Data – data analysis to predict population needs and improve planning; artificial intelligence and blockchain – automation of decision-making in the field of social programs, use of blockchain technologies to increase data security and transparency.

Digitalization and transparency not only simplify citizens' access to services, but also lay the foundation for the long-term development of the region, ensuring openness, efficiency, and trust in public institutions.

CONCLUSIONS

The process of restoring post-conflict territories includes the implementation of comprehensive measures outlined in 10 steps. Each of

these steps is important for ensuring stability, restoring the livelihoods of the population, and creating conditions for long-term development.

The conclusion of the first step is the need to conduct a comprehensive analysis of the destruction and its impact on various sectors of life. This assessment allows us to determine the extent of damage to infrastructure, the economy, the social sphere and the environment, prioritize restoration work depending on its criticality and impact on the lives of the population, and develop a strategic plan with a clear definition of deadlines, budgets and responsible executors.

Infrastructure reconstruction is the foundation for normalizing life in post-conflict areas. The priority is to repair and modernize energy systems, water supply, transport networks, and digital infrastructure.

Restoring infrastructure creates conditions for the return of the population, attracting investment and stimulating economic activity. The integration of modern technologies, such as «green» energy solutions, increases resilience to possible future crises.

Demining is critical to ensuring the physical safety of the population. The restoration of law enforcement, the fight against looting and crime contribute to stabilization. The protection of digital systems and cybersecurity are becoming increasingly relevant in the modern world.

Economic recovery is an important tool for ensuring stability and sustainable development. Supporting small and medium-sized businesses through loans, grants and benefits contributes to job creation and local economic development. Reviving the agricultural sector, especially in agricultural regions, stimulates food security and export potential. Investments in infrastructure projects ensure long-term economic stability.

Human capital development is an important element of recovery. Restoring educational institutions and access to quality education contributes to social cohesion and the development of future generations. Vocational retraining programs help people adapt to changing labor market conditions. Integrating innovative technologies into the educational process increases the competitiveness of the region.

Environmental measures ensure sustainable development and improve the quality of life. Land reclamation, cleaning up areas of toxic materials and restoring natural resources are important tasks. The development of renewable energy and the introduction of energy-efficient technologies contribute to environmental sustainability. Environmental education campaigns raise public awareness and stimulate a responsible attitude towards the environment.

After a conflict, it is necessary to ensure the integration of all segments of the population. Reintegration programs for internally displaced persons and veterans contribute to social stability. Cultural and educational activities aimed at reconciliation reduce tension in society. Social cohesion creates conditions for peaceful coexistence and joint development.

The creation of digital platforms for monitoring and managing recovery processes increases transparency and efficiency. The introduction of e-government simplifies administrative procedures and reduces corruption. Access to modern technologies ensures the integration of the region into the global digital economy.

International support is essential for post-conflict recovery. Financial assistance in the form of grants, loans and investments allows for the implementation of large-scale projects. Humanitarian assistance helps meet the basic needs of the population in crisis conditions. Cooperation with international organizations provides access to best practices and knowledge.

Monitoring and adaptation ensure the effectiveness of recovery plans. Using digital technologies to collect and analyze data allows for real-time assessment of progress. Continuous adaptation of strategies to changing conditions ensures their relevance and effectiveness. Openly informing the population about recovery results increases the level of trust in authorities.

SUMMARY

The study examines the problem of restoration and creation of infrastructure for sustainable development of the deoccupied regions of Ukraine. The main emphasis is on a multifaceted approach that includes economic, social, environmental and institutional aspects. The authors emphasize the importance not only of restoring destroyed facilities, but also of creating conditions for long-term development. Considerable attention is paid to environmentally sustainable technologies, energy conservation and the use of renewable energy sources. A special role in this process is played by social cohesion, restoring citizens' trust in the authorities and ensuring the inclusiveness of reconstruction. The study also analyzes international experience and suggests specific steps for integrating these regions into the national and global context. Recommendations for attracting international support, innovative technologies and developing strategic planning are aimed at achieving sustainable development and improving the quality of life. This work is a significant contribution to the development of an effective policy for the restoration and development of the deoccupied territories of Ukraine.

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