

# Climate Change Influenced by Technologies: Legal, Social and Economic Implications



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**Abstract:** *The problem of global warming is a threat to humankind. A slow, steady and gradual increase in the average temperature on the planet is a systematic event directly related to the negative effects of climate change. This phenomenon contributes to the rise of the world ocean level, and, as a result, leads to flooding of large territories. The world community is concerned about the need for concerted action within the UN to develop common standards and principles to counter the negative effects of global warming and climate change issues have become the subject of legal regulation on international and regional levels. Climate change under discussion has been an important issue for more than a decade. However, at present, humanity is facing a real threat to its further existence, as the increase in the average planetary temperature threatens not only natural but also economic, social and political crises and disasters.*

*In this paper, the authors analyze various effects of global processes, in which humans take part, on the prospects and directions of the development of civilization. The focus is on one of the most important problems – the negative impact of humans on the environment – the current situation and potential threats. The authors attempted to address the specific consequences of climate change from the standpoint of the existing international legal regulation, from the 1992 Framework Convention to the 2016 Paris Agreement, while highlighting the economic and political dilemmas faced by the international community, as well as various scenarios of development for different regions of the world. Naturally, the positions of the two antagonistic world powers, the Russian Federation and the United States of America, are discussed, as well as the conflict of interests of the international community as a whole and individual states. The authors also discuss a rather sensitive matter of protection of individual rights of people, mentioning certain achievements in this area due to the functioning of international human rights mechanisms, both of quasi-judicial and judicial nature.*

*As a conclusion for the commentary, the authors formulated the consequences to which this trend can lead, considering both the economic, social and political aspects.*

**Index Terms:** average temperatures, climate change, environment, international regulation, rise of the level of the Ocean.

## I. INTRODUCTION

The UN Security Council held a session on climate change and security on January 29, 2019. The initiator of the meeting was the Dominican Republic, which, as an island state, is extremely vulnerable to natural disasters and suffers serious losses. According to the World Bank, in 2017, hurricane “Maria” alone caused a loss of \$ 1.3 billion for this country – 224% of the volume of its economy [1].

In Sudan, the effects of climate change have increased the struggle for land; in the basin of Lake Chad, local residents, impoverished as a result of flood, join armed groups; in Somalia, drought forced more than 2.6 million people to leave their homes – this, in turn, led to an increase in cases of human trafficking and child exploitation.

Back in 2016, scientists were concerned that temperatures in Russia are increasing 2.5 times faster than on average on Earth. The growth rate of the average annual temperature in the country is 0.42°C over ten years. Globally, the rate of temperature change during the same period is 0.17°C [2].

In this regard, Russia's position at the UN Security Council meeting, voiced by Permanent Representative Vasily Nebenzya, looks quite strange: Russia “always stands for increasing international cooperation in disaster risk reduction and enhancing resilience to them”, and also supports “the central role of the UN in this direction”; at the same time, Moscow considers it “unnecessary and even counterproductive to consider climate problems in the UN Security Council” [1].

The problem of climate change, which is naturally a part of one of the global threats to humankind – the environmental threat, is gradually becoming more and more important [3] – [6].

It endangers the human well-being achieved by the “progress of civilization”, increases the risk of natural disasters and, unfortunately, demonstrates its global character and unprecedented scale, which caused concern more than twenty years ago.

Our aim was to analyze the effect of anthropogenic activities on climate change on the planet, as well as the effectiveness of legal and technological attempts to prevent this process.

As a hypothesis, we propose the following provisions:

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1) Existing predictions of climate change on the planet have a number of drawbacks; they do not have a sufficient degree of reliability;

2) Changes in one climatic factor – an increase of the average temperature on Earth – will lead to serious perturbations in different sectors of the economy (agriculture, construction, international trade, and others), as well as to an increase in migration flows and an increase in conflicts;

3) The main role of the existing international mechanisms to combat climate change comes down to the public disclosure of information, but not to actions to change the situation.

## II. PROPOSED METHODOLOGY

### A. General description

In our work, we used general scientific cognitive methods:

- induction: on the basis of a generalization of the trends in the development of technologies, the world economy, a conclusion is made about the complex impact of climate change on the socio-economic sphere of human activity;
- deduction: a hypothesis was formulated about the low effectiveness of international mechanisms to combat the negative consequences of rising temperatures on the planet;
- statistical analysis: comparison and synthesis of statistics on various countries on climate change, as well as studies conducted by international organizations (UN);
- formally-legal: analysis of legal documents in the field of climate change (The Intergovernmental Panel on Climate Change (IPCC), UN Framework Convention on Climate Change, Kyoto Protocol 1997, Agreement on Combating Climate Change and Enhancing Action Needed to Ensure Sustainable Low-Carbon Development 2016).

### B. Algorithm

The issues of national security and sovereignty in the subject of discussion stand against the positions stating the theoretical impossibility of the existence of humankind. The forecasts made by different researchers are similar in one thing – negative consequences for the entire population of the planet. Of course, the presumption about the role of human in these processes causes fierce disputes: most scientists believe that it was human activity that caused global warming, while other researchers point to important factors that shape the climate on our planet, but do not depend on human activity – solar activity, volcanic eruptions, etc. Whichever of these opposing groups is right, it is important to identify the economic and social consequences of the trend of rising temperatures on the planet.

1. The rise in the number of climate refugees<sup>1</sup> will continue. At present, according to various sources (the UN and independent organizations), the number of people who were forced to leave their homes due to changes in climatic conditions ranges from 30 to 35 million. For example, the

tragic events in Syria were due not only to political reasons but also to climate change. Because of rising temperatures, depletion of aquifers in the soil, hundreds of thousands of farmers in this country lost a large part of the income due to lower yields and were forced to move to the cities, which led to an increase in social tension. This situation triggered the aggravation of many pre-existing problems in Syria. In the future, climate migration will increase, affecting all continents, and richer or more prosperous countries will experience pressure in the form of millions of refugees seeking to get into them at any cost. Reinforcement of migration laws and the use of force can provoke retaliation, which will further escalate the political contradictions between countries.

2. The climate is becoming drier, and this inevitably affects the environment, landscape, topography, soil and other natural components. As a result, territories suitable for farming, recreational zones, and nature conservation areas are reduced. This, in turn, will provoke a rise in prices of food and leisure. The current trend of reduction of biodiversity of flora and fauna will only intensify. Even in those regions that do not have extreme temperatures, the changing climate can transform the existing way of life. For example, several years of drought in the Volga region or in the central states of the United States led to a loss of yields of grain and other crops. The authorities are forced to consider options for the use of seeds of agricultural crops, which are not typical for this region and usually used in arid territories (republics of Central Asia). However, this may cause changes in natural food chains and entire ecosystems.

3. The requirements for building codes and infrastructure facilities will change. Because of flooding of many territories, particularly, coastal ones, completely new house designs will be required (for example, on piles), and bridges, railways, subway lines will have to be remade or rebuilt. In Russia, a large number of settlements in the regions of the Far North will simply fall into the water as a result of permafrost melting, while gas and oil pipelines, which provide the largest part of the foreign currency revenue to the federal budget, will require reconstruction or construction of protective supporting structures. In some regions, water is the main problem, however, in others, its absence is a crucial issue. The future of cities such as Dubai, Kuwait City, Abu Dhabi, where millions of people live, looks pessimistic, as the lack of water and high temperatures will make living in them very expensive, dangerous to health, and for many – just impossible. The total investment volume in housing and industrial construction, as well as the construction of industrial, transport, social and recreational infrastructure within the planet, is very difficult to calculate, but the numbers will be enormous, as it will be necessary to provide housing and jobs for citizens, and to solve the problems of climate refugees.

<sup>1</sup> We should not forget about the establishment of a new legal category, and, accordingly, the need to regulate the legal status of “environmental” or “climate” refugees.

4. As a result of climate change, the resource base of humanity is being transformed. First of all, it affects the reserves of fresh drinking water: the water level in a large number of rivers (including Volga, Irtysh and other rivers in Russia) decreases, and its quality deteriorates. Similar transformations occur in lakes and ponds. The flooding of coastal regions will lead to absorption of freshwater sources by saline seawater, and salt levels will increase in groundwater aquifers. Up to one billion people on the planet are already experiencing problems with the water needed for drinking, cooking, and personal hygiene. In the near future, the shortage of water resources may lead to a sharp escalation of the political situation and military conflicts over control of declining water resources. For example, after vast reserves of underground fresh water were found in Libya (the Nubian aquifer has an area of more than two million km<sup>2</sup>, and the total water volume is projected to be 150,000 km<sup>3</sup>) [3], the construction of a water supply system began and the country turned from an importer of water (at the price of \$4 per 1 m<sup>3</sup>) into its exporter. Price per 1 m<sup>3</sup> for citizens and legal entities was 35-40 cents, which is comparable to Russian rates. Libya could turn into a regional leader with independent policy. This situation did not suit the leading Western countries, and tragic events occurred in this country as a result of this.

Water problems will inevitably lead to a decrease in agricultural production. In addition, the desertification of agricultural land, the decrease of the area of arable lands due to urbanization also reduces the potential of the agro-industrial complex of the world, which further escalates the situation with hunger in many countries.

5. The effects of temperature increase listed above will lead to conflicts around the world. Even now, sanctions are used by most countries of the world (despite the fact that they are WTO members), wars over the possession of territories, water and other resources occur in Africa and the Middle East. Most countries are already experiencing or will experience in the near future a shortage of certain resources, which will require solving the urgent problems in a radical way. Currently, despite the economic crisis and reduced budget opportunities, there has been a steady increase of military budgets in the world, which indirectly reflects that several countries are preparing to solve problems arising from climate change using force.

6. Climate change on the planet will dramatically change the direction and intensity of the flow of goods and services in international trade. The international division of labor has formed specialization of countries in the production of one or another product. As a result of the above processes, soil depletion, flooding of territories and other negative factors can occur (and in a number of countries and regions they are already occurring), which will make it impossible to fulfill the obligations assumed to supply products, which means that trade flows will be redirected to other subjects of the world economy. Many industrial facilities (for example, shipyards) are located at the shorefront (China, South Korea), so if the level of the World Ocean rises, the existing industrial centers and ports will simply go under water. Thus, it will be necessary to change the infrastructure and a large number of foreign trade leaders may lose their dominance.

### III. RESULT ANALYSIS

In the course of its development, human civilization has gone through various periods in which certain regions or countries pulled ahead in a technological or economic race, while others slowed down or rolled back. Many great empires, which had a dominant position (for example, Spain), later found themselves in a difficult situation or lost their influential role. Others (for example, China), after periods of continuous crisis or regress, once again took the lead, as can be seen from the indicators of the economic development of the country. Currently, there is an unconditional leader – the United States, which has not only an economic advantage (the largest GDP in the world), but also the military potential (its military budget is larger than the defense budgets of the rest of the world combined), which allows to defend the interests of American companies in different regions of the planet, including capturing new raw materials or markets for finished products. At the same time, the processes of globalization and IT development in the global community led to the disappearance of obstacles for the movement of not only goods and services, but also for the transfer of ideas, information and environmental problems. Moreover, this process is global, and, as a result, no country can be protected from the problems of others.

Humanity faces the need to solve paramount problems, which require joined efforts of the entire global community because otherwise, the collapse of the entire civilization is possible. A large number of books and articles on these problems have been published, films have been made, and discussions are being held. Different authors propose different lists of problems, however, the most important among them are the problems of hunger and water supply, environmental pollution, overcrowding in certain regions, social inequality and others. Unfortunately, humankind not only did not reduce the number of conflicts but also actively builds up armaments. The United States, as an advanced economic power, could have led the process of stopping conflicts, however, instead, it itself often acts as the instigator of crisis situations (Afghanistan, Iraq, Libya, Syria). In our opinion, the attempt of the US to solve its internal problems at others' expense cannot be realized in practice, as the world economic system has a high degree of interdependence. Therefore, for example, negative trends in certain regions of the world (where conflicts occur and military operations are conducted) can, in time, affect the United States itself. In addition, several promising areas of development of science and technology can lead to such new crisis situations, compared with which the current volatility of world development can later be interpreted as a stable period of growth.

After analyzing the most global and long-term problems of civilization, as well as the directions for scientific and technical progress and the possible consequences of existing trends and discoveries for the global community, we propose two main manifestations (of different scale) of this development process.



There are many publications devoted to this topic, which consider existing or promising technologies, which are key to the further development of the economy [7]. Such areas traditionally include nano- and femtotechnology, 3D printing, space research, and robotics. Some of these technologies have provided industrial prototypes and exert influence on the structure of world markets [8]. In our opinion, these technologies and directions of scientific and technical progress have a common feature – this is “the progress of the near-sight”. They have already provided experimental and developmental prototypes or are produced on an industrial scale. Prospects for such technologies can be predicted rather easily, although unpredictable changes are possible. The scale of the impact of these innovations is also different: for example, nano- and femtotechnologies can lead to changes in the very biological nature of humans, but space research has been conducted for more than half a century and is developing more slowly than it was believed in the 1970-1980s. However, in addition to the technological tendencies listed above, there are global problems that pose risks to the existence of humanity itself. Therefore, an adequate response is required from the entire global community, and not just individual countries and citizens.

The analysis of such problems, in our opinion, requires integration of efforts of representatives of various scientific disciplines, as well as top-level politicians and ordinary inhabitants of the planet Earth, as the absence of a quick and timely response to the threats in question can mean the realization of the worst-case scenarios for humanity.

One of these problems is climate change and human impact on the environment and on the planet as a whole. Humanity already began to change the landscape, its habitat, when its population was small. However, the increase in the influence on nature became exponential in the second half of the 20th century. There are virtually no places on Earth that humans do not use for economic, residential or recreational purposes. Human activity has even led to changes in the planet relief. Magnitnaya Mountain near Magnitogorsk, for example, was turned into a quarry, in Japan, Singapore, and Dubai, artificial island formation technologies are used, water forests are destroyed (almost all over the planet), water resources are also seriously affected (the Aral Sea has virtually disappeared). In addition, the rapid industrial development (first in Europe and the United States, then in the USSR, Asia, and South America) led to the enormous use of natural resources, a large part of which are nonrenewable. As a result, many regions in which large-scale resource extraction took place have experienced periods of rapid economic growth followed by a recession, depression, and reorientation of specialization. However, such cases are few, exemplified by the Ruhr basin in Germany and Cardiff in Wales. Most of such regions survived sharp deterioration of the environmental situation as the main result of such rapid use of resources.

In October 2018, the Intergovernmental Panel on Climate Change published a Special Report [9] on global 1.5°C warming. It stated that reducing global warming to 1.5°C compared to 2°C or more, would lead to certain positive effects: global sea level rise by 2100 would be 10 cm lower, the Arctic Ocean would be free from ice during summer only once a century, and the number of coral reefs would decrease

by 70-90%, while 2°C global warming will lead to the death of almost all of them (more than 99%).

Such a situation is observed everywhere in the world. Although European countries and the United States were able to partially compensate for the negative effects, there is a depletion of resources and a decrease in the biological diversity of the environment in other regions of mineral resources extraction. The population explosion in the 20th century led to significant industrial growth necessary to meet the dramatically increased needs of humankind. As a result, for example, since 1950, production of plastics reached 300 thousand tons per year [10]. The durability of plastic, on the one hand, led to its widespread use in various areas of life, but on the other hand, to massive pollution of the planet’s surface. For example, a so-called “Great Pacific garbage patch”, which has an area larger than France, was formed in the South Pacific on the surface of the ocean. The production of concrete reached 25 million tons per year, and a total of more than half a trillion tons was produced overall [11]. The combined area of all asphalted roads is five times the size of the UK. The active development of agriculture (increased population must be provided with food and clothing) led to an increase in the number of domestic animals and, simultaneously, to the disappearance of a large number of plant and animal species, deforestation, drainage of wetlands and other negative consequences. Depauperation of biodiversity can provoke the collapse of the animal and plant ecosystems, which in turn makes the existence of human civilization impossible. The atmosphere of the planet is also under great pressure since sulfur emissions have increased three times since 1950, methane concentrations have doubled, and carbon dioxide content has increased by more than 30% [11].

In the state of Florida, USA, by 2100, six million people will live in floodable areas due to rising sea levels [12]. In the middle of the 21st century, the volume of fishing in the tropical parts of the oceans can be halved [13]. This will lead to loss of jobs for fishermen, and on a global scale – to food shortages. The problem of urbanization of the population deserves special attention: according to UN projections, 84% of all people will live in cities by 2100 [14]. On the one hand, this requires the rearrangement of new areas of agricultural land and woodland, which will deteriorate the ecological situation and reduce the potential of the agro-industrial sector. On the other hand, infrastructure will also need colossal investments, not only because of the increased population, but also because several large cities (New York, Tokyo, Lagos, Rio de Janeiro and others) are located on the shores of seas and oceans, and, therefore, can be flooded as a result of rising sea levels. In other regions, where problems with water supply already exist, the temperature can reach stable values of 50°C by the end of the century, which is dangerous for health. This applies to the Middle East, North Africa, several areas of Southeast Asia. Forest fires have also become more common in countries such as the United States, Russia, Canada and others, which means a drier climate with little precipitation, thereby increasing the risk of new fires.

The strategy to combat climate change began to form in 1992. At the Earth Summit in Rio, the United Nations Framework Convention on Climate Change (UN FCCC) was adopted, which entered into force in 1994, and 197 states ratified it.

The ultimate goal of the UN FCCC is “to achieve... stabilization of the concentration of greenhouse gases in the atmosphere at a level that would not allow dangerous anthropogenic impact on the climate system” and, “... in time sufficient for natural adaptation of ecosystems to climate change, which does not jeopardize food production and ensures sustainable economic development”, which is no longer feasible.

The Kyoto Protocol of 1997 [15], as a supplement to the UN FCCC, obliges participating countries to reduce and stabilize greenhouse gas emissions. It also included the so-called Flexibility Mechanisms, which provide for trading in greenhouse gas emission allowances, projects to reduce greenhouse gas emissions carried out in one of the countries in whole or in part through investments from another country, and clean development mechanisms, which are projects to reduce greenhouse gas emissions carried out in one of the countries of the UN FCCC (usually developing) in whole or in part due to the investments of the country included in the list of Annex I to the Convention.

In 2016, at the 21st session of the Conference of the Parties to the United Nations Framework Convention on Climate Change, an agreement was signed to combat climate change and revitalize the activities necessary to ensure sustainable low-carbon development. It was named the Paris Agreement [16]; it was signed on International Earth Day by the heads of 175 states in one day, which shows the seriousness of intentions. However, is this true?

The Paris Agreement is a voluminous document with ornate language and many cross-references. The main purpose of the agreement is to “keep the growth of the global average temperature much lower than 2°C above the pre-industrial level and make efforts to limit the rise in temperature to 1.5°C” (Sec. 2). However, compared to the Kyoto Protocol, the measures envisaged by the agreement are general, mostly advisory in nature. The fact that the Paris Agreement does not contain obligations of individual countries (unlike, for example, Flexibility Mechanisms) is not optimistic either.

The Paris Agreement, along with other reasons, is also used for the threats of potential sanctions against the Russian Federation. For example, according to a study conducted by a group of specialists from the liberal economic coalition, the Russian Higher School of Economics (HSE) and the American Massachusetts Institute of Technology (MIT), the ratification of the agreement can pose a threat to Russian coal and gas exports. Without diversification, the Russian economy could lose 0.2-0.7% of GDP growth after 2035 because of the Paris agreement. However, the refusal of its ratification will cause the introduction of a carbon tax on Russian exports [17].

It should be noted that the US President himself is skeptical about the problem of climate change. This is exactly what the program of the Republican Party states, together with the thesis that climate change is not a priority issue for the US

national security. The Paris Agreement (like the Kyoto Protocol) “represents only the personal obligations of its signatories; no agreement can be binding for the United States until it is submitted and ratified by the Senate...” [18].

During the assessment of the potential threat to the state, people are rarely taken into account. Increased morbidity rate, flooding of archipelagic states, the disappearance or reduction of populations of wild forests inhabitants, which are food for the tribes living in them [19] – all this is not taken into account in legal acts and economic projects.

However, the problems of climate change directly affect individual rights, including the activities of human rights treaty bodies [20]. The Resolution of the UN Human Rights Council No. 7/23 “Human Rights and Climate Change” had an important role in this process. It stated that climate change is a universal problem that requires a global solution [21].

In February 2018, the Inter-American Court on Human Rights adopted the Advisory Opinion “Environment and Human Rights”, which outlined the connection between the wrong state policies in the fight against climate change and the violation of individual rights [22].

Such steps should entail, at the very least, the possibility of recognizing the right to file individual complaints in connection with the violation of the environmental rights of the individual by the state.

#### IV. CONCLUSION

The statistical and theoretical material analyzed above allows us to conclude that the changes that are currently occurring in our civilization under the influence of increasing global temperature are inconsistent. On the one hand, there is a natural convergence of interests of the subjects of world law interested in solving common problems: the deterioration of socio-economic development, the escalation of environmental and other world problems. On the other hand, the corporate goals of the largest members of the world market (transnational corporations, banks, consortia) often conflict with the aspirations and desires of ordinary citizens of the Earth. In this regard, the hypothesis about the low efficiency of international mechanisms to regulate climate change on the planet, in our opinion, can be considered confirmed at this stage in the development of human society.

Statistics of migration flows, deterioration of the situation with water supply, as well as the escalation of a number of political conflicts in several regions of the world at once, serve as a convincing argument in favor of the second hypothesis.

As for the first hypothesis about the inaccuracy of several forecasts, the trends in the development of scientific and technological progress allow us to hope for a successful resolution of this problem. However, to confirm this, more in-depth research in this area of scientific knowledge is needed.

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