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Deepening of the World-System Crisis

Reconfigurations of the World-System and Potential Impacts on Destabilization and Environmental Degradation

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Abstract

Since the beginning of the Great Recession in 2008 the world-system has become increasingly in a state of crisis, which continues to deepen. Since Russia's special military operation in Ukraine (SMO) in February 2022, the world-system has entered a new phase of development that combines international, economic and other crises. The geopolitical aspects of the world-system crisis and the consequences of the military conflict are now being actively debated, but there is almost no research on how these crises and military actions affect and will continue to affect the environmental situation in the region and in the world in general. In this paper we analyze different aspects and reasons and explain how and why the deepening crisis of the World-system has had and will have a negative impact on the ecology of the world.

Keywords: Economic Crisis, Ecological Crisis, Environmental Situation, World-System, World-System Crisis, Environmental Degradation, Negative Impact on the Ecology, Climate, Military Actions, Disasters, Green Energy, CO_2

Since 2008—that is, since the beginning of the Great Recession—the world-system has been increasingly in a state of crisis, which continues to deepen. This is a systemic crisis, and it is associated with a gradual change in the balance of power, with the weakening of American dominance, with the rise of new powers whose political regimes are not democratic. Respectively, this is leading to increased tensions, contradictions and a slowdown in globalization, which is now being rapidly reversed. Thus, the world-system and world order are undergoing considerable transformations[1]. we call these transformations "the World-System reconfiguration" (Grinin L.and Grinin A. 2022b: 263; see also Grinin 2022b). Our idea is based on our theory of the periodic catching-up of the political component of the world-system, which tends to lag behind the economic component. Such gaps are eventually bridged, but by no means in a smooth way. On the contrary, the catch-up process tends to be rather complex and turbulent and provokes powerful structural transformations. We believe that the Arab Spring has initiated the reconfiguration of the world-system, which will be associated with revolutionary processes in the twenty-first century (Grinin, Korotayev, and Tausch 2019; Grinin, Grinin, and Korotayev 2021; Grinin L.and Grinin A. 2022b).

Since February 2022, the world-system has entered a new phase of development combined with international, economic, and other crises. The uncertain outcome of Russia's Special Military Operation in Ukraine (SMO), the split in the world, the break-up of the global economy into a few economic and financial zones, and other processes open up other options for the transformation of the world order apart from what seemed to dominate yesterday. It is possible to consider several likely scenarios for changes in the world-system in connection with the SMO in Ukraine, as well as some other aspects of the transformation of the world order.

How Crises Affect and Will Continue to Affect the Environmental Situation?

The geopolitical aspects of the world-system crisis are now being actively debated, but there is little research on how these crises affect and will continue to affect the environmental situation in the regions and in the world in general. At this point, we would like to make a note that in this paper we are trying to show the ecological dimension of the modern world-system crisis, so we primarily focus on environmental problems, degradation, disasters, and environmental damage. We touch less on climate issues. [2] At the same time, we would like to express an obvious, but in the last fifteen to twenty years little emphasized, idea that environmental and climate issues, although closely related, are by no means synonymous. Recently, however, environmental problems have very often been replaced by climate problems (even in the work of the UN

[1] The change of world order and world leaders is the subject of many well-known studies, e.g., Kennedy (1987); Arrighi (1994, 2007); Modelski and Thompson (1996); Huntington (1996); Mearsheimer (2001); Wallerstein (2003); Zakaria (2008); Chase-Dunn, et al. (2011).

[2] A number of ideas on climate policy, with which we agree, were expressed in a special chapter of our report to the Club of Rome (Akaev and Davydova 2023). On the impact of conflicts on climate change and, vice versa, on how possible climate changes can affect conflicts see Theisen, Cleditsch, and Buhaug (2017).

Environment Program [UNEP]). This can be explained by the great importance and global character of the latter, but such an approach is unjustified. What harms the climate is not necessarily bad for the environment, and vice versa. For example, wind and solar power plants are good for the climate, but are harmful to the environment. And nuclear power stations, as many people believe today, do not harm the climate, but they clearly harm the environment.

With respect to climate issues, we will limit ourselves in this section to what is generally known. China, the United States, India, the EU27, Russia, and Brazil were the six largest greenhouse gases emitters in the world in 2022. Together, they account for 50.1 percent of the world's population, 61.2 percent of global GDP, 63.4 percent of global fossil fuel consumption and 61.6 percent of global GHG emissions (Crippa, et al. 2023; Greenfield 2023). However, the trends are different: emissions are increasing in China, India and the United States of America, but decreasing in Brazil, the European Union and the Russian Federation (UNEP 2023).

For the purposes of this article, it is important to emphasize the following. We believe that, in general, the deepening of the described crisis of the world-system will have a negative impact on the global environment for a number of reasons: first, the inevitable weakening of environmental policy coordination; second, destabilization in various countries, which inevitably leads to environmental degradation; third, that crisis phenomena always force governments to solve environmental problems on a residual basis; fourth, that growth of military expenditures changes the proportions of all other expenditure items, including environmental ones. On the other hand, military operations and preparations for them inevitably increase the consumption of resources and carbon energy. Finally, fifth, the deterioration of the economic situation, including in the context of the world-system crisis and crisis in certain regions and countries (in particular in Europe, see below), leading to the rejection of decisions already taken on climate and environmental issues.[3] With these points in mind we can agree that the ecological crisis is an energy crisis and an economic crisis, and is also a political crisis (Price 2010). We can also add to this list a world-system crisis, which also has a military component.

To conclude this section, we should note that in some cases demographic pressure can have a significant impact on inter-state tensions, for example, in the form of disputes over water resources. The most famous example is the dispute between Egypt, Sudan, and Ethiopia over the construction of the grandiose hydroelectric power station Grand Ethiopian Renaissance Dam in Ethiopia on the upper reaches of the Blue Nile, the right tributary of the Nile, near the border with Sudan (see Grinin 2020a). The intensity of emotions is justified, since the Blue Nile is Egypt's main source of water (85 percent of the Nile's flow comes from Ethiopia). It is not surprising that these three countries, which the Nile flows through, are now engaged in a desperate dispute over

[3] This particularly concerns the actual recognition of nuclear energy as "green" and the abandonment of previous decisions to close nuclear power stations, for example, in France, and, on the contrary, the intensification of this sector, both in France and in other countries, in particular in China. There are a number of reasons for this, but one of them is the breakdown of established gas links, leading to rising energy prices. Once again, nuclear fuel waste (not to mention the likelihood of accidents) is an environmental time bomb that will persist for hundreds of years.

how this water should be shared. Many mediating countries and the UN have been involved in the dispute.

Crisis. Military Actions and Environmental Degradation

The geopolitical aspects of the world-system crisis require special consideration in terms of the impact of military conflicts on the environment. Military actions that destroy the natural environment are called ecocide or environmental degradation. Meanwhile, the impact of military actions on the Ukraine's environment is already extremely destructive. Take, for example, the destruction of the Kakhovka Hydroelectric Power Station. This is really a big disaster.

Let us recollect that on the night of 6 June 2023, the dam of the Kakhovka hydroelectric power station was damaged and its upper part collapsed under the pressure of water. As a result, water from the Kakhovka reservoir began to flow uncontrollably downstream into the Dnieper. The hydroelectric power station regulated the flow of the Dnieper River to supply electricity to several regions, as well as to supply water to arid areas on both sides of the Dnieper and to irrigate tens of thousands of hectares of agricultural land in the Kherson, Zaporozhye and Crimean regions. Dozens of settlements downstream of the Dnieper were flooded, tens of thousands of people lost their homes, and about 600 square kilometers of land were flooded. Crops were destroyed and fertile soil was washed away. According to some reports, the disaster at the Kakhovka hydroelectric power station will make farming impossible on an area of 584,000 hectares. The land that was under water has now dried up and become a useless wasteland. In addition, the overflow of the Kakhovka reservoir has flooded cemeteries, animal burial sites, gas stations, sewage treatment plants and sewers. Coastal areas are threatened by biological and toxic pollution. The pollutants and bacteria that entered the water were carried by the current and partially settled in nearby areas, while the rest flowed into the Black Sea (for more detail see OBSE 2023; Pavlova 2024).

Unfortunately, there are many armed international and internal conflicts going on in the world; in some countries, like Burma, the DRC and others, they have been going on for decades. On the whole, the negative environmental consequences of military action are numerous. Let us quote some of the conclusions that were drawn in our report to the Club of Rome in the chapter "Ecology. Life in the "Unstable Biosphere" (Kovaleva 2023: 90):

> Military actions cause large-scale, long-term and severe damage to forests, fertile land, and pastures. "Cleansing of nature" through the destruction of vegetation and soil becomes a war against future generations of inhabitants. One thing is beyond doubt – almost all military operations are always accompanied by changes and destruction of the natural environment. Let us take as an example just two (of many) aspects of the impact of military conflicts on ecology.
>
> First is the military engineering (earth) works for the construction of defensive and other military facilities (trenches, roadblocks, dugouts, etc.), the placement of military equipment that leads to changes in the relief, formation of artificial excavations and dumps, movement of soil, surface and deep influence on the soil, underlying rocks and vegetation, destruction of vegetation, wind and water erosion, changes in the water-air regime of soils, disturbance of natural soil processes, growth of buried soils.

> Second, is the direct effect associated with changes in the surface caused by explosions, and the indirect effect caused by shock waves and disturbances of the stability of the soil cover. In the plains, the indirect effect is relatively small, but in the mountains, it is significant and depends on the steepness of the slope, the mass of soils moving due to the activation of erosion processes. Landslides produce huge masses of friable gravel deposits at the foot of the slopes.
>
> It is already clear that the destruction of nature by military action will have profound long-term consequences. With any environmental impact, the greatest danger is not immediately occurring effects. Much more worrying is the prospect of those significant, slowly accumulating changes that can occur due to poorly understood chemical reactions.

It's worth adding here that the military actions in Ukraine have a lot of negative effects in addition to what has already been described. In particular, we should mention the drifting naval mines in the Black Sea, the use of depleted uranium shells, which will obviously be a source of radioactive contamination of the soil, as well as the massive use of cluster munitions, the use of which is prohibited in most countries, but among those who have not signed The Convention on Cluster Munitions, unfortunately, the United States (supplier of such outfits), Russia, and Ukraine remain.

The above paragraph also indicates that the following measures will be needed to improve the environment and rehabilitate contaminated territories in the areas affected by military actions:

1. identification of sources of pollution, localization, and elimination of oil pollution of the territory at the sites of military equipment, wells and oil refineries;
2. investigation and assessment of the degree of pollution of surface and groundwater used as drinking water by cities and towns;
3. carrying out works to prevent pollution of surface waters;
4. work to locate and extract oil products from long-term man-made deposits;
5. inspection of radioactive waste disposal sites;
6. restoring the state service for monitoring the state of the environment. (Kovaleva 2023: 91)

Unfortunately, the amount of used munitions, including cluster munitions, on Ukraine's territory is such that another generation will suffer from remnants and unexploded munitions.

Geopolitical Struggles and their Impact on the Environment and Climate

Every armed conflict damages the environment. However, the global crisis discussed in this paper, which is accompanied by conflicts, naturally leads to very serious environmental degradation that can provoke global disasters. In itself, the ever-increasing talk about the permissibility of the use of tactical nuclear weapons, and even strategic nuclear weapons, threatens to become a self-fulfilling prophecy.

The reconfiguration of the world-system and the destruction of the world order greatly intensify geopolitical rivalry and its severity. And this rivalry inevitably damages the environment, since it is not aimed at improving people's lives and preserving the environment, but at crushing

rivals at any cost. In the excitement of geopolitical struggle, it is easy to forget about the environment. Even peaceful rivalry (more precisely, rivalry in the form of hybrid warfare) affects the environment. Thus, the desire to oust Russia from the European gas market, and the consequent increase in gas (and oil) production in Texas and other states, leads to environmental degradation because of the use of so-called hydraulic fracturing methods. The result is huge water consumption (up to 0.4–0.5 million m3 during the operation of just one well), injection of up to 3,500 m^3 of special chemicals, degradation of aquatic ecosystems, deterioration of water quality for residents, micro-earthquakes, pollution of the territory, and so on (Zoback, Kitasei, and Copithorne 2010; Solovyanov 2014). Military confrontations are even more harmful to the environment and climate. Thus, the war in Ukraine requires a huge amount of cargo to be transported by air, which increases the carbon footprint.

Refusal from pipeline gas in favor of liquefied gas will increase carbon dioxide emissions due to large leaks during transporting of gas for liquefaction and liquefied gas conversion, and it is also important that a large amount of additional energy is required to transport liquefied gas across the oceans. The gas is liquefied at minus 163 degrees Celsius so that it becomes liquid and its volume decreases to 1/600th of its original volume. But then it needs to be converted to a gaseous state again in regasification terminals.

Local conflicts are also becoming part of a global geopolitical confrontation, involving a wide range of forces. All this can have a significant impact on the environment and climate. For example, the conflict in Gaza has led to a huge humanitarian catastrophe but the environmental consequences, both in Gaza and on a global scale, are huge, although they are not discussed. In addition, the Houthi attacks have led to a reduction in shipping traffic in the Red Sea, so that they have to use the route around Africa, which requires much more fuel.

The war in Ukraine led to a reduction in gas consumption, and as a result, coal consumption in Europe increased by 2 percent in 2022, and even by as much as 4 percent in Germany (Manukov 2023). At the same time, the share of hard coal in Germany's total energy balance increased to 9.8 percent. Coal consumption is also growing globally. According to the fourteenth Emissions Gap Report 2023 (UNEP 2023), global primary energy consumption increased in 2022 mainly due to increased supplies of coal, oil and renewable electricity, while gas consumption decreased by 3 percent after the energy crisis and war in Ukraine (Ibid. 2023).

In recent years, competition and confrontation between the major powers in Africa has intensified and became more acute. The struggle is both for opportunities to exploit the continent's natural resources and for geopolitical and other influence (see Grinin 2020b, 2021a). Along with the important benefits for African countries, this rivalry can also intensify civil wars, competition for resources, and so on; as well as unsustainable forms of extraction.

Capitalism, Energy, Environment, Crisis, and Economic Growth

It has become largely commonplace to criticize capitalism for being responsible for the resource depletion and environmental (and climate) degradation, for being the main beneficiary and stakeholder of increasing fossil fuel consumption and continued economic growth, and for being

the main threat to modern civilization. It is not uncommon that there has been a lot of talk in the West in recent years about how capitalism is bad, how the pursuit of profit and economic growth damages the climate, environment, and humanity in general, and how it should be replaced by something else. This is argued more or less in a number of anti-capitalist manifestos, such as the report to the Club of Rome "Come on!" (von Weizsäcker and Wijkman 2018) or the book by Klaus Schwab and Thierry Malleret (2020) *COVID-19: The Great Reset*. Although there is much that is true in this critique, there is also much that is purely ideological and propagandistic cliches.

It is not our task to analyze such criticism in detail (for more details, see Grinin et al. 2022). What is important for us now is that first, the world-system crisis that we are talking about includes an economic crisis, as well as stagnation and a slowdown in economic growth; second, the economic crisis is certainly related to the environmental crisis, because attempts to overcome the crisis or to make more profits inevitably increase the burden on the environment; third, capitalism is, of course, organically linked both to the growth of resource consumption, especially energy, and to environmental degradation (the ecological crisis is an economic crisis [Price 2010; see also Jessop 2012; Collins 2013; Kolasi 2019]); fourth, military actions and a split in the world-system (along with the expenses for the ongoing Green Deal) have made the horizons of a return to cheap energy very distant, thus increasing the crisis and social tensions in Europe and other regions; and fifth, since capitalism, according to many, survives and can develop only with cheap energy ("carbon capitalism," according to John Urry [2013], who mentioned that oil is central to contemporary capitalism), its crisis and even collapse are predictable (Collins 2013). Accordingly, the crisis (collapse) of capitalism threatens great problems for humanity and the environment[4].

Of course, we will not be able to consider the whole set of relationships, but it is quite important to touch on the issue of the relationship between economic growth and environmental security[5].

So far, unfortunately, it turns out that development and well-being are in opposition to environmental security and especially to the reduction of emissions and vice versa. For example, there has come seemingly positive information: in 2023, Germany managed to reduce carbon dioxide emissions to the lowest level since 1950 (Dzen.ru 2024). However, it turns out that this is largely at the expense of the energy crisis, a reduction in the production in energy-intensive industries (Dzen.ru 2024), and a slide into recession. In recent years, global emissions have fallen by 3.7 percent. That is great. But that was the result of the COVID-19 pandemic and lockdowns (Crippa et al. 2023).

But the environmental trend cannot progress only in times of disasters and economic crises. This would be a path to a dead end and social degradation. However, there are many proposals to

[4] The crisis of capitalism will occur before the ecological crisis, somewhere in the 2030–2050s. And it will become the main problem of humanity, reaching a global scale (Collins 2013).

[5] The question that there are limits to growth, that the race for economic growth threatens resource depletion, environmental destruction, and demographic collapse has been actively debated since the famous Club of Rome report "The Limits to Growth" (Meadows et al. 1972). But this report, like subsequent ones (Pestel 1989; Meadows et al. 2004), was still largely perceived as extreme.

abandon the idea of economic growth completely or mainly, openly or hiding behind euphemisms[6]. "Can economic growth go on forever?… Instead of organizing our societies and economies around the principle of growth, we should organize them around the principle of sustainable human development, which requires the metabolic stability of the wider ecosphere" (Kolasi 2019).

Our position is that, up to a certain level, the correction of senseless growth, the race for prestigious consumer goods, and the morally and legally unrestricted pursuit for profit is very useful. A moderate movement towards a better system of distribution in a society in which inequality has become excessive is also very desirable. This will only improve the health of society and give it impetus for further development. There is no doubt that economic growth cannot be based on environmental degradation. But such limitations and self-restraint, canalization and redistribution are useful only up to a certain point, beyond which they begin to cause more harm than good.[7] Where this level lies is a very important question, however it is not ideological, but rather empirical, established in the process of careful socio-political experiment. It's like a diet for someone prone to obesity. Limiting the amount of food one eats and keeping to a balanced diet will improve health. But if a person starts to consume significantly less than the body needs, then illness is almost guaranteed in the long term. And loss of strength, anorexia, reduced activity, and depressed mood are almost certain.

Therefore, finding a balance between environmental security and economic growth is undoubtedly a priority. However, attempts to create "the metabolic stability" (Kolasi 2019) will soon lead to serious social and political consequences, with the worst being the coming to power of populists who simply reject all environmental and climate goals as far-fetched and harmful. Trump's policies are a good illustration of how this can happen (see Grinin and Korotayev 2020). Thus, finding opportunities to combine (even modest) economic growth and compliance with environmental policy is the main challenge. It is also possible, to a certain extent, to make growth more rational and to focus on developing areas that have less impact on the environment. However, the idea that it is possible to live without growth at all is an illusion that is dangerous for the social stability of society. In the context of a growing world-systemic crisis and crises in many countries, it would be particularly dangerous and unreasonable.

The most important aspect of the issue is also ignored, which is the greatest impact of a real reduction in consumption on the low income countries. And, of course, they will not agree. This means that the gap between the rich and aging global North and the poor, young global South will

[6] The politicians' over-reliance on the GDP as an indicator of economic prosperity has led to the current depletion of natural and social resources (Schwab and Malleret 2020). The authors of the report to the Club of Rome believe that GDP measures nothing more but the speed at which money flows through the economy, and that GDP growth does not guarantee the achievement of non-economic goals, but rather the opposite (von Weizsäcker and Wijkman 2018). Although the GDP indicator is often subject to generally fair criticism (see Easterlin 2010; Costanza et al. 2014; McElwee and Daly 2014; Goldsmith 2019; Kapoor and Debroy 2019), in this case the criticism tends to hide the fact that the potential of developed countries has weakened, as well as to cast doubt on the need for economic growth in general; however, the rejection of growth as a goal objectively leads to the stagnation of society (for details see Grinin L. and Grinin A. 2021).

[7] Ralf Fücks has some very good ideas on this point (Fücks 2013).

widen. And that will only exacerbate the global crisis without solving environmental problems. Ralf Fücks (2013) rightly notes, that the debate around society beyond growth does not take into account the prospect of global growth dynamics in the coming decades. Whether the world economy will grow or not is not decided in Europe. He emphasizes that it is no longer a question of whether the global economy will continue to grow, but rather how it will continue to grow. Zero growth is unrealistic and highly undesirable, given the scale of poverty. It is also impossible to continue in the same spirit (Fücks 2013). It is important, that Fücks's (2013) book rightly proposes a third way, which is to say environmentally sustainable and socially acceptable growth.

We will return to the issue of combining economic growth and environmental policy in developing countries below. However, we should note that our position is expressed in the title of one of our chapters in the aforementioned report to the Club of Rome "High income and low income Countries. Toward a Common Goal at Different Speeds" (Grinin, Malkov, Korotayev 2023). In other words, low income countries will inevitably have to move towards environmental and climate goals, but much more slowly than developed countries.

In addition, we should not forget that in the late twentieth and early twenty-first centuries many developed countries actively transferred industrial (dirty) production to developing countries (especially China) in order to increase the profitability of these companies due to lower wages and reduced environmental requirements (see e.g., Martin and Schumann 1997; for our position see Grinin and Korotayev 2015). This has yielded significant dividends for low income countries, but the severity of their environmental problems has increased. At present, the importance of these industries, especially in China, is so great that sudden changes could significantly exacerbate economic problems around the world, and the global economy is already slowing down, threatening to turn into a global crisis. In particular, despite the People's Republic of China's great efforts in the transition from coal to other types of energy, coal still remains the basis of China's energy supply. The rapid attempts to abandon it in 2021 immediately led to an energy crisis in China. The environmental problems of individual countries thus become global.

As to the rapid development of less developed countries, one cannot help but say that this development is associated with accelerated modernization. And such modernization usually leads to various destabilizing manifestations, such as revolutions of various kinds, separatism, civil wars, etc. (for more details see Grinin 2013, 2020a, 2020b, 2021a, 2021b, 2022a, 2022b; Grinin and Grinin 2022a, 2022b). Naturally, such destabilizing processes have a negative impact on the environment.

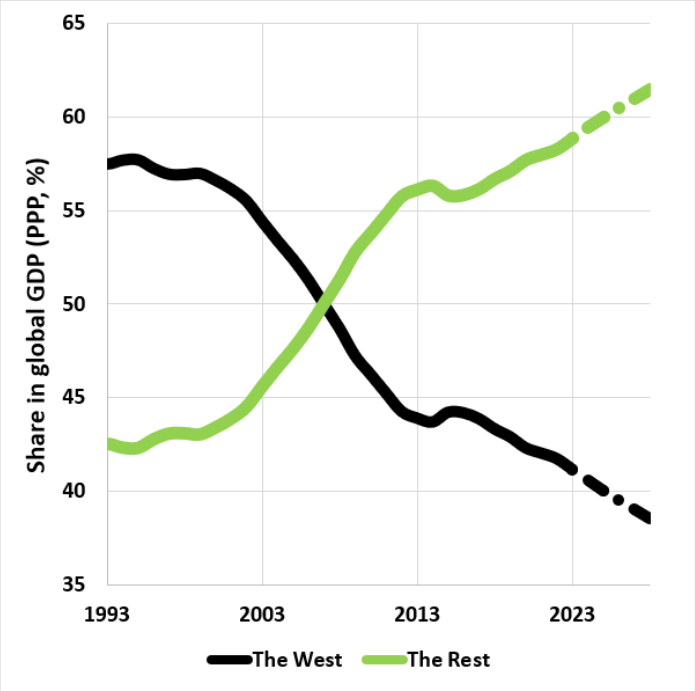
On the other hand, let us add that it is important to take into account that the backward traditional farming methods, especially agriculture in conditions of rapid population growth, have a very serious and negative impact on the environment. The most striking examples here are shifting cultivation and slash-and-burn agriculture and transhumance in the Sahel region of Africa, and the clearing of tropical forests to expand agricultural land in tropical areas. However, technological and economic growth could very significantly reduce the pressure on land due to the transition from extensive to intensive agriculture and increased productivity, including by reducing

the amount of land under cultivation. Thus, economic growth in many developing countries could also play a positive role in environmental terms.

Crisis and Developing Countries: Global South and Global North

Developing countries are currently experiencing higher economic growth rates than developed countries. Accordingly, the share (and hence the importance) of the former in global GDP is growing (see Figure 1). We have called this process the Great Convergence (Grinin and Korotayev 2015).

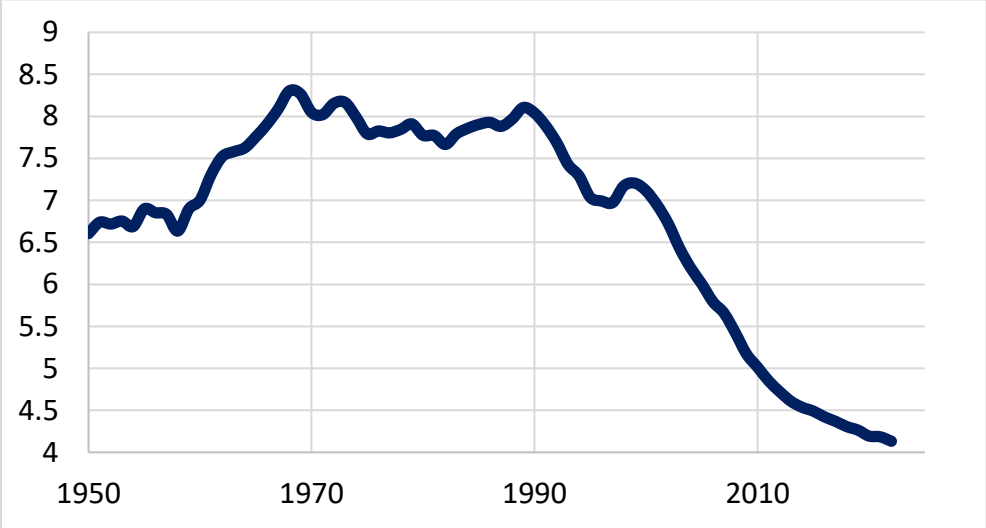
Figure 1. Dynamics of the share of Western countries ("The West") and the rest of the world ("The Rest") in world GDP (PPP), 1993–2023 with a forecast to 2028, by percent.



Notes: Data source is the latest version (October 2023) of the "WORLD ECONOMIC OUTLOOK" (WEO) (https://www.imf.org/en/Publications/WEO/weo-database/2023/October/weo-report). The IMF *Advanced economies* aggregate was used as a proxy for "Western countries".

Although in recent decades low income countries have significantly reduced their gap with high income countries in terms of GDP per capita, nevertheless, the gap is still very large, many times larger (see Figure 2).

Figure 2. Dynamics of the gap (in times) between Western countries and Third World countries in terms of GDP per capita, 1950–2020.



Note: the numbers on the y-axis indicate how many times GDP per capita was higher in Western countries than in Third World countries in the corresponding year [Sadovnichiy et al. 2014: 25, Fig. 1.17; updated with latest IMF] data.[8]

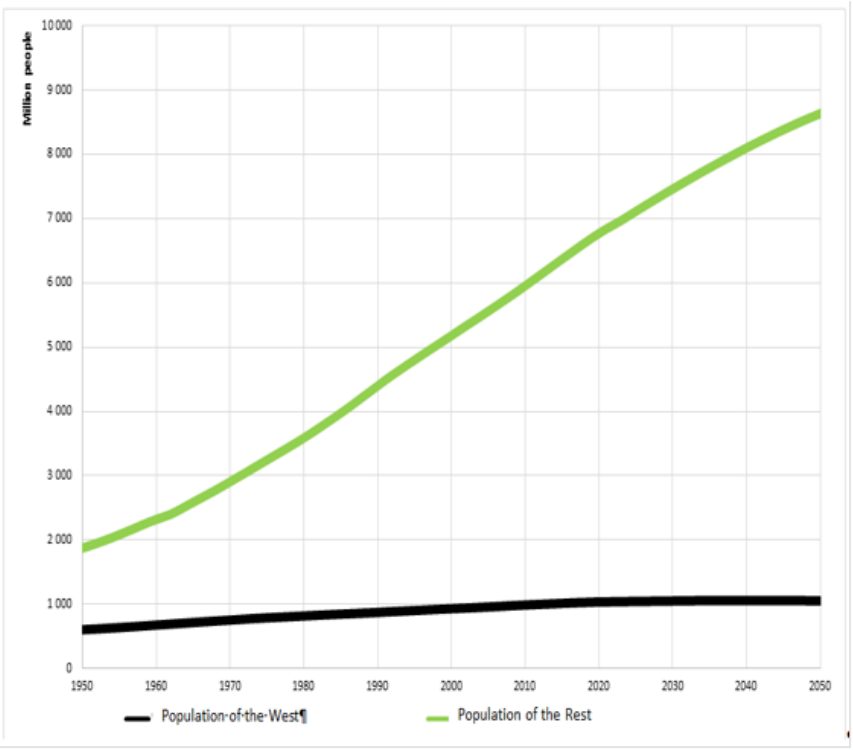
In this context, it is not surprising that the confrontation between the global South and North has intensified due to the awareness of its significance and capabilities, as well as in connection with the Special Military Operation and the deepening contradictions in the world, and the development of the crisis in the world-system. In this regard, one should realize that environmental demands and programs to reduce emissions are currently in conflict:

1. With the urgent need of the countries of the global South for rapid development, which is impossible without high economic growth, while in the high income countries, as we see, the need for such growth, is already being questioned.
2. With the need to increase per capita consumption, without which it will be extremely difficult not only to significantly reduce the gap in living standards, but even to move out of poverty to the world average level of development. Meanwhile, it is the increase in living standards that accounts for a very large part of greenhouse gas emissions, not to mention soil degradation and so on.
3. Finally, it is in the global South that population growth continues, while it has almost stopped in the North (see Figure 2). And this cannot be ignored, both in terms of the need for economic growth and the "right" of populous countries to their share of "per capita" emissions. Let's take an example of the latter.

[8] https://www.imf.org/en/Publications/WEO/weo-database/2023/October/weo-report

India is among the top four emitting (and therefore most polluting) countries. However, India's per capita consumption-related emissions are much lower (Greenfield 2023). Besides, according to the UNEP 2023 Emissions Gap Report (UNEP 2023), territorial greenhouse gas emissions per capita vary significantly from country to country. For example, they are more than double the global average of 6.5 tonnes of CO_2 equivalent (tCO_2e) in the Russian Federation and the United States of America, while in India they are *less than half that figure*. How can we ensure that India does not use the second half? This is very difficult, given that coal consumption in the country alone grows at 4 percent or more per year (Manukov 2023). The West, whose share of the world's population is only 12 percent and is constantly decreasing (see Figure 3), cannot "feed" the remaining 7/8 of the population, and also cannot live without goods from the developing countries. Therefore, reduction of greenhouse gases may lead to decline in the supply of high income countries with necessary goods with all the ensuing consequences.

Figure 3. Population dynamics of the Western countries ("The West") and the rest of the world ("The Rest"), in millions of people, 1950–2022, with the UN Population Division's Average Forecast to 2050.



Notes: data source – UN Population Division database (https://population.un.org/wpp/). West = Western Europe + USA + Canada + Australia + New Zealand + Japan + South Korea.

How can we reconcile the challenge of escaping poverty and underdevelopment with reducing greenhouse gases when 2.4 billion people still lack access to clean cooking and 775 million lack access to electricity? (UNEP 2023) Much has been written about the need to find such a solution for developing countries, but there are not yet enough ways to solve them. And with the global crisis, there is no "light at the end of the tunnel" at all. The aid from developed countries is being

reduced completely. However, although solving environmental problems is also extremely difficult, it seems that it will still be easier to deal with because some environmental problems can be solved through good legislation, administration, improved culture, and so on.

The 2023 Emissions Gap Report (UNEP 2023) rightly notes that meeting the energy needs for broader human development will lead to a significant increase in energy demand. Although it has been suggested that it will be possible to meet this growing demand for energy in low income countries more efficiently and equitably through low-carbon energy as renewable sources become cheaper (UNEP 2023), this still seems technologically completely unrealistic.

Thus, the problem of combining rising living standards in poor countries with the need to protect the environment, and in particular, meet the climate objectives, is perhaps the most difficult to solve. The development of green energy will, of course, contribute to the solution of this problem. But it will not be enough by far. Therefore, in addition to the necessary legislative, socio-cultural (including improving literacy), and economic measures, which we have not had the opportunity to discuss in this paper, we suppose that some technological methods can help here to some extent. In particular, we believe that it is the transition to the mass implementation of smart and intelligent systems that will largely solve the problems of energy efficiency and energy saving and help to realize environmental and climatic tasks. This transition will create a CO_2 utilization system that will make significant progress in reducing carbon emissions. In addition, one of the important ways of solving some ecological problems may be the development of innovative biotechnology (for details see Grinin et al. 2024).

The Need to Adapt Environmental Programs to Changing Situation

Planning environmental and climate-friendly programs is extremely important. However, ill-conceived or ill-adapted environmental standards and programs, in particular plans to reduce the use of herbicides, fertilizers, and so on, together with a number of other factors, lead to social tensions, in particular farmers' protests (Holland, Germany, France, etc.); and in some places to a food crisis and, as a consequence, revolutions. Sri Lanka is a recent example. This, of course, exacerbates the general crisis in the world. On the other hand, the impact of the crisis on such events is manifested in the fact that climate and environmental programs are long-term programs. So, when the economic and geopolitical situation changes dramatically, they come into conflict with the real opportunities available in societies. As a result of this discrepancy and of increased socio-economic hardships, the effectiveness of these programs is significantly reduced while the negative impacts increase. For example, an analysis of the progress in reducing emissions in Germany in 2023 (see above) shows that this reduction is due to a reduction in coal-fired power plants and production volumes in energy-intensive industries (Dzen.ru 2024), largely as a result of the energy crisis and the slide into recession in 2023. As a result, the coalition government's climate policy will lead to economic degradation.

However, it is obvious that reducing industrial and agricultural production cannot be the main path of environmental policy. This is a destructive path, which is very limited in terms of resources

and ultimately leads to a reduction in environmental investment. In addition, the decline of the chemical industry in Germany will be compensated by an increase in other countries and a corresponding increase in greenhouse gas emissions and pollution.

Thus, it often turns out that instead of real progress in improving the environment, there often occurs an actual backslide in that direction. This particularly applies to energy policy. For example, the program to close down nuclear power stations in Germany in the situation of the refusal of Russian gas has led, as already mentioned, to an increase in coal consumption in 2022. The war in Ukraine has generally led to a reduction in gas consumption and an increase in the use of coal in Europe and the world (see above), and therefore to an increase in carbon dioxide emissions. The energy crisis with increasing polluting emissions is taking place against the background of attempts to increase the emission tax, which only creates additional tensions in society (as evidenced, in particular, by the protests of European farmers). Thus, it is necessary to adapt environmental programs to changing conditions.

Conclusion: Paving the Way for a More Environmentally Sustainable World Society

Countries, regions, and humanity as a whole are faced with the difficult tasks of preserving the environment and reducing the negative impacts leading to possible climate change. The deepening of the world-system crisis, accompanied by regional and national crises and conflicts, increased military spending and reduced spending on environmental purposes—all these and other factors dramatically complicate these tasks. Of course, this does not mean that important environmental objectives should be removed from the agenda. However, this may require a certain correction of these objectives in terms of timing, completeness of implementation, and other parameters, since in a crisis situation the attempts to achieve the previously set objectives (under more favorable conditions) at any cost—and even more so to accelerate their implementation—may lead to the opposite effect: a complete abandonment of these objectives, discrediting of the idea itself, coming to power of anti-environmental forces, and so on.

In his work "Global Warming and its Impact on Trends in World Politics, Economics and Energy," Askar A. Akaev (2023) writes that the developed programs to reduce the damage to the environment and climate are not properly applied in practice due to the lack of effective global governance policies and strong political will of world leaders. He justifiably makes a conclusion that political leaders of a new formation are needed, who not only have knowledge of modern achievements of science and technology but also face environmental challenges and are capable of preventing the coming global environmental crisis.

And that is very true. However, both in the context of the subject of this article, and in a broader world-system and global aspect, we would say that even more urgently we need new elites who will have the will and the determination to agree on new and fairer conditions for a new world order, in which the renunciation of war and the desire to solve universal human problems would become the most important foundations and principles. And then will it be possible to lay

foundations for a more just, democratic, collectively rational, and much more environment-friendly world society.

We think that there are some preimages of these new principles of the forthcoming new world order in the BRICS' practice of interstate communications. For now, unfortunately, the situation is that the more unstable the world order becomes, the more the environment is affected. However, we must not despair but work together to find the most rational ways of solving environmental and climate problems.

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