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ACQUIRED HELPLESSNESS SYNDROME IN MONOFUNCTIONAL SYSTEMS EXPERIENCING MULTICRISIS: MECHANISMS OVERCOMING CHALLENGES IN RESILIENT CIRCULAR ECONOMY

Viktoriia Mykytenko*
Mykhailo Ptoukha Institute for Demography and Quality of Life Studies of National Academy of Sciences of Ukraine,
Kyiv, Ukraine
ORCID iD: 0000-0002-8212-9777

Nataliia Sheludko
Mykhailo Ptoukha Institute for Demography and Quality of Life Studies of National Academy of Sciences of Ukraine,
Kyiv, Ukraine
ORCID iD: 0000-0001-6936-3158

Veronika Khudolei
Academician Yuriy Bugay International Scientific and Technical University,
Kyiv, Ukraine
ORCID iD: 0000-0002-6658-7065

Nomeda Dobrovolskienė
Vilnius Gediminas Technical University,
Vilnius, Lithuania
ORCID iD: 0000-0002-1606-9980

*Corresponding author:
E-mail: vmikitenko@ukr.net

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Introduction. This study examines the issue of acquired helplessness syndrome (AHS) in monofunctional socio-ecological-economic systems, which are formed due to external armed aggression. The lack of integrated solutions covering demographic, social, economic, ecological, psychological, and institutional aspects limits the effectiveness of regeneration processes, reduces territorial competitiveness, and hinders development.

Aim and tasks. This study aims to develop an integrated conceptual and methodological model for overcoming AHS by combining circular economy tools, the resilience paradigm, and cognitive rehabilitation approaches.

Results. The analysis revealed interrelated demographic, economic, environmental, social, institutional, and psychological determinants of AHS that form sustainable barriers and risks to the restoration and modernisation of monofunctional systems (MFS). Using expert assessment and a matrix of relationships, the weighting coefficients of the influence of key determinant groups on socio-ecological-economic regeneration and rehabilitation were quantitatively assessed. Critical barriers, threats, and risks underlying the manifestations of SPB in MFS were identified. This approach made it possible to develop practical mechanisms for stabilisation and recovery, integrated into a holistic conceptual model, to form adaptive strategies for spatial development in a multi-crisis situation. A universal algorithm for restoring the stability of the MFS is proposed, ensuring competitiveness, adaptability, and inclusive territorial development, consistent with international post-crisis recovery practices.

Conclusions. The study confirmed that overcoming the AHS in monofunctional socio-ecological-economic systems requires integrating demographic, socio-ecological-economic, psychological, and institutional components into a single management system. The developed model and algorithm can serve as a universal methodological tool for the adaptation of various types of territorial entities in the future. The proposals contribute to restoring the cognitive and social activities of local communities and increasing their resilience to multidimensional threats. Prospects for further research are related to testing model solutions in various regional contexts, assessing their effectiveness, and developing digital tools to support management decisions in the regenerative development and rehabilitation of MFS.

Keywords: AHS, Monofunctional Systems, Circular Economy, Resilience, Sustainability.

1. Introduction.

In conditions of multi-crisis, a set of shocks and crises of a military, socio-economic, and environmental nature, there is a deep monofunctionalisation of territorial systems, which is accompanied by the loss of economic, social, and environmental multidimensionality. Such a transformation forms persistent negative socio-behavioural patterns, particularly the syndrome of acquired helplessness, which blocks society's ability to self-recover, innovate, and develop resiliently. In conditions of depletion of the resource base, destruction of economic ties, and limited access to markets and investments, traditional approaches to the restoration of territories lose their relevance. The applied meaning of the circular resilient concept is actualised, combining the principles of circular economy, environmental responsibility and social reintegration, creating closed resource circulation cycles, minimising losses and ensuring sustainable development (Kennedy & Linnenluecke, 2022).

It is worth noting that the issues of circular resilience and overcoming the syndrome of acquired helplessness in monofunctional systems are also reflected in international scientific discourse. Research within the framework of "resilience studies", "behavioural economics", and post-conflict "recovery frameworks" demonstrates an increase in attention to the cognitive and social factors that influence the restoration of socio-ecological and economic systems (Parnell & Crandall, 2020).

The modelling of circular resilience is consistent with methodological approaches proposing innovative adaptation mechanisms that are especially relevant for countries with experience of war and deep socio-economic crises. The academic importance of this development lies in the formation of integrated mechanisms for overcoming the syndrome of acquired helplessness through the synergy of economic, environmental, social, and cognitive rehabilitation tools. The creation of a universal algorithm determines the practical significance of ensuring the resilience of monofunctional systems in the post-multicrisis period, which increases the possibilities of their spatial, economic, and social regeneration.

2. Literature Review.

The issue of overcoming the consequences of monofunctionalisation of territorial systems, particularly in conditions of deep crisis transformations and turbulence in the functioning of the socioeconomic system of the state, is actively studied within the framework of interdisciplinary scientific approaches.

The theoretical basis for this direction is formed by works devoted to diagnosing and minimising AHS (Seligman, 1975; Maier & Seligman, 2016). The social and psychological aspects of this problem are highlighted in studies of the mechanisms of adaptive behaviour of communities, stress resistance, and collective ability to change and adapt to rapidly changing living conditions (Bonanno, 2021; Ungar, 2021). Several modern studies supplement the theoretical basis for this study.

In particular, Baratta et al. (2023) outline the neuroscientific mechanisms of the transformation of the state of acquired helplessness into resilience; Longman et al. (2023) analyse the psychological mechanisms of collective adaptation to climate-related stresses; Wang et al. (2025) identified and systematised the destructive factors determining the manifestations of acquired helplessness syndrome, including among youth groups, emphasising its relevance in modern educational and social environments..

Regarding aspects of economic policy, a significant contribution is represented in the studies of Calzolari et al. (2021), Geissdoerfer et al. (2017), Kirchherr et al. (2018), and Korhonen et al. (2018), where the key emphasis is on closed cycles of resource use as a tool for overcoming structural imbalances and eliminating threats. Some studies on spatial economics and regional development (Camagni & Capello, 2013; Pike, 2017) emphasise the importance of restoring the multidimensional functionality of territories by integrating socio-ecological-economic factors.

The synergy of these approaches is provided by the combination of cognitive rehabilitation mechanisms with economic-ecological tools, which is detailed in works dedicated to the restoration of human capital and social cohesion (OECD, 2021, Putnam, 2000, Sen, 2014).

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Therefore, the multidisciplinary use of the above triad of concepts will create the basis for developing an integrated model for overcoming acquired helplessness in monofunctional systems, consistent with the principles of circular sustainability and inclusive development.

3. Methodology.

The methodological basis of the study is a interdisciplinary approach that integrates the provisions of the resilience paradigm of socio-ecological-economic systems (Biggs et al., 2015; Libanova, 2024) and the concept of the circular economy (Melnyk, 2024), adapted to the conditions of the war and post-war transformation of monofunctional systems. Simultaneously, a matrix of relationships between the determinants of the acquired helplessness syndrome was constructed using a combination of methods.

a) System analysis: To structure determinants into six interconnected groups (demographic, social, economic, environmental, institutional, and psychological) to determine the logic of their influence and interaction in the context of regeneration processes.

b) The method of structural-logical modelling was used to visualise and formalise inter-group relationships, which allowed them to be presented in a matrix format.

c) Expert-analytical method in combination with the modified method of hierarchy analysis to determine the weight coefficients of the influence of each group of determinants on the processes of regeneration and rehabilitation of monofunctional systems (MFS) (the expert sample was formed with the involvement of specialists in the fields of regional economic and environmental management, which ensured interdisciplinary verification of the results).

Additionally, factor analysis was used to identify structural and functional barriers that determine the development of AHS, cluster analysis to typify monofunctional territories by the level of resilience and recovery potential, and the comparative historical analysis method to compare national experience with international practices of post-crisis transformation.

An integrated conceptual and methodological model for overcoming AHS was developed and built on four interconnected blocks: diagnostics of the state of the system, identification of risks and barriers, formation of innovative mechanisms of stabilisation and regeneration, and adaptive integration of results into a long-term development strategy. This approach to building an integrated model for overcoming AHS ensures the scientific validity of the solutions proposed by researchers and the universality of their application in practice in various spatial-functional contexts.

A universal algorithm for restoring the stability and resilience of the MFS was developed based on a synthesis of interdisciplinary methods and conceptual approaches that ensure the comprehensive nature of the restoration and eco-modernisation of monofunctional systems.

Thus, the following were considered:

1) Conceptual and theoretical approaches: a) the resilience paradigm as the basis for building a recovery strategy focused on the system's ability to adapt, counteract, and quickly recover from crisis impacts.

b) The concept of a circular economy ensures resource efficiency, ecological balance, and the integration of closed production and consumption cycles.

c) An inclusive economy – involving all social groups in the regeneration processes and increasing social cohesion.

d) The institutional integration approach combines demographic, social, economic, environmental, psychological, and institutional components into a single management system.

2) Methodological approaches:

a) System analysis – to formalise the algorithm's goals, objectives, and stages using interconnected logic.

b) SWOT analysis – to identify internal and external factors influencing the competitiveness and adaptability of the MFS.

c) The scenario forecasting method models alternative recovery trajectories and chooses the optimal strategy depending on risks and resource constraints.

d) Hierarchy analysis method – to rank priority areas of recovery.

e) Factor-cluster analysis to group territories by resilience level, allowing the algorithm to adapt to different types of MFS.

3) Instrumental and applied methods:

a) Benchmarking – to compare national and international post-crisis recovery practices.

b) The structural-logical modelling method formalises the algorithm through interconnected phases and blocks.

c) Expert assessments – to verify the proposed mechanisms and determine the realism of their implementation in the short, medium, and long terms.

Despite the existence of separate scientific studies on the topic of the article, devoted to overcoming the consequences of monofunctionalisation and implementing circular approaches, there are no holistic scientific solutions that would integrate demographic, social, environmental, economic, psychological, institutional, and cognitive rehabilitation aspects into a single interdisciplinary model.

However, existing developments mainly focus on narrow aspects, particularly economic rehabilitation, infrastructure restoration, or local social support, ignoring their interdependence and the need for institutional coordination in the long term. Therefore, the absence of an integrated approach significantly limits the effectiveness of regeneration processes within the state, preventing the synchronisation of socio-economic, environmental, and cognitive-rehabilitation mechanisms of recovery. This, in turn, hinders the formation of effective strategies for overcoming the AHS, slows the return of multidimensional functionality of territories after destruction during a large-scale war, and reduces their resistance to repeated crisis impacts.

Simultaneously, it should be noted that the conditions of military monofunctionalisation particularly exacerbate this problem, turning the entire country into a monofunctional territory. Without the systemic integration of the institutional components of reconstructive spatial development (RSD), achieving full socio-ecological and economic stabilisation is impossible, ensuring circular sustainability and quality of life.

4. Aim and Tasks.

This study aims to substantiate and develop an integrated conceptual and methodological model for overcoming the syndrome of acquired helplessness in monofunctional socio-ecological-economic systems in war and post-war transformation challenges.

This study combines the principles of the circular economy, resilience paradigm, and cognitive rehabilitation approaches to ensure the comprehensive regeneration of territories, increasing their socio-economic stability and ecological balance. This study identifies key structural and functional barriers to recovery. It develops mechanisms for integrating demographic, social, environmental, economic, psychological, and institutional components into a single system for managing regeneration processes under increasing threats and risks to sustainable management. The results of this study will be a methodological toolkit for adapting different types of monofunctional systems to multicrises, corresponding to modern practices of post-crisis transformation of multidimensional dynamic systems.

5. Results.

To assess the state and dynamics of resilience (using integrated indices), generalised data from international statistical sources were used, in particular, the Circularity Gap Report (Circle Economy, 2018–2023), OECD Resilience Systems Analysis (OECD, 2014–2022), and integrated indicators from the World Bank Open Data database (Circle Economy Foundation, 2024, Organisation for Economic Co-operation and Development, 2024, World Bank, 2024).

The analysis covered 15 countries worldwide with different levels of socioeconomic development and economic structure, including EU member states (Germany, France, the Netherlands, and Poland), countries with economies in transition (the Czech Republic, Lithuania, and Ukraine), and industrial leaders in Asia (Japan, South Korea, and Singapore). The methodology was based on a unified index scale ("0–100"), where indicators for 2010 were taken as a conditional starting point:

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a) The circular economy index was formed based on the share of material reuse, energy efficiency, and the level of implementation of resource-saving technologies.

b) The resilience index considered the adaptive capacity of the economy, institutional stability, social cohesion, and the ability to quickly recover after crisis events (considering methodological justifications) (Libanova, 2024).

The dynamics presented in Figure 1 demonstrate a gradual growth trend for both indices in 2010–2020, followed by a decline in 2021–2023, which is associated with both the pandemic and geopolitical upheavals (the war in Ukraine).

Monofunctional socio-ecological-economic systems, especially under conditions of military monofunctionalisation, demonstrate a significant decrease in adaptive capacity and resilience to external challenges and threats to sustainable management (Sharifi, 2023; Mykytenko & Sheludko, 2025).

Thus, the key factor blocking the effectiveness of regeneration processes is the AHS, which manifests itself in the degradation of initiatives at the local level, the reduction of social capital and human resources, the loss of institutional flexibility, and an increase in dependence on external assistance.

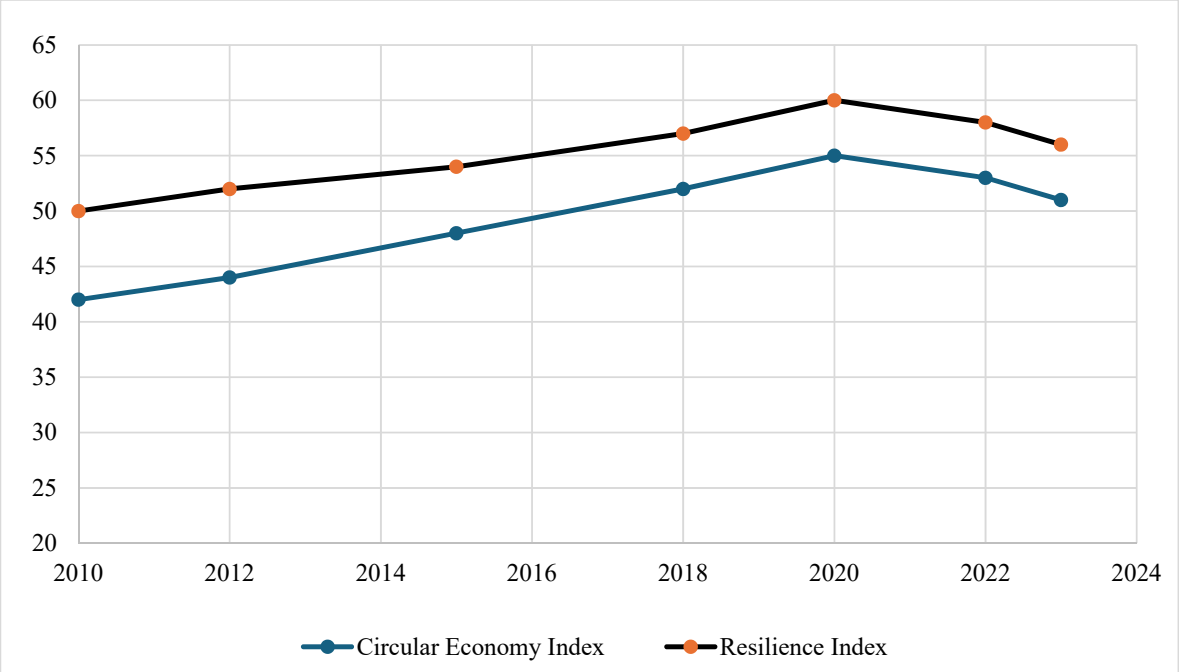

Fig. 1. Circular Economy and Resilience Index Trends, 2010–2023.

Note: The sample includes Germany, France, the Netherlands, and Poland; the Czech Republic, Lithuania, and Ukraine; and Japan, South Korea, and Singapore.

Source: based on data from the Circle Economy Foundation (2024), the Organisation for Economic Co-operation and Development (2024), and the World Bank (2024).

The analysis (Mykytenko, 2024) identified interrelated demographic, economic, environmental, social, institutional, and psychological determinants of the AHS. These determinants form persistent barriers to restoration, regeneration, rehabilitation and eco-modernisation of the MFS (Table 1).

The analysis also enabled the construction of the Matrix of Interrelations of AHS Determinants (Table 2).The average integral coefficient of the importance of the impact on the regeneration processes (0.76) indicates a high level of interdependence and systemic nature of barriers.

Table 1. Determinant Groups of AHS as Persistent Barriers to the Restoration, Rehabilitation, and Modernisation of Monofunctional Territories.

Group of Determinants	Key Manifestations and Drivers	Consequences for Recovery and Modernisation
Demographic	Outflow of migrants, depopulation, population ageing, and accelerated demographic decline. Loss of labour potential through casualties and disability. Declining birth rate.	Reduction of the labour force and shortage of skilled personnel. Labour productivity decline. Deformation of the age and status structure of communities.
Economic	Monofunctional economy and reliance on a single activity. Disrupted production and infrastructure chains. Loss of markets and logistics routes. Reduced investment attractiveness	High vulnerability to external shocks. Limited diversification of the economy. Chronic deficit of resources for innovation.
Ecological	Degradation of natural resources due to military operations. Pollution of soil, water and air. Decline in biodiversity. Destruction of ecosystems and natural landscapes.	Reduced ecosystem services. Deterioration of environmental safety of production. Rising ecological risks for population health.
Social	Destruction of social service infrastructure (education, health care, culture). Decline in civic engagement. Loss of horisontal ties within communities. Social isolation of certain population groups.	Intensification of social fragmentation. Growing inequality in access to services. Decline in communities' capacity for self-organisation.
Institutional	Weakening of local self-government. Lack of coordination between levels of governance. Absence of integrated planning. Dependence on external funding.	Decline in the effectiveness of governance. Low resilience to crisis situations. Limited capacity for strategic transformation.
Psychological	Learned helplessness syndrome among the population. Spread of distrust towards authorities and institutions. Psychological exhaustion. Traumatic stress.	Decline in social resilience. Lower levels of initiative. Reduction of cognitive and social regeneration capacity.

Table 2. Matrix of Relationships Between Determinants of Acquired Helplessness Syndrome.

Influence / Dependence	Demographic	Economic	Ecological	Social	Institutional	Psychological	Coefficient of Influence & Regeneration
Demographic	–	0.85: outflow of labour force deepens economic crisis	0.55: decline in ecological management	0.70: social degradation of community	0.60: weak human resource base of governance	0.80: traumatisation and loss of motivation	0.78
Economic	0.80: low incomes stimulate migration	–	0.60: limited investment in ecological recovery	0.75: deterioration of social infrastructure	0.65: decline in financial and institutional capacity	0.70: economic pessimism	0.83
Ecological	0.55: pollution reduces settlement attractiveness	0.60: ecological losses undermine economy	–	0.70: deterioration of public health	0.55: institutional overload in recovery	0.50: ecological anxiety	0.64
Social	0.70: rupture of social ties → demographic decline	0.75: loss of services weakens economy	0.65: absence of community eco-stability	–	0.80: lack of civic participation in governance	0.85: growth of depression and stress reactions	0.76
Institutional	0.60: weak governance and processes	0.70: inefficiency of economic regulation	0.55: ecological vulnerability	0.80: inconsistency in social policies	–	0.75: loss of trust in institutions	0.70
Psychological	0.80: loss of motivation to work	0.75: weakening of entrepreneurship and economic activity	0.55: passivity in ecological activity	0.85: passivity in community projects	0.75: alienation from institutions	–	0.72

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The analysis revealed the following patterns:

1) The most significant systemic impact is exerted by economic (0.83) and demographic (0.78) determinants, which form the primary constraints for modernisation.

2) Psychological (0.77) and social (0.76) factors are powerful multipliers of adverse effects, which slow down even with the presence of investments.

3) Environmental factors (0.64) had a lower direct impact but a high latent risk, especially in the long term. Thus, high coefficients of cross-impact confirm that an integrated, interdisciplinary, and multi-vector approach is needed to overcome the AHS.

The presented graph (Fig. 2) reflects the distribution of weight coefficients of the influence of six key groups of determinants: demographic, economic, environmental, social, institutional, and psychological on the processes of regeneration and rehabilitation of the MFS in the war and post-war periods.

This diagram was constructed based on the synthesis of statistical data from international and national sources, including the World Development Indicators database (demographic, economic, and social indicators) of the World Bank (2024), reports of the United Nations Environment Programme (2023), statistical collections of the State Statistics Service of Ukraine (environmental and institutional indicators), as well as the generalised results of surveys and research conducted by the Organization for Economic Co-operation and Development (2023) in the field of social cohesion and psychological resilience of communities.

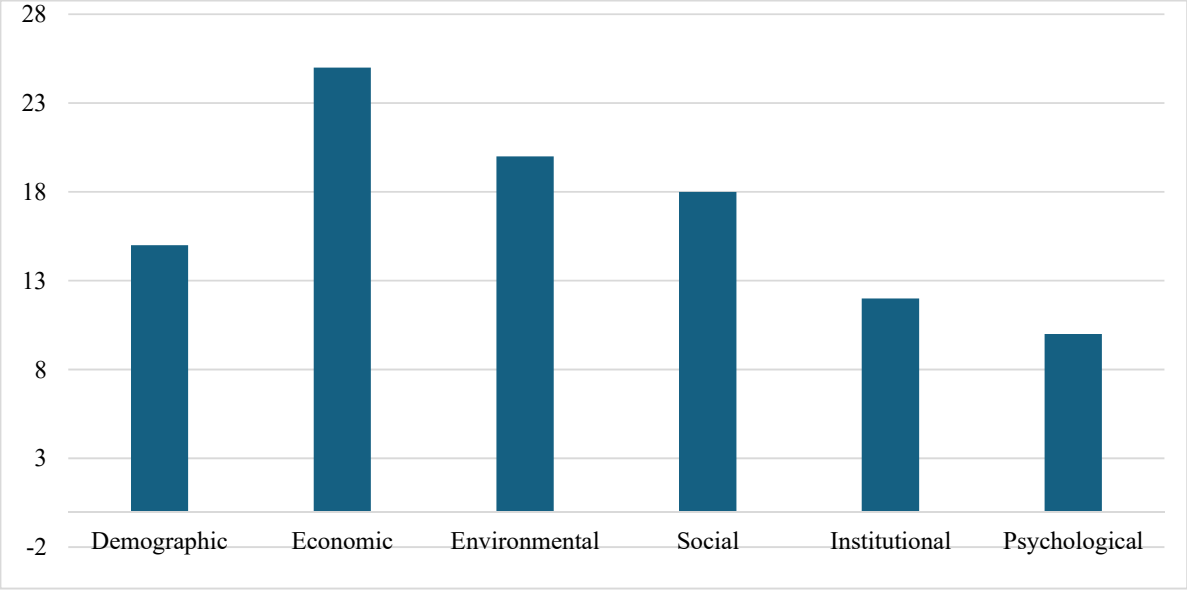

Fig. 2. Weight Coefficients of Key Determinant Groups Influencing the Regeneration and Restoration of MFS.

Source: based on the United Nations Environment Programme (2023) and World Bank (2024).

The calculation of weight coefficients was carried out using the Saati hierarchy analysis (AHP) method, which allowed the integration of expert assessments and statistical data into a single model for assessing the impact of each group of determinants on the effectiveness of regeneration processes (Saati, 1990). Given the above, it should be recognised that the feasibility of using an integrated approach to solving problems that combines the principles of the circular economy, resilience paradigm, and cognitive rehabilitation methods. Such a combination will ensure resource and economic optimisation and the restoration of social activity, psychological confidence, and institutional capacity of communities.

The integrated conceptual and methodological model for overcoming the AHS proposed by the authors (Table 3) is based on four interconnected blocks:

a) diagnostics of the structural and functional state of the system;

b) identification of key barriers and risks;

c) development of innovative mechanisms;

d) adaptive integration of results into a long-term development strategy.

Its implementation involves the development of a concise (simplified) "system passport" (block A), further barriers and risks are identified (block B), and a portfolio of innovative mechanisms is constructed and piloted (block C).

Table 3. Four-Block Matrix of the Integrated Conceptual and Methodological Model for Overcoming AHS.

Block	Goal	Input Data	Methods & Tools	Results	Indicators	Responsible	Horizon
a) Diagnosis: structural-functional state	Basic system assessment	Demography; economy; ecology; infrastructure; social surveys; psychometrics	System analysis; territorial profiling; GIS/remote sensing; sociology; econometrics; data audit	System passport; heat map of vulnerabilities; baseline index of state	Index of demographic resilience; economic index; HYO; ecological risk index; social capital index; level of GDP	Local authorities; analysts; academic, ecological, psychological services	Short-/medium-term
b) Identification of barriers and risks	Identification of bottlenecks	Results of diagnostics; regulatory framework; financial budget; security scenarios	SWOT; PESTEL; risk-resource map; scenario analysis; causal-probabilistic diagrams; Delphi	Risk map; risk prioritisation; "problem tree"; target tree	Top-10 barriers; vulnerability index; risk probability; tolerance threshold	Coordinating council; line ministries; expert panels	Short-term
c) Development of innovative stabilisation and regeneration mechanisms	Design solutions	Barrier map; resource cards; best practices; institutional opportunities	Portfolio optimisation; design analysis; piloting; scaling; diversification mechanisms; psycho-social support programmes	Package of mechanisms: economic diversification; social reintegration; eco-regeneration; cognitive rehabilitation protocols; institutional change	Social ROI; diversification index; reintegration index; ecological footprint; life quality indicators	Executive bodies; local authorities; clusters; NGOs; expert community; social partners; donors	Medium-term
d) Adaptive integration into long-term strategy	Scaling and consolidation	List of mechanisms; institutional linkages; monitoring; feedback; M&E system; policy recommendations	Roadmap for 7–10 years; cross-sectoral partnerships; institutional anchoring; monitoring & evaluation; adaptive policy; strategic partnerships	Achievement of goals; sustainability index; institutional strengthening; capacity growth	Regions and macro-regions; intersectoral structures; national councils	Regions and macro-regions; intersectoral structures; national councils	Long-term

Moreover, the solutions are finally integrated into a strategy with constant monitoring and correction (block-d). Therefore, considering the above developments, a universal algorithm was proposed for restoring the resilience of the MFS, designed considering the goals of competitiveness, adaptability, and inclusive development in the post-crisis period. It combines six scalable modules for the community, region, macro-regional zone and cluster. Simultaneously, the justification for the choice of the proposed mechanisms for the regeneration of the MFS (within Phase III) is based on a multilevel analysis of international practices of post-crisis transformation and existing scientific approaches to overcoming structural inertia in socio-ecological-economic systems.

Unlike traditional economic models, the proposed approach integrates demographic, social, ecological, economic, psychological, and institutional components into a unified management system. This ensures resource and economic efficiency and the recovery of communities' cognitive and social activities, reducing dependence on single-profile production and enhancing investment attractiveness.

Phase I. Diagnostics and goal setting (0–3 months).

The first phase forms a system passport for the territory. It collects and verifies data (demography, labour markets, GRP/GDP structure, environmental status, infrastructure, institutional capacity, AHS level (psychometrics), and social capital).

A map of vulnerabilities and assets is also drawn up: a heat map of disparities and a list of "growth nuclei" (human capital, SME networks, logistics hubs, universities/research institutes, green energy). Goals and constraints are specified and justified by identifying and transforming existing problems into SMART goals with clear success thresholds (economic, social, environmental, institutional, and cognitive). In addition, this phase establishes and justifies basic indicators: economic diversification index, employment rate, well-being indicators (IWI/IWI-lite), social capital index, environmental risk index, resilience index, and AHS indicator.

At the same time, a minimum set of criterion indicators is determined and calculated (for each plane):

a) Economic: index of diversification of activities, share of SMEs, employment, median income, investments.

b) Social: index of social capital, participation of citizens in decision-making processes, access to services.

c) Environmental (circular): material intensity, share of reuse/recycling, energy intensity, emissions.

d) Psychological (cognitive): level of AHS (according to a standardised scale), participation in mental health programs, return to active employment.

e) Institutional: time of administrative procedures, number of public-private partnerships, transparency index, and speed of decision-making.

A composite resilience index is justified as an aggregated indicator, with weights determined by experts.

Phase II. Identification of barriers and risks (1–3 months; conducted in parallel with Phase I).

During this phase:

a) From the problem tree, it was formed into a goal tree and a cause-and-effect analysis.

b) Compile a risk portfolio: use PESTEL and scenario analysis, ranking and determining the "likelihood and significance of impacts"; set tolerance limits; build a response plan/

c) Conduct a regulatory audit to clarify obstacles for small and medium-sized enterprises (SMEs), barriers to market entry, and access to land and funds; develop recovery procedures and circularity standards.

Phase III. Designing solutions (2–4 months).

The selection of mechanisms and the reasons for their integration were justified. During this phase, after completing the diagnostics (Phase I) and identifying barriers and risks (Phase II), the following were performed:

a) An analytical comparison of the identified problems and potentials with existing tools and practices (national, international, industry-specific).

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b) The selection of mechanisms those are capable of simultaneously covering demographic, social, environmental, economic, psychological, and institutional components.

c) The justification of the choice, taking into account the expected effect not only for resource and economic efficiency, but also for the restoration of cognitive and social activity of local communities.

d) The integration of systemic and complex mechanisms into a single management system that works on the principles of complexity, intersectoral interaction, and synergy of impacts.

Along with this, it was forming a portfolio of coordination, stabilisation and regeneration mechanisms (at least one in each of the areas):

1) Economic: diversification (clustering, cross-sectors), SME restart programs, access to finance tools (guarantee funds, blended finance).

2) Social: employment and retraining centres, community hubs, programs for restoring social capital and human assets.

3) Environmental (circular): industrial symbiosis, reuse of materials and waste, localisation of supply chains, energy efficiency and scaling up of renewable energy.

4) Psychological (cognitive): protocols for overcoming AHS (CBT programs, peer-to-peer support), corporate mental health programs, medical and genetic counselling.

5) Institutional: resilience office, single "window" for investors, simplification of administrative procedures, public-private partnerships, etc. Finally, in this phase, eco-design interventions are implemented. For each mechanism, build and form (determine) a logical-structural matrix, budget, executors, deadlines, risks, and specify criterion indicators.

Phase IV. Piloting and quick wins (3–9 months duration).

Pilot projects (MVP pilots) are implemented for 90–180 days (i.e. two to three pilots from different planes, in particular, industrial symbiosis and the retraining centre, and, accordingly, mental health programs). In addition, monitoring and adaptation tasks are solved using a quasi-experimental approach, which involves the correction of protocols and documentation.

An important aspect of implementation is trust communication with a public dashboard of indicators, open reports, and community participation in decision-making.

Phase V. Scaling and institutionalisation (6–24 months).

During the implementation of this phase, the following is carried out:

a) expansion and scaling of successful pilots, typical solutions, training of teams in the "training of trainers" format;

b) integration into strategic documents, development strategies, as well as budgets and spatial plans; alignment with the Sustainable Development Goals and sustainability taxonomies;

c) conditions and tools for financial sustainability are formed: co-financing mechanisms (state programs, donors, local budgets, IMP-oriented investments), social bonds, and performance-based contracting.

Phase VI. Continuous improvement (post-implementation; constant).

At this stage:

a) An M&E loop is formed and implemented based on the Plan–Do–Check–Act (PDCA) cycle.

b) A quarterly revision of criteria indicators and risks is carried out; an independent efficiency audit; updating of goals.

c) Anti-fragility parameters are determined and assessed: stress tests, backup scenarios, and increasing the redundancy of critical functions.

d) Knowledge transfer occurs when a base of cases and practices is formed, interregional networks, publications and seminars are developed, and data exchange occurs.

All phases and management actions according to the MFS resilience restoration algorithm must comply with the principles of:

a) Human-centricity (priority of programs to overcome and restore human capital).

b) The significance of environmental and social impact to launch socio-ecological-economic interventions.

c) "Circularity" by default: eco-design, local material and energy cycles, industrial symbiosis, eco-modernisation, etc.

d) Data management (open dashboards and data verification).

e) Eco-management (in the relationship "government-business-communities-academia-donors") to build a new management format, in which entities with diverse interests and powers jointly make decisions and share responsibility.

6. Conclusions.

This research scientifically substantiates an integrated conceptual and methodological model for overcoming AHS in monofunctional socio-ecological-economic systems operating in war and post-war transformation conditions. The model combines diagnostics of the structural and functional state, identification of key barriers, development of innovative mechanisms for stabilisation and regeneration, and their adaptive integration into long-term development strategies.

Within the approach framework, a comprehensive combination of demographic, social, environmental, economic, psychological, and institutional management components is provided, increasing the effectiveness of recovery and strengthening local communities' cognitive and social activity.

The key determinants of the restoration of resilience are not only resource and economic efficiency but also the integration of mechanisms of cognitive rehabilitation, inclusiveness, and social cohesion, which can ensure the long-term resilience of MFS. The proposed toolkit is universal and can be adapted to different scales and types of MFS, meeting the challenges of multi-crises and modern practices of post-crisis transformation.

The results provide a foundation for a new paradigm for managing monofunctional territories based on circular resilience, social adaptability, and cognitive regeneration principles. Future research will focus on the quantitative operationalisation of the model, assessment of cognitive-rehabilitation measures on social mobilisation, scenario-based modelling of circular transformations, and adaptation of the framework to regions facing protracted crises, large-scale destruction, and severe technogenic pressures.

Practical implementation envisages the integration of the findings into regional development policies, international recovery programs, and educational formats for decision-makers. Previous studies on quality of life as a state-building imperative serve as important methodological reference points.

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