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ВЕСТНИК

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NAS RK is pleased to announce that Bulletin of NAS RK scientific journal has been accepted for indexing in the Emerging Sources Citation Index, a new edition of Web of Science. Content in this index is under consideration by Clarivate Analytics to be accepted in the Science Citation Index Expanded, the Social Sciences Citation Index, and the Arts & Humanities Citation Index. The quality and depth of content Web of Science offers to researchers, authors, publishers, and institutions sets it apart from other research databases. The inclusion of Bulletin of NAS RK in the Emerging Sources Citation Index demonstrates our dedication to providing the most relevant and influential multidiscipline content to our community.

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ENVIRONMENTALLY INDUCED MIGRATION IN THE CONTEXT OF THE CORONAVIRUS PANDEMIC

Abstract. The purpose of this article is to identify the specific trends of migration flows induced by negative environmental changes in the context of the COVID-19 pandemic. First of all, based on an analysis of meteorological data it was proved that in the near future, the risk of dangerous natural disasters that might cause large-scale population movements remains no less high than in the past few years. A temporary reduction in CO2 emissions due to a reduction in industrial production and transportation along with restrictive infection control measures will be short-term and insufficient to slow down climate change. Consequently, we can expect that during the pandemic the number of environmental migrants throughout the world will not decrease and might reach about 20 million people a year only due to forced relocations caused by weather-related hazards. In this study, we use the term environmental migrants to refer to both those people who have been forced to leave their place of residence due to natural or technological disasters, and those people who have voluntarily decided to migrate under amid slow-onset environmental degradation. Both of these categories of migrants are already exposed to the risks posed by adverse environmental conditions. In the context of a coronavirus pandemic, additional risks begin to affect each group differently. Internally displaced people will face problems caused by restrictions on movement imposed in most countries, as well as poor sanitary and hygienic conditions during evacuation and at temporary accommodation centers, which greatly increase the risk of infection and further spread of the virus. Voluntary environmental migrants in most cases move because of the inability to continue their usual economic activities in the changing environmental situation in their home region and the need to find a job in a sphere which does not depend directly on natural and climatic conditions. Most often these are farmers who look for temporary employment in cities. This category of migrants will be adversely affected by the economic consequences of the coronavirus pandemic, namely, the reduction of jobs and wages in a number of industries, especially ones that are related to public services and transportation. A cut in remittances will reduce the adaptive potential of their environmentally vulnerable home areas, and lead to further deterioration of the environment and living conditions of the population.

Keywords: environmental migration, coronavirus pandemic, ecology, climate change, disasters, migration, epidemic, COVID-19, risks, security, migrant rights.

The coronavirus pandemic has had a tremendous impact on all spheres of life around the globe, causing extreme concern among national governments, international organizations, and ordinary citizens. According to the American Johns Hopkins University, by June 2020, coronavirus has already caused deaths of more than 500 thousand people in the world [1]. There is no doubt that such an emergency which poses a threat to the life and health of the population requires increased attention and urgent action. However, unfortunately, it does not cancel out the existence of other global threats, such as climate change and environmental deterioration. Thus, according to the report of the World Health Organization (WHO), these problems led to the death of at least 150 thousand people in 2000, and in 2030 – 2050 they will cause about 250 thousand deaths per year [2, p. 13]. In addition, according to the statistics for 2008 – 2019, natural hazards are causing on average displacement of 21 million people a year [3]. At the same time, the annual number of natural disasters in the world steadily increases and more than tripled in the period from 1980 to 2018 (from 240 to 798 events per year) [4]. There is a consensus among leading

climate specialists that the cause of this negative trend is global climate change which is developing due to the increased anthropogenic impact on the environment [5, p. 13-14].

1. Ecological situation in the time of the coronavirus crisis. The restrictive measures taken by the governments of most countries to combat the coronavirus pandemic led to a reduction in industrial production and transportation, which are the main sources of carbon dioxide emissions into the atmosphere causing the greenhouse effect and global warming. Thus, according to scientists from the Centre for Research on Energy and Clean Air (CREA), during the epidemic in China, CO₂ emissions decreased by quarter [6]. However, with a high degree of certainty in the long term, the economic downturn and quarantine measures will affect negatively the implementation of programs to reduce pollutant emissions and preserve biological diversity. Firstly, the implementation of such programs requires significant financial investments which will bring benefits only decades later. According to the estimates by Bloomberg NEF, in 2019 the volume of global investments in “clean energy” amounted to \$282.2 billion [7]. The economic crisis and the policy to overcome it, as well as the need to invest in other sectors during a pandemic will deprive countries of the opportunity to fully support environmental projects. This situation has already been observed after the financial crisis of 2009, when global CO₂ emissions decreased by 1%, but already in 2010 they increased by 5% again [8]. Secondly, the pandemic and restrictive measures impede international dialogue and cooperation on climate change issues. For example, a key UN conference, COP26, was postponed until November 2020 [9]. Thirdly, energy market experts have already expressed concern that prices for carbon emissions in the ETSs will fall following reduction in the demand during the pandemic [10] which might lead to their mass purchase and subsequent increase in greenhouse gas emissions.

In addition, a few months of reducing atmospheric pollution is not enough to eliminate the effects of centuries-long anthropogenic impact on the environment and stop the systemic processes which have been launched by it. According to the US National Center for Environmental Information (NCEI), May 2020 was the warmest May on record for the globe in the entire history of observations since 1880 [11]. Droughts and record heatwaves are observed in Europe and the southern US states. The temperature of the Pacific Ocean is 1.5°C higher than average, which means an increased risk of the formation of powerful hurricanes. On 12-13 April 2020 tornadoes in the US states of Texas and Maryland claimed lives of 36 people [12]. In May 2020, Cyclone Amphan hit Bangladesh and eastern India killing up to 20 people [13]. Due to the warm and rainy winter in the Horn of Africa locust populations have increased to unprecedented size [14]. Locust summer seasonal migration routes pass through the countries of West Africa, the Persian Gulf, Iran, Pakistan, and India. The UN Food and Agriculture Organization predicts that the locust invasion will be a serious blow to the food security of the poorest countries in the region, while international organizations and economically developed countries may not be able to provide them with enough humanitarian aid due to the consequences of the coronavirus pandemic. The risks associated with natural disasters are exacerbated by their potential ability to provoke man-made disasters, such as breakthroughs of dams, accidents at nuclear, thermal and hydroelectric power plants, chemical plants, transport and pipelines. On 29 May 2020, in Russian city of Norilsk over 20 tons of diesel fuel leaked from a tank at Nor Nickel thermal power plant polluting the Dal'dykan and Ambarnaya rivers. Office of the Prosecutor General of the Russian Federation claims the reason might be surface subsidence [15] which is known to be caused by Arctic permafrost thaw. Thus, an analysis of the current environmental situation shows that a high probability of natural disasters persists during the period of the coronavirus pandemic.

2. Theoretical approach to the study of environmental migration. In order to understand how the infection and measures aimed at combating it will affect environmental migrants it is necessary first to identify how natural and man-made disasters affect the population on endangered territories. In 2020, experts of the World Economic Forum called climate action failure and extreme weather the most serious long-term risks in terms of their impact and likelihood correspondingly [16, p. 29-37]. In 2017, weather-related hazards caused record-high direct economic damage amounting at \$334 billion [4]. But the main danger of both natural and man-made disasters is that they make the environment itself unfit for human habitation, which leads to an increase in morbidity and deaths [2], lower productivity of labour [17, p. 26-27], and mass migrations, since the first natural reaction to worsening living conditions is the desire to flee from the dangerous area. According to the World Bank estimates, if no action is taken, by 2050 over 143 million people could be forced to move within their own countries to escape the slow-onset impacts of

climate change – such as declining agricultural yields, water shortages and rising sea levels – in three most vulnerable regions: sub-Saharan Africa, South Asia and Latin America [18].

In this study, we understand environmental migration as a movement of people induced by negative changes in the environment of any type – climate change and natural disasters, gradual deterioration of the environment, or technological disasters. In the first case, such displacees can be referred to as climate migrants. However, given the specificity of the topic of this research and the close relationship between all these phenomena, we find it reasonable not to discuss subtypes of environmental migration by its causes separately. Our previous studies have shown that the trends of environmentally induced migration flows in spatial and temporal dimensions depend mainly not on the nature of the event that caused them (natural or technological), but on the character of the onset of such event: sudden, catastrophic, or slowly progressing [19, 20].

The first category of events includes natural disasters (floods, droughts, hurricanes, extreme temperatures, wildfires, mudflows, etc.), as well as man-made disasters (radiation and chemical accidents, breakthroughs of dams, major transport accidents, fires, etc.). In this case, the displacement of the population from the emergency zone is forced and carried out urgently. Often it is organized, that is, proceeds in the form of evacuation. As a rule, such migrations are short-term, return and take place within the borders of a state. Since migration is always fraught with risks, in such cases people who did not plan to change their place of residence do not want to move further than necessary, and for a longer time than necessary for their safety. Cross-border migrations usually happen only from settlements located on the state borders. Practice shows that most migrants prefer to return to their habitual place of residence, if possible, and rebuild their houses. In the scientific literature and public discourse, such migrants are sometimes referred to as “environmental refugees” or “climate refugees” [e.g. 21], however, in reality such migrants do not fall under the legal definition of a refugee in accordance with the international law [22, p. 14].

Migrations induced by slowly progressing adverse environmental changes – such as soil degradation, desertification, water shortages, various kinds of pollution, sea level rise, extreme temperatures – proceed in a fundamentally different way. Such slow-onset hazards can sometimes develop for decades before people begin to feel their negative impact on their state of health and the conditions of economic activity. In such cases, migrations are not forced and their flows are not massive. The decision to migrate is most often prompted by economic considerations, as environmental degradation noticeably reduces the productivity of agriculture, forestry, fisheries, and livestock. Empirical studies and expert surveys that we conducted earlier in the regions of the Far North of Russia showed that often migrants themselves do not identify the environmental situation as the root cause of migration [23]. Such migrations can be seasonal – for example, during the periods of drought in the southern regions – and are often performed by only one member of a household. Since they involve agricultural workers to the greatest extent, such population movements are usually directed from rural to urban areas, where there is a chance of employment in industries that are not dependent on environmental conditions [24]. Such migrants can move both within their own countries and across the borders. For example, in Russia there is a significant influx of migrants from Central Asian countries. Some of them left their homes due to environmental degradation [25]. It should be noted that statistical accounting or estimation of the size of this category of environmental migrants is extremely difficult and possible only on the basis of complex mathematical models. Attempts to create such models have been made, in particular, by the World Bank [18]. A number of researchers have expressed doubts that this type of migration could be separated from economic migration [26].

3. Risks of coronavirus pandemic for environmental migrants. Regardless of whether a resettlement from an ecologically unfavorable zone was forced or not, and whether ecological troubles were perceived as its main reason, such migrants are already exposed to risks associated with negative environmental changes. In the context of the coronavirus pandemic, they are subjected to additional risks associated with the danger of infection, on the one hand, and quarantine measures, on the other hand. These risks will affect the participants of the two subtypes of environmental migration that we have identified in different ways, although to a certain extent these problems are common to all migrants. In general, they have already been identified by researchers [e.g. 27] and representatives of international organizations [e.g. 28].

First of all, most countries have introduced temporary restrictions on movement at the local or national level, many state borders remain closed [29]. This situation is most difficult for refugees and displaced persons, for whom migration is a matter of their safety, health, and sometimes life. Given the

fact that natural and man-made disasters tend to develop suddenly and often cannot be predicted in advance, affected individuals are not able to plan their movements, choosing a more favorable time. Such migrations will occur spontaneously despite of any degree of restriction on movement and any epidemiological situation. This means, on the one hand, an increase in the risk of infection for migrants themselves, and on the other hand, an increase in the risk of spreading the infection to new territories along with a wave of displacees.

Researchers have already noted that due to the large crowding of people and poor sanitation on the road and in temporary camps, refugee health is at risk during the coronavirus pandemic [e.g. 30]. The same is true for environmental migrants who were forced to leave their places of residence due to natural or man-made disasters, especially if there are wounded among them. For example, during a flood in the Irkutsk region of Russia in June-July 2019, more than a thousand people were evacuated from Tulun. All of them were temporarily placed at only two points in the walls of educational institutions in safe areas [31]. Obviously, the spread of infections in such conditions will be extremely high, since they exclude the possibility of social distancing and compliance with hygiene norms. When Cyclone Amphan hit South Asia in May 2020, Bangladesh had to prepare almost 10,500 additional shelters to accommodate evacuees with a measure of social distancing [32] and avoid a surge in new cases of COVID-19. Also, the return of such immigrants to their habitual places of residence will be delayed due to the complexity of the work on liquidating the consequences of the emergency and the reconstruction of the housing stock in a pandemic.

It is worth noting that a number of factors simultaneously increase both the risk of mass migrations in the event of a natural or man-made disaster, as well as the risk of widespread viral infections. These include the high population density of the territory, the insufficient level of infrastructure development, the presence of problems in the organization and operation of emergency services, the functioning of public warning systems, and the failure to manage migration flows.

As for the environmental migrants who decided to relocate under the influence of slow-onset hazards, in the event of a pandemic, they will generally face the same problems as labour migrants, but the worsening of their position will negatively affect the environmental situation in their home regions as well over some time. The specificity of this subtype of environmental migration lies in the fact that it serves as the most important strategy for communities' adaptation to negative changes in natural and climatic conditions [e.g. 33]. As we have already noted above, in this case migration involves mainly those employed in agriculture who move with the aim of finding a job in other sectors of production. In the context of the coronavirus pandemic, not only borders, but also many enterprises are in lockdown, especially those working in the service sector and the transportation. According to economists, both in Russia [34] and around the world [35] the negative impact of the coronavirus pandemic on the labor market and population incomes will be noticeable and will continue after the pandemic is over. Migrants are particularly vulnerable in this regard for a number of reasons. First of all, a significant part of them are employed in the most affected by the pandemic sectors of economy. According to statistics by the Organization for Economic Co-operation and Development (OECD), in the OECD countries, about 14% of foreign migrants were engaged in trade and repair services, 6% – in the hotel and restaurant business, 6% – in the transport industry, 6% – in various public services [36]. In addition, the employment of migrants is often vulnerable and unstable, that is, they are at increased risk of dismissal and reduction in wages, as well as violation of workers' rights, including due to their illegal or semi-legal position in the labor market because of the lack of official registration, official labour contracts, and officially paid wages [37]. Thus, it is possible to predict with high confidence that due to the coronavirus pandemic, migrants will lose their jobs and income, and new arrivals will not be able to find a job.

This situation poses great risks for environmental migrants, since the restrictive measures taken to combat the spread of infection have mostly affected employment in cities where trade, service, transport, and garment industry enterprises are concentrated. Migrants who seek employment in these sectors because of declining agricultural productivity due to climate change and environmental degradation will not be able to get enough jobs. As a result of this and due to lower incomes, they will not be able to send enough remittances back home, which previously allowed their families to use this money for investments in new agricultural equipment and technologies. Doing so the population of environmentally vulnerable territories increased farm productivity, reduced the environmental load and adapted to climate change. Some migrants will be forced to return to marginal and dangerous areas, increasing anthropogenic pressure on already damaged ecosystems and thus increasing the risks of their further deterioration. The

“poverty trap” and inequality among the inhabitants of these territories will deepen, more and more people will not have enough money to move, even if their life and health are in danger due to the ongoing deterioration of natural and climatic conditions [38].

Conclusion. Thus, the spread of coronavirus infection COVID-19 has become a serious additional risk of environmental migration. In cases when the displacement was caused by sudden natural or man-made disasters, there is a high risk of infection of a large number of people during the evacuation and in temporary accommodation centers. Restrictions on movement across and within the countries might also be a threat to the safety of endangered populations if evacuation is not organized by local authorities. In the case of slow-onset environmental degradation, which makes it impossible to continue the usual economic activities, migrants will face also risks caused by the economic consequences of the pandemic. It will reduce the adaptive capacity of environmentally vulnerable areas. An analysis of the latest meteorological data allows to predict that in the near future the likelihood of large-scale natural hazards around the globe will not decrease compared to previous years. Natural disasters, in their turn, are potentially capable of provoking technological disasters. The danger of infection, restrictive measures and the economic consequences of the pandemic will impede the process of migration itself, the adaptation of migrants at the places of settlement, as well as the rectification of the consequences of natural or man-made disasters and reconstruction work. They will require additional precautionary measures, and additional costs from the state budget in addition to spending on combating infection and supporting the population and economy during the pandemic, as well as additional attention to protecting the rights of migrants, who will face especially acute issues of access to health services and employers’ compliance with labor contracts. Since the COVID-19 pandemic in many respects has become an unprecedented challenge in the modern history of all mankind, it requires new responses in the fields of healthcare, legal practice, economic and social policies, climate change action, etc. It is necessary to continue research and search for scientifically based approaches to these problems in order to use the crisis as an opportunity for making decisions that will contribute to sustainable development in future.

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КОРОНАВИРУСТЫҚ ПАНДЕМИЯ ЖАҒДАЙЫНДАҒЫ ЭКОЛОГИЯЛЫҚ КӨШІ-ҚОН

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ЭКОЛОГИЧЕСКАЯ МИГРАЦИЯ В УСЛОВИЯХ ПАНДЕМИИ КОРОНАВИРУСА

Аннотация. Целью данной статьи является выявление особенностей протекания миграционных процессов, спровоцированных негативными изменениями окружающей среды, в условиях пандемии коронавирусной инфекции COVID-19. Прежде всего, на основе анализа данных метеонаблюдений было установлено, что риск серьезных природных катастроф, способных вызвать масштабные перемещения населения, в ближайшей перспективе остается не менее высоким, чем в последние несколько предшествующих лет. Временное снижение выбросов CO₂ в атмосферу вследствие сокращения объемов промышленного

производства и транспортных перевозок на фоне ограничительных мер по борьбе с инфекцией окажется краткосрочным и недостаточным для того, чтобы замедлить климатические изменения. Следовательно, можно ожидать, что во время пандемии численность экологических мигрантов в мире не уменьшится и может составить порядка 20 млн. человек в год только за счет вынужденных переселений, вызванных стихийными бедствиями. В данном исследовании под экологическими мигрантами понимаются как лица, вынужденные покинуть своё место жительства из-за природных или техногенных катастроф, так и добровольно принявшие решение о миграции под воздействием медленно прогрессирующей деградации окружающей среды. Обе эти категории мигрантов уже подвергаются рискам, порожденным неблагоприятными природно-климатическими условиями. В условиях пандемии коронавируса на них начинают воздействовать дополнительные риски, которые по-разному сказываются на каждой из групп. Вынужденные переселенцы будут сталкиваться с проблемами, вызванными ограничениями передвижения, введенными в большинстве стран, а также плохими санитарно-гигиеническими условиями во время эвакуации и в пунктах временного размещения, которые многократно повышают риски их заражения и дальнейшего распространения вируса. Добровольные экологические мигранты в большинстве случаев переезжают из-за невозможности продолжать привычную хозяйственную деятельность в изменившейся экологической ситуации в их домашнем регионе и необходимости поиска работы в сферах, чье функционирование не зависит напрямую от природно-климатических условий. Чаще всего это фермеры, отправляющиеся на временные заработки в города. На данной категории мигрантов отрицательным образом скажутся экономические последствия коронавирусной пандемии, а именно сокращение рабочих мест и оплаты труда в целом ряде отраслей, особенно связанных с обслуживанием населения и транспортными перевозками.

Ключевые слова: экологическая миграция, пандемия коронавируса, экология, изменение климата, катастрофы, миграция, эпидемия, COVID-19, риски, безопасность, права мигрантов.

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