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Russia's Military Aggression in Ukraine and Its Consequences for Geographic Education and Science

The study aims to assess the impacts of Russian military aggression against Ukraine on the sphere of education and science, and suggestion of ideas on how to form strategies and tactics to develop education and science in this country after the aggressor is finally conquered. Results. Guided by open cartographic and statistical sources revealing military activity in Ukraine, the authors have preliminarily assessed material, physical and moral losses and suggested ways to overcome the crises that descended upon Ukrainian educational and scientific spheres, in particular, those to transit to the European system of instruction in the establishments of higher education, strengthening of role/significance of learning geography in secondary schools as the discipline that forms worldview systemic thinking in the young generation. Russian military aggression has already disclosed strong and weak sides of geographical instruction in Ukraine, while the interest manifested by western higher education establishments to Ukrainian vis-à-vis gives way to cardinal changes in the system of education, in particular, geographical education in this country.

Keywords: *geographical education and science, teaching geography, training of specialists, reform of education, impacts of military aggression, perspectives of geographical education.*

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Військова агресія Росії в Україні та її наслідки для географічної освіти і науки

Мета роботи — оцінка наслідків воєнної агресії Росії проти України в освітній та науковій сфері та ідеї щодо формування стратегії і тактики розвитку освіти і науки в нашій державі після перемоги над агресором. *Результати.* За відкритими картографічними та статистичними даними про хід воєнних дій в Україні здійснено попередню оцінку матеріальних, фізичних і моральних збитків та запропоновано шляхи подолання кризи в освітній та науковій сферах України, зокрема перехід на Європейську систему викладання у закладах вищої освіти, посилення ролі й значення вивчення географії у середній школі як предмету, що формує світоглядне системне мислення у підростаючого покоління.

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Воєнна агресія Росії проти України показала сильні й слабкі сторони географічної освіти в Україні, а інтерес західних ЗВО уможливив кардинальні зміни в системі освіти, зокрема географічної, в Україні.

Ключові слова: географічна освіта і наука, викладання географії, підготовка кадрів, реформа освіти, наслідки воєнної агресії, перспективи географічної освіти.

Research timeliness

Russian war against Ukraine that began in 2014 and grew into full-scale aggression on 24 February 2022 is, among all other dangers, an existential threat to the development of Ukraine. It was acknowledged by historians and philosophers centuries ago that Russia can for decades be at permanent war. V. I. Kluchevskiy, one of the fathers of Russian history, noted that Russia was a permanently-colonizing state that tried to more and more expand its monstrous territory the whole time of its existence [1]. And this historical fact is once again confirmed today by Russia's yet other aggression in Ukraine. It is undoubted that we shall free all territories occupied by Russians, but our society will then unavoidably and fully face the consequences of war. There, therefore, exists an urgent necessity to assess all impacts of war and find ways to rebuild the country for the purpose of its further development. The plans for the post-war recovery of Ukraine have already been highlighted in the President's of Ukraine Special Decree No. 266/2022 of April 21, 2022 (On Establishment of the National Council for Reconstruction of Ukraine).

The priorities in the postwar reconstruction of the state have already been concentrated in *Ukraine's Restoration Plan*. We believe that the formation of an educated, patriotic and Ukraine-centric Society is the part of this plan where the enlightenment, in the first turn, historic and geographical, shall be given a leading role. It is to a great extent due to geography that geographical knowledge and present-day education form in every citizen of Ukraine the awareness of being privy to the development of intellectual, spiritual,

and political Ukraine-centricity, unity of Ukrainian people and their land, culture, history, and vision of future.

Golda Meyer, when she was the Israeli Prime Minister, emphasized that successful development of the state is only possible when maximum attention is given to its three components, namely, education, medicine, and the army. Ukraine was made to form a new and strengthen its army in the course of the last eight years, incessantly develop its defense capability, intensify its war capability (inclusive of that received as the US and European aid), and has already proved its military capacity and highest professionalism while repulsing Russian attacks. Unfortunately, eight years of educational reform have led to the destruction of the system of education on the whole and that of higher education in particular. Natural sciences as "the most expensive" ones in the system of education, that is, those that require essential subventions that got off the rail of the 30-year-old financial standards for equipment and highly qualified staff were among the biggest sufferers. And, undoubtedly, scientific and educational spheres now face the problem of not only a mere assessment of the impacts of war but that of the reasoning out the changes in key spheres of state policy, in particular, in the advancement of educational activity and scientific transformations.

The present study **aims** to an assessment of consequences of Russian military aggression against Ukraine in the sphere of education and science, and suggestion of ideas to help form strategies and tactics to develop education and science in Ukraine after the aggressor is conquered.

Coverage of problem, major works

The present-day problems of higher education in Ukraine can be described as follows:

1. *Loss of demographic potential*. Different sources assert that it is already over 5.5 million people left Ukraine (inclusive of nearly 2 million children) in the course of the active phase of Russian aggression (see Fig.1). Ukrainians are sincerely grateful to those states of the world that sheltered the refugees.

However, due to the fact that Ukraine was left by many young people before their 18, inclusive of students whom Europe allowed to simultaneously continue education in their countries, Ukrainian higher education establishments had problems with the restoration of quota in 2022–2023, since nearly 10% of students of the 1st and the 2nd academic years already lived abroad, and nearly the half of these made



Fig. 1. Map scheme of emigration from Ukraine beginning from February 24, 2022 (source: UNHCR)

their choice in favor of foreign educational establishments, particularly when they encounter little problems with resuming studies in Europe.

And, if the process of emigration is not regarded as irreversible, the physical destruction of Ukrainians represents a real loss of the demographic potential of the country. The open sources told that 243 children were killed and over 446 were wounded in Ukraine

as of June 3, 2022 (*see Fig. 2*). A month later, on July 15, 2022, the Office of General Prosecutor presented figures that grew 1,5 times: 344 and 640 children correspondingly. And, that does not count information received from places of active hostilities. And, that does not count children's moral and psychological traumas, among them thousands of children forcibly deported to Russia...

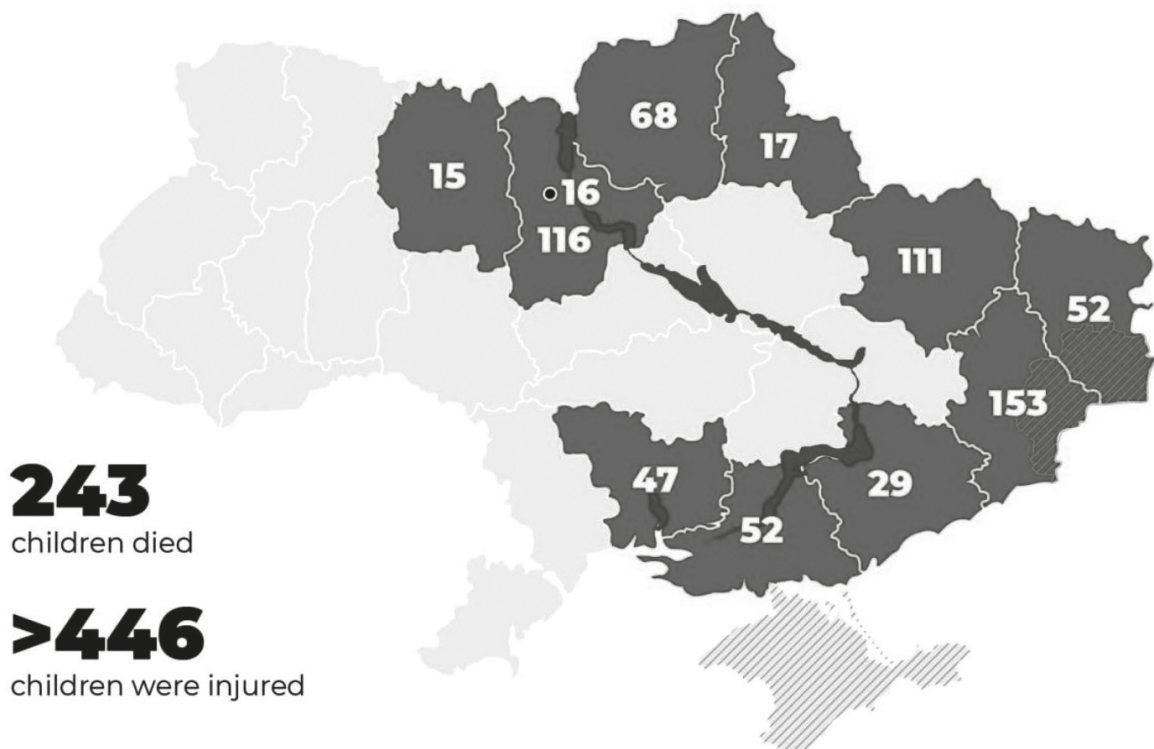


Fig. 2. Map scheme of injured children (source: Office's of General Prosecutor data) [5].

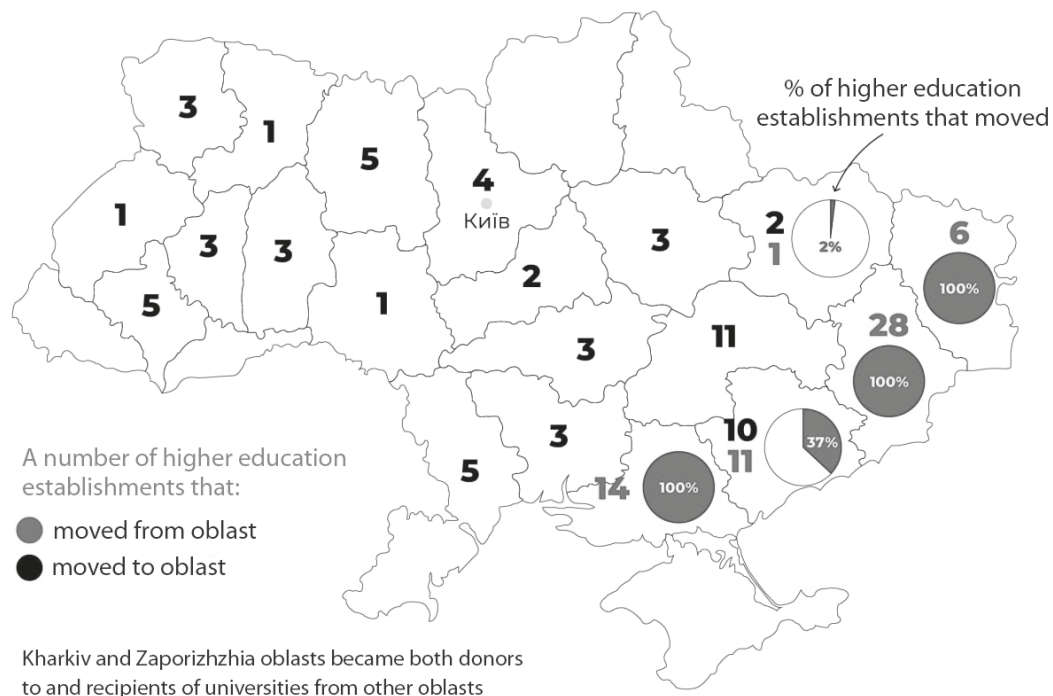


Fig. 3. Map scheme of migration of higher education establishments after February 24, 2022 (source: mass media).

2. *In migration.* The IOM Office in Ukraine regards the amount of internally displaced people (IDP) in the period from February 24, 2022 until April 1, 2022 as 7.139 million. With respect to territory, the greater part of people moved from Kyiv (2.384 million) and Eastern Ukraine, that is, Kharkiv, Donetsk, Luhansk, Dnipropetrovsk, and Zaporizhzhia oblasts (2.363 million). Significantly less were the moves from Northern Ukraine (Kyiv, Zhytomyr, Sumy, and Chernihiv oblasts)—1.656 million people and Southern Ukraine (Odesa, Mykolaiv, and Kherson oblasts)—0.4 million. As to IDPs' age structure, 49% of them are children of 5–17 being the basic consumers of educational services [2]. The majority of these are represented by students of primary and secondary schools, but school leavers are also found. Unlike primary and secondary school students who usually learn distantly at their home schools, the essential portion of school leavers is in fact transferred to secondary schools at places of their registered temporary residence. The first months of the war were the months of migration of a significant portion of higher educational establishments, predominantly from the east and the south of Ukraine (see Fig. 3), and that was the reason why the displaced educational establishments and those in the zone of hostilities have lost the majority of the quota of the 1st year students (approx. $\frac{2}{3}$ of the same in 2021). All changes and amendments introduced by the Ministry of Education to the entrance rules were

useless, for the applicants' parents gave their preference to universities and institutes in the center and in the west of Ukraine.

3. *Catastrophic ruinations.* It was 1071 higher education establishments that suffered from Russian bombardments and shelling as of April 15, 2022, and 95 of them were totally destroyed. In August, the figures grew to 1981 and 230 correspondingly [3], and that once again proves that the annulment of Ukrainian people, their education, and culture are the aggressor's principal and true goals (see Fig. 4–5). Further functioning of ruined or damaged establishments of higher education will require big capital expenditures, but it is nothing when compared to human losses, destroyed communities, micro-districts within big cities, objects of critical infrastructure, etc. Ruined homes, feelings of danger, and the loss of demographic potential are weighing obstacles to the functioning of education in Ukraine. Still, harder is the situation with higher education establishments that were or still are on the temporarily occupied territories where unique facilities, instruments, equipment, and collections were factually destroyed (brought out, plundered) as it was with the training geological depot of the Laboratory of Geophysics and Geological Exploration of the Department of Geology, Geography, Recreation and Tourism of the Karazin University in Kamyanka, Iaium District, Kharkiv Region (see Fig. 5).

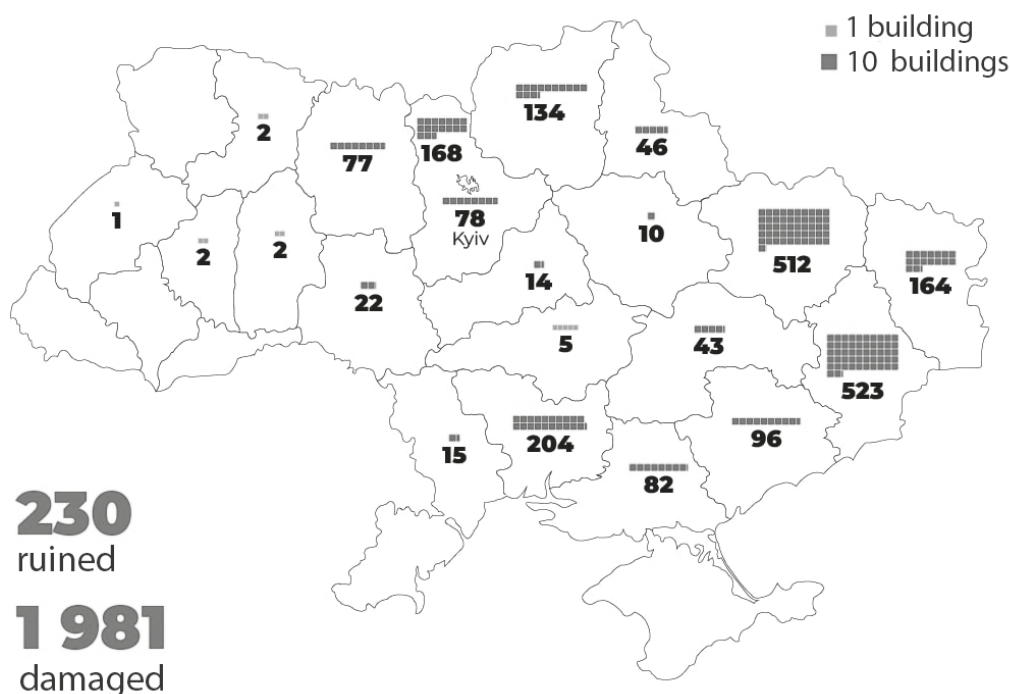


Fig. 4. Map scheme of damaged and ruined higher education establishments as of August 9, 2022 (source: open sources, data available with the Ministry of Education)

4. *Problems with the university admission process.* There were 77.6 thousand daytime state-funded places under the bachelor program in 2021 or nearly 36% of the bachelor program quota. Such balance was observed in the last years. However, due to open war, destruction of economics, and extremely hard material state in families within all regions of the state, the number of entrants under contract has dramatically decreased. It is still one more challenge to the system of higher education that will inevitably impact the number of scientific/pedagogic staff positions and sometimes the existence of departments and even establishments of higher education. The situation will not be recovered by this-year growth of masters who chose to study under contract, for it is only a temporary phenomenon: a scarce number of this-year bachelors will in three years become the same scarce number of masters.

The consequences of military aggression with respect to the system of education can on the whole be divided into *regional* and *national*. *Regional* consequences derive from the huge number of IDPs from the east and the south of Ukraine which means a significant decrease in competitors for higher education in these territories, while higher education establishments of the west are not ready to accept (accommodate, provide with everything necessary) that a great number of students. *National* problems are deeper and of still longer run, since caused by external migration: 20 thousand educators are abroad,

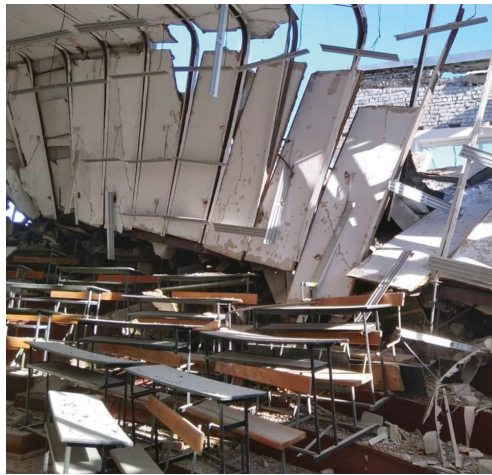
1.5 million children live in emigration where they study, get on with their lives, learn the language of countries of residence, their parents seek for vacancies (and many of them are already employed), many people have nowhere to come back (ruined homes, apartments, destroyed plants where they worked in peacetime), and, therefore there is great anxiety of whether that capable emigrants and their children are going to return in Ukraine. If not, that will mean a demographic decline for generations and a continuous decrease in the number of students. This process can become irreversible if the government will not set a goal to preserve the educational potential of the country, that is, on the model of the European countries, support higher education establishments that suffered in the period of aggression, in the first place, provide them with equipment, facilities, software, flexible systems of payment for education and provision of scholarship to make education attractive in our country not only for ethnic Ukrainians but for foreign nationals, too.

The present-day situation in Ukraine once again shows that the formation of an educated Ukraine-centric society that would not rely on someone's goodwill and kindness but develop and defend its own interests should be among the national-level priorities.

This fundamental idea should specifically be supported by qualitative geographical education which helps form Ukrainian identity, cultural belonging, and skills to think in world categories of



Building of
the Department of
Economics, Kharkiv
N.V. Karazin University



Building of
the Physic-Technical
Department, Kharkiv
N.V. Karazin University



Training Geological Depot,
Kharkiv N.V. Karazin
University
(Kamyanka, Iziurm District)

Fig. 5. Some consequences of missile and bomb attacks on Kharkiv N.V. Karazin University

apprehension of Ukraine and apply the same in the political, economic, and cultural life of the region, Europe, and the world. Geographical knowledge itself is the basis for awareness of belonging to Ukraine and involvement in the development of intellectual, spiritual, and political Ukraine-centricity and unity of all Ukrainians and their land, culture, history, and future. It is now evident that these would have long ago become the conceptual issues of school geography. Instead, *Geography of Native Land*, a primary and secondary school course based on regional natural history was substituted by *Environmental Studies*, an integral course of general content. Geography of Ukraine, a secondary school course was added with topics from the economic and social geography of the world, that is, the 10th Grade topics were transferred to be learned in the 8th and the 9th grades. This, in its turn, resulted in a thematic overload of the *Ukraine in the World: Nature and Population*, a limited-hours course studied in the 8th Grade, and *Ukraine and World Economics*, a limited-hours course studied in the 9th Grade. Both courses probably enjoy the advantages of application of the comparative geographical approach, but they precisely lost in the concentration of learning geography of Ukraine and formation of students' awareness of Ukraine-centric position, and, secondly, educative components under these programs are excessively wide and difficult for these age groups of school students.

This is why the Ministry of Education should reconsider its priorities in school education and school geography in particular. Like history, geography affords much more options for the patriotic upbringing of future generations. And, geography can in no way have a status that would be lower than mathematics or biology.

The same and even more important is the case with higher geographical education, for it is higher education establishments that form specialists (teachers or scientists) who can give systemic complex knowledge of the environment. Russian aggression showed our people's almost total unawareness of cartography and topography, that is, they poorly know topographic maps; can not find their bearings with the map, and do not at all have a sense of direction. This was many times confirmed by volunteers, military men, and common people. The reason lies in the overregulation of education with endless rules and norms.

Everything has its beginning and its end: this war will one day conclude, and we shall start to rebuild Ukraine on the principles of security and harmony with the environment. And, starting the process, we

should give priority to the systemic geographical approach, the same as geography should be appropriated the key role in the restoration of the country, while geographical and geo-ecological approaches in territorial planning should become primary approaches. These can only be reached with the uninterrupted preparation of a sufficient number of specialists in geography whose instruction should begin even as we speak. However, present-day geographical education is unable to do this, not because of the absence of specialists but because the specialists are not free in creation being overregulated with instructions, norms, and reports.

There once was the Ministry of Education's good idea to prepare specialists within the frame of their specialties, but the national list of the same that started to be formed 8 years ago still does not meet international standards. By way of example, isn't geography a special area of knowledge that studies Earth and the place of humankind on it? The present-day standards of specialties do not give the answer. The National Inspectorate for Quality of Education has now become a commercial structure that beds on higher education establishments as disabling burden making the latter cut educational programs initially called to instruct highly qualified and competent specialists in narrowly focused areas of activity. It is our reality that educational activity licenses are issued to establishments whose staff and areas of activity can in no way prepare specialists in this or that area, e.g., ecologists can not be trained by ship repairers, tourism specialists—by experts in food technologies, geologists/oil, and gas extractors—by builders and municipal economists. And, this takes place in a situation when a number of traditionally geographical areas of focus disappeared from the lists of sciences that study space, e.g., cartography is referred to building. At the same time, geographer programs now offer still fewer disciplines of topographic/cartographic cycle, for each guarantor of the educational program knows that 50% of credits within the educational program should provide for preparation in specialty alongside other educational programs. If we add general disciplines, and optional disciplines (those from different spheres of knowledge that are of students' individual interest, often non-professional), the net result will make 25–30% of credits under the major. And no higher education establishment will risk withdrawing from it, for there exists such thing as accreditation where the observance of the aforesaid norms shall be strictly analyzed and permission/non-permission to continue educational activity be given. From the standpoint of the lecturer of

the higher education establishment, the work of said Inspectorate in the present format is useless; moreover, it is harmful, since takes a great weight of lecturer's (especially guarantor's of the educational program who usually does this unsalaried) time which could be more efficiently spent on raising qualification, communication with students, or simply the rest. Meanwhile, the Inspectorate can work with the sites of educational programs or with departments that realize the programs, social media where students share their impressions, and never divert lecturers, employers, or directors of structural divisions of higher education establishments from the performance of their principal duties. It is not the guarantor of the educational program who should assess his own work but the expert-guided by clear criteria should find and inform of shortages, while the former may then appeal/non-appeal to higher instances.

The fact that the Ministry of Education did not include Geography on the list of either compulsory or additional courses while planning its 2023 National Multidiscipline Test is yet another proof that they do not want to hear geographers and consider geography among the major Ukraine-centric disciplines.

Another big problem of geographical preparation (and natural on the whole) lies in the fact that, unlike social-humanitarian, natural specialties are not so popular in our country and do not attract future students so much as they do with the other specialties; the "lecturer-student" standard (which is the basis for higher education establishment's financing and development of its job pattern) does not make possible preservation of wide circle of specialists in this or that area who would ensure a high professional level of lecturing, and, respectively, students' knowledge. And, beginning from the next academic year, the result of an essential reduction in the professor/lecturer staff in higher education establishments; three-year distant education; moral pressure connected with military aggression; "high" salary of a young talented, and creative lecturer who has completed his postgraduate studies—the natural education (and geographical in particular) will encounter the collapse, since the older lecturing staff has tired to fight endless changes in the rules of the game in education (or with education) and will therefore go to enjoy their deserved rest, while the young people will seek for a well-paid job where much less moral efforts are required to be applied. And this situation is only natural from both material and psychological points of view, for every man and woman lives with the hope that new times will come and everything

will become better after the war, everything will be done on a rational basis, on the best foreign models.

Geographical science now experiences the moment of truth. "Red directors" who totally ignored the European vector of Ukrainian Development from the very beginning of our sovereignty, had formed in people a contemptuous attitude towards scientists, and permanently underfunded science in the course of all years of existence of the independent Ukrainian state. That resulted in the loss of young people's interest in scientific activity, and those still active do not see their future in Ukraine. Power holders' corruption and uncontrolled and inappropriate use of funds has led to a lack of orders for scientific developments (some of them find implementation outside state borders). Known chains that once connected education, science, management of economics, and business are now broken and require restoration.

It is all ready for years that effective state demands from different authorities and enterprises are not at work. What is meant here are national-scale credits which should be worked over by university graduates for at least 3 years.

In times of factual absence of state support of a scientific activity, scientists nevertheless have to publish their papers in periodicals introduced in some scientometric databases. In most cases, these periodicals are outside Ukraine, and publications in them should be paid for. In any case, this should not be interpreted as an appeal to isolating Ukrainian geography and stopping cooperation with the world's leading geographers. The state, as is the case with other countries, should provide respective solutions to Ukrainian geographers to have work experience abroad and network. Of special attention here is the study of foreign languages as a means of communication and integration into the world's geographical space.

There is a sense that the government men are satisfied with the fact that school and university graduates, candidates, and doctors of sciences leave abroad, and do not wish to realize that the state involved great funds to prepare them all, the funds now given away free to other countries. At the same time, the Ministry of Education managed to find sources of income for its own structures through the introduction of the system of licensing of higher education establishments.

The GDP's scientific content is to a great extent defined by the number of scientists per million inhabitants. Unfortunately, this figure in Ukraine is 5 times less today than it was 30 years ago.

In pursuance of the Ukrainian Restoration Act, the National Council for Reconstruction has

developed the *Ukraine's Restoration Plan* consisting of 15 programs, where Program 12 (*Development of Education with Focus on Major Competences and Innovations*) accentuates improvements in the quality of education and teachers/lecturers' preparation, harmonization with European standards, renewal of IT-programs in cooperation with business structures, reform of technical education, and foundation of the system of grants to researchers and scientific parks.

Educative activity can not also ignore the problems of the environment distorted by war. As follows from the data available with the Ministry of Environmental Problems (November 2022), it is now 10 national parks, 8 reserves, and 2 biosphere reserves, 2.9 million ha of the territories of the Emerald Net, and 16 Ramsar Convention objects, or 20% nature-protected territories affected by war activities, as well as 450 thousand ha of forests now suffer hostilities or are under occupation.

Conclusions

The preliminary analysis of the consequences of Russian aggression in Ukraine allowed assessing anew the importance and actuality of geography in its different dimensions—from the formation of patriotism, love of native land, and territorial identity of people, to applied dimensions such as working with maps, find oneself on the territory, etc. Among school manuals cut or put on fire by the aggressors on temporarily occupied territories, there among the manuals in history or Ukrainian language also were books in geography. The erasure of geographical knowledge or its presentation from the imperial and chauvinistic positions are among the key chains of the so-called “denazification” of Ukraine aimed by Russia. This war is a big impulse to Ukrainian education and science to transfer to European standards of the content of educational programs and courses whose part is still developed on the methods and knowledge that do not

meet realias and demands of postindustrial society. And, we shall soon need a specific actualization of knowledge on management and renewal of territories in the postwar period (territorial planning, landscape planning, problems of spatial development, etc). All these to a great extent touch geography, too.

There are many ideas and suggestions to improvement of the situation. We should soon provide for real coordination and interaction between geographers who work in schools, higher education establishments, and academic institutions. Doing so would help realize and organize top-priority directions of research, and avoid duplication and atomization of efforts in scientific exploration. It is extremely important to organize efficient scientific councils with real levers of influence on the formation of directions of dissertation research and guarantees of preparation of highly qualified specialists.

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