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## Mountain law and climate change

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**Abstract:** This paper presents 22 indicators used to highlight the actual global warming trends. The indicators are the outputs of a detailed research activities performed by scientists from all over the world. These 22 indicators were divided into eight separate categories: atmosphere and climate; glaciers, snow and ice; marine systems; terrestrial ecosystems and biodiversity; water; agriculture; economy; human health. Some specific mountain area aspects are relieved with Mountain Law in Romania.

**Keywords:** global warming, climate indicators, climate change, mountain area, mountain law, Blue Economy

**JEL Codes:** F01, I00, K19, Q01, Q57

### 1. Blue Economy and the main causes of global heating

The complexity of the 21st Century society and economy is also the most important source of vulnerability. Man, as a social entity through his enormous ability to organize society has been able to endanger man precisely as a biological entity. This society and the economy on which it relies depend on fossil energy resources. These resources, as well as many other resources that we use today, are exhaustible and this makes unsustainable permanent economic growth. Scientists have demonstrated this and are looking for solutions to avoid a deep crisis. One of the absurdities of the modern era is the fact that valuable materials are considered waste, these materials should serve as raw materials in a new production cycle [15]. Production systems should work like natural systems, where nothing is lost, all materials are reused in a cyclical system.

An attempt to find a solution was the "green economy" model, which tried to reduce pollutant and greenhouse gas emissions parallel to job creation through private and public sector investments. But the green economy proved to be very costly and it turned out that it did not solve the problems of the system. But there was another try: the blue economy. In Gunter Pauli's book "The Blue Economy: 10 years - 100 innovations - 100 million jobs" [8], an economic model is presented that transforms society's abundance into abundance by treating it - a different way and from a new perspective of the big issues that cause environmental problems.



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According to this business model, seemingly individual environmental problems can be linked with scientific solutions based on nature's inspiration and mechanisms can be created that are beneficial to the environment and also bring economic and social benefits.

The basic idea of this economic model is that entrepreneurs can create economic benefits by creating jobs, reducing energy use, increasing benefits at every stage of the process, and engaging the community [10].

Health geographer Ronan Foley [11] asks for a broader effort to value the blue: by incorporating health, well-being and wider cultural practices; by opening up the ontology to an ethically framed duty of care; as well as the emotional and affective power of blue (all themes familiar to human geographers); and adds psychotherapeutic geographies and legal geographies (legitimation, ownership) to the mix. Perhaps most pertinent to our mountains to seas argument is his promotion of an ethical care perspective [12].

The global warming trend of recent years is due to the "greenhouse effect" induced by additional generation in the atmosphere as a result of human activities, gases naturally occurring in the environment and to some extent in the ozone. Water vapor also contributes to the greenhouse effect. Normally, the solar radiation once reached the surface of the earth, is reflected in part, reaching the cosmic space again. The additional presence of greenhouse gases in the atmosphere has the effect of successively reflecting the sun's radiant heat, thereby contributing to the global warming of the atmosphere. The latest data indicate an increase in the average global temperature of 0.7 ° C [4]. A similar phenomenon occurs in heliothermal lakes. The most famous example in our country is the Ursu Lake from Sovata. The salty lake created by the natural barrier of the course of the Criș-Toplitza and Auriu streams is covered on the surface by a film of a few millimeters of fresh water from the two streams. This film acts as a reflective glass for solar heat radiation, preventing them from leaving the mass of water, which they additionally heat, all the more so as the depth is higher. Since the lake is used for its therapeutic qualities, periodically, over a day, treatments are discontinued to allow the thin film of fresh water to recover. If in the case of Lake Bear, this greenhouse effect is positive, not the same thing happens in case of additional heating of the atmosphere. The additional contribution to the greenhouse effect, divided by the main greenhouse gases, is in percent, in the order of: carbon dioxide (61%), methane (19%), chlorofluorocarbons and hydrochlorofluorocarbons (13%), nitrous oxide (6.3%), hydrofluorocarbons, perfluorocarbons and sulphur hexafluoride as a whole (0.7%). The most important contribution to greenhouse gas emissions lies in the energy sector through the emissions of carbon dioxide and nitrogen oxides from combustion of fossil fuels (coal, oil, gas) in large combustion plants. Significant contributions lie in transport, agriculture, communal households. Waste dumps are an important source of methane emissions [6].

## **2. Arguments and indicators involving climate changes**

Analyzes conducted over the past few years have highlighted a global average temperature increase (+0.7 ° C), due in particular to the increase in CO<sub>2</sub> Reconstitution made for the last 400,000 years, shows periodic oscillations of the global average temperature of the atmosphere, with a period of approximately 100,000 years, taking as a reference the average of the years 1961-1990 [1]. Deviations from the reference line were up to approx. - 8 ° C downwards and approx. + 3 ° C, up. The same variation, in phase, is found in terms of CO<sub>2</sub> concentration naturally occurring in the atmosphere, variation that has led to temperature increases or decreases in the past. The appearance that leads to the idea of global warming different from



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the past temperature peaks is the increase in the carbon dioxide peak compared to the other historical peaks, an increase due to anthropogenic activities. This explains another anomaly, namely, the almost constant maintenance of the maximum temperatures reached about 8,000 years ago, an element unprecedented in the past. It also draws attention, overlapping the current increase in carbon dioxide due to anthropogenic activities, with its natural growth peak. Of course, questions arise over the precision of the reconstructions and the explanation of the relatively constant maintenance of the relatively high temperatures of the last eight thousand years, although most of them were recorded before the industrial age. Experts have 22 indicators that highlight the current global warming trend. These indicators synthesize the results of an intense research activity of scientists around the world. The report [4] produced by the European Environment Agency in Copenhagen together with the European Center for Air Theme and with the support of the German Federal Environment Agency and the National Institute for Public Health and Environment in the Netherlands points out that the 22 indicators cover eight major areas:

- Atmosphere and climate. Glaciers, snow and ice, Marine system, Terrestrial ecosystems and biodiversity, Water, Agriculture, Economy, Health.

For each of the eight domains, a number of specific indicators, eloquent in terms of climate change, have been established. Some of these, such as Glaciers, snow and ice, terrestrial ecosystems and biodiversity, agriculture or health, reflect aspects specific to the mountain area directly or indirectly. Below we will present these indicators for each of the eight domains separately: [6]

**2.1 Atmosphere and climate.** The indicators highlighted in relation to the atmosphere and the climate are four: greenhouse gas concentration; global and European average temperature; precipitation in Europe; extreme temperatures and precipitations. The observed decline in precipitation in Southern Europe will have severe effects, manifested as more frequent droughts, with major impacts on agriculture and water resources. Romania, for example, also faces atypical floods since December 1995. With regard to extreme temperatures, it is forecast that cold winters will almost entirely disappear in 2080, and hot summers will become more frequent.

**2.2 Glaciers, snow and ice.** The three indicators pursued in this area relate to: the state of the glaciers, the snow cover and the Arctic Ocean. The glaciers of the Swiss Alps have reduced their surface since 1850 with one third and the mass by 50%. It is estimated that by 2050, about 75% of the Alps glaciers will disappear.

**2.3 Marine system.** Four indicators are relevant to the marine system: rising sea levels; sea surface temperature; increasing seasons; structure of marine species. The level of the seas around Europe has increased in the last century by 0.8 to 3 mm / year. The projected rise in sea level between 1990 and 2100 is 2.2 to 4.4 times the growth rate of the 20th century, and the growth trend will continue for centuries.

**2.4 Terrestrial ecosystems and biodiversity.** Five significant indicators have been identified: plant species structure; the distribution of plant species in mountain regions; the absorption of carbon by the terrestrial surface; plant phenology and growth season; survival rate of birds. It is forecast that the migration of many plant species to the north will continue, and by 2050 their distribution will be affected in many parts of Europe. There is an increase in plant diversity in northern Europe as a result of the shifting of many thermophilous plant species to the north. In the Alps, migration to altitude has led to an increase in the richness of plant species in 21 of the 30 representative mountain peaks. With regard to carbon capture



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capacity by the land surface in Europe, it can be increased by reforestation actions and improved management and planning of the territory.

**2.5 Water.** Climate change at the water level is quantified through the annual flows of the rivers. They have grown in some regions of Europe, including Eastern Europe, and have declined in others, including southern Europe. Annual flows are projected to fall sharply in southern and south-eastern Europe, but to grow in northern and northeastern Europe, with significant consequences for water availability.

**2.6 Agriculture.** The agriculture is illustrated by a single indicator: annual crop yield. Annual crop production for sale has grown steadily in Europe over the past 40 years, particularly due to technological advances, while climate change has had little influence. In most parts of Europe, agriculture is expected to benefit from increased CO<sub>2</sub> concentrations and higher temperatures, especially in the center and northern Europe. In some parts of Southeast Europe, agriculture will be affected by climate change as a result of increased water scarcity. Poor harvests will become more frequent as a result of the increasing frequency of extreme climatic events: droughts, floods, storms, hail, as well as pests and diseases.

**2.7 Economics.** The relevant indicator for the economic area in relation to climate change is the economic loss. If we refer to Europe, 64% of all catastrophic events, based on the 1980s, occurred due to weather conditions and extreme climatic conditions: floods, thunderstorms, droughts, heat waves. Over 79% of the economic losses resulting from catastrophic events were due to weather and climate conditions. Economic losses caused by climate events have increased significantly over the past 20 years, from an average annual value of less than \$ 5 billion to about \$ 11 billion. Four of the 5 years with the largest economic losses in this period were after 1997.

**2.8. The health.** The last analyzed area of health is assessed by three representative indicators: heat waves; floods; diseases caused by insects. In the summer of 2003, in western and southern Europe, more than 20,000 lives were lost, above the usual rate, especially among the elderly. This situation has been attributed to the heat wave that has faded over this region. Between 1975 and 2001, 238 major floods were recorded in Europe, well above the flood of the previous period. The number of flood-hit populations, with adverse physical and mental consequences, has increased significantly. It should be noted that the loss of life decreased significantly as a result of improved alarm, intervention and rescue measures. In the future, it is expected that the frequency of extreme floods (especially of rapid floods) will increase as a result of climate change. Encephalitis and Lyme disease (Lyme borreliosis) caused by insects (ticks) increased between 1980 and 1995 in the Baltic and Central European regions. It is not yet clear how many of these additional cases are due to the temperature increase in the last decades.

All the above arguments, which highlight a climate warming trend, have prompted decision-makers around the world to promote a series of regulations aimed at counteracting climate change by: limiting greenhouse gas emissions greenhouse gases, carbon sequestration capture capacity at ground level, promotion of renewable energy sources. The most effective global measures have been taken following the promotion of the United Nations Framework Convention on Climate Change and the Kyoto Protocol. [1] These have been strengthened at European level through the adoption of the 6th Environmental Framework Program, the European Climate Change Program and two important directives on the marketing of greenhouse gas emissions permits (Directive 2003/87/EC), as amended by the Liaison Directive (2004/101/EC). The latter regulates the correlation between the flexible mechanisms introduced



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by the Kyoto Protocol (Joint Implementation) [1] and the trading of emission permits under the Directive on the marketing of permits.

### **3. Mountain law and the mountain economy**

The mountains were a place of refuge for the Romanians, a prayer sanctuary, a defensive fortress, a water and food spring, oasis of living and the burial place of their loved ones, a symbol of the ascension and the becoming of Christ, vain defenders, trustworthy friends of our two-dimensional formation. The holy Fathers of the Church say that "the mountains symbolize the back of God", which everyone is carrying, because all the manifestations of God have taken place in the mountains. In the Scripture it is said that Jesus Christ himself gives the mountain a special attention there, always going to pray for himself, turning the mountain into a sanctuary of prayer and conversation with the Father and the Holy Spirit. [3].

Romania's mountainous area is a climate less favored area, agricultural development, isolation and altitude-specific peculiarities, and has been affected in the last 25 years by an ever-increasing decline in the economic and social state of households traditional. Among the natural resources existing at the local level, permanent meadows (pastures and meadows) and livestock breeding constitute the vital elements for the population currently existing in the traditional peasant households located in the mountainous areas of Romania.

The most serious problem facing livestock farmers in the mountain area that generates a pronounced negative dynamics of livestock mainly represented by ruminants (cattle, sheep and goats) is the lack of coupled subsidies for 2-5 cows milk and 10-25 sheep / goats, on average, the traditional peasant households, as well as the non-utilization of high quality mountain products (milk, dairy products and meat products) at prices that compensate for the relatively low productivity of the mountain meadows of small milk produced by the extensive breeding system in which the animal feed is composed almost exclusively of the freshwater polyphloral grass, grazing in the summer season, respectively preserved in the form of hay in the winter season. [2].

Recovery of this situation requires the implementation of appropriate sustainable and sustainable development policies for these areas and the granting of increased subsidies to all livestock farmers irrespective of the size of their herds, taking into account the difficulties and specificities of mountain farming, supplemented by the establishment of short (milk, dairy products, meat and meat products) at prices that are as convenient as possible for producers and acceptable to the large mass of consumers, ensuring the agility of traditional mountain households, reducing mountain depopulation and encouraging young farmers to continue the secular traditions grounded on these settlements.

If it is desired to talk about the mountain economy without mentioning economic and political slipping so far, or without a minimal socio-economic analysis, then it means that any discussion becomes useless and meaningless, without proper legislation, without a Minister of the Mountain, and without a healthy native capital, one cannot talk about a real mountain economic action, but only about a reaction to psychological revolt, the inability of a nation, or attempts to "override the mountain" through the incomensurable effort of some university professors which come with concrete, realistic and sustainable research proposals and projects for a competitive and world-class mountain economy.



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"The right national interest", open to the common and universal interest, is the solution of a profound Romania and of a genuine state of law, and not sluggish or without a country project, and without having the economy of the mountain in the plan of governance, because almost 31% of the national territory is the mountain. [3]

From 2 August 2018, we have a new Law of the Mountain, no. 197, whereby the Romanian state recognizes the existence of specific natural conditions, the differences between the mountain communities and the application of the principle of solidarity for these territories. [5] The law provides Romanians with subsidies and aids if they choose to move to certain mountain areas in the country. The total amount of the subsidies is one billion Euros. According to this normative act, the mountain inhabitants will receive financial and material support to organize their households or to be able to practice in these areas. One billion euros will be allocated from the state budget for 10 years. At the same time, young families of mountain farmers who set up households and raise livestock will be exempted for 5 years from agricultural income tax, and then pay only half of it.

Also, the Romanian state grants financial compensation, in accordance with the regulations in force, to the landowners in the mountain area, located in Natura 2000 sites, natural parks, national reserves of biosphere reserves and other protected natural areas. The Ministry of Agriculture and Rural Development and the Ministry of National Education will collaborate in introducing into the secondary, vocational and lyceutical education a package of study subjects with basic notions about the socio-economy of the mountain area. In addition, the form of organization of pre-school and primary education in the mountain area will be established by methodological norms approved by Government Decision. Practical training of students will be carried out at pedagogical facilities attested by gymnasiums, based on a public-private partnership. Agricultural specialists, doctors, young teachers up to the age of 35, settled in communes or mountain villages more than 20 km away from a city benefit from a "mountain premium" equivalent to 100% of the basic salary. Teachers practicing in isolated villages or mountain hamlets benefit from a "mountain premium" equivalent to 100% of base salary.

Always, through the functions of ecosystems in the alpine regions, the mountain has been an important source of clean air, fresh water, energy and food, in a word, a source of life for people. That is why, on December 11, the International Day of the Mountain was celebrated. Proclaimed in 2003 by the UN General Assembly, the celebration aims to encourage the international community to organize events at all levels to bring to the attention of the public the extremely important role that mountains have in our lives, both from an ecological and economic perspective.

#### **4. Conclusions**

This article, there is a brief overview of the implications of climate change, its impact on the environment, and the causes that have triggered these global phenomena. An important place among the sources of greenhouse gases belongs to the energy sector based on the burning of fossil fuels, along with transport, agriculture, communal management. At the same time, the energy sector is also one that can make a decisive contribution to solving this difficult problem by introducing advanced technologies, increasing energy efficiency, promoting renewable energies, etc. The main indicators that highlight the current global warming trend, the global and European regulations for improving the situation, the measures taken in our country to counteract these trends, including through a strong international



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cooperation, have been presented. Some of the indicators, such as: Glaciers, snow and ice, terrestrial ecosystems and biodiversity, agriculture or health, highlight the consequences of global changes on the mountain area, which will lead in the future to the decisive growth of its role and importance for the country's agriculture and economy. The Mountain Law of August 2, 2018 provides Romanians with subsidies and aids if they choose to move to certain mountain areas in the country. The total amount of subsidies is one billion euros.

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