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Sustainable Development Concerning with Mankind's Climate Changes

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Abstract

Mankind has witnessed many outstanding weather happenings which determined radical climate changes and thus, the draught is expected further to grow. Many experts, academics and scientists all over the continents have strongly called for attention about the importance of saving the water, either for housing and industrial consumers. According to the February - 2007 UNO Report, Terra is the subject of an accelerated global heating process, firstly due to the carbon emissions. Several decades further the climate changes will continue even if, theoretically, these emissions could partly be stopped. As one of the official UNO's institutions, the World Meteorology Organisation certified the global heating and alerts about another worrying phenomenon, namely the soil disaster.

Keywords: environment, climate changes, global warming, greenhouse effect, sustainable development, EU policy on the environment, climate protection

JEL Code: Q50; Q51; Q53; Q54; Q58

1. Extreme phenomena generated by climatic changes

Human society has lately witnessed some extraordinary meteorological phenomena. The recording of temperature started in 1880 and January and April 2007 marked the highest values, according to World Meteorology Organization (WMO): "*Since January 2007 we have witnessed extreme weather manifestations and record temperatures in many areas of the world*", reports WMO, noting that the global temperature was 1.89⁰ Celsius higher than the month's average in January, and 1.37⁰ Celsius above the average of that month in April. A 2007 assessment of the UNO Intergovernmental Panel on Planet Change (IPCC) shows that the planet's warming is not evenly distributed and this is most probably due to human activity, especially fossil fuel combustion. According to WMO, the most frequent extreme phenomena that took place in 2007 were:

- low pressure area monsoons, in a double number than usual, which caused devastating floods in India, Pakistan and Bangladesh, killing more than 500 persons, forcing other 10 million persons to leave their households and destroying vast agricultural areas;
- the first cyclone in the Arabian Sea, which stroke Oman and Iran;

- the wettest May-July period in Great Britain (England and Wales), when the highest precipitation level (406 millimetres per square meter) was recorded since they started recording them in 1766;
- the powerful storms in Northern Europe since January;
- the extremely abundant and early rains in Sudan, since the beginning of June;
- the landslips that caused 3-4.5 meter high waves which swallowed 68 islands from the Maldives archipelago in May;
- the heat wave that entered Western and Central Russia in May;
- the two waves of extreme heat that stroke South-eastern Europe in June and July.

If the examples above come from the Northern hemisphere, it does not mean that the Southern hemisphere has been protected from extremes. An unusually cold current of air, which caused strong winds, blizzards and heavy snowfalls in South America, also determined the temperature drop in July 2007, down to -22° Celsius in Argentina or -18° in Chile. In June 2007, South Africa had its first snowfall since 1981, the snow reaching 25 centimetres in some parts of the country. Nevertheless, the Northern hemisphere recorded the warmest January in history, The Netherlands reporting the highest temperatures since 1706, the average being 7.1° Celsius (2.8 degrees above the averages of the 1961-1990 interval). In Germany, during 2007, the temperature was 4.6° Celsius above the average of the 1961-1990 intervals. The Atlantic coasts of the USA are systematically stroke by hurricanes carrying the names of splendid human beings – men or women, fact recently extended to coasts of the Pacific. South-eastern Europe is ravaged by unprecedented heat waves, while Great Britain or Germany is experiencing major floods, unseen in the last half century. *“One might say that due to global warming there will be a number of meteorological extreme phenomena but we can not attribute specific events to global warming”*, says Malcolm Haylock, an expert in climatic problems. As for the floods and drought though, it is difficult to attribute the precipitation trend to human activities.

The European commissioner for Environment, Stavros Dimas, has drawn attention to the fact that it is absolutely necessary for the EU states to have a common strategy in order to be sure that in the future they will have sufficient water both for population consumption, and for commercial activities. The drought is expected to get worse due to climatic changes, he added. According to the Commission’s data, in the following years the drought will affect not only the south of Europe, but also the centre and the east of the continent. That is why the European experts emphasize the fact that water should be drastically saved both by household and industrial consumers. Otherwise, the drought will jeopardize the entire continent. Moreover, one recommends that the water sources should be correctly evaluated before starting any economic activity in any area.

2. Water: the great dilemma

On March 22nd, 2007, the European Parliament held the International Water Convention where European deputies, national representatives, local communities and citizens all over the world participated. The participants agreed that access to water is a human right and a common good, that water supplying should be publicly financed and that citizens should participate in managing the water sources. The growth of population and agricultural production – 70% of the water that we use is consumed in the agriculture, the bad management of water resources and, sometimes, the political situation may lead to lack of drinkable water in some regions. In the 21st century, the climatic change will intensify the desertification of Africa, which will lead to population emigration from the areas affected by the lack of water to the areas with an easier access to water, such as Europe. The water transmitted diseases cause 80% of illness and deaths in the developing countries, killing a child at every 8 seconds. In spite of the fact that

Europe has enough water supplies, this continent is confronted with problems related to pollution, unsuitable waste storage and abusive water use. Tourism is a risk factor for drinkable water in Europe, especially on the Mediterranean coast where a tourist staying at a hotel consumes, on an average, 30% more water than a local inhabitant of the same region.

In the following years, water related global crises might lead to conflicts and to a raising number of refugees. Some experts foresee that the wars of the future will be waged for water and not for oil. Water is already the cause of tensions in the regions that use the same water courses. The Nile, for instance, is used as water source by nine countries: the quasi-totality of the water used in Egypt (where it does not rain) comes from this river. Ethiopia and Sudan, situated up-river, use more and more water due to population growth, reducing thus the quantity that Egypt supplies from. The Tiger and Euphrates rivers are another example of this kind. These supply three countries: Turkey, Syria and Iraq; for instance, 80% of the water used in Syria come from the rivers that spring in Turkey. Water is a strategic resource in some regions of the world. Fifteen or twenty years ago nobody would have imagined that they could buy bottled water.

Water means life and any human being has the right to it, it was stated during the 2007 International Water Convention. Water is an essential resource and every citizen must have the right to it. It is important that we change the entire concept of surface water management, including the use of rivers, the diminishing of the un-forested areas, the increase of solid surfaces which leads to rapid drainage of water into oceans. This negative current has to be reversed. The politics of land cultivation have to take into consideration the water detainment measures.

The European authorities underlined the fact that 20% of the water presently used in Europe is wasted and the European Commission data show that, soon, the percentage could go up to 40%. This is why a rationalization of the consumption is in order. The European Commission specialists say that the drought has got bigger and bigger in the EU member states in the last 30 years. The drought and the extreme heat have cost the EU's budget more than 1000 billion EURO. In 2003 alone, over 100 million people suffered from significantly high temperatures and lack of water. The drought affected a third of EU territory and the damage is impressive. The European Commission defined a first series of strategic options to be adopted at European, national and local level and to be taken into consideration in order to ensure the availability of water resources. One of these strategic options is to establish a fair price for water under the circumstances that the "polluter pays" principle has to become the rule. This is in fact an older obligation of the EU member states which should give up using free water by the end of 2015. Therefore, important changes are necessary regarding water distribution to the users and the way it is used. The Commission suggests, among others, a few measures that can be easily adopted, such as encouraging the installation of tap water saving devices, new showerheads and toilettes systems. On a larger scale, the Commission recommends an adequate distribution of water among the economic sectors giving priority to water savings.

According to the latest UNO report, on February 2007, the Earth has been exposed for some time now to a global warming phenomenon caused primarily by the emissions of carbon dioxide. The climatic changes will go on for decades even if, theoretically speaking, the most part of emissions of carbon dioxide were stopped. Global warming is a phenomenon certified also by the World Meteorology Organization (WMO), the official UN body responsible of climate. According to the studies done under the patronage of WMO global temperature on Earth grew with almost half of degree between 1960 and 1990. A lot of areas in Europe and the USA have experienced heat waves, with record temperatures in July and August during the

recent years. Numerous regions in the USA had temperatures over 40⁰ Celsius while the European temperature average for July was 2.7⁰ Celsius above the world climatologic norm.

According to Baddour Omar, PhD in climatology with the WMO in Geneva (Switzerland), considering the global climatic scenarios, we shall witness a warming in winter of approximately 2⁰ Celsius and a lot more accentuated in summer, more than three degrees in northern Romania and over four degrees in the south. Almost unanimously the specialists admit that the climatic changes are mostly the result of human activities. The director of Greenpeace Romania, Ana-Maria Bogdan, has warned that *"unless carbon dioxide emissions are reduced with 20% by the year 2020, we are facing the risk that the Earth's temperature grow by two degrees as compared to the present moment, and the climatic changes will be unprecedented in human kind history"*. One of these will certainly be the rise of sea's and ocean's level. Romania is directly affected by this and the beach erosion phenomenon – present on the Black Sea's side for a several years now, will get worse in the future.

The destruction of farm land is another aspect worth taking into account. The land gets dry due to the hotter and hotter summers. According to a study made by weather experts from 13 countries, Romania included, a great part of Europe will face desertification. Our country is no exception. The most affected regions will be Dobrogea, Oltenia, part of Walachia and Banat. This fact will determine a chain reaction: the agricultural production might fall by approximately 50-60%. The prices of the agricultural products will go up and those that will be mostly hurt will be the peasants who are completely dependent on the fruit of the land.

The researcher Jim Hansen, NASA climatologist, believes that only reducing neither the emissions of carbonic anhydride – which reached in 2005 the highest levels ever recorded on Earth – is not enough nor the best fitted way to fight global warming at present. Carbonic anhydride will lead to a rise of the sea level and to the extinction of many animal species that can not adapt to the alteration of the delicate balance of their climatic habitat. According to a WWF (World Wildlife Fund) report, provided the global warming goes 2 degrees above the pre-industrial levels (at present the ratio is 0.8 degrees), the extinction rate of these species might be 38% in Europe and 72% in North-Eastern Australia.

3. Humanity's post-industrial era – the Kyoto protocol

One marked that 1970 is the beginning of post-industrial era, and some years later the concept of sustainable development was defined in 1986, as *"satisfying the present necessities, without hypothecation on the future generations' capacity of satisfying their own necessities"*, or, a *"meeting the needs of the present without compromising the ability of future generations to meet their own needs"*. Many institutions worldwide interested in the mankind's and planet future have evolved many climate models and scenarios, based upon complex numerical models and dynamic physical and chemical laws.

Since 1970, the level of carbon dioxide emissions has risen by approximately 80%. The effects, little felt at first, and even less believed by the political decision makers have later been felt in the annual average temperature rise on Earth. As a result, the specialists started making calculations and prognoses, more and more pessimistic for the planet: in order to maintain global warming at a +2 degrees level, it is necessary to continuously reduce the emission of greenhouse effect gases by at least 50% under the level existing in 1990, and this by the year 2050.

As a concept, sustainable development implies the interest in developing new energy sources and minimization of the environment affecting waste as well. Fossil fuels are a finite resource

and an economically limited one, inducing emissions that affect the environment and contribute to the climate change. A sustainable energetic system has to integrate regenerating resources and low emission burning chains at acceptable costs. Sustainable development requires the generation of balance between economic development, social equity and environment protection in all the regions of the planet. Therefore, this concept can not become a reality in the absence of a real political will in as many countries as possible.

The Montreal Protocol in 1987, which was signed by several industrialized states of the world, stipulated the gradual reduction of chlorofluorocarbon emission by introducing new technologies that do not use these gases bad for the ozone layer anymore. The results appeared relatively fast. Starting with 1997, the climatic protection has been associated with the Japanese city of Kyoto where the United Nations adopted the first agreement that forced the signing countries to take measures of climate protection. However, legally speaking, the protocol yielded no obligations for medium developed countries like India and China. When negotiating, it was claimed that the industrialized western states had the moral obligation "*to clean up first in their own yard and remove the dirt they had produced for several decades*" before other countries join them in their effort of ecologically reconditioning the blue planet.

At first, only the less industrialized states committed themselves to reduce the gas emissions, responsible for the so-called *greenhouse effect*. The year 2000 was established as reference point. The EU assumed the responsibility of reducing its toxic gases emissions by 8% till 2012. Japan and Canada promised a 6% reduction, while the USA declared initially a 7% reduction. The treaty's Protocol was initially signed by Bill Clinton, and then it was rejected by the American Congress.

At present, 175 countries have ratified the Kyoto Protocol which will remain in force only till 2012. New negotiations regarding the prolongation of the protocol's effects started in the Indonesian island of Bali in December, 2007; the negotiations refer to the period after 2012 and are based on the commitments taken as a result of the Kyoto agreement. By the 90's, Romania realised the importance of these actions and signed the Kyoto Protocol of reducing the greenhouse – gas effects together with many other countries and adapted the judicial framework to this aim (i.e., No. 3/2001 Law).

The ambitious **Kyoto Protocol**, which was hoped to slow down the global warming process, is now in force, most of the industrialized countries having accepted to reduce their polluting emissions, less the United States of America. According to the terms of the treaty, the industrialized world is to diminish by 5% the present level of gas emissions by 2012, on an individually established ratio basis. The European Union committed itself to reduce its polluting emissions by 8%; the reductions refer to three of the most important gases: carbon dioxide (CO₂), methane (CH₄) and sodium oxides (N₂O) – which will be measured against the reference year 1990 (except for some of the countries with transitional economy, including Romania, and which will be measured against 1989).

In 2005, when the treaty was signed by 141 countries, of which 30 strongly industrialized, the USA and Australia considered that the protocol would burden their economies too much. Moreover, President Bush publicly expressed his doubt regarding the researches related to global warming, but the idea that the Earth is getting warmer is being contested by only a few scientists. At the end of 2007, the United States admitted the necessity of certain measures of stopping global warming, even if they had not signed the Kyoto Protocol, and then the new Australian government announced significant changes as far as the environment protection is concerned, thus ratifying the Kyoto Protocol on December 6, also 2007.

There is a general opinion that the emissions into the atmosphere of the above mentioned three gases, plus three types of fluorides, do contribute to the appearance and perpetuation of a greenhouse effect which could have dramatic consequences upon the delicate climatic system of the planet. The average global temperature rose by 0.6⁰ Celsius between 1900 and 1990, and it may rise by another 5.8⁰ by 2100, according to the amount of carbon dioxide in the atmosphere. In connection to this, the European commissioner for the environment, Stavros Dimas, stated that *"Climatic changes constitute one of the most important challenges in the environment sphere and are a threat against the economies of the EU countries. Our purpose is to bring to the same table those involved in this area and discuss about the solutions and efforts that are necessary to reduce the greenhouse effect"*.

The USA's leaving the Kyoto process worried the European industrial leaders regarding the economic costs for the accomplishment of the EU environment defence plans. The Intergovernmental Panel for Climatic Changes (IPCC), founded in 1988 by the World Meteorologist Organization (WMO) and by the United Nations Environment Programme, has made several evaluation reports regarding the climatic changes, which state that:

- Average global temperature rose by 0.6⁰ Celsius (between 1960-2000), being more evident in North America, the equatorial region and Asia;
- Sea level, as global average, has risen by an annual ratio of 1 millimetre;
- Thickness and spatial expansion of the arctic ice has decreased (by 40% in the last 30 years); contrary to this, there were no changes in the expansion of the ice in the Antarctic region (between 1978-2000);
- Glaciers retired from the non-polar regions (in The Alps);
- Mutations took place in the bio systems: earlier blossoming of plants; earlier arrival of the migrating birds;
- Precipitations have risen by 5-10% at medium and high latitudes, in the northern hemisphere and fallen by 3% in the subtropical regions (land).

The climatic scenarios are based on some complex numerical models, which rely on physical, dynamic and chemical laws. Several important factors to be taken into account are the emission of greenhouse effect gases, the economic and social development, and the technological changes. There are following several ideas of climatic scenarios foreseen by the specialists for the 21st century:

- Average global temperature will rise by 1.4⁰-5.8⁰ Celsius, which means a warming 2-10 times bigger than last century;
- Quantities of precipitation at global level will increase, with large regional differences: rises and falls between 5% and 20%;
- Climate change will lead to changes in the atmospheric circulation; this, in its turn, will generate changes in the frequency and amplitude of some extreme events (tornados, hurricanes, tsunamis, etc.);
- Increasing number of very hot days, while decreasing the number of very cold days;
- Increasing amplitude and frequency of extreme precipitations in many regions, while the frequency of droughts will increase as well.

On March 11, 2005, the European Commission presented its strategy for the post-2012 period. In this document called *"Winning the Battle Against Global Climate Change"* the European Commission did not established new targets, but it focused both on the challenge of co-opting as many countries as possible (among which the USA and Australia but also developing countries such as China, Brazil and India), and including as many sectors as possible, whose activities should be monitored (for instance, aviation and sea transport). The EU environment ministers made more ambitious proposals of reducing greenhouse gases than in the case of the Kyoto Protocol: about 15%-30% by the year 2020 and about 60%-80% by the year 2050. The

European ministers wished to clarify that a global approach is necessary, which includes cooperation both with the great industrialized countries which chose not to adhere to the Kyoto protocol, and with the new economic powers of China and India.

In comparison with the 1961-1990 reference periods, the statistics underline the fact that the annual average temperature was 1.6⁰ Celsius higher in the 2002-2005 intervals. February, March, May, June, July and November were warmer than usual. Every year, several storms of significant intensities accompanied by whirlwinds happen in one or more countries on each continent, Romania being no exception from this "rule". As a result of the warming process, the expansion of marine ice in the northern hemisphere decreased by 40% in the last 50 years. In the 20th century, rivers' and lakes' annual freezing period decreased by approximately two weeks.

According to a researchers group in the United States, the whole in the ozone layer above the Antarctic has stopped its expansion process. Moreover, the ozone layer might regenerate in the next 60 years. The layer blocks the Sun's ultraviolet rays which are considered to be responsible, among others, for skin cancer. The regeneration of the ozone layers seems to be result of the reduction of greenhouse gases emissions, such as Freon. The ozone layer protects life on Earth from the ultraviolet radiation from space, especially from the Sun. discovered more than twenty years ago, the whole in the ozone layer above the Antarctic extended very rapidly. The cause: the chlorine ions in the chlorofluorocarbon gases decomposed the ozone or oxygen 3 ions. Chlorofluorocarbon has been used ever since 1930 to manufacture electrical home appliances, such as refrigerators and air conditioning units.

After 1987, when they signed the Montreal Protocol regarding the gradual diminishing and then forbidding the use of chlorofluorocarbon, decreases in the rhythm of degradation of the whole in the ozone layer was noticed and then even a tendency of regeneration. Studies monitoring the evolution of the whole in the ozone layer above the Antarctic of the last years, estimate a total regeneration of the layer around the year 2050.

Romania was among the first countries that ratified the Kyoto protocol of reducing the greenhouse effect gases, even since 1997, by the Law 3/2001. Once this protocol is in force, Romania may sell other signing countries the right to emit greenhouse effect gases within the ratio allotted to our country. Romania was assigned a ratio of 250 million tones of carbon dioxide-equivalent as compared to the annual 147 million tones that it pollutes the atmosphere with. The difference of 103 million tones of carbon dioxide-equivalent might mean over 1 billion Euros, that is a sum necessary for instance to start restructuring the energetic system. Selling the difference should take into account the medium and long term development of the Romanian economy. For the emissions sold now for 10 Euros per tone the Romanian companies could pay over 100 Euros penalties in the future. Therefore, the benefit of obtaining a considerable amount of money by selling gas emissions all these years might cost us dearly in the future.

At the end of 2007, an international meeting on climate issues was held in Bali (Indonesia) under the patronage of the UNO. Its primary purpose was to officially start the discussions regarding the establishment of an international framework for climatic protection after the Kyoto Protocol's provisions have ceased (2012). At the same time, a plan of the International Climate Convention will be outlined and which will contain the objectives, the activity calendar and aspects such as the role of the developing countries in fighting climatic change or technology development. The new treaty will be ready for approval debates no sooner than 2009. *"From the experience of the previous years, we know that the debates on such a difficult issue can not be called negotiations. I will not make it a secret though that I hope that here, on*

the island of Bali, we will succeed in drawing a formal plan of negotiations. I am convinced that the delegates will manage to cope with the challenges described by the scientists. Our mission is extremely important", as Yves de Boer declared at the beginning of the Bali Conference, as an executive secretary of the United Nations Framework Convention on Climate Change.

4. The effects of climatic changes

A report made at the middle of 2006 by EU Bank watch Network and Earth Friends-Europe showed how much money the EU allots to fight the effects of climate change. According to the both organizations as they established for 2007-2013 period, the funding will not be effective in reaching the European common goals. According to the report, the member states should allot five percents of the whole European funds for calamity prevention, and each member state should record almost similar values in terms of gas emissions.

The problem of global warming, as one of the most important preoccupations of planet's specialists, was analyzed at the middle of January, 2007, in Davos, Switzerland, at the traditional World Economic Forum. More than 5000 scientists from around the world gathered there to diagnose the so-called "climatic bomb": global warming. The UNO mandated intergovernmental group of experts that have in mind the problem of global warming published a new report on the topic of the future of our planet and of the danger of global warming. The melting of glaciers and the dilatation of the oceans are also consequences of the warming that might play "retroactively" the role of accelerators of this process. Climatologists assert that the greenhouse effect might amplify the warming without the possibility that we could determine the limits of this phenomenon and without the possibility to go through it, as Eduard Bard from the College de France explained. This study regarding the effects of climatic changes analyses the changes that have already appeared as compared to the level of the '80s and forecasts for the next 90 years, till the end of the present century. In some regions of the planet, the land will become arid, and grains will be successfully grown only in north of Europe, not in south or centre of it as it has been done so far. In Europe, twenty years from now, the corn production will be 60% of the present one, and the only areas suitable for grain cultivation will be Poland and Germany. According to the study of the UNO specialists, weather warming will affect the entire continent, but the areas with high risk of desertification are those from the southern half of the continent. Romania is also on list of the areas that will experience advanced changes. Along Spain, Italy and Greece, our country is among the first affected by weather change; the manifestations will be noticeable starting with 2015-2025. The central and northern regions of the continent will experience accentuated changes in the '80s of this century. In Romania, the main regions affected by desertification will be Oltenia, Banat and Dobrogea, where the land will get dry due to lack of water.

As it states at the middle of April 2007 in a public report of the American nongovernmental organization - CNA Corporation, "*Global change of climate might act as multiplication factor for the instability of some of the most troubled areas of the world and constitute a significant challenge for the national security of the USA*".

The particularly special value of the gloomy prognoses contained in the report is given by the fact that the text is supported by a Consultative Military Committee, consisting of 11 retiring generals and admirals, among whom general Gordon R. Sullivan, ex US Army Chief of Staff, and vice-admiral Paul G. Gaffney II, ex president of National University of Defence and ex chief of US Navy research programmes, as well as admiral Joseph W. Prueher, ex-chief commander of the American forces in the Pacific and ex ambassador of the USA in China.

In September 2007, the European Commission suggested a specific world alliance regarding the battle against climatic changes. It aims to encourage adaptation measures, to reduce the emissions resulted from deforesting, to use the benefits generated by the world carbon market and also to support developing countries being prepared to cope with natural catastrophes. Between 2007 and 2013, the EU is to invest 177 billion Euros in 10 of the central and east European Member countries. The money comes from structural and cohesion funds. As the report shows, *"In the same period when this money will be spent, Europe will have to take serious measures of gas emission reduction until the recently established limits of reduction about 20-30% by the year 2020, and about 60-80% by the year 2050 should be reached"*. It is disturbing the fact that Spain, Portugal, Greece and Ireland, the four countries that enjoyed the largest allocations of European funds, have also recorded the biggest increases of carbon dioxide emissions. According to the same document, *"If the EU wants to fight against climate changes efficiently, it has to make sure that this will not happen in the east and centre of Europe. On the contrary, the European funds for the new member countries must contribute to exactly the opposite of this thing: the reduction of gas emissions and the improvement of living standard"*.

Both World Meteorologist Organization (WMO) and World Health Organization (WHO) admit that the heat waves affect the health and this is the reason that they were on an advanced stage in making a Guide of rapid alert in case of heat waves. At present, the WMO cooperates with a series of partners in order to create warning multi-systems meant and designed to reduce the effects produced by climatic changes, especially by strong storms, floods and heat waves. On the World Health Day – that is celebrated each year on April, 7 – the World Health Organization (WHO) drew attention upon the severe effects that global warming has on peoples' lives. The General Director of WHO warned that tornados, floods, storms and drought kill tens of thousands of people every year. Similarly, diseases closely related to climate – such as malaria, diarrhoea, malnutrition caused by lack of proteins lead to the loss of more than three billion human lives every year. *"It is imperious that governments, health ministries in every country should adopt strategies which place people's health and welfare on the first place and should also protect the population from the effects of climatic changes"*, underlined the director of World Health Organisation -WHO. According to a study made by Australian researchers in April 2008, climatic changes will also contribute to the increase of blindness risks caused by cataract, due to high levels of exposure to ultraviolet rays.

By the beginning of April 2008, several sectors such as aviation, energy, health, financial services, transportation and tourism, were included by the KPMG (a firm of fiscal consultancy and financial audit) into a report regarding the risks of climatic changes. The six mentioned sectors are especially threatened by the risks of climatic changes, being little or at all prepared to cope with such changes. All 18 sectors analyzed by KPMG in its report are not sufficiently prepared to confront with the new risks associated with climatic changes. *"We have analyzed industries from the entire global economy and we have noticed that there are huge differences among them regarding the relation between the risks of climatic changes and the degree or readiness to cope with them, plus a tendency to underestimate these risks"*, showed Barend van Berger, director of KPMG Sustainability, the division which made the report. The conclusions of the document are entitled "The climatic changes change your business" and are based on the analysis of 50 public partial reports concerning the risks upon the business and the economic impact of climatic changes at sector level. The quoted public reports were analyzed and a level of risk and a degree of readiness to cope with this risk were evaluated. Although the energetic sector is much better prepared than the rest of analyzed sectors, the climatic changes that human kind has been confronted with for a number of years now, make it the most risky analyzed sector.

The scientific evidence of anthropogenic climate change is overwhelming; it is happening and it is accelerating. What we see today is only the beginning and the result of past greenhouse gas emissions. Present trends will continue whatever we do, unfortunately. These scenarios should give highest priority to ensuring the convergence and coherence of the goals for competitiveness, job creation and resource efficiency.

5. Predictions and actions regarding climatic changes

Canada, Russia and many Northern Europe are expected that they should confront in the next years with very strong precipitations, while regions north of the Equator should become much drier. A clear connection between the manner in which precipitations are distributed and man's influence on the climate has been identified. Francis Zwiers, one of the authors of this report, says that *"It is for the first time that we detected a correlation between precipitations and man's influence on the environment. We can cope with the temperature changes but we can not cope with those interfering in the way water is distributed. There will be an impact on world economies and on the manner in which we produce food"*.

At the present phase and in terms of greenhouse effect gas emissions, China will surpass the United States, but it does not commit to reduce them, as long as neither do the United States. We can expect a country like China to make absolute commitments of reducing the emissions, and EU can manifest its willingness to cooperate with developing countries in order to enhance their contribution to the global effort to reduce the emissions, using all opportunities to reduce the intensity of the emissions resulted after their economic development. It is better that the impressive economic growth in China, India, Vietnam or other countries should be a great opportunity for the world, taking into account the fact that this growth implies an even greater responsibility of these countries from the viewpoint of fighting against global challenges, such as climatic changes.

Nowadays we can no longer afford to think like this: *"I take care of my energetic model, based on fossil fuels, I do not care about the rest of the world"*; China is already feeling the effects of pollution on health and on climatic changes as well. Effective governance of institutions for sustainability is vital. Many good ideas exist on paper. The European Union is the most advanced of industrialising regions and has tended *de facto* to take the international need. One could assess that the European Union has an uncontested world political leadership in social and environmental protection. The EU is today the first-ranked power in the sector producing technologies that do not emit greenhouse gas emissions. The EU is now seriously looking at economic growth "beyond GDP". The European climate is influenced by a climatic system called the North Atlantic Oscillation. This system is based on measuring the atmospheric pressure at sea level near Island and the Azores Islands. During the last 50 years these figures have had a falling tendency, but it is difficult to assume that they have been caused by human activity, as long as this fact can not be precisely established. Nathan Gillet, professor the department of Climate Research within East England University, says *"We have the clear proof that the man has a huge influence on how precipitations are formed. We have to fight against the effects caused by climate change and especially to improve our systems of protection against floods"*. The predictions of the British Environment Agency are even gloomier: Great Britain will suffer annual losses of 2 billion dollars, exclusively due to floods caused by climatic changes. The Globe and Mail publication has a much stronger point of view, based mainly on a study made by the prestigious *Nature* magazine.

A British study underlined that, along with the whole series of extreme phenomena whose effects have been tempered in the last two years by a series of natural phenomena, global warming will be much more seriously felt starting with 2009, moment after which extremely

warm years will be recorded. A group of researchers from the British National Meteorologist Agency studied that at least in half of the years between 2009 and 2015, the average annual temperature will be higher than 1998 as the reference year. Their predictions were formulated on the basis of a computer programme especially designed by the British meteorologists, a programme which takes into account both elements like greenhouse effect gas emissions, and marine and oceanic currents and temperatures, or meteorological phenomena such as "El Nino", which predicts the formation of hurricanes in the Atlantic Ocean and monsoonal storms stronger than usual in Asia. Starting from these data, the researchers made a climatic simulation for the years 2005-2014 and the conclusion was that the cooling of a part of the Pacific Ocean and the resistance to warming of the Arctic Ocean compensate for the rise of temperatures caused by the greenhouse effect gases. This compensating effect will be temporary though, and after 2009 global warming will be much more evident. Generally speaking, for the analyzed decade, there will be a rise of the average annual temperatures. Thus, in the opinion of the British researchers, the average annual temperature in 2014 will be 0.3^o Celsius higher than in 2004. Previous studies forecast a rise of the average annual temperature by 3^o Celsius by the year 2100, warning that this would have catastrophic consequences upon the environment. In order to check the viability of the programme, Doug Smith, from the British National Meteorologist Agency, and his colleagues tested the new simulation model on the years 1982-2001, so that they could be able to confront the results with the reality recorded by meteorological services in the world. According to Doug Smith, the validity of the new model has been proved, since it gave more precise results regarding temperatures than the previous simulations.

Actually, there are several environmental principles in the Treaty 27 - implemented in relevant Directives – that are of central importance to the environmental approach of all European banks generally, and the European Investment Bank notably. It means the integration principle, in Article 6, and the principle of aiming at a high level of environmental protection in Article 95 (3) and Article 174 (2). The integration principle requires that environmental considerations be appropriately weighed in all aspects of EIB work, including through the transparent development and implementation of its corporate strategy, operational plans, objectives and targets, sector lending policies as well as in the projects it finances. EU policy on the environment coordinates a high level of protection based on the application of the precautionary principle, and on the principles that preventative action should be taken, that environmental damage should be rectified at source, and that the polluter should pay. The principle that environmental damage should be rectified at source is enshrined in a number of EU laws, notably those concerning water and air pollution. It implies emission restrictions on production facilities and other point sources of pollution, for instance, as defined in the Integrated Pollution Prevention and Control (IPPC) Directive 30.

The EIB requires that promoters implement appropriate measures to prevent, or at least reduce point source pollution from impacting areas within and beyond the boundaries of a project. Underlying the above principles is a requirement on the part of the EU that investment decisions reflect their true value to society, including through the prices people are willing to pay – or are actually asked to pay as users in application of the polluter-pays principle - to protect and enhance the environment and the costs that society incurs when the environment is damaged.

6. Conclusions

The degradation of ecosystems and the erosion of their associated biological diversity are barriers to achieving the sustainable development, as human well-being depends on the Earth's ecosystems and the continued flow of services they provide. Climatic changes will lead to wars and armed conflicts, which will affect at least 2.7 billion people and 46 countries, according to

a study made by International Alert, at the middle of 2007. The largest area of Asia, Africa and South America will witness war hotbeds and social problems, as climatic changes will determine the erosion of the soil, the rise of sea level, the melting of the glaciers and the intensification of storms. 1.2 billion persons and 56 countries risk to be politically destabilized, and "the climate changes will enhance the predilection for violent conflicts, which will leave the communities even poorer and less capable of coping with the consequences of climatic changes", warns the report. Dan Smith, the coordinator of the study declared that the most severe threats are those regarding the countries that do not have the necessary resources and stability to cope with the global stabilization. Smith gave Peru as an example of a country which uses drinkable water that comes mainly from melting the glaciers. In 2015 almost all glaciers will have melted due to global warming, and the 27 million inhabitants will be almost deprived of drinkable water; in case the Peruvian authorities take measures now, they might be able to prevent the crisis to appear, but Peru has a reduced democratic experience. As climate changes tend to lead to military conflicts and even wars, which can affect billions of people and many countries all over the world, the present society must cope with twin challenges:

- To cope with the effects of climate change that we cannot, or choose not to, prevent.
- To adapt economic and social development to cope with the need to mitigate further change.

According to Hans Joachim Schellenhuber of the Potsdam Institute for Climate Research the first decision in managing climate change is „...the art of avoiding the unmanageable and managing the unavoidable”. The unmanageable in his view was the scenario of a 6 degree centigrade rise in temperature and the unavoidable was the 2 degree centigrade rise into which we are probably locked by past decisions and the momentum of present systems. Effective governance of institutions for sustainability is vital. Many good ideas exist on paper. The EU is the most advanced of industrialising regions and has tended *de facto* to take the international need. There is also a need for more comprehensive study of support mechanisms to determine what interventions is effective, how much they will cost and how the burden will be shared. The challenge is to work out how to deploy these technologies within the constraints imposed by climate change whilst meeting aspirations for welfare growth and equity. This will require massive investments in education, thus ensuring the development of good behaviour and practices that better reflect the true value of biological diversity and natural ecosystems, towards better recognising the real costs of using the Earth's natural capital in the course of its work.

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