






THE SPATIAL DIMENSION OF THE WAR EFFECTS IN UKRAINE: AN AGENDA FOR COUNTRY RECOVERY

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Abstract. In the pre-war period, Ukraine faced significant development gaps, and a large part of its territory was in unfavourable social and environmental conditions. Despite some reforms, the overall imbalances of the spatial framework remained unchanged, and the processes of European integration were de facto rather slow. At the same time, Russia's geopolitical influence and the geo-economic impact of various global actors remained prominent. The outbreak of the war in 2022 led to large-scale changes in the structure of regional centres, significant social shifts, and further policy transformation at all levels. Communities and territories affected by the war consequences to varying degrees now demonstrate different patterns of development capacity and resilience, as well as its vision, which obviously leads to functional changes. The article aims to analyze the transformation processes caused by the hostilities, to reassess the guidelines for regional development, and to identify the priorities of post-war recovery

Keywords: post-war recovery, spatial development, spatial planning, strategies, Ukraine.

Introduction

In the course of its formation as an independent state, since 1991, Ukraine has had to overcome numerous challenges and solve problems related to crises in the economic, social and environmental spheres. One of the constant main catalysts for the problems of state development has been the spatial imbalance in the development of all spheres of the state body as a system and its individual components.

Since the times when it was a part of the Soviet empire (1919-1991), Ukraine has inherited spatial imbalances in the economic and social development of its regions. The ecological state of the regional environment, with a general trend towards exacerbation of crisis phenomena and negative consequences of excessive anthropogenic impact, was aggravated by its extreme values in the regions with the highest concentration of enterprises of the resource-depleting industries and also excessive agricultural development, primarily plowed land, which in some regions exceeded 79% of their area (Maruniak et al., 2021).

One of the largest spatial disproportions was rooted in the settlement system and, accordingly, in the level of development of its constituent elements – the settlements. At the same

time, the level of their acuteness was felt in both horizontal and vertical dimensions, particularly in terms of imbalances of the:

- level and development dynamics of cities and rural settlements of different ranks;
- interregional imbalances in economic, social and environmental development of settlements, especially cities (these imbalances were the subject of a separate study conducted by the authors, the results of which will be presented in the course of the main paper);
- inconsistencies in urban development with global trends, which limited the influence of centers in the framework of the state's spatial development.

Disproportions in the country's spatial development led to general negative trends in ensuring adequate quality of life, which in turn led to worsening of the birth rate and migrations indicators, imbalances in the population structure and exacerbation of the situation in the labor markets, etc. The sectoral imbalance was reflected in the dominance of raw materials exports and low-tech products in the GDP structure, and thus the leading role of agricultural production and the metallurgical industry.

It should be noted that Ukraine has taken consistent steps to remedy and improve the current situation. The most important factors contributing to this were the course towards European integration and the signing of the relevant Association Agreement, which became the driving force behind the implementation of the relevant norms and principles of the European Union at the legislative level and in the practice of planning processes. Another important factor that is organically linked to the above is Ukraine's participation in the implementation of the doctrine of sustainable development, 'Agenda 21', and the global Goals 2030.

Russia's full-scale military invasion on February 24, 2022, dramatically changed the situation in Ukraine. It has become an extremely powerful force majeure factor that has jeopardized the implementation of all strategies and plans for regional development and the development of certain sectors of the economy, and has led to gradual functional changes in major centers.

There are several approaches to analyzing the spatial dimension of war. The first of them is largely related to geopolitics and political geography (O'Loughlin, 1986; Berman, 1996; Enterline, 1998; Le Billon, 2001). It is about assessing the role of spatial features in the development of a conflict, its duration, and changes in scale. The second approach is more related to military geography and aims to assess specific characteristics of the territory (terrain, soil, water resources) in the context of warfare (Rustad et al., 2008; Sayadyan & Gevorgyan, 2020). Finally, the third approach considers the consequences of war or conflict for the territory of a country or its administrative and natural units. In terms of subject matter, the most attention is drawn to the assessment of environmental impacts (REC CEE, 1999; Dudley et al., 2002; Austin & Bruch, 2007;) although studies are also conducted on social consequences or socio-economic consequences for certain types of territory (Weidmann & Zürcher, 2013; Pech & Lakes, 2017; Malchykova & Pylypenko, 2022, OECD, 2022). We can also mention several comprehensive methodologies used by international organizations, which will obviously continue to be developed in Ukraine (WB, 2023a).

This article is largely focused on the third approach, while aiming to present the general outlines of the situation currently emerging in Ukraine under the influence of the war, to see certain spatial patterns that need to be taken into account in the reconstruction process, and in particular in the making of policies in the coming years, and finally to determine what should be on the agenda of spatial development policy, making a certain revision of the existing achievements.

This aim is determined due to several factors:

- the dynamic phase of the war (forecasts for its end are rather unclear);
- limited information base (some information is closed, some is not available for other reasons);
- declared documents on comprehensive recovery at various levels, which, at the same time, are not sufficiently reflective of the spatial perspective for the country, regions and communities.

Thus, the article will present sections on: the pre-war situation (policy of spatial planning and main challenges); the consequences of the war in terms of the economy, transport and logistics, social and demographic situation, environmental problems, cultural and information space; types of territories, by the peculiarities of the impacts and consequences of the war and planning agenda for the nearest future.

The study was based on data from open sources, surveys, reports of international organizations, and state statistics prior 2022.

Pre-war agenda: reforms and their consequences

The changes in social structures that occurred as a result of Ukraine's independence, the departure from the commanding form of economic management, two revolutions, the Orange (2004) and the Dignity (2013-2014) ones, and strengthening of relations with the EU countries, contributed to a kind of reboot of the economy and management structures, to improvement of the legal framework that defines the basic principles of spatial development, and to the adoption of a number of important strategic documents. They include, first of all, the Association Agreement with the EU (2014); the September 30, 2019 Decree of the President of Ukraine 'On the Sustainable Development Goals of Ukraine for the period to 2030' (LoUA, 2019), adapted to country's conditions 'Goals 2030, Ukraine' (ME UA, 2017), 'State Regional Development Strategy for 2021-2027' (LoUA, 2020), and the relevant Development Strategies for each of Ukraine's regions, which were developed on its basis.

Analysis of these regional strategies (Rudenko et al., 2022) allowed us to identify a number of positive fundamental provisions related to the optimization of spatial development, in particular:

- significant attention and definition of 'sustainable territorial/spatial development' and 'effective self-government/management/strong communities' as strategic goal;
- importance of goals and objectives formulated in the context of threats to state security and military operations: restoration of critical infrastructure; ensuring security, national identity and an integrated information space;
- significant attention to functional areas in certain regions – strategic goals include the development of rural or mountainous areas, the development of cross-border cooperation, the development of export-oriented industries, and the development of tourism;
- increased focus on infrastructure development.

At the same time, a drawback that was systematically observed in regional strategies was their low environmental friendliness. Development strategies at the local level faced similar weaknesses and strengths.

An important step toward spatial development optimization and overcoming development imbalances at the bottom level of government, and improving the development management effectiveness at the local level was the administrative and territorial reform in Ukraine. In accordance with European practices, it envisaged the creation of territorial communities as grassroots territorial entities with a high level of self-governance, significant rights and opportunities for in-

initiative in determining priority and breakthrough areas of development, and maximum provision for the most acute and priority needs of the local population.

The implementation of the reform was practical step towards optimization of the state spatial development management, taking into account the framework capabilities, potential of the regions and other determinants of their development as constituent components in the structure of the country's spatial development, and establishing optimal functional links between them within the framework of a single state strategy for spatial development. The reform has launched the process of decentralization of power, redistribution of responsibilities and financial flows between the center and the regions.

In this context, it is fundamentally important to ensure the success of territorial communities and their ability to serve as the foundation for a practical transition to sustainable development at the level of higher administrative units – enlarged districts, regions, and the country as a whole.

The implementation of the reform also required a balanced and comprehensive consideration of all territorial development determinants. First and foremost, it was necessary to take into account the natural factor and peculiarities of social and natural interaction within the natural and economic systems of different territorial levels, which, unfortunately, was not always done properly. This explains the insufficient level of fulfillment of the spatial development potential at the local level, as was expected from the reform.

Despite Ukraine's clearly defined course towards European integration in 2014, and probably in spite of it, Russia's influence remained noticeable. Its manifestation was in the economic sphere (energy dependence, high share of Russian business in previous periods), direct military aggression, ideological and political manipulations, the main agents of which were the churches of the Moscow Patriarchate and representatives of certain political entities and business groups. To a certain extent, such manipulations led to changes in electoral sentiment and a gradual shift away from the priorities of the country's defense capability that were on the agenda in the first years after the invasion of eastern Ukraine and the annexation of Crimea.

In general, on the eve of Russia's full-scale invasion, the situation in the spatial development of Ukraine was characterized by the following key features:

- The country has implemented a significant number of norms and provisions of EU legislation on sustainable spatial development into national legislation and has become a participant in the main international legal acts on sustainable development;
- Strategic planning documents at the national, regional, and local levels reflect goals and objectives, as well as specific measures to achieve the 2030 Agenda in Ukraine.
- The process of reforming spatial planning, which has been started in 2014, primarily at the local level, was successful, accompanied by the implementation of pilot projects of international organizations, such as UNDP, GIZ, U-LEAD, USAID, etc.

At the same time, the progress of the above was significantly limited by the impact of a number of external and internal challenges, including:

- Russia's war in eastern Ukraine, the occupation of Crimea and parts of Donetsk and Luhansk regions;
- globalization, which limited state control in all sectors of the economy;
- insufficient understanding of the spatial factor importance in implementing sustainable development models at all levels of government;
- rapid staff turnover at all levels of government;
- dominance of the party affiliation principle over the principle of professionalism in decision-making on appointments to senior positions in public administration at all levels;
- corruption, lobbying of local interests while ignoring national spatial development needs when making decisions on the implementation of regional strategies and projects;

- continued population decline due to negative natural and mechanical migration;
- the trend towards further concentration of the population in the largest cities, primarily in Kyiv, which exacerbates imbalances in the socio-economic development of regions, cities, towns, and rural areas;
- negative effects of land concentration and creation of agricultural holdings on the labor market in rural areas;
- the outflow of the most active population of working age and highly skilled people abroad;
- low dynamics of infrastructure development, poor quality of transport and social infrastructure;
- high anthropogenic pressure and environmental degradation within certain regions, territorial communities, and settlements.

The aforementioned trends, especially those of population decline, deteriorating infrastructure, and increasing environmental degradation, have only intensified since the outbreak of war.

War: impact and dimensions

There is a large number of methods for assessing impacts on natural and socio-economic systems, but what is happening in Ukraine goes beyond traditional approaches. In addition, the impact is felt globally (Kumar et al., 2022; OECD, 2023; Pascariu et al., 2023; Zhou, 2023).

As noted above, Russian aggression, through direct and indirect impacts, has caused large-scale social transformations in Ukraine. In general, the following key features can be identified:

1. Changes in the economy, primarily due to asset losses, business relocation, and radical production decline in certain sectors;
2. Social shifts due to millions of internal displacements and migrations, a rapid decline in the quality of life;
3. Restructuring of the transportation system and logistics links;
4. Loss of biodiversity and ecosystems;
5. Changes in cultural space.

Let's take a closer look at the characteristics of each area.

Ukraine's economy suffered significant losses and threats to energy security back in 2014, after the partial occupation of Donetsk and Luhansk regions. Therefore, given the occupation of a large part of the territory in 2022, we can talk about estimated losses of more than 30% of the country's GDP (Fig. 1).

As can be seen from the figure, five regions (Donetsk, Luhansk, Zaporizhzhia, Kherson, and Crimea) remain occupied to varying degrees in 2023. As of 2021, their share in the country's GDP (excluding Crimea) was 12%. In addition, in 2022, the occupation and subsequent liberation took place in Kyiv, Chernihiv, Sumy, Kharkiv, and Mykolaiv regions, with GDP share of 17.5% in 2021. The hostilities in 2022 undoubtedly led to a decline in the GDP of Kyiv (23% of GDP in 2021) and are now taking place in Odesa region, which Ukrainian business considers to be a so-called frontline region (about 5% of GDP in 2021). In general, according to Ukrainian entrepreneurs, only 14 Ukrainian regions are conditionally suitable for doing business – 'Safe' (Volyn, Rivne, Lviv, Ternopil, Khmelnytsky, Ivano-Frankivsk, Zakarpattia, Chernivtsi) and 'Supportive' (Vinnytsia, Zhytomyr, Cherkasy, Kirovohrad, Poltava, Dnipro) (RPR, 2022). Thus, the process of business relocation, which began on the eve of the war, continued actively throughout the year. According to the Ministry of Economy, as of April 2022, more than 1,500 thousand applications were submitted by entrepreneurs, and a third of them have been completely relocated. For regions such as Lviv, Ternopil,

Ivano-Frankivsk, Chernivtsi, and Zakarpattia, this was an additional opportunity to revitalize old production areas (Ukrinform, 2022).



Figure 1. Economic potential of Ukraine's regions and its losses as a result of the Russian occupation
Source: own elaboration based on the State statistics service of Ukraine data.

At the same time, sectoral peculiarities should be taken into account. It is not possible, for example, to relocate agricultural and mining enterprises, and quite difficult to relocate enterprises with significant production capacities. Demand for different types of products also matters. Thus, according to a survey of enterprises in 2022, the fastest recovery rates were demonstrated by food processing enterprises, almost a quarter of which restored production to pre-war levels and exceeded them in mid-2022 (IER, 2022).

In general, according to the World Bank's estimates for the period February 2022 – February 2023, the housing and utilities sector (37.4%), transport (26.5%), as well as industry and trade (8.1%), energy (7.9%), agriculture (6.5%) suffered the most damage, with a total amount of damage of \$134.7 billion (WB, 2023). Other sources partially confirm the amount of direct losses by sector. According to the Ministry of Agrarian Policy of Ukraine and the Kyiv School of Economics, as of September 15, 2022, the total amount of losses incurred by the agricultural sector as a result of Russia's large-scale invasion of Ukraine reached \$6.6 billion. However, indirect losses due to reduced production, the blockade of ports, and increased production costs are estimated at \$34.25 billion. Almost a third of agricultural land has also been lost (KSE, 2022).

Transport and logistics systems are also being rebuilt for the so-called 'western direction'. The state of extreme congestion and challenges of the first months of the war, which were manifested by huge passenger flows towards the western borders and cargo flows in the opposite direction, were slowly balanced. A major challenge was the destruction of the logistics infrastructure around Kyiv, which traditionally played the role of a central hub, logistics systems, and industrial enterprises in the eastern regions. Therefore, relevant facilities began to appear in the border regions, along with an increase in the intensity of transportation focused on the ports of Poland, Romania,

and Bulgaria. In addition, as part of the enhanced integration with the European system, the Lviv hub is gaining the status of a hub for the relevant transport corridors.

Social trends are no less disturbing. The full-scale war has led to huge refugee flows, reminding Europe of the migration crisis of 2014-2016. Accurate data on the size and composition of Ukraine's population were not available before, in the pre-war period, due to the absence of population censuses since 2001. According to various estimates (World Bank, Eurostat, State Statistics Service), as of the end of 2021 and beginning of 2022, the population was 41-43 million people. At present, the most optimistic estimate of the population is 36.7 million people (UNFPA, 2023), and the number of people who were abroad as of June 2023, according to the Ministry of Foreign Affairs, was about 8 million people. According to the UN, as of September 2023, the number of Ukrainian refugees abroad exceeded 6.2 million (UNHCR, 2023). Data on population and departures are indirectly confirmed by information from mobile operators. In particular, revenues from international roaming services increased 2.4 times in 2022 compared to 2021 (NKRZI, 2023)

The specifics of the distribution and integration of Ukrainian refugees in the EU are the subject of separate studies, including those conducted within international projects and platforms (Rossignol et al., 2022; MPC, 2023). The general profile of refugees shows a predominance of middle-aged women and a high proportion of children. There is a significant fluctuation in sentiment about returning to Ukraine, while it is clear that the share of those who will remain abroad is growing under the influence of factors such as the duration of the war and the degree of destruction in specific regions and localities. Therefore, after the war is over, there is a high risk of a demographic crisis, which can be overcome not only by policies to stimulate fertility, but also by measures to make the territories that will welcome former migrants more attractive.

The internal redistribution of human resources, and thus the flows of internally displaced persons, should also be taken into account (Fig. 2).

As Figure 2 shows, in 2023 there was a significant redistribution of the total flow of internally displaced persons (IDPs) by region. Thus, while in 2021 the undisputed leaders were several eastern regions and the capital region, with the outbreak of a full-scale war, the popularity of not only the 'safe' western but also the central regions has increased significantly. Given the rather high rates of depopulation that have occurred in the industrialized regions of the east in recent decades, as well as the consequences of prolonged hostilities, this trend of east-west population shift might play a significant role in the reconstruction process, stimulating the development of some regions and stagnating others. At the same time, there are a number of problems of social and economic adaptation of internally displaced persons, including employment, use of social infrastructure, and integration into local society.

Today, the assessment of environmental damage is difficult, given the imperfect tools and the continuation of hostilities. Along with a significant redistribution of existing anthropogenic emission sources and changes in the usual activity of industry and vehicles, new sources caused by hostilities have emerged. Nature complexes and their components in a number of cities and industrialized areas have undergone irreversible changes. All these consequences together lead to a significantly modified spatial and temporal distribution of air and water pollution, which must be taken into account in the post-war recovery of the country to achieve the 2030 Sustainable Development Goals. The cumulative impact on the components is ultimately most evident in the loss of biodiversity and ecosystem services. The first attempts at monetization show billions of dollars in losses, which will only increase.

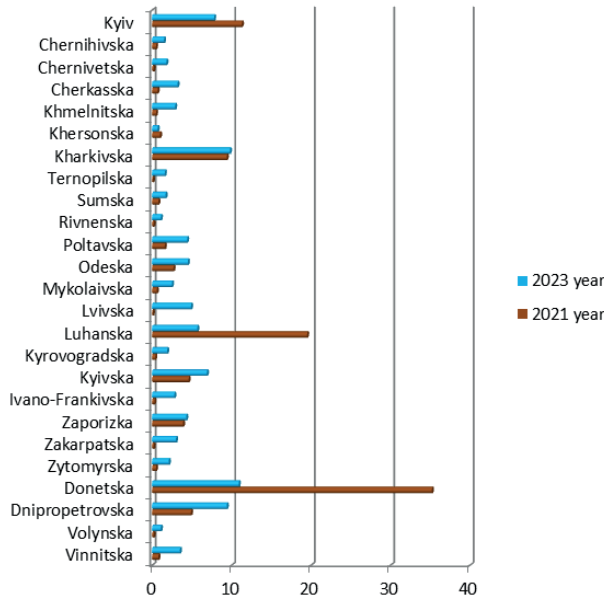


Figure 2. Share of internally displaced persons in the host regions (Ukraine=100%): changes in 2021/2023
Source: own elaboration on the basis of Glavkom (2023).

Changes in the country's cultural and information space have become a somewhat controversial type of transformation. Among positive features are the growing role of Ukrainian identity, the corresponding cultural product, and the cohesion of society. For example, back in 2020, in Kyiv and the region (potential agglomeration), 31% of the agglomeration's residents considered themselves Europeans, and 20% considered themselves citizens of the USSR, which was certainly reflected in various areas and dimensions (CoE, 2022). Cases of the language law violation (by university professors or in the service sector) are increasingly causing public outcry. Support for learning other foreign languages is growing, especially English, which is now declared the second most widely used language in the country. The need for strict adherence to the norms and requirements of the law, on which the system of Western democracy rests, is increasingly perceived as the only possible condition for building a successful state, and has proven to be effective in practice for millions of migrants to the EU and North America. At the same time, it should be noted that there is a significant loss of cultural heritage sites and problems with financial support for creative industries. According to a survey conducted by the Ukrainian Cultural Foundation (PROSTIR, 2022), a significant proportion of such enterprises faced a decline in demand for their products and, accordingly, a reduction in financial support for their staff. Grant support remains critically important for both the cultural and scientific spheres.

In the next section, we will take a closer look at both the nature of the impacts and their spatial differentiation.

Communities and regions through the prism of war consequences

Based on a generalization of the main consequences of the impact of Russian aggression on the territory of Ukraine, we can distinguish several main types of regions and communities of the country, which should be taken into account in planning their development and reconstruction (Table 1).

Table 1. Ukraine. Regions and communities by the consequences of the war

#	Type of territory by peculiarities of war impact	Regions
1	Occupied in 2014, remain under occupation	Territorial communities of Donetsk and Luhansk regions, Crimea
2	Occupied in 2022, remain under occupation	Territorial communities of Donetsk, Luhansk, Zaporizhzhya, Kherson regions
3	Liberated territories	Territorial communities of Sumy, Chernihiv, Kyiv, Zhytomyr, Kherson, Kharkiv regions
4	Territories bordering Russia and territories close to the front line	Territorial communities of Chernihiv, Sumy, Kharkiv, Luhansk, Donetsk, Zaporizya, Khersonska, Mykolaiv Regions
5	Territories bordering Belarus	Territorial communities of Chernihiv, Kyiv, Zhytomyr, Rivne, and Volyn Regions
6	Territories with a projected population decrease in 2023 compared to February 2022 higher than the average Ukrainian level ¹	Territorial communities of Chernihiv, Sumy, Kharkiv, Mykolaiv, Donetsk, Luhansk, Zaporizhzhya, Kherson regions
7	Territories with a projected population decrease in 2023 compared to February 2022 lower than the average Ukrainian level	Rivne, Volyn, Zakarpattia, Ivano-Frankivsk, Cherkasy, Kirovohrad, Odesa, Poltava, Ternopil, Chernivtsi, Khmelnytsk, Vinnytsia, Zhytomyr, Dnipropetrovsk regions
8	Territories with the smallest reduction in the number of the population, or with a slight increase of population	Kyiv city, Kyiv region, Lviv region

The boundaries of certain types overlap, both due to the dynamic nature of hostilities and the manifestation of several factors of influence. It is important to take into account the fact that the war in Ukraine is not over and every day brings new destruction. Almost the entire territory of the country, despite the ever-increasing capabilities of the Ukrainian air defense system, is under the threat of missile and drone attacks. The priority of these attacks may change from time to time. While in the fall of 2022 and winter of 2023, the main targets of the Russians were energy facilities, starting in mid-summer 2023, the Black Sea and Danube ports of Ukraine are increasingly being targeted, which, accordingly, reduces the infrastructure potential of Ukraine's grain and food exports.

Each of the types of regions identified in Table 1 has, in the most general terms, its own peculiarities in terms of the consequences of the impact of Russia's full-scale invasion on the demography, environment and economy.

The territories occupied in 2014 are the Autonomous Republic of Crimea and parts of Luhansk and Donetsk regions. They have been subjected to a major destructive impact of the occupiers on the prospects for sustainable development. The territory of the Autonomous Republic of Crimea is currently being developed primarily as a Russian military base. The construction of new military

¹ Types 6-8 are defined on the basis of the Ptoukha Institute's for Demography and Social Studies of the National Academy of Sciences of Ukraine forecasts.

facilities has caused significant damage to the region. The impossibility of supplying Dnipro waters through the North Crimean Canal has led to the actual elimination of large-scale agricultural production in the Crimean steppe, degradation and desertification of landscapes. Crimea lost the opportunity to use the potential of ecosystem services, lost the opportunity to develop international tourism, which could have provided a high level of socio-economic development with relatively little anthropogenic pressure on nature.

The territories of the occupied Donbas have also undergone negative changes. These include the closure of mines, their massive flooding, and the contamination of large areas with mine water. Russia's military operations during the occupation caused the destruction of numerous potentially environmentally hazardous industrial facilities. The occupation has led to mass migration of the population, violation of the gender and age structure of the residents who remained in the occupied territory, deterioration of economic and social indicators of the territory development, etc.

A violent policy inherited from the Soviet era and aimed at changing the ethnic structure of the population continues to be implemented - bringing in people from Russia, often from its most remote and depressed regions.

Territories occupied in 2022. The indicated territories generally follow the trajectory of development of the regions occupied in 2014, although they have significant differences today. First and foremost, we are talking about numerous civilian casualties, which experts preliminarily estimate at more than 80,000 people in Mariupol alone (5.ua, 2022). We should also note the large outflow of people from the regions. Residents who did not have time to evacuate now live in difficult socio-economic conditions and are subjected to severe pressure and abuse by the Russian occupiers. The scale of violence and genocide here can be assessed only after the de-occupation. As in the regions that were occupied earlier, the Russians are pursuing a criminal policy of replacing the local population with migrants from their remote regions.

The scale of destruction of residential, industrial, transport and municipal infrastructure in the course of hostilities in the regions is also noteworthy. In the occupied parts of Kherson and Zaporizhzhia regions, the consequences of the Kakhovka hydroelectric power plant dam destruction by the Russian occupiers, as discussed above, were most pronounced. In addition, several lines of defensive structures have been built within these territories, which has distorted the landscape. These lands have been mined by the Russian side on an unprecedented scale. Their liberation will inevitably be accompanied by significant damage to all components of the environment, economic facilities and infrastructure.

Territories liberated by the Ukrainian Armed Forces in 2022-2023. The communities of these regions suffered significant damage to residential, commercial and transportation infrastructure. Almost all of them were randomly mined by the enemy during the retreat. As a result, the prospects for agriculture and forestry are significantly hampered and fraught with high risks. The liberation of the territories from Russian troops revealed the scale of crimes against civilians. They have obviously led to changes in the strategy of NATO countries in the event of a possible direct conflict with Russia, which rejects the possibility of even a temporary occupation of a part of the territory of an alliance member. At the same time, the communities of these regions, especially Kyiv, received significant advisory and often investment support from Western partners, which allowed them to quickly begin the process of reconstruction.

Border and frontline areas with Russia. Within these areas, there is particularly significant destruction, damage to the population, nature and the economy. The relative stabilization and slowdown in the change of the front line has caused particularly large-scale destruction of industrial

and residential buildings, and many settlements have been reduced to rubble. This is especially true in the cities of Donetsk and Luhansk regions. The proximity of the border allows the aggressor to conduct large-scale shelling with cannon artillery, multiple rocket launchers and aircraft. Examples include the shelling and destruction of Kharkiv, Sumy, and other border settlements. The large-scale hostilities caused a particularly large outflow of civilians to other regions of Ukraine and abroad.

Border areas with Belarus. Some of these territories have been occupied and liberated (i.e., they have the consequences of war described for regions of the second type). Today, all the territories bordering Belarus are under the potential threat of an attempted invasion by Russian/ Belarusian troops. As a result, the conditions for conducting economic activity are complicated, and there is a threat to the lives of local residents. A significant factor that complicates the possibility of forestry and agriculture is the mined area. We can also note the significant destruction of the transport infrastructure caused by both the Russian aggressor and, in some cases, the Ukrainian resistance forces to prevent the enemy's advance. At the same time, Volyn and Rivne regions are often considered to be so-called 'safe regions' where certain sectors of the economy and transportation are successfully developing.

Territories with a projected population decrease in 2023 compared to February 2022 higher than the average Ukrainian level. These territories have suffered the greatest damage from the hostilities. The processes of mechanical population movement in these regions are complex. Parts of these regions which are more distant from the combat zone have become recipients of IDPs from the occupied and most destroyed territories. This category of people is dominated by older people. At the same time, young people and children migrated abroad and to more western regions of Ukraine. This has resulted in negative changes in the gender and age structure of the population and a shortage of personnel in many sectors of the labor market. As a result, the rate of migration abroad and to safer regions of the country is the highest in Ukraine, which has led to the most negative population dynamics. With the ongoing war, bombings and missile attacks, the regions are subject to further destruction.

Territories with a projected population decrease in 2023 compared to February 2022 lower than the average Ukrainian level. All regions in this group were not under occupation. There were no ground hostilities on their territories (except for the northeastern part of the Korosten district of Zhytomyr region within the northern territory of the Narodytska community). This is the reason for the relatively smaller scale of migration of local residents abroad. However, even on a smaller scale, the processes of mechanical movement have led to negative changes in the structure of the population and an aggravation of the situation on the labor market.

The absence of hostilities within the regions is a factor that has led to the highest level of preservation of agricultural land from mining and degradation. This determines the special importance of these territories for the food security of Ukraine and many countries of the world.

Territories with the smallest reduction in the number of the population, or with a slight increase of population. This type of territory includes Kyiv, Kyiv and Lviv regions. As for the capital region, the decisive factors are the attractiveness for internally displaced persons, labor and other migrants in terms of possible employment, higher than average salaries. Another important factor is the relatively better protection of the territory by means of air defence, which means a better level of safety and condition of critical infrastructure facilities, etc. Lviv region is attractive to the population due to the relatively lower risk of danger from missile and drones attack, the proximity of the Polish border (possible destination for employment, and enrolment of school graduates in higher education institutions). The region has the largest housing stock and the most

developed social infrastructure among all western regions of Ukraine. At the same time, the relative proximity of the border with Belarus is a negative factor for this type of territory, which poses a potential threat of military operations, attempts at offensive, and destruction.

Abovementioned types territories are also shown on the in the Figure 3.



Figure 3. Ukrainian regions and communities by the consequences of the war

The specifics of the war’s impact in different types of regions are presented in more detail in Table 2.

The above assessment is preliminary and requires further elaboration based on the results of a comprehensive assessment of the economic, social and environmental damage that has been and is being caused to the regions of Ukraine, as well as changes and consequences due to the ongoing hostilities. In particular, it may be advisable to distinguish the type of coastal Black Sea territories of Ukraine that are currently under intense shelling by the aggressor and suffering significant damage. With the emergence of additional opportunities to assess the effects of the war on the possibilities for sustainable spatial development of Ukraine, this assessment will be improved or changed, as well as clarified at the community level. Examples of projects that will contribute to more accurate assessments and are currently being implemented include: the UNDP-supported project ‘Creation of an interactive online platform for mapping war-related damage, classifying destroyed objects by type and degree of damage using geographic information systems’; the project supported by the National Research Foundation of Ukraine ‘Geographic Information System for Spatial Assessment of Environmental Degradation in Ukraine as a Result of Russian Aggression’.

Table 2. Intensity of the consequences of Russian aggression in different types of regions

#	Types of impacts	Types of territories (Table 1)							
		1	2	3	4	5	6	7	8
1	Explosions of shells, mines, missiles, bombs outside of settlements, destruction of strategically important infrastructure facilities	++	+++	+++	+++	+	+	+	
2	Mining of the territory outside settlements (and demining processes)	++	+++	+++	+++	+++	+		
3	Movement of military equipment and personnel	+++	+++	+++	+++	++	+	+	+
4	Explosions and destruction of military equipment	++	+++	+++	+++				
5	Deaths of personnel and civilians without the possibility of burial	+	+++	+	+				
6	Explosions of shells, mines, missiles, bombs within populated areas, destruction of housing and critical infrastructure	+	+++	++	+++	++	+	+	+
7	Internal displacement of the population from the regions of hostilities to conditionally safe regions within Ukraine	+	+++	+++	+++	++	++	++	+
8	Emigration of the Ukrainian population	+	+++	+++	+++	++	++	+	++

Policy making in the field of territory planning

The outbreak of the war necessitated the implementation of appropriate adaptive changes in legislation and policy, primarily in the area of territory planning. Several documents regulating the development of programs and plans at various levels were adopted (LoUA, 2011 as last amended by *№ 3141-IX* *від* 10.06.2023). And, at present, the gaps in the stated approaches are obvious (Lytvynchuk et al., 2022; Maruniak et al., 2022). In 2022-2023, the Recovery Plan for Ukraine and a number of derivative documents were approved. At the regional level it is the Recovery and Development Plan for the region, and at the local level it is the Recovery and Development Plan for the territorial community. At the same time, documents defining the content of comprehensive recovery programs for regions and communities were also approved. However, given the number of adopted documents and their low quality, the success of their practical implementation remains questionable. In addition, the programs of comprehensive community restoration developed for example can only worsen the quality of the basic urban planning documentation that will be developed later and contribute to the irrational use of the territory.

Table 3. Key features of local planning documents

Comprehensive plan of the territorial community (LoUA, 2021)	Program of comprehensive restoration of territorial communities (LoUA, 2022)
<ul style="list-style-type: none"> • Provides for coordinated decision-making on the integrated spatial development of settlements as a single system of accommodation and the territory beyond their borders • Contains 10 sections, with a detailed description of the content and structure of each section • Provides for the consideration of planning documents of all levels, as well as the interests of neighboring communities • Has a high level of comprehensiveness, planning decisions are based on thorough assessments of social, economic, and environmental components, and assessment methods have been developed over many years • Contains a Landscape Planning section that defines the status of environmental components and the purposes of their use • Contains a significant amount of illustrative materials • Subject to the strategic environmental assessment procedure • It is developed and approved over a sufficiently long period of time • The plan developer is a certified specialist in urban planning and land management 	<ul style="list-style-type: none"> • It is controversial ‘Defines the main spatial, urban planning and socio-economic priorities of the recovery policy and includes a set of measures to ensure the recovery of the territory of the respective region’, contains ‘proposals for amending or developing urban planning documentation at the local level’, but ‘does not belong to urban planning documentation’ • Does not focus on the specifics of the housing system and development within the community and provides only a brief description of the geographical location • Does not take into account the framework documents of other levels and communities • Not subject to strategic environmental assessment • Contains 17 partially duplicated chapters without detailing their content • Does not contain any information or references on the methodologies to be used for the proposed assessment of negative impacts and damages • Developed and approved quickly • Requirements to the developer are not defined

As can be seen from Table 3, the contextual features of the Program and the general level of this document create preconditions for making poorly justified spatial decisions that, at best, will not be implemented. However, the development of drafts of such solutions has already begun, often with the use of grant funds and various standards.

At the state level, the provisions of the State Strategy for Regional Development for 2021-2027 are being updated. At the same time, the General scheme of planning the territory of Ukraine, which expired several years ago, is not being revised, and therefore, it is not yet possible to talk about comprehensive functional zoning with directions and priorities of the postwar Ukraine territory use at the national level.

Under these conditions, it would be advisable to look at other possibilities for supporting and developing the spatial framework of the state, in particular in terms of supporting major agglomerations as large cities are potential centers of post-war recovery. Their development was once mentioned in the Strategy 2021-2027, and now it could become the basis for territorial cohesion in macro-regions. It should be noted that due to the lack of agglomeration mechanisms, as well as prolonged centralized management, the formation of agglomerations and the actual processes of metropolization have been rather slow. At the same time, given the return of a significant number of refugees and de-occupation, the potential for this remains feasible. The idea of cooperation between communities in the area of influence of large cities is also supported by their residents, and the number of supporters has increased during the war. For example, compared to 2020, the share of the population of the so-called Kyiv agglomeration that supports the idea of cooperation between Kyiv and neighboring communities to solve common problems has increased from 45% to 95% (CoE, 2022). Compared to 2021, the identification of Lviv region residents

with 'Greater Lviv' has also increased significantly. Thus, the number of those who consider themselves as a part of the 'Greater Lviv' has increased from 56% to 85% (KIIS, 2023).

In general, it should be noted that despite the success of a number of pre-war reforms, the spatial planning sector needs further changes, and, of course, a clearer conceptual vision at all levels. At the same time, the over-prioritization of the local level, in the absence of a vision at the national level, is neither in the interests of recovery nor in line with the principles of EU spatial development, so it is advisable to adjust this scenario.

Conclusions

Before the outbreak of the war with Russia, Ukraine had a number of problems with sustainable spatial development, some of which were overcome in the course of reforms. These problems included significant socio-economic imbalances, poor quality of life, including the environment, and policy shortcomings. Russia's full-scale invasion in 2022 added to this list the huge losses of territorial capital - human, economic, and natural. Given that the war is still ongoing, the full extent and level of destruction and damage caused to Ukraine can only be assessed after the war is finally over and Ukraine's territorial integrity is restored. The potential for reconstruction in most regions remains equally limited. At the same time, the current period is a time for strategy development, which should take into account various scenarios regarding the duration of the war, the degree of destruction, the volume of losses, and the characteristics of each region and subsequently the community. The main areas of such strategies include:

Developing approaches to the typization of territories at different levels. Such assessment can be carried out both within administrative boundaries and in accordance with the areas of impact (occupation, active hostilities and mining of the territory, spread of the consequences of man-made disasters caused by hostilities). Subsequently, the identified types of territories can be used as the basis for strategies and spatial plans to formulate appropriate rehabilitation goals and measures.

Development of methods for assessing the consequences and losses for economic sectors and the environment. Such assessments are currently being carried out by some international organizations for Ukraine as a whole. Methodologies have also been developed for assessing individual environmental components (soils, nature reserve areas) or property losses. However, a conceptually close approach to the 'place-based approach' has not yet been developed. This includes the choice of indicator systems, GIS assessment and visualization, available data sets, and the data infrastructure itself, which can be used for different purposes.

Reassessment of the role of individual regions in ensuring the spatial development of the country under different scenarios, taking into account the current and long-term consequences of the war. The 'east-west' shift in logistics, certain industries and services is already clear. In a prolonged war, it is these conditionally 'safe' regions, along with several central ones, that will potentially provide the country's GDP, its international relations, and create a 'recovery and accommodation space.' The new centers growth process is already visible in the information space and is mostly associated with Lviv, which is even ahead of Kyiv in developing an agglomeration strategy. Therefore, the issue of a rapid 'reset' in the field of planning is relevant for both regions and communities in the West. At the same time, there is a need to find solutions for the regions bordering Russia, which in the short term means minimizing flows and staying in the zone of risks and threats.

Preparation of the basis for the prompt development (updating) and approval of documents that ensure planning at the state level – the State Regional Development Strategy and the General Planning Scheme of the Territory of Ukraine. Ignoring the latter will lead to another underestimation of ‘place’ and ‘space’ in development planning, unviable or incorrectly delimited functional zones. Potentially interesting would be the approval of the Concept of Sustainable Spatial Development, which would provide for the creation of a common framework for both documents. It could also provide a roadmap for future investors who now have their own vision of priorities in the reconstruction and realization of their investments. Legislative support for agglomeration processes, which is currently being implemented with the support of international donors, is of great importance for further cohesion.

It is on this basis that recovery programs and plans for regions and communities should be prepared, which are currently being developed sporadically and unsystematically throughout the country, with little correlation with sectoral plans and strategies, and with each other as well as with higher-level guidelines. So, obviously, the first step should be a systematic review of these documents adopted in the wake of the ‘recovery’. The intentions of the communities to rebuild and the resources available for their implementation are expected to be different. The quality of programs developed in the absence of methodologies and guidelines, outside the framework of the vision of the future post-war system, economy and spatial development of the country, will also vary. The rather idealistic scenario of revising the ‘restoration’ documents in practice should at least protect the territories from chaotic development and even greater environmental impacts.

In the longer perspective, Ukraine will continue to implement the Sustainable Development Goals and a number of EU directives, while the legislative preconditions for this should be formed now.

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