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Transformation of Threats to Demographic Security and Sustainable Development of the Region Due to Increased Military Actions

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ABSTRACT

The main purpose of the article is to identify the main threats to demographic security and sustainable development of the region in the context of military actions. The methodology implies modern methods of hierarchical analysis and analysis methods. The reason for choosing this topic is accompanied by the fact that, because demographic factors significantly affect the stability and security of the development of the region, the problem of ensuring demographic security, in particular in terms of identifying and tracking changes in key threats, is relevant and important for the further restoration of human resources. According to the results of the study, the features of the transformation of the main threats to demographic security and sustainable development of a particular region were determined. A response level matrix was proposed for each of the identified threats in order to counteract the most impact and further reduce the pace of implementation of activities. Research has limitations. The fact that as a result of hostilities, a small number of regions can be the object of research. In the future, we should consider the demographic security and sustainable development of regions that do not have the influence of military actions and compare them with our research results.

1. INTRODUCTION

The technological progress of the last decade did not refute but only contributed to the assertion of the opinion that the main wealth of any state was and remains a person. The above is based at least on the fact that a person, using unlimited resources through knowledge and information, can provide the country's competitive advantages, creating high-tech products (works, services) through personal intellectual potential. Therefore, any decrease in human resources should be considered in terms of the loss of the potential for further socio-economic development and competitive positions in the geopolitical space. Due to the significance of the impact of such losses on national security, they are an object of demographic security with a corresponding specification of the content and tracking the impact of key threats for the further development and implementation of protective measures. The intensification of the struggle for human resources, which provide added value and form the basis for the transition to a post-industrial society, while at the same time deepening globalization processes that destroy obstacles to the free movement of a significant number of the population, requires focusing on ensuring demographic security as a priority for the stable and secure development of the country.

In modern realities, the process of ensuring demographic security and sustainable development of the region can be defined as the development of the population of a certain country, in which the age, gender, and ethnic structure improve in accordance with national interests, providing for the preservation of integrity, sovereignty, independence, and geopolitical status. Ensuring demographic security consists in creating conditions for sustainable development not only of the state through the formation of the necessary quantity and quality of human resources but also of each person by satisfying his biological and social needs. That is, at the present stage of human development, demographic security implies the synchronous achievement of the interests of a single region and each citizen.

The main purpose of the article is to identify the main threats to demographic security and sustainable development of the region in the context of military actions. At the same time, the structure of the article involves proving the relevance of the chosen topic, reviewing the literature, and presenting the main methods that form our research methodology. The results of the study and the discussion part of their discussion are presented separately. The final stage of our article is formed on the main studies, conclusions, and vision for further work.

2. LITERATURE REVIEW

Evaluating the literature on the chosen topic [1-3], it should be agreed that the main priority areas for the development of the system of public administration in the regions are strengthening security and countering threats. To date, most regions have accumulated sufficient potential to manage the interaction between the state and business; territorial economic systems have significant experience and resources to improve the efficiency of the cooperation system. The priority task should be to ensure sustainable development.

In general, as noted by Chichkanov et al. [4], the main goal of sustainable development is to ensure dynamic socio-economic growth, preserve the quality of the environment, and rational using the potential of natural resources, meeting the needs of modern and future generations through the construction of a highly efficient economic system that stimulates environmental constancy, productive labor, scientific and technological progress, as well as social orientation. Nevertheless, we partially agree with this, since, in our opinion, the level of demographic security also has a significant impact on ensuring the sustainable development of any region.

One can often find in Bond et al. [5], Bresciani et al. [6] the fact that the level of demographic security affects the sustainable development of any region. Sustainable development summarizes the process of survival and reproduction of the nation's gene pool, the activation of the role of each individual in society, ensuring his rights and freedoms, preserving the natural environment, and creating conditions for the restoration of the biosphere and its local ecosystems, focusing on reducing the level of anthropogenic impact on natural environment and harmonization of human development in nature, the level of demographic security. It is impossible not to agree with this.

Melnikas [7], Stankevičienė et al. [8], the issue of sustainable development of the region is always extremely important, especially when it comes to threats. The state regional administration is called upon to activate and update the use of all types of available resources, opening up a new market and social opportunities, creating stimulating conditions, maintaining a nutrient environment for improving economic efficiency and increasing the quality of life of the population in the regions, subject to effective counteraction to threats. The degree of effectiveness of countering threats to the sustainable development of the potential of the region is determined by the level of state regional management. This relationship is a fairly existing pattern of modern regional governance. Here we agree and also believe that the threats today should be analyzed in more detail.

However, despite the great attention to the problem of ensuring the sustainable development of regions around the world, the issue of ensuring demographic security and sustainable development for those regions where the environment is extremely difficult as a result of military actions remains open.

3. METHODOLOGY

The research methodology includes two main methods: methods of hierarchical analysis and methods of analysis and synthesis of statistical information.

In order to characterize and identify the main threats to the demographic security and sustainable development of the region, a thorough analysis and synthesis of information in the selected region should be carried out.

The process of ensuring demographic security and sustainable development can be considered dynamic, tracking trends, which requires the generalization of a significant amount of information. Classical methods of analysis and synthesis should be applied in those regions where the scientist knows all its aspects. Unfortunately, hostilities are a terrible thing and, fortunately, not all regions are dealing with this crisis. Today, in the center of Europe, such regions exist only in Ukraine as a result of the military aggression of the Russian Federation. We will choose the Kharkiv region, which was recently successfully liberated and is now trying to restore its own security and sustainable development.

The method of hierarchical analysis allows the application of the econometric theory of connections and matrix and system analysis. The main purpose of this method is to determine the position of each of the threats in the overall hierarchy, in order to establish responses to threats in order of importance and criticality.

According to our methodology, for further convenience of the presented results, all threats should be designated as a set of indicators S_{ij}.

The main element of this methodology is the construction of matrices. The so-called dependence matrix of the dimensions of the parts S_{ij} is formed. For this, equality (1) or (2) must hold:

$$S_{ij}=1 \text{ (only if } i \text{ directly affects } j) \quad (1)$$

$$S_{ij}=0 \text{ (only if there is no influence)} \quad (2)$$

Next in the graphical level is a matrix of possible connections between S_i and S_j. If there is a connection between S_i to S_j, then we are talking about a certain level of reach. Then such elements will be denoted as $C(S_i)$. If in the matrix of connections, the arrows point to any of the threats, then such a threat has a certain impact. That is, element S_i is the predecessor of element S_j. We denote such elements as $H(S_i)$. According to the chosen method for our research methodology, we need all this in order to determine the so-called intersection of these elements (in our case, threats). Because it is possible and will be presented later in the text. At the same time, such a section is determined according to equality (3), however, if no threats are not achieved in any way and they remain, then this will form the appropriate level of priority of measures to counter these remaining threats and the condition will be as follows (4):

$$L(S_i)=C(S_i)\cap H(S_i) \quad (3)$$

$$L(S_i)=H(S_i) \quad (4)$$

Thus, the algorithm of the methodology we have chosen can be represented as follows:

- identification of the main threats to demographic security and sustainable development of the region;
- endowing each threat to demographic security and sustainable development of the region with a symbol for easier perception;
- using formulaic expressions to establish links between threats to demographic security and sustainable development of the region;

- formation of matrices to identify the level of impact of each threat to demographic security and sustainable development of the region.

In general, the methods chosen for our study are not extremely complex and rarely used. Despite the fact that they were used earlier, for example Sylkin et al. [3], in the context of demographic security and sustainable development of the region where active hostilities are taking place, this is a novelty.

4. RESULTS OF RESEARCH

The new phase of the military aggression of the Russian Federation has changed the structure of influence of the main factors, putting military actions in the forefront, while at the same time exacerbating the threats that were relevant before.

The level of demographic security in Ukraine has a clear downward trend. It is important to emphasize that we are not talking about a short period of the current active phase of hostilities but in fact the last thirty years. A clear demonstration of this fact can be data on the deterioration of demographic processes, when in 1990 104 children were born per 100 deaths, in 2016 - 68 children, and in 2021 - 39 children. Of course, we can talk about the significance of the influence of economic and political factors, but the fundamental problem is a rather passive observation by the relevant state bodies with a statement of the facts of the rapid loss of human resources.

The exacerbation of the demographic crisis is indicated by the fact that in 1991 51.6 million people lived on the territory of Ukraine, but in 2021 this number decreased to 41.4 million (excluding Crimea and the occupied Donbas), that is, by more than 10 million. The main reason can be considered a decrease in the birth rate (in 1991 - 630.8 thousand people, and in 2021 - only 272 thousand people) with at the same time consistently high mortality (in 1991 - 670.0 thousand people, and in 2021 - only 714.3 thousand people) with a correspondingly high rate of population decline, which, for example, in 2000 reached 373.0 thousand people.

Ukraine is characterized by high rates of population aging. So, in 1959, the proportion of people aged 60 years and over was 10.5%, in 2001 this figure increased to 21.4%, in 2010 it was already 26%, and as of January 1, 2021, it was defined as 24.4%. An international comparison can be made using World Bank data, taking into account the proportion of the population aged 65 and over. So, in Ukraine, this figure is 17%, while in the EU it is 21%, which indicates a deepening of disproportions in the age structure. It should also be taken into account that an increase in the proportion of older people provokes an increase in the burden on each able-bodied person due to the need to pay more taxes to withhold and pay pensions. If in 1991 there were 185 people over 65 per 1,000 citizens of working age (15-64), in 2021 this number has increased to 258 people. Such circumstances are also taken into account by people of working age when choosing alternative options for extending employment, and this situation does not in favor of Ukraine.

The annexation of Crimea in 2014 and the further conduct of hostilities within certain territories of the Donetsk and Lugansk regions provoked the first wave of migration due to the influence of the threat associated with military aggression. That is, this threat was not new for the demographic security of Ukraine, but the scale of its implementation has changed significantly already in 2022, which will be noted later. At the same time, it should be understood that the critically high number of refugees in 2022 was the result of already existing experiences. This moment also indicates that the issue of the security of living space is a priority for each individual, which means that it should first all be taken into account in state policy in order to stabilize the demographic situation.

As of July 12, 2022, about two-thirds of children are outside Ukraine or as internally displaced persons. In total, about 15.7 million people are in need of humanitarian assistance, including 3 million children. The duration of the conflict, which is 8 years, followed by a sharp increase in intensity from February 24, 2022, accompanied by the displacement of a significant number of the population with a worsening humanitarian situation, significantly complicates the process of ensuring demographic security and actualizes the need to consolidate international assistance.

This is demonstrated by the experience of the Kharkiv region, which became the object of our study. All authors are currently engaged in the restoration of this region and strive to increase its demographic security and achieve sustainable development. All authors today are actively working on this and, like no one else, they know best what threats today negatively affect this region. The dynamics of the demographic situation in the region are shown in Figure 1.

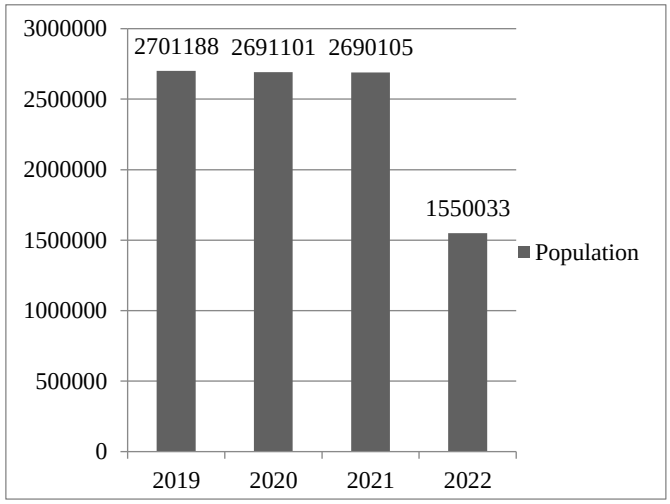

Figure 1. The dynamics of the demographic situation in the region, millions

We, according to our methodology and our own experience in the selected region of Ukraine, will highlight the key threats to demographic security and sustainable development. Note that they are more subjective and determined on the basis of practical experience of working in the region in the conditions of hostilities: (S_1) A decrease in the number of jobs due to the migration of enterprises; (S_2) Deterioration of the ecological condition; (S_3) Reduced opportunities for quality education as a result of military actions; (S_4) Increasing poverty, which negatively affects the ability to maintain the viability of the body; (S_5) Deterioration of the crime situation and deterioration of the social infrastructure due to the incompleteness of the decentralization reform; (S_6) Increasing Divorce Rate Due to Fear in Warfare; (S_7) Crisis state with the food supply of the population.

Following the rules of formulas (1) and (2), we will carry out a matrix analysis of the dependence of threats in a dimension of 7 units. Using formulas (1) and (2), we determined the presence or absence of dependence of one

threat on another, which was indicated in the corresponding digital format (0 or 1) in Table 1.

Table 1. Matrix analysis of the dependence of threats to demographic security and sustainable development of the region

S_{ij}	S_1	S_2	S_3	S_4	S_5	S_6	S_7
S_1	0	0	0	1	0	0	1
S_2	1	0	0	0	1	0	0
S_3	1	1	0	1	0	0	0
S_4	0	0	0	0	1	0	0
S_5	0	0	0	0	0	0	0
S_6	1	1	1	0	0	0	1
S_7	0	0	0	1	0	0	0

Matrix analysis of the dependency made it possible to build the necessary data for constructing a graphical matrix. It is represented by a pair of parts S_i and S_j. A graphical matrix of connections between threats to demographic security and sustainable development of the Kharkiv region is shown in Figure 2.

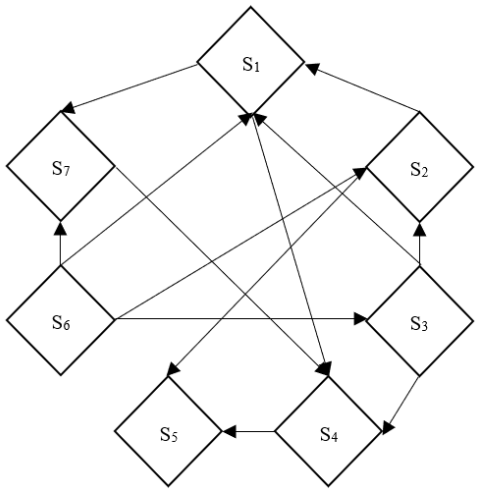

Figure 2. Graphical matrix of connections between threats to demographic security and sustainable development of the region

So, the graphic matrix of connections will help us to analyze the reach of threats to demographic security and sustainable development of the region we have chosen (Table 2).

Table 2. Matrix analysis of the reach of threats to demographic security and sustainable development of the region

S_{ij}	S_1	S_2	S_3	S_4	S_5	S_6	S_7
S_1	1	0	0	1	1	0	1
S_2	1	1	0	1	1	0	1
S_3	1	1	1	1	1	0	1
S_4	0	0	0	1	1	0	0
S_5	0	0	0	0	1	0	0
S_6	1	1	1	1	1	1	1
S_7	0	0	0	1	1	0	1

Thus, the calculation results show that equality (4) is satisfied with the threat (S_6) of an Increasing Divorce Rate Due to Fear of Warfare. It is this threat that will constitute the lowest level of influence on ensuring demographic security and sustainable development for the selected region. It needs only strategic measures that can be implemented only after the victory of Ukraine (Table 3).

Table 3. Matrix for determining the systemic level of the negative impact of threats to demographic security and sustainable development of the region

S_{ij}	$C(S_i)$	$H(S_i)$	$C(S_i) \cap H(S_i)$
S_1	1;4;5;7	1;2;3;6	1
S_2	1;2;4;5;7	2;3;6	2
S_3	1;2;3;4;5;7	3;6	3
S_4	4;5	1;2;3;4;6;7	4
S_5	5	1;2;3;4;5;6;7	5
S_6	1;2;3;4;5;6;7	6	6
S_7	4;5;7	1;2;3;6;7	7
$L(S_i)= H(S_i)$	**(S_6) Increasing Divorce Rate Due to Fear in Warfare**		

As Table 4 shows, equality (4) will hold for threat (S_3) Reduced opportunities for quality education as a result of military actions. This threat also requires long-term strategic measures to ensure demographic security and sustainable development.

Table 4. Matrix for determining the systemic level of the negative impact of threats to demographic security and sustainable development of the region

S_{ij}	$C(S_i)$	$H(S_i)$	$C(S_i) \cap H(S_i)$
S_1	1;4;5;7	1;2;3	1
S_2	1;2;4;5;7	2;3	2
S_3	1;2;3;4;5;7	3	3
S_4	4;5	1;2;3;4;7	4
S_5	5	1;2;3;4;5;7	5
S_7	4;5;7	1;2;3;7	7
$L(S_i)= H(S_i)$	**(S_3) Reduced opportunities for quality education as a result of military actions**		

Table 5 shows that this time the new system level forms the threat (S_2) Deterioration of the ecological condition. Here we can already talk about tactical measures that can be implemented already during hostilities. Maximize environmental safety.

Table 5. Matrix for determining the systemic level of the negative impact of threats to demographic security and sustainable development of the region

S_{ij}	$C(S_i)$	$H(S_i)$	$C(S_i) \cap H(S_i)$
S_1	1;4;5;7	1;2	1
S_2	1;2;4;5;7	2	2
S_4	4;5	1;2;4;7	4
S_5	5	1;2;4;5;7	5
S_7	4;5;7	1;2;7	7
$L(S_i)= H(S_i)$	**(S_2) Deterioration of the ecological condition**		

According to equality (4) also holds for (S_1) A decrease in the number of jobs due to the migration of enterprises. Here you can use tactical countermeasures and create new jobs and attract returning enterprises (Table 6).

We are moving to such systemic levels at which the use of operational countermeasures is required. For example, such a threat is (S_7) Crisis state with the food supply of the population. Such problems cannot be postponed until tomorrow and must be resolved in an operational format to ensure demographic security and sustainable development of the region (Table 7).

Table 6. Matrix for determining the systemic level of the negative impact of threats to demographic security and sustainable development of the region

S_{ij}	$C(S_i)$	$H(S_i)$	$C(S_i) \cap H(S_i)$
S_1	1;4;5;7	1	1
S_4	4;5	1;4;7	4
S_5	5	1;4;5;7	5
S_7	4;5;7	1;7	7
$L(S_i)= H(S_i)$	**(S_1) A decrease in the number of jobs due to the migration of enterprises**		

Table 7. Matrix for determining the systemic level of the negative impact of threats to demographic security and sustainable development of the region

S_{ij}	$C(S_i)$	$H(S_i)$	$C(S_i) \cap H(S_i)$
S_4	4;5	4;7	4
S_5	5	4;5;7	5
S_7	4;5;7	7	7
$L(S_i)= H(S_i)$	**(S_7) Crisis state with the food supply of the population**		

Operational measures are needed to respond to threats (S_4) Increasing poverty, which negatively affects the ability to maintain the viability of the body, and (S_5) Deterioration of the crime situation and deterioration of the social infrastructure due to the incompleteness of the decentralization reform (Table 8).

Table 8. Matrix for determining the systemic level of the negative impact of threats to demographic security and sustainable development of the region

S_{ij}	$C(S_i)$	$H(S_i)$	$C(S_i) \cap H(S_i)$
S_4	4;5	4	4
S_5	5	4;5	5
$L(S_i)= H(S_i)$	**(S_4) Increasing poverty, which negatively affects the ability to maintain the viability of the body**		

We will form a response matrix to certain threats to demographic security and sustainable development of the Kharkiv region in the context of strategic, tactical, and operational measures (Table 9).

Table 9. Response matrix to certain threats to demographic security and sustainable development of the Kharkiv region

Countermeasures	**S_1**	**S_2**	**S_3**	**S_4**	**S_5**	**S_6**	**S_7**
Strategic response	-	-	+	-	-	+	-
Tactical responses	+	+	-	-	-	-	-
Operational response	-	-	-	+	+	-	+

Summing up, we note that the proposed methodological approach to responding to threats, presented in such a form, in our advisory opinion, should be implemented in the form of countermeasures to ensure demographic security and sustainable development in our region.

5. DISCUSSIONS

In general, the difference between our study and similar ones presented in the works of many scientists from all over the world [9-11] is in the analysis of the current situation in the selected region and the formation of its main ones through the econometric method, the matrix for the orderly application of measures to counter threats to ensure demographic security and sustainable development of a region that is not in normal conditions but has an aggressive military environment.

In discussing the results of the study, attention should be paid to the choice of the region for our analysis. Today, the security and sustainable development of Ukrainian regions are different from any other. The military aggression of the Russian Federation is accompanied not only by hostilities within the territories where a real confrontation takes place but by massive missile strikes throughout the country, mostly on civilian infrastructure with a significant number of civilian casualties due to the use of obsolete weapons of the last century. Therefore, the issue of security is an order of magnitude more complicated, because it should provide for the formation of conditions not only through the maintenance of life and the ability to work but the avoidance of danger to the lives of refugees. Consequently, the level of influence and possible consequences of the realization of this threat depends on the duration of military aggression. If military actions stop quickly, then most women with children will return to Ukraine, in other conditions they will adapt to the EU countries with subsequent migration, and men to reunite with their families after the restrictions on leaving the country are lifted.

Krupa et al. [12], Kopytko et al. [13], Marhasova et al. [14], who study the problems of ensuring demographic security and sustainable development of the regions of Ukraine, today in all regions there are almost 7.5 million internally displaced persons, we are talking about residents of those areas on the territory of which hostilities took place and are being conducted. A significant part of these people, in order to save their lives, was forced to move to regions in Western Ukraine, thereby provoking an additional burden on the social sphere and creating a situation on the labor market when up to 16 applicants compete for one vacant job. This situation allows us to predict that the current destruction and overload of the social sphere will be an additional incentive for large families or people with special needs not to return to regions in Ukraine, for whom better conditions will be created in the EU countries. Considering that in Ukraine employers, using the favorable situation in the labor market, reduce wages and reduce the social package, highly qualified workers will look for an opportunity to stay in the EU countries to continue working on more favorable terms for themselves.

The long duration of the war will also affect the birth rate, which, as noted above, is characterized by negative dynamics (for clarity, let's take the period corresponding to the beginning of the military aggression of the Russian Federation (children per 1 woman): 2015 - 1.506; 2016 - 1.466; - 1.374; 2018 - 1.301; 2019 - 1.228; 2020 - 1.217). In the current situation of large-scale aggression, many families may delay the birth of a child, which will further slowdown the reproduction of the population.

Active hostilities do not allow an objective assessment of the loss of human resources among the military and civilian populations. In the first case, we are talking about a ban on the dissemination of this type of information, and in the second, it is about the impossibility to take into account the facts that take place in the occupied territory. These circumstances affect the excellent estimates of the number of victims.

Nikonenko et al. [15], Raszka et al. [16] have carefully studied the issues of sustainable development in the region. As part of their research, attempts were made to characterize the

current level of development of the region in order to further develop a program to improve this process.

However, our study differs in that we not only analyzed the demographic situation in the regions of Ukraine but also identified the main threats and determined the decency of applying countermeasures in order to ensure demographic security and sustainable development.

We proved that all the threats to demographic security, which were identified as the main ones before February 24, 2022, remained relevant after the start of large-scale aggression. At the same time, these threats have given way to the level of priority for the development of stabilizing measures for the sharp increase in the number of refugees and internally displaced persons, making it more difficult to meet the need for food, shelter, and medical care.

6. CONCLUSIONS

Summing up, it should be noted that for the region we have chosen, there are a number of problems and threats that should be paid attention to. Examining the characteristics of the region and the country as a whole, it should be noted that the result of the implementation of threats to food security in Ukraine, the counteraction to which was not provided at the proper level, was the deepening of the demographic crisis, which manifested itself in a decrease in the birth rate, high morbidity, and mortality, low life expectancy. the increasing pace of migration. It is undeniable that similar threats, in particular the relatively low birth rate, also occur in the EU countries, but the dynamics are excellent. In Ukraine, in the last thirty years, in most cases, the demographic situation has worsened due to the passive policy of state regulation, while in the EU countries this issue is given maximum attention from the standpoint of building human potential for further sustainable development.

The demographic situation in the region we have chosen until February 24, 2022, was characterized by the presence of significant threats to demographic security, including low birth rate, the level of which did not provide a simple replacement of generations; high morbidity and mortality of the population; low life expectancy, one of the lowest in Europe; population aging; mass distribution of one-, two-child families; constantly growing themes of labor migration with subsequent transformation into moving to a permanent place of residence outside the country of entire families; departure of young people for education and further work.

The new phase of military aggression on the part of the Russian Federation not only aggravated the previously existing and progressive threats to the demographic crisis but provoked the emergence of new ones, including those related to a significant number of refugees, most of whom are women with children and people over 60; a large group of internally displaced persons who lost their homes and jobs; exacerbation of problems with physical and economic access to food for the majority of the country's population; the complexity of production and the destruction of food export logistics chains; the destruction of social infrastructure, in particular medical institutions, which makes it difficult to maintain the necessary level of life for a large number of the population of the chosen region.

Ensuring demographic security and sustainable development of regions in Ukraine, given the significant impact of key threats over the past thirty years with the subsequent complication of the situation provoked by the next phase of military aggression by the Russian Federation, should be modified and, first of all, assume: the preservation of quantitative and the development of qualitative characteristics of the population, increasing active life expectancy, improving the age and sex structure, optimizing internal and external migration processes, strengthening family values and strengthening social responsibility for the life and health of people. The achievement of these goals should be facilitated by the effective work of regional policy in achieving interests in the economic, political, and social spheres.

According to the results of the study, the features of the transformation of the main threats to demographic security and sustainable development of a particular region were determined. A response level matrix was proposed for each of the identified threats in order to counteract the most impact and further reduce the pace of implementation of activities. Research has limitations. The fact that as a result of hostilities, a small number of regions can be the object of research. In the future, we should consider the demographic security and sustainable development of regions that do not have the influence of military actions and compare them with our research results.

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