

# International Legal Means of Disputes Settlement: Judicial Settlement and EDR

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## **1. Introduction**

The many situations when population had been exposed to dramatic environmental damages raised awareness with regard to the strong footprint that humans have on the environment and with regard to the necessity to keep it healthy. *“Unfortunately, examples of incidents resulting in serious environmental damage are numerous. Well-known illustrations include such events as: [...] the 1986 Chernobyl nuclear power plant accident which caused radioactive contamination of the natural environment and very substantial damage to human health across the borders in Europe and Asia; [...] the cyanide spill in the year 2000 from the Baia Mare mine in northwestern Romania, resulting in toxic pollution of the Danube and its tributaries in downstream countries, killing hundreds of tons of fish in some sectors of the river; and the marine oil spill incidents that have caused massive damage to the coasts of a number of countries, especially in Europe.”* 1 (**Training Manual on International Environmental Law** <http://www.unep.org>. p.51)

## **2. Liability**

As result of the impact of these unfortunate events, the nations identified which are the values that have to be protected by law and the outcome was translated into 10 emerging principles and concepts of the environmental law are: Sustainable development, integration and interdependence; Inter-generational and intra-generational equity; Responsibility for transboundary harm; Transparency, public participation and access to information and

remedies; Cooperation, and common but differentiated responsibilities; Precaution; Prevention; "Polluter Pays Principle"; Access and benefit sharing regarding natural resources; Common heritage and common concern of humankind; and Good governance.

Anyone who acts against these values, which, by now, had been transposed in legal provisions, falls under the liability regime and will have to pay for restoration of the affected environment or compensating for the damage caused. The subject may be individuals (private or legal persons) as long as the polluter is identified and the damage is concrete, but quantifiable, as well. But the main actor may be also a State. In this case, a distinction must be made, between the type of act that generated the damage. If we dealt with wrongful acts, the responsibility of the State is engaged. If we dealt with lawful activities, the State is liable. As we may notice, the difference is made by how the State had breached obligations arisen out of international commitments.

Basically, these are the key-elements for a dispute to arise, and this the moment when the claimants chose the fora for settling it, according to the provisions their situation falls under.

### **3. Dispute Settlement according to UNFCCC**

The UNFCCC dedicates Article 14 to settlement of disputes, according to which, *"in the event of a dispute between any two or more Parties concerning the interpretation or application of the Convention, the Parties concerned shall seek a settlement of the dispute through negotiation or any other peaceful means of their own choice. When ratifying, accepting, approving or acceding to the Convention, or at any time thereafter, a Party which is not a regional economic integration organization may declare in a written instrument submitted to the Depositary that, in respect of any dispute concerning the interpretation or application of the Convention, it recognizes as compulsory ipso facto and without special agreement, in relation to any Party accepting the same obligation:*

*(a) Submission of the dispute to the International Court of Justice; and/or*

*(b) Arbitration in accordance with procedures to be adopted by the Conference of the Parties as soon as practicable, in an annex on arbitration."*

There are several fora for settling environmental disputes around the world, but maybe too few and not very easy to access, compared to how many damages are cause every day because of maltreatment that environment is exposed to. The strongest barrier to overpass in order to improve this mechanism is a political one – there is a continuous fight between the citizen's interest and the State's interest (especially in economic terms). And until this situation is fixed, covering the lost for each and any damage will be an exceptional victory and not a daily business.

#### **4. Courts of Justice**

Beside the European Court of Justice and various international human rights courts (European, African, Inter-American), which deal with environmental issues due to their profile, the most important player is the International Court of Justice, which acts under the auspices of the United Nations and is competent over a dispute, only when fulfilling a sine qua non condition – the two or more States gave their consent with regard to ICJ jurisdiction over their dispute. Unfortunately, *"some of these bodies were established in an environmentally innocent era, when the protection of the environment was not elevated as a fundamental societal value at the international level. Their procedural rules do not accommodate needs of environmental victims. The international courts function within the nascent frameworks of international law and often lack compulsory jurisdiction and enforcement mechanisms."* 2 (Avgerinopoulou, Dionysia-Th. – ***The role of the international judiciary in the settlement of environmental disputes and alternative proposals for strengthening international environmental adjudication.*** Yale Center for Environment, 2003

<http://www.yale.edu/gegdialogue/docs/dialogue/oct03/papers/Avgerinopoulou.pdf>, p.18)

#### **5. Environment Dispute Resolution – EDR**

Usually, in climate-related disputes, where victims who are potential

claimants against insurers, government agencies, and others, another way of settlement of disputes is needed (at least a faster one, for obvious reasons): EDR (Environment Dispute Resolution). Claimants prefer conciliation, negotiation, mediation or arbitration. But this EDR are not chosen only by private or legal persons, but also by States.

The most know arbitral tribunals which deal with environmental disputes are the International Centre for the Settlement of Investment Disputes (deals with environmental disputes in a foreign investment context), World Bank Inspection Panel (considers environmental disputes as long as they interfere with the World Bank activities), the Dispute Settlement Understanding (is the main function of the World Trade Organisation), or the International Tribunal for the Law of the Sea (functions under UNCLOS).

The Permanent Court of Arbitration (PCA) 3 (<http://www.pca-cpa.org/>), is an international organisation based in The Hague in the Netherlands, since 1899 (the oldest institution for international dispute resolution). Taking into account the growing importance of environmental affairs, the PCA has established a very elaborated Environmental Dispute Resolution mechanism, by adopting Optional Rules for Arbitration of Disputes Relating to Natural Resources and/or the Environment 4 ([http://www.pca-cpa.org/showpage.asp?pag\\_id=1058](http://www.pca-cpa.org/showpage.asp?pag_id=1058)). Since the establishment of these rules, the administrative council of the PCA is constantly promoting the activities of the PCA in this field.

A specialized arbitral tribunal is the International Court of Environmental Arbitration and Conciliation (ICEAC) (with permanent seats in Spain and Mexico). This Court settles disputes that are submitted by states, private parties, or NGOs (allow individuals, NGOs, and other private entities to bring disputes on equal footing with governments). 5 (Kalas, Peggy – ***International environmental disputes resolution, Why we need a global approach*** – INTGLIM 2002

[http://www.wfm-igp.org/site/files/WSSD\\_Kalas\\_DisputeMechs\\_Aug2002.pdf](http://www.wfm-igp.org/site/files/WSSD_Kalas_DisputeMechs_Aug2002.pdf) . p.2)

It is true that EDR are developing, but, most of the times, the physical

issues at stake are mastered only by scientists, biologists, chemists (the experts), while lawyers, mediators and specially the disputants are not prepared to grab the scientific phenomenon their dispute is about. Reason for which, in order to reach greater success, the EDR practitioners need a "rigorous and dynamic base, one that integrates a sophisticated appreciation and understanding of the environment with a contemporary and innovative approach to resolving dispute."6 (Painter, An – ***The Future of EDR (Environmental Dispute Resolution)*** – Natural Resources Journal. Vol.28 (Winter 1988) [http://lawlibrary.unm.edu/nrj/28/1/07\\_painter\\_future.pdf](http://lawlibrary.unm.edu/nrj/28/1/07_painter_future.pdf) )

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# Global Warming and Climate Change – The International Approach

## **Abstract:**

This article shows the efforts and the results of the international community for mitigation and adaptation to climate change but it also emphasizes that international cooperation must improve.

**Table of Contents:**1. Introduction2. History of the International Approach – until the United Nations Framework Convention on Climate Change (UNFCCC)  
3. The Kyoto Protocol – a Starting Point of a Worldwide Long-Lasting Debate: the Conference of the Parties (COP)

## **1. Introduction**

Due to the scientists' pessimistic outcomes, the international community decided to take a stand and keep global warming below 2°C (compared to the temperature in pre-industrial times = no more than 1.2°C above today's level). But this was not a decision taken without any efforts, on the contrary, for a long period of time, many of the international "players" have denied the phenomenon, its effects and have struggled against taking any actions. This was the moment when the European Union (the main character analysed in my paper) faced the reality and turn itself into a driving force in fighting Global warming and Climate change (GW & CC), by negotiating at international level, developing the UN Framework Convention on Climate Change and the Kyoto Protocol, and making the world aware of the gravity of these issues.

## **2. History of the International Approach – until the United Nations Framework Convention on Climate Change (UNFCCC)**

For a long period of time, there had been a big gap between the scientific reality, public opinion and political decisions, not only at national level,

but especially at international scale. It takes time at least to uniform the opinions, if not harmonize the decisions for choosing a single path to go on. But, as history had clearly shown, the best driving force in reaching (if not also implementing) an international agreement is almost never a positive one, but a common danger – hardly to admit, especially by huge egos.

Not all the environmental changes come only with disadvantages, at least in a short term perspective. It is easy to acknowledge that big financial powers have the instruments to “harvest” for their benefit the results of warmer climate in some parts of the world. For example, anyone could ignore the big picture and focus only in enjoying the fact that on his territory, where decades ago no plants could grow because of the cold climate, now, the agriculture is blossoming. More than this, a big power may use all its strength in order to control also the resources remained in the hands of the weak ones. But no one, no matter the hierarchies, should act so irresponsible, without regard for the future generations. History means that I learn about someone’s past and the next generation will learn about my present. Therefore, a basic conclusion arises: There has to be a next generation, in order for someone to learn about my present. But I wonder how aware are the big powers about this simple logical issue? No matter how selfish one can be, at one point, the idea of destroying the only opportunity – which is this planet – of making the history that someone could one day read, strikes the man, and pushes him act with precautions.

This is how, on 16 June 1972, the first UN conference regarding environmental issues took place at Stockholm and 113 countries adopted the Declaration of the United Nations Conference on the Human Environment. The outcome of this conference was a statement in itself. A set of principles were established, through which the UN admitted the common need for actions in preserving a clean environment and adopted a complex approach on this issue, having as starting point the legal liability with regard to the environmental damages. The core of this decision was the idea that economical and social development must take place only within the environmental protection frame. 1 (Radulescu, Catalina – *The Open Society Reports. Policies and Environmental Rights. Soros Fundation*, Ed.Dobrogea, Contanta, 2011, [www.soros.ro](http://www.soros.ro), p.22-23) This

conference had a worldwide impact also at a institutional level: not only that the countries agreed to promote nationally the outcome of this decision, but, the UN created UNEP, a body in charge with implementing the international principles regarding the environmental protection.

As the time went by and the nations were more and more aware of the damages created by humanity to this planet, more international agreements were issued with the purpose to set frames for protection, such as the Vienna Convention for Protection of the Ozone Layer (1985) and the Montreal Protocol on substances that Deplete the Ozone Layer (1987), amended and adjusted in 1990

At the UN Conference on Environment and Development in 1989, the General Assembly issued several resolutions with concerned the following aspects:

- the protection of global climate for present and future generations of mankind
- the possible adverse effects of sea-level rise on islands and coastal areas, particularly low-lying coastal areas
- the implementation of the Plan of Action to Combat Desertification.

Through one of the resolutions (44/228), the members emphasized the necessity for a global reunion on environment and development, reunion known as The Earth Summit, which took place in Rio de Janeiro in 1992 – event considered the strongest promoter of the international environmental law. The outcome of this Summit was the United Nations Framework Convention on Climate Change (UNFCCC), adopted with the purpose of achieving *“the stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system. Such a level should be achieved within a time frame sufficient to allow ecosystems to adapt naturally to climate change, to ensure that food production is not threatened and to enable economic development to proceed in a sustainable manner.”* 2 (**United Nations Framework Convention on Climate Change. 1992** <http://unfccc.int/resource/docs/convkp/conveng.pdf>, Art.2)

Through this Convention, as provided by Art.7, was established the Conference of the Parties (COP), with the scope of observing the implementation of the



agreed provisions of the UNFCCC to promote them (at the national and, as appropriate, sub regional and regional levels, and in accordance with national laws and regulations, and within their respective capacities), but also to issue any other necessary instrument for achieving this purpose. The COP had as mission also to mobilize financial resources and to cooperate with competent international organizations and intergovernmental and non-governmental bodies, in order to achieve its goals. Interesting enough, the UNFCCC drew a line between the input expected from the parties, *taking into account the differing circumstances, responsibilities and capabilities of the Parties and their respective commitments under the Convention.* (Art.7.2b)) On top of this, as a purpose in itself, the Convention provided the following: *The developed country Parties [...] shall provide new and additional financial resources to meet the agreed full costs incurred by developing country Parties in complying with their obligations [...]. They shall also provide such financial resources, including for the transfer of technology, needed by the developing country Parties to meet the agreed full incremental costs of implementing measures [...]*

All the provisions looked astonishing on paper and taking into consideration the magnitude of the event and the parties involved, this Conference gave huge hopes to the entire world. We were finally one body and mind, aiming and fighting shoulder to shoulder, rich and poor, for the same goal.

But, as history had shown us on too many occasions, there is a huge gap between words and facts, between making a decision and its implementation, and that when it comes to financial costs, our so famous United Nations splits in a second.

### **3.The Kyoto Protocol – a Starting Point of a Worldwide Long-Lasting Debate: the Conference of the Parties (COP)**

In 1997, the third Conference of the Parties (COP 3) took place in Kyoto, Japan. The main purpose of this round of meetings was cutting off the emissions of greenhouse gas. The IPCC Report-1990 showed there was a need of 60% reduction. While the EU agreed on a 15% reduction, the US proposed not to

cut at all, but just to stabilize them. A disappointing consensus was reached: a reduction of 5.2% for the period between 2008-2012.

In 1998, The Buenos Aires Conference took place, followed in 2000 by the Hague Climate Conference, where US demanded a special treatment, wishing to be excluded as subject of the provisions regarding the carbon sinks and the nuclear energy. The EU opposed this demand, and a collapse was imminent. The World split into two groups: on one side there were US, Japan, Russia, Canada, Australia, New Zealand and, on the other side, the EU and the developing countries.

Later on, in 2001, US, the World's biggest polluter (20-25% of the total emissions), opposed to the Kyoto Protocol, on the grounds that China and India were not subjects to the agreement. It is important to mention that Global Climate Coalition came alive, and, on the contrary of what might seem, it was formed by a group of large business. They forced a huge propaganda and lobby, determining US not to sign the protocol. It is true that over time, important companies from this group realized how this move had affected their image, therefore, they turned the page and shifted it towards the opposite direction (at least at the surface), creating another group – the Business Environmental Leadership Council.

In 2001, a restless year regarding the Big Powers' policy on climate change, included an agreement reached in Bonn and the Marrakesh Climate Conference (US being absent at this last one), both with too low echoes.

In 2002 took place the New Delhi Climate Conference (COP 8). by that time, Japan, Brazil, China and India had ratified the protocol. But disputes between developed and developing countries arose on how much input each developing country should bring to reaching the targets (a little bit contrary to the UNFCCC provisions).

The Buenos Aires COP 10, 2004 had as main point on its agenda the entry into force of the Kyoto Protocol. This happened at the beginning of the next year (February 16, 2005) with the support of more than 30 industrialised countries which had chose to be bound by its provisions. But what is the Kyoto Protocol

– a legal instrument for cutting off the emissions of greenhouse gas – without the World’s main polluter – the US?!

At the Bali COP 13, in 2007, the parties reached an agreement (the “Bali Roadmap”) with regard to creating an Adaption Fund, which led once more to disputes between the two big groups (the rich and the poor), the developed countries demanded from the others similar contributions to their own, if not almost equal. The discussions regarding a post-Kyoto international agreement taking effect in 2013 were divided to be covered during three COPs: in 2007, 2008 and 2009.

The next year, at Poznan, the Adaption Fund for the developing countries was created and was allocated the disappointing amount of \$60 millions. At the same time, a parallel EU Summit took place in Brussels and the Member States decided to cut off the greenhouse emissions to a 20% by 2020. 3 (***The EU Explained. Climate Action***

[http://europa.eu/pol/pdf/flipbook/en/climate\\_action\\_en.pdf](http://europa.eu/pol/pdf/flipbook/en/climate_action_en.pdf), p.10)

The outcome of the Copenhagen COP 15 (Denmark, 2009), not far from the previous ones, may be drawn up in a single phrase: the developing countries demanded from the main polluters to cut off emissions, while the latter resist to significant efforts as well as written and signed commitments.

The press release from COP 16 (Cancun, 2010) pointed out the raise at \$30 billions in funds, the increase of technology cooperation and the design of a Green Climate Fund (operating entity provided to support projects, programmes, policies and other activities in developing countries related to mitigation. 4 (***Climate Change. Key terms in 23 Languages*** – EU Council – 2011 [http://ec.europa.eu/clima/publications/docs/terms\\_en.pdf](http://ec.europa.eu/clima/publications/docs/terms_en.pdf))). The formal structure of this latter fund was included in the “Durban Platform” – a continuation of the Kyoto protocol, created at the COP 17 (Durban, 2011).

Another opportunity to reach the same old conclusion, according to which reaching a common agreement of the Parties is neighbour to utopia, was provided by the Doha COP 18 (Qatar, 2012).

The purpose of the COP 19 (Warsaw, 2013) was to create a loss and damage pillar, as a normal consequence of the other two previous pillars which COP focused upon by then – mitigation (emissions reduction) and adaptation. At least this decision seemed a realistic one. When wasting so much time on fighting amongst each other, instead of fighting global warming, when failing to agree upon a proper adaptation, the most reasonable step to take is to calculate the costs of the expected effects and be prepared to bare them. But, unfortunately, not all costs may be covered financially.

The most surprising and welcome outcome of the most recent COP (Lima, 2014) is “The Lima Ministerial Declaration on Education and Awareness-raising”, which calls on governments to put climate change into school curricula and climate awareness into national development plans. 5

(<http://newsroom.unfccc.int/lima/lima-call-for-climate-action-puts-world-on-track-to-paris-2015/> )

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# Identifying a Worldwide Issue: Global Warming and Climate Change

(Part II)

## **Abstract:**

This article aims to explain the importance of a habitable climate for humanity and how our activities (especially in the last decades) have altered the composition of the global atmosphere, breaking in this way the natural balance so necessary for keeping the environment healthy and alive.

**Table of Contents:**1. Introduction (Read in Part I)  
2. Linkage of Life: Atmosphere, Water, Land, Life (Read in Part I)  
3. History of Civilization – From Prosperity to Defying Nature (Read in Part I)  
4. **Global Warming Effects – from 2°C to 6°C**

## **4. Global Warming Effects – from 2°C to 6°C**

*Occasionally a particularly striking study makes headlines in the newspapers, but the vast majority of these forecasts are buried in obscure specialist journals, destined to be read only by other climatologists. Most of these journals are taken by Oxford University Radcliffe Science Library, where they sit – undisturbed for weeks or even years on their dimly lit shelves – just a mile or so down the road from my own house. I realised that it was almost as if I had a Delphic Oracle in my back garden or Nostradamus living next door – except that these scientific prophecies were already coming true.*<sup>1</sup> (Lynas, Mark – ***Six Degrees. Our Future on a Hotter Planet***, Fourt Estate, 2008, p.XV)

April 22- 24, 2014 – **BREAKING NEWS** :

- “Giant Antarctica Iceberg Puts NASA on Alert”<sup>2</sup>

(<http://news.sky.com/story/1248474/giant-antarctica-iceberg-puts-nasa-on-alert>)

- “Antarctic iceberg break-off captured in NASA images”<sup>3</sup>  
(<http://www.cbc.ca/news/antarctic-iceberg-break-off-captured-in-nasa-images-1.2641004> )
- “Iceberg is twice the size of Atlanta”<sup>4</sup>  
(<http://edition.cnn.com/2014/04/22/world/asia/antarctic-iceberg/>)
- “Iceberg eight times the size of Manhattan breaks off from Antarctica”<sup>5</sup>  
([http://www.washingtonpost.com/posttv/national/iceberg-eight-times-the-size-of-manhattan-breaks-off-from-antarctica/2014/04/23/87d55a64-cb1a-11e3-b81a-6fff56bc591e\\_video.html](http://www.washingtonpost.com/posttv/national/iceberg-eight-times-the-size-of-manhattan-breaks-off-from-antarctica/2014/04/23/87d55a64-cb1a-11e3-b81a-6fff56bc591e_video.html))

And it is not a first. *Large chunks of Antarctica’s ice, which have been stable for tens of thousands of years, are gradually breaking off. In 2000, a piece the size of Connecticut broke off, containing 4,200 square miles of ice. In 2002, a piece of ice the size of Rhode Island broke off the Thwaites Glacier.*<sup>6</sup> (Kaku, Michio – ***Physics of the Future. How Science will Shape Human Destiny and our Daily Lives by the Year 2100***, Penguin Books Ltd, England, 2011, p.97-98) All eyes are on the Poles, where the effects of global warming are most visible. Due to this, the ice cap has lost 40% of its thickness in the last 40 years. Scientists are very concerned when seeing the ice surface shrinking every year. In this rhythm, it might disappear in the next decades. In order to picture the consequences, I will use Greenland as an example. It contains 20% of the fresh water of the entire Planet. If Greenland melts, the sea level will rise by 7 meters. For every vertical meter that the ocean rises, the horizontal spread of the ocean is about 100 meters. More than this, by such an enormous amount of ice being melted, the flow of ocean and air currents around the planet will also be affected.

As the time has gone by, the scholars reached the conclusion that if humanity persists in ignoring its footprint on Earth, it will turn the environment into a very bad shape, destroying the equilibrium which is so essential for having a habitable planet. They constructed scenarios for the consequences of global warming by each additional degree and what might happen when the “taking no measures against” attitude is chosen. They do not agree on WHEN we will reach +3°C or +6°C, but they count that time in years and decades, for example, some militate for the fact that we will reach + 3°C by 2050, others,

by 2100. But no one is fighting anymore over the "IF", but over the "HOW SOON" it will happen.

Let us remember the European summer of 2003. 7 (Baldwin, Alec – ***Six Degrees Could Change the World***, based on a book by Mark Lynas, National Geographic Channels, 2009). In Switzerland, the temperature climbed above 30°C (at the beginning of June), reaching 41.1°C in the south of the country (at the beginning of August). Only Paris witnessed over 10.000 heatstroke victims and the whole Europe, between 22.000 and 35.000. The Rhine river in Germany ran at the record low level, some glaciers in the Alps lost 10% of their entire mass and the crops losses totalled around \$12 billion. Analysis showed that, during the summer of 2003, temperature was 2.3°C above the norm. This shows us that a phenomenon which few years ago we considered a natural disaster, might become a normal annual event. And this would be only the first phase.

Towards a +3°C temperature, all eyes will be on the Amazon rainforest. Unlike others, this one is not used to and cannot adapt to occasional burn (which for some forests sometimes is needed for keeping it healthy). The trees of the Amazon forest are used to constant humidity, in order to run its ecosystem. If the global temperature rises over +2°C , the collapse will begin and by 2100 (the most optimistic deadline), the interior basin of Amazon rainforest will be transformed into a massive desert. The 2005 Amazon drought was only a teaser of what will happen.

In addition, the population will face a dramatic lack of fresh water and this process has already started. By now, across the Planet, one major river from ten no longer flows into the sea for several months of the year. In his book, Christian Parenti describes an isolated effect of lacking the water, example which could be perfectly applied at a larger scale: *"In Telaga, water is political; to manage water is to manage society.[...] Two-thirds of Indians are farmers, most of whom depend on Himalayan glacial runoff or the monsoon rains. And the region's hydrological system is sliding into crisis: monsoon variability is increasing; the rains are too late or too light, or they come heavily all at once. In the winter, some areas get no rain."*8 (Parenti, Christian – ***Tropics of Chaos: Climate Change and the New Geography of***

**Violence**, Nation Books, 2012, p.138) The lack of water will determine the farmers to leave their lands and migrate towards the cities (as first step) and this will give birth to a new kind of urban growth, but this time will not be led by the urge to prosper, but by the urge to survive. The immediate consequence will be the diminishing of the resources. Let us make a use of a simple example in order to understand better the amount of water we need in order to produce food: for one kg of potatoes is needed a quantity of 100 litres of water, for 1 kg of rice – 4.000 litres of water and for 1 kg of beef we need 13.000 litres of water. Obviously, this will drive up market prices once the +2.5°C threshold is crossed (as shown by the IPCC studies). In this way, starvation becomes a real possibility for the developing countries.

At +4°C, deltaic cities from Mumbai to Shanghai are exposed to danger, as well as Alexandria, London, Boston, New York and Venice might be saved only by huge financial efforts put into construction of ever-higher defences against floods. The coastal cities, as New Orleans is today, will need to be surrounded by real fortifications in order to keep the water outside, once these will be below its level. Neither in central and northern Europe the situation will not show a positive picture, as heavy precipitation will increase significantly, while the south of the continent will witness massive drought and desertification. Because of the global warming, Siberia, Alaska and Southern Greenland will face an accelerate melting process which will lead at unexpected fires and insect attacks. *As the earth heats up, tropical diseases are gradually migrating northward. The recent spread of the West Nile virus carried by mosquitoes may be a harbinger of things to come. UN officials are especially concerned about the spread of malaria northward. Usually, the eggs of many harmful insects die every winter when the soil freezes. But with the shortening of the winter season, it means the inexorable spread of dangerous insects northward.* 9 (Kaku, Michio – **Physics of the Future. How Science will Shape Human Destiny and our Daily Lives by the Year 2100**, Penguin Books Ltd, England, 2011, p.108-110) A severe effect will be the loss of the forests from far to the north of the Arctic Circle, which will be totally wiped out.



But one of the most dangerous consequence is the melting of permafrost. The scientists approximated that an amount of 500 billion tonnes of carbon are locked up in permafrost frozen Arctic soils. *"Where the soils remain too wet for oxidising decomposition, anaerobic bacteria move in and produce vast quantities of methane – an even more dangerous greenhouse gas than CO<sub>2</sub>, due to its more powerful short-term effect on the climate. In other areas, carbon can dissolve directly into water and be released as CO<sub>2</sub> from rivers, lakes and the Arctic Ocean."*<sup>10</sup> (Lynas, Mark – **Six Degrees. Our Future on a Hotter Planet**, Fourt Estate, 2008, p.202) But this is not only a simple scenario, but the pure and simple current fact – permafrost is already melting and scientist have already discovered that since 1999-2001 in Siberia and Abisko, Sweden.

With that amount of methane and carbon dioxide added at the already existing unbalanced composition of the atmosphere, we enter into an irreversible accelerated global warming process, where huge climate changes are imminent. At +5°C the picture is more than grey: the rainforest is burned up, there are no ice sheets, severe extra heat in the atmosphere which leads to a sequence overwhelming evaporation and precipitation (e.g. the UK will face yearly severe winter flooding) and we will be posed to massive climate migration, where the population will transfer particularly to Canada and Siberia. But *"where no refugee is available, and crops and supplies fail, civil war and a collapse into race or community conflicts seems – sadly – the most likely outcome"*<sup>11</sup> (Lynas, Mark – **Six Degrees. Our Future on a Hotter Planet**, Fourt Estate, 2008, p.227).

*Could it be something worse than that? At +6°C it could. Scientists say that 18.000 years ago, during the deepest freeze of the last ice age, the global temperature was about -6°C colder than today. This piece of information is meant to help us realize how fragile is every degree, when it comes to global temperature, and how dramatic are the effects of breaking this climatic equilibrium. We shall approach with precautions the analysis of the increasing or decreasing with each degree, because there is a massive difference between the local temperature fluctuations (where the human body can adapt from -6°C to +6°C), while the planet, at -6°C is facing an ice age*

and at +6°C the ocean's temperature is rising so high, that frequent oceanic methane eruptions (from the subsea continental shelves) will take place near cities as London or Tokyo, creating disasters worse than Hiroshima and Katrina combined.

Possible Effects of Climate Change<sup>12</sup> (Sources: Stern, 2007; IPCC, 2007. J.M. Harris, B. Roach – *The Economics of Global Climate Change – GDAE 2009*  
[http://www.ase.tufts.edu/gdae/education\\_materials/modules/The\\_Economics\\_of\\_Global\\_Climate\\_Change.pdf](http://www.ase.tufts.edu/gdae/education_materials/modules/The_Economics_of_Global_Climate_Change.pdf), p.12)

Type of Impact	Eventual Temperature Rise Relative to Pre-Industrial Temperatures				
	1°C	2°C	3°C	4°C	5°C
<b>Freshwater Supplies</b>	Small glaciers in the Andes disappear, threatening water supplies for 50 million people	Potential water supply decrease of 20-30% in some regions (Southern Africa and Mediterranean)	Serious droughts in Southern Europe every 10 years 1-4 billion more people suffer water shortages	Potential water supply decrease of 30-50% in Southern Africa and Mediterranean	Large glaciers in Himalayas possibly disappear, affecting ¼ of China's population
<b>Food and Agriculture</b>	Modest increase in yields in temperature regions	Declines in crop yields in tropical regions (5-10% in Africa)	150-550 million more people at risk of hunger Yields likely to peak at higher latitudes	Yields decline by 15-35% in Africa. Some entire regions out of agricultural production	Increase in ocean acidity possibly reduces fish stocks
<b>Human Health</b>	At least 300,000 die each year from climate-related diseases. Reduction in winter mortality in high latitudes	40-60 million more exposed to malaria in Africa	1-3 million more potentially people die annually from malnutrition	Up to 80 million more people exposed to malaria in Africa	Further disease increase and substantial burdens on health care services
<b>Coastal Areas</b>	Increased damage from coastal flooding	Up to 10 million more people exposed to coastal flooding	Up to 170 million more people exposed to coastal flooding	Up to 300 million more people exposed to coastal flooding	Sea level rise threatens major cities such as New York, Tokyo, and London
<b>Ecosystems</b>	At least 10% of land species facing extinction. Increased wildfire risk	15-40% of species potentially face extinction	20-50% of species potentially face extinction. Possible onset of collapse of Amazon forest	Loss of half of Arctic tundra. Widespread loss of coral reefs	Significant extinctions across the globe

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## Identifying a Worldwide Issue: Global Warming and Climate Change

(Part I)

## **Abstract:**

This article aims to explain the importance of a habitable climate for humanity and how our activities (especially in the last decades) have altered the composition of the global atmosphere, breaking in this way the natural balance so necessary for keeping the environment healthy and alive.

### **Table of Contents:**1. Introduction

### 2. Linkage of Life: Atmosphere, Water, Land, Life

### 3. History of Civilization – From Prosperity to Defying Nature

### 4. Global Warming Effects – from 2°C to 6°C (Read in Part II)

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## **1. Introduction**

*"Listen to me, please! You are like me, a homo sapient, a wise human. Life, a miracle in the Universe, appeared around four billion years ago and we, humans, only two hundred thousand years ago. Yet, we have succeeded in disrupting the balance that is so essential to life. Listen carefully to this extraordinary story, which is Yours, and decide what You want to do with it!"*<sup>1</sup> (Arthus-Bertrand, Yann – **Home**, Elzeviz Films/Europacop/France2, 2009)

This is how it began one of the many documentaries that crossed my path during previous research, a piece of work meant to raise awareness with regard to the world we live in. A mixture of fabulous landscapes and images of natural disasters gave me a pause of thought and a couple of questions came to my mind: Why is the World turning upside down? Where did we do wrong? What is the problem? How to manage this linkage of life made by atmosphere, water, land and life combined? How fast and by which methods do we have to fix our mistakes? Which is the new legal order We need to implement, so We can heal this Planet – an asset We share? What is my footprint, as a sole human being from a small country, in relation with an atmosphere with no boundaries?

## 2. Linkage of Life: Atmosphere, Water, Land, Life

Our daily routine usually does not allow us to go outside the box, to have a look at the big picture and think at the world we live in, at our role on this planet and at what will come after us. We are walking agendas that focus on certain things only at certain times. How often do we wonder how do our small actions look at a broader scale? But we avoid to do that, because looking at ourselves from an upper perspective scares us. It shows ourselves to be too small, and makes us realize we are just one of the many species on this planet and, more than this, each of us, as individual do not own this planet, but we come by, like in a hotel room, and after staying a few decades, just leave. How often do we think at what do we leave behind, how much do we disturb our neighbours, how well do we maintain our room in order to leave it in a proper shape for the future guests?

Earth runs on a harmonized balance, in which every being has a role to play. It took me a while to get out of my daily routine, out of my box, to comprehend, to grab the essence of this mechanism and to admit that nothing is self-sufficient and each and one of the beings of this Planet exists through the existence of another. This theory, according to which the engine of life is linkage, is also known as *The GAIA Theory* and belongs to Professor James Lovelock, a scientists who used to work in the laboratories of NASA and British Academia. Many compared the magnitude of his theory with the discovery that we are not the centre of the Universe, or with Darwin's theory of natural selection. According to Lovelock, Planet Earth is a self-regulating system, especially when it comes to its own atmosphere, and, by interfering, a catastrophe might occur.

Half a century ago, while he was part of a research team at NASA, working on the burning issue "Is there life on Mars?", Lovelock came up with the idea of measuring the composition of the atmosphere of Mars, chemically, and, according to the gases found, there was the answer to the question. The measurements were easy to be taken, also without going there – just by using

a regular telescope improved with an ultra-sensitive infra-red analyser. *“My argument was, if there was life on the surface, there it would be obliged to use the atmosphere as the source of materials to make itself. And it would also have to use the atmosphere as a place to deposit its waste products. And doing that, would change the composition of the atmosphere in a way that would reflect the existence of life.”*<sup>2</sup> (***Beautiful Minds – James Lovelock (The Scientific Gaia Hypothesis)***, BBC Four, 2010) On September 1965 the results of the analysis came up. In order to prove there was life on Mars, a variety of gases needed to be found in the composition of the atmosphere. But, the results showed something else: almost nothing but carbon dioxide and bare traces of other gases. This meant that Mars was probably lifeless.

It is true that this discovery was a remarkable and historical by itself, but in addition, something else came alive: *“At that moment, suddenly a thought came to my mind. But why is the Earth’s atmosphere so amazingly different? The Earth is an amazing Planet. How does it stay habitable, all the billions of years? We have got oxygen mixed with methane, that would be explosive if it were different in composition. Then it occurred to me that both gases were made by living organisms at the Earth’s surface. If they were making them, maybe they were regulating them. The Earth is a self-regulating system, almost alive, that’s holding its atmosphere constant. If the organisms can regulate the amount of gas in the atmosphere, then, they can regulate the temperature. The life is involved in self-regulating the state of atmosphere and the climate.”*<sup>3</sup> (***Beautiful Minds – James Lovelock (The Scientific Gaia Hypothesis)***, BBC Four, 2010)

For many years, this theory has been unaccepted, criticised, considered pessimistic for humanity, forbidden from being published in scientific magazines, but eventually, embraced by scholars. Lovelock’s view about the future of our Planet with regard to the presence of humans (and to our impact, if we continue to behave as we do it at the moment), from a Gaian perspective, of course, does not draw up the most colourful painting – *“[...] when we first started interfering with the atmosphere, nothing much happened. It was encompassing it by its ordinary regulating mechanism. But when it gets too much, Gaia can’t cope with it. It’s going to play absolute mayhem with*

*our civilization in the next 10 or 100 years."*<sup>4</sup> (***Beautiful Minds – James Lovelock (The Scientific Gaia Hypothesis)***, BBC Four, 2010)

### **3. History of Civilization – From Prosperity to Defying Nature**

The best way to understand the present and foresee the future is to look into the past and upon the evolution of humanity in order to realize the impact that climate had on the today's world economic and social map. In drawing up the history, in the simplest manner, we start with the beginnings, when people lived as hunters, having as main occupation satisfying their basic needs from one day to another. In time, populations living in friendly climates and near water resources, started to domesticate plants and animals. This predictable food production determined humans to build up long-lasting settlements, to develop their social skills in an organized manner and the surplus provided through agriculture had been the driving force of our evolution.

Organized on hierarchies and by activities, and because of the food supplies, the communities decided to divide their labour on different fields as the group's needs were changing – once the basic ones had been covered, others appeared in addition. Therefore, some of the groups were supported by the farmers in order to study different phenomena or to find solutions to improve their working tools, their weapons, or to search for cures against illnesses. All kinds of discoveries and inventions, known simply as technology, brought advantages to some communities over the others.

The world's population started to grow and, people, in need to expand their crops fields and to build cities and civilizations, commenced cutting off the trees and changing the course of the rivers. Domestication of animals, for agriculture and travelling had been also another key for evolution. This conferred to communities the opportunity to travel, discover new places (maybe better for their needs than the ones they had known from before), other peoples, other customs and this was the starting point for commerce – a way to make profit and increase the capital. Learning about others' assets,

drove to rivalry between peoples and appetite for domination – reasons enough for starting competition and military conflicts.

Evolution, progress have not always been due to covering basic or luxurious needs, but also to show supremacy over the others of the same kind. But the competition had been unfair since the beginning, when some communities had been fortunate enough to live in friendly climate places (having in this way all the tools necessary to evolve – today's rich peoples) and the others living in places where only too few nutritious plants could grow and too few animals to be domesticated (the pure and simple translation of the saying "there cannot be a sharp mind on an empty stomach" – today's poor peoples). Eurasia, for example has large landmass, stretching from east to west and is, thus, in the same climate zone – temperate, which has multiple seasons, making it, in this way, harder for diseases to spread (since many of the "bearers" of diseases die during the winter season).<sup>5</sup> (Lambert, Tim; Harrison Cassian – ***Guns, Germs and Steel***, based on a book by Professor Jared Diamond, PBS / National Geographic Channels, 2005)

On top of this situation, the gap had grown even bigger once the rich countries, helped by technology, discovered the soil resources – gold, silver, diamonds, coal, gas and oil. This does not mean that the poor peoples do not have them. They simply do not have the technology and the financial power to exploit them – just another sad picture called "A rich country of a poor people". But this is not an impediment for the rich to take over the richness from the poor.

This had happened continuously in the last half a decade, either through military or contractual means, especially when it comes to coal, gas and oil. These fossil fuels had been revolutionary – in few decades – a single lifetime – the exploitation and usage of coal, gas and black gold have changed the face of Earth more radically than all previous activities of humanity.

*Posed to a tremendous worldwide deforestation (the Amazon forest has been reduced by 20%), a tripled population in 50 years, 900 million cars on top of*



*the already existent industry and huge amount of pesticides and fertilizers used in agriculture, the scientists admitted the composition of the atmosphere has changed, containing a serious amount of carbon dioxide (among other dangerous substances), due to which the World is warming up and we daily bare the consequences. Sunlight easily passes through carbon dioxide. But as sunlight heats up the earth, it creates infra-red radiation, which does not pass back through carbon dioxide so easily. The energy from sunlight cannot escape back into space and is trapped. We also see a somewhat similar effect in greenhouses or cars. The sunlight warms the air, which is prevented from escaping by the glass. Ominously, the amount of carbon dioxide generated has grown explosively, especially in the last century. Before the Industrial Revolution, the carbon dioxide content of the air was 270 parts per million (ppm). Today, it has soared to 387 ppm. (In 1900, the world consumed 150 million barrels of oil. In 2000, it jumped to 28 billion barrels, a 185-fold jump. In 2008, 9.4 billion tons of carbon dioxide were sent into the air from fossil fuel burning and also deforestation, but only 5 billion tons were recycled into the oceans, soil, and vegetation. The remainder will stay in the air for decades to come, heating up the earth.)*<sup>6</sup> (Kaku, Michio – **Physics of the Future. How Science will Shape Human Destiny and our Daily Lives by the Year 2100**, Penguin Books Ltd, England, 2011, p.97-98)

#### 4. Global Warming Effects – from 2°C to 6°C (Read in [Part II](#))

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