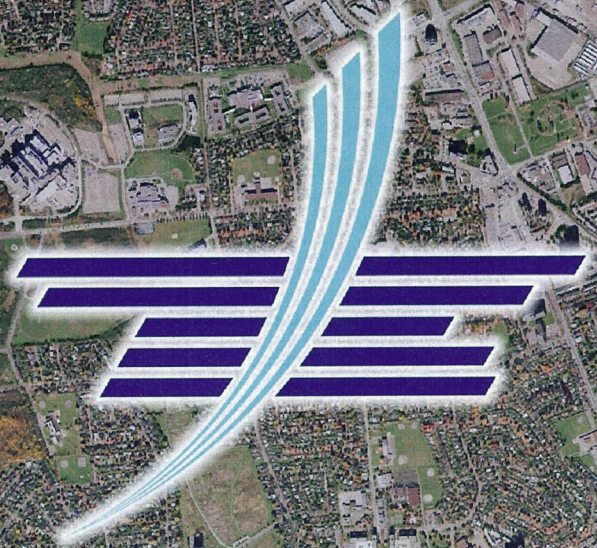


Riccardoe Di Done / Timi Ecimovic

The Climate Change System Introduction

Zg. Medosi, Korte, Slovenia and Montreal, Canada
August 2010



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(CANADIAN ENGLISH)



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By: Riccardoe Di Done and Timi Ecimovic

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1. The Climate Change System Introduction

Worldwide researchers and scientists, complex problem solving, case study research, education, and many other activities of Homo sapiens individuals and today's society have to take into account the climate change system affairs. The main role of the Climate Change System is to evaluate the changes within the biosphere, which became riskier issues at the end of the 20th and the beginning of the 21st centuries.

The Climate Change System is the provider, maker, holder and guardian of the living conditions within the Earth's biosphere, and has a more important role than humans thought it had in the past. The Earth's biosphere has the important role of making, providing, holding and guarding the living conditions, to which the living creatures have to adjust in order to live. Number of extinction of species, smaller and larger alike, are due to changes in the environmental qualities, due to changes within the Climate Change System.

The Earth's biosphere is made of interdependence, interactions and co-operation of matter, energy, information, powers and forces, particles, rays and yet not known contents of the Nature at time of observation, and has three bases – Water, Land and Air environments. To be ready for changes and mitigations due to the impact of Climate Change System, all of us single representatives of the human race have to learn more about the basics of the biosphere. Risk assessment research was not well developed during the industrial revolution and recent times, and issues like: intensive agriculture, synthetic chemical production, money democracies, corporate social responsibility, nuclear technologies, combustion engines, GMO, GMP, have resulted in harmful substances being discharged into the biosphere or the environment: ocean waters, land and air and this for a long period of time. Today there is the question of *when* and *how* harmful this has been on the living creatures of the Earth's biosphere. Science and people need to understand the notions of interdependences, interactions and co-operation within the environment, of all matter, energy and information, to allow for a sustainable future of our civilization. They should use *systems thinking*, e.g. The Dialectical Systems Theory (Mulej, Slovenia) to do this job requisitely holistically and therefore successfully.

Individuals and society are using nature, the environment and the biosphere like they were unlimited commodities. The quality of nature is getting more complex due to the impact of the Climate Change System. Sudden floods, strong winds, earthquakes, tsunamis and changes within the local environment are all results of changes within the climate change system. Here are our recommendations:

- Apply systems thinking, e.g. the Dialectical Systems Theory; linking human work and its creativity with holism of thinking, decision-making, actions and innovation.
- If we develop an interdependent, interactive and co-operative relationship with nature, it will offer us better living conditions.

We think it is advisable to learn about the limits and possible impacts of the Climate Change System, to have a clear vision of the needed changes, which will affect society, the biosphere and Earth. We will focus on specific features of the Climate Change System to support our two suggestions.

The water, land, and air environments or biosphere are the bases of life on the planet Earth. Not many researchers and individuals are familiar with the notions of interdependences,



interactions and co-operation needed for the survival of living creatures. Latest research, using systems thinking, on the Climate Change System has had an important impact on our knowledge of nature, it has helped us better understand environmental changes.

From nature's point of view, the Climate Change System refers to weather it is a set, system, a complex entity of conditions within the living space of the biosphere. Actually the living space is the biosphere, a tiny part of the Earth's Planetary System. Being aware of the climate and taking it into consideration when making important decisions have been two very separate issues, especially in the recent centuries when industrialization has taken the lead and has caused a narrow professional specialization to reign and prevail.

There are two main sources responsible for the changes in our climate: the natural changes and the ones caused by humans. We humans should understand both of them in order to accept the natural ones and their impacts such as floods, droughts, air and water pollution, as well as understand and try to prevent the ones that we create.

Each system should be formally set according to its size (size referring to its complex structure, not its actual physical size):

- Macro, Mega, Superior, Senior, Very Big demonstrate systems such as the Universe, the biggest system known to us, the solar system, the planet Earth.
- Micro, Inferior, Junior, Sub are used to identify smaller systems, both natural: Homo sapiens, plants, animals, living creatures; as well as man-made such as townships, cars, aircrafts, rockets, satellite, etc.

It is important to note that the above systems could be characterized some as artificial and others as natural and that the integral of human activities cannot be included in only one science: natural or social. We however think that all these systems do qualify to be characterized as being all natural, as long as the systems are a direct result of a living creature's activity. We are not illusive to the fact that not everyone may understand or adapt this philosophy but we hope that with time everyone will understand our point of view. For the time being we will employ both terms: artificial and natural, so that this text remains as clear as possible.

The systems theory, systems thinking, analysis and synthesis are the best available tools we currently have to help us understand complex problems such as Macro and Micro systems. There is no simple system and we cannot say that we have mastered the intricacies of even one of them. This could be rightfully demonstrated by using systems thinking, which could make the difference between today's scientific thinking and tomorrows.

The challenges for us humans today are much more complex than ever before, we have reached a critical peak of our ability to understand the present time. Our relationships with nature, space and the environment are deteriorating; they are becoming unfriendly to us; however we should be best friends with them. Our civilization's anthropocentric philosophy, present social order, religious approaches/governances, profit-based democracies, totalitarian rulers, the lack of tolerance between different groups, dividing and ruling policies (from ancient times till now), local, national, international and United Nation's bureaucracies, ruling by monopolizing information and our organizational techniques all need to be restructured, modified, transitioned for a better tomorrow. Whether our civilization will have a better tomorrow is now an important question that needs to be answered before we reach the point



of no return, meaning NOW. We are optimistic that tomorrow will enable our civilization to understand and befriend nature, space, the environment, the Climate Change System, the cosmos and all other systems, which will then result in opening new doors and in return offer a sustainable future for all humans and creatures of planet Earth.

The current understanding of the Climate Change System is being limited by our anthropocentric views, however tools such as the systems theory, systems thinking, analysis and synthesis can help us better understand the notions of interdependence, interaction and co-operation of mono, trans, multi, inter and supra-disciplinary issues, which are all an integral part of the inferior and superior systems within the planet Earth's system, as well as the Solar system, the Milky Way and the Universe.

Nature does not repeat itself; it always goes in only one direction – multidimensional dynamic evolution. Its direction is unknown to us.

All our beliefs, religions, natural, social and technical achievements, technologies, techniques, governances, local communities, families and relationships, have fed our egos to the point that we are now suffering from the god complex, believing that we are the rulers of nature, space and biosphere. When it comes to joining forces for the mutual interest and survival of our civilization, we are experts in finding excuses based on national interest, national security, national citizens' wellbeing, etc. However, these are empty phrases made to defend and protect individuals, collective rulers and national elites. We have assumed the role of leader but we should also have a moderate life style, a long life, peace, tolerance and stability because nature requires it.

Our anthropogenic views have influenced today's understanding of the Climate Change System, originating from national and international bureaucracies offering monetary gain to scientists in return of spoken and written material based on information that they wish to publicize to the world. Redirecting scientific research, applied research and theoretical work to their advantage is easily achieved when politicians and bureaucrats, well rehearsed in the matter of ruling, are making narrow-minded decisions for science and technology progress and are handling the resources. How can we explain the tremendous development of armaments, chemical synthetic products, the 1.000.000.000 + more as one billion of combustion engines, motorized vehicles, aircrafts, ships, boats and agricultural machines, as well as our marketing and profit-making oriented products, our transportation system, our promotion of "Globalization" as a tool for making money, when our scientists are not being paid to accomplish basic research work, when research needed to understand biosphere system related issues are being neglected? How can we do nothing when the survival of our civilization is being threatened by human actions?

It's simple; we are currently overlooking the pending "tragedy of the commons"

The Climate Change System is a natural macro system composed of interdependence, interaction, co-operation of superior and inferior natural systems. The Climate Change System responds not only to our civilization's activities, but also to rules and practices of interdependence, interaction and co-operation of other natural systems. The reason we do not understand the Climate Change System is due to the improperly directed research. This has nothing to do with the common humans, but with the one-sidedness of the present social order, profit-based democracies, national and international bureaucracies and this especially



in the G7 countries that are currently leading our civilization. The lack of holism has left room for biased human actions.

Let's take for instance, the ozone depleting synthetic chemical product referred to as CFC, which has been produced based on market-oriented research. Its production aimed profit rather than benefit and is causing the Climate Change System to react with changes that may result in the total destruction of our civilization. We need to learn how to manage ourselves. It is true that humans did not know the side-effects of CFC, however, now we do. There is absolutely no reason we should continue using materials that short and long term ill effects are unknown to us. Just to name a few: genetically modified organism techniques – GMO and GMP, war technologies, uncontrolled development, use of new synthetic chemical products and combustion engines, information techniques and energy transmissions influencing magnetic fields and the bases of the Earth's equilibrium, are currently the most dangerous activities of our civilization. This is without mentioning nuclear technologies are better off remaining behind locked laboratory doors instead of being used and causing pollution for millions of years to come.

From energy and gases to planetary explorations, that's how we can summarize the evolution of the planet Earth.

The climate or the Climate Change System has been one of the biosphere's systems. It is responsible for the maintenance of our living conditions. As a natural system, it is inferior to the biosphere, the planet Earth, the Sun, the Solar System, the Milky Way and the Universe. Later on we shall look in depth into each of these systems. The Climate Change System has many inferior systems: the atmosphere, water (seas/oceans), land and other components of the biosphere and some of these systems also have inferior systems within them. All of them combined are making one holistic biosphere system. Each system should be known as a moving, interdependent, interacting, co-operating, dialectical and dynamic system that evolves. They are all evolving in a unidirectional dynamic multidimensional manner. To an uninterested person, nature may look like chaos, but as the late Professor Dr. Helmut Metzner wrote "Chaos to Bios", nature may look chaotic to us humans, but our achievements may look like chaos to nature. Holistic knowledge and ethics should decide what is right or wrong.

The Climate Change System is a very complex system, which is interrelated with a number of superior and inferior systems. The main purpose of the Climate Change System is to maintain the energy equilibrium, meaning the temperature, moisture, and water cycle system, composition of the troposphere, atmosphere and ocean current. Other sub-systems will be explained later on.

The Climate Change system cannot be explained, understood or researched with the knowledge of one or two current scientific disciplines. Our scientific research approach should be holistic, supradisciplinary, multidisciplinary and worked on by a team of scientists with supra, trans, multi and inter disciplinary abilities. It is obvious that scientists need to use a variety of techniques such as: systems theory, systems thinking, analysis and synthesis, complex problem solving and case research/studies to be able to work successfully on exploring nature.

Supradisciplinarity in terms of research, from a natural science point of view, is a precondition of an individual to be able to understand the complex problems of the complex



systems. The supradisciplinary work/research is above the classical scientific discipline, at least from the viewpoint of understanding the needs of research, work and actions aimed at a system functioning in regular and other conditions, interrelated with the system itself and its inferior and superior systems.

The living conditions are not a set, but rather a system, entity of the biosphere environment qualities and are preconditions for life to appear. The theory of evolution, the Gaia Theory, the system theory, the known past and present and the status of the biosphere are proving the above hypothesis to be correct.

The origin of the climate system and the Climate Change System are dynamics of the planet Earth – its appearance and existence, as part of the Solar System's appearance and existence and as a result of the Universe's dynamics.

The Climate Change System rules over the life status on the planet Earth, not by command it, but through interdependences, interactions, co-operations, impacts and consequences on its dynamics. Here we may comment on the role of humankind, present civilization on the Climate Change System, which may be described as triggering the system dynamics by its activities. One of the triggering effects was when humans discovered and introduced CFC and synthetic chemical substances, which when are given circumstances are moving in higher layers of atmosphere and by action of chlorine ion are distorting ozone trivalent oxygen molecules into oxygen;. The destruction of the ozone protecting layer is a result of humankind's introduction of commercially important synthetic chemical products based on CFC.

2. Brief History of the Planet Earth as one of the Subsystems of the Universe

The planet Earth appeared around 4.5 billion years ago (4,500,000,000). At that time, the planet was something resembling a ball of energy and gas with a temperature of around 7,000 degrees Celsius. The planet slowly cooled down and 200 million years later, firm matter was formed. The oldest rocks on Earth have been estimated to be 4.3 billion years old (4,300,000,000).

The planet Earth is what we would qualify as one of the inferior systems of the Solar system, the Milky Way and the Universe.

The Universe is the macro, the largest, and most complex of all the systems mankind have researched and explored. It consists of all matter, energy, information, light and other forms of radiation, particles, rays, powers, forces and other yet unknown contents. It is basic environment. It regroups all that exists, anywhere in space and time (conditionally time included). The Universe includes Earth, everything on Earth and within it, and everything in the Solar System. Our Solar System contains eight major planets, thousands of comets and minor planets called asteroids. It also contains the Sun; the star around which the planets revolve.



If we estimate the total amount of existing information in the Universe as being 100 units, then our civilization's knowledge may be equivalent to the value of 1 or 2 units. Much more exploration and research is needed, as the dynamics and evolvment systems are well beyond our current knowledge of the Universe. Understanding the holistic nature of the Universe requires us to grasp that the Universe's dynamics are present in countless forms, transitions, expansions, big and small bangs, appearances and disappearances, multidimensional levels, large and small dimensions and are continuously evolving.

Second to the Universe, the Milky Way is a limited part of the Universe within which we humans exist. We need to increase, as much as possible, our knowledge of this system, it should be a priority. The Milky Way consists of about 100,000 + billion stars, countless number of planets, micro-planets or asteroids, other forms of matter, energy, information, light, particles, rays, power, forces and so much more that is currently unknown to us.

As part of the Solar System, the composition of Earth is unique, as it was born in a blend of matter, energy and information. Numerous forms of matter, energy, information, light, particles, rays, forces, particles, and yet unknown contents have been colliding with Earth since its birth, which in turn create forms that we currently see today. Our Earth's dynamics are influenced in major part by the permanent energy flux from the Sun and from collisions with asteroids, which arrive from outer space. To know that outer space incidents, such as collisions with asteroids, can have major impacts on the equilibrium of the Earth's Planetary System, which also impacts the Climate Change System, is important information, as it will help us better understand the Climate Change System.

If we have a look at our Earth's history, we are able to identify dramatic changes of our living conditions that have impacted the Climate Change System. For instance, Glacial or Ice Periods were direct results of drastic changes of the land and ocean mean temperatures. Of course, we should not forget that land mass and salt water mass react differently to changes of the mean temperature as their abilities are different. Consequently, the impact of the ice age on terrestrial life (land covers approximately 30% of Earth's surface) has been greater than it has been on marine life.

3. Interdependence, interaction, and co-operation between the Life, the Climate Change System and the Biosphere.

Interdependence, interaction and co-operation between life, the Climate Change System and the Biosphere are factors that influence the evolution of life forms and result in the current environmental conditions. The primordial Earth, some 4.5 billion years ago, was lifeless and unrecognizable by our civilization standards. The air was oxygen free and many subsystems of the Climate Change System we know today, did not exist. The Climate Change System evolved according to the components and system relations that were present then.

The growth of life on Earth has mirrored the conditions of its primordial surface, its physical appearance and other contents. It took Earth something like 0.7 billion years to create life. The first evidence of life dates back 3.8 billion years. It took around 1.2 billion years for primordial microbial life to evolve and become the complex biosphere it is today. The biosphere's first energy transition from anaerobic to aerobic energy production, caused by



microbial life, was responsible for a major atmospheric change, the production of oxygen. At one point in time, the oxygen level of the atmosphere reached 40% but has diminished to 21% at the end of the XIX century.

The production of oxygen has a major impact on living conditions, passing from a primordial time to the present. The concentration of oxygen in the air must not get any lower than 8%, as that is the minimum required for the survival of living creatures. Currently, in some overpopulated cities, the concentration of oxygen is as low as 10%. We are recommending that oxygen concentration be monitored as it is a precondition for our survival and these especially in environments, such as big cities, that are much polluted.

Our civilization's first settlements were built some 14,000 years ago, as a result of the improvement of the social life of pre-antiquity humans. The first settlements on European soil were built on swamps for security reasons and regrouped more than 10,000 people. These settlements were a direct result of the changes of the living conditions within the biosphere that evolved from the last ice age, which ended some 16,000 – 60,000 years ago. The Climate Change System's conditions on Earth were almost at the same level of quality as they are today. There has been changes, however, none as drastic as the ones that are about to happen. The differences between today's living conditions and the ones 200 years ago are due to the extreme input of our civilization's output of waste matter, nuclear technology side-effects, synthetic chemicals and human population explosions. The destruction of the biosphere is due to the selfishness of human needs. In short, our actions have triggered the major changes happening within the Climate Change System.

The Climate Change System is a natural complex entity/system. It consists of several subsystems; however it is itself a subsystem of systems such as Earth, the Solar System, the Milky Way and the Universe. It is a very old system and is in constant change, it offers rather stable conditions to life forms. The present status of the impact on Climate Change System has more extreme changes and this for centuries of industrialization and post-industrialization as ever before and this since the end of the last ice age. We humans are not the only cause of this dangerous process, but we are a substantial one, especially that our decisions and actions are not based on a holistic system thinking.

The Climate Change System is an integral part of the Earth's Biosphere; it somehow falls between its inferior and superior systems. Every system, including the Climate Change System itself, has a number of mutual interdependences, interactions and co-operations.

As we have mentioned before, the Universe consists of all matter, energy, information, light and other forms of radiation, particles, rays, powers, forces and other yet unknown contents. The Universe has a dramatic influence on Earth's Climate Change System, for instance anything that may have a catastrophic impact on the Solar System or Earth's collision with space bodies. It has happened in the past and will surely enough happen again. There is a hypothesis that the extinction of dinosaurs was caused by the collision of Earth with a cosmic meteorite some 65 million years ago.

The largest and most superior natural system is the Universe. The probability of a destructive interaction between Earth and the Universe is very low. There are countless number of star systems and other forms within the Universe; as such it has little chance of experiencing major destruction caused by the activities of the Universe system.



From our point of view, the Solar System is a very large system, yet it is a very small one from a galactic point of view and even much smaller from a Universe point of view. The Sun and its eight known planets are one small subsystem of the Milky Way Galaxy. Actually the Milky Way Galaxy has hundreds of thousands of star systems and our Solar System is just one of them.

The Sun is the central star of the Solar System and corresponds to 99.8% of its mass. It is the center of its system and the source of all the energy and matter within it. Of course, it is an inferior system to the Milky Way, which is over 100,000 billion times larger in mass than the Solar System. The Solar System revolves around the center of the Milky Way at a speed of around 250 kilometers per second.

For our Earth's planetary system, the Sun is the source of everything from its birth to today. We exist because the sun provides energy, warmth, light and other important components that are interdependent, interacting and co-operating together. Our planet system is completely dependent on the Sun. Our current living conditions are mirrored by our current physical, geographical, biological and other statuses.

Of course, the Sun is not the only influence among the Solar System, as there are other interdependent, interacting and co-operating relations between neighboring planets, planet-like bodies of different sizes such as the Moon, and other forms of energy, matter, information, and natural forces. The sunward planet is Venus and the outward is Mars. Together with Mercury, these four planets are terrestrial planets. The other four planets: Jupiter, Saturn, Uranus and Neptune are gigantic balls of gas and remain in the outer part of our Solar System. Pluto has been recently described as asteroid and is no more the planet, it is not always last planetary object revolving, because of its oval shaped orbit, and it is sometimes before Neptune. Recently two new larger asteroids, aligned with the Sun, have been discovered and they are located behind Neptune.

The Solar System is stable; changes within its system qualities reflect and influence the whole system. The most important parts of the Solar System are: the energy flow from the Sun to the planets and the quality of each planetary system. The quality of the Solar System is not defined solely by the composition of each planet, but also by the distance between each of them to the Sun. The stream of light and heat from the Sun makes life on Earth possible. The quality of the Sun system and the unique composition and distance of it from Earth are interdependent, interacting and co-operating parts of the Earth's life support system.

Understanding the many powers and forces of nature, such as: gravity, magnetism, energy, matter, information transformations, the role of rays and particles, the movements (orbital, galactic and Universal), the Solar System, the Sun, the planets including ours, will enable us to understand the characteristics of the interdependences, interactions and co-operations of the parts within the whole system.

The Sun has a diameter 109 times bigger than the Earth's and 400 times larger than the Moon's. All eight planets, other smaller and larger asteroids, and all other forms within the Solar System orbit around the Sun. The Sun and all planets are moving like tops and are all orbiting around the Milky Way Galaxy. We should research all of these movements, to provide us with a better understanding of the basic powers resulting of interdependences,



interactions and co-operations among parts of the Solar System. This system, as well as others, functions according to their given systems/entities of parameters. Our civilization has the chance to explore, research, and understand nature and our existence.

The birth of the planet Earth can be placed at around 4.5 billion years ago. At that time, the Sun provided the energy, matter, and information necessary for shaping its subsystems, its planetary systems and other bodies. The Earth appeared as a gaseous mass; it then rotated like a top and orbited around the Sun for a few hundred million years, which in return resulted in it taking the shape of a planet.

4. The Earth Planetary System

The Earth planetary system is very robust. At present we have an inner core of 1,500 miles in diameter composed of iron and heavy metals, an outer core of 1,400 miles, a lower mantle of 1,400 miles, an upper mantle of 400 miles and the crust has from 2 – 45 miles in diameter.

On the top of the crust, there are permanent dynamic changes caused by the natural powers by which the Earth's surface was/is shaped. And the atmosphere is covering, protecting and completing the biosphere of the planet up to 650 miles or 1,000 kilometers, where the Exosphere is ending into the outer space. The main subsystems of the Earth are: its planetary body, its Moon, and its atmosphere. Its planetary body has got 8,000 miles or 13,000 kilometers in diameter. The Earth is the fifth planet by its diameter, the largest one is Jupiter with an eleven times larger diameter, and the smallest one is Pluto¹ with around one fifth of the Earth's diameter.

The surface of the Earth together with its atmosphere is making its biosphere, where we live and where the life has been a part of its system for more than 3.8 billion years. At that time in history the first appearance of the microbial life could be placed.

Among the life supporting components of the Earth, oxygen is most important element. It forms:

- Two inorganic oxides - water and carbon dioxide, which are the life supporting molecules, and
- Atmosphere with oxygen molecules in the breathing air, and
- The ozone layer as the protection against UV rays.

After setting such a support within the system of the biosphere the success of the life on Earth was just a matter of time.

The outer supporting part of the Earth is the flow of light and warmth from the Sun, which is enabled by the Earth's adequate distance from the Sun, actually, and supports life on Earth rather than prevents it, which is the case on the Earth's neighboring planets Venus and Mars.

¹ Pluto was recently described as asteroid and is no more called the planet. As result we have only 8 planets. After Pluto asteroid two more large asteroids have been researched as additional rotating bodies at far end of the Solar system.



The unique composition of the planet Earth and its distance from the Sun are two major qualities that have evolved with the evolution of the Solar System and are making the basic possibility for the life to appear on the Earth also at present.

The Earth crust surface, at present, is made of a terrestrial part, which is covering around 30 percent of the planetary surface, and of an ocean/sea waters cover taking the remaining 70 percent of the planet surface. The ratio between oceans and lands was changing with dynamic changes of the Earth surface evolutions. The first appearance of the water on the Earth was the deciding factor for the formation of its surface and atmosphere. After cooling down the atmosphere was thick and much lower than now. The primordial atmosphere was oxygen free. A big change was the appearance of the first life forms, which have been anaerobic microbial organisms living without oxygen. They were gaining the necessary hydrogen for their synthesis of different organic carbon compounds from dissolved inorganic compounds of carbon. It took hundreds of millions of years for them to change the primordial Earth from its anaerobic to its aerobic stage. Their significant contribution was the sink of carbon dioxide, when their dead cells came down as sediment to the bottom of the oceans, where they have been transformed into numerous carbon compounds and that we see today as fossil fuels. It was the time of the first energy transformation, actually those organism transformed compound inorganic and organic molecules to gain two units of energy per molecule.

In the next generation microbes were able to split water molecules with assistance of the light from the Sun, and used the released hydrogen to reduce the carbon dioxide molecules. By this photosynthesis a rich biomass was produced. The end product of this reaction was the molecular oxygen, but its appearance was poisonous for the existing living creatures. It changed the life entirely, and the new generation of microbes was able to use oxygen as its oxidation of biomass by respiration. It was the first energy transition on the Earth, because with such a transformation of the sugar molecule they gained 36 energy units or eighteen times more than the anaerobic microbes. It allowed the nature ET the planet Earth successful continuum of the life.

The carbon dioxide was a part of water due to its solubility, and oxygen that was not soluble in water, became an integral part of the atmosphere. The concentration of the oxygen in the atmosphere was increasing and changing, and settled at 21 %, with 78 % of nitrogen, and the remaining 1 % was made of carbon dioxide, methane, and some other gaseous elements. With appearance of oxygen in the atmosphere, with influence from the Sun radiation the oxygen molecule was split down to the elementary oxygen, which in the upper layers of atmosphere made the three-valence oxygen molecule ozone. With time the ozone formed an UV impermeable screen or ozone protection layer against those rays from the Sun, which have been responsible for decomposition of the dioxide molecules – the UV rays. The biosphere on the Earth responded with evolution of life, its intensification and transition from water to the Earth's terrestrial parts. The bacterial life moved on the terrestrial part of the surface, formed on the crust top a carbon rich layer, which eventually became what we today call soil. The Earth system evolved to the stage when complex life forms were able to appear. It was some 3.700.000.000 years ago, and land mammals appeared some 350 millions years ago. The human predecessors are dated some 8 millions years ago, and Homo sapiens, our predecessor, some 200,000 years ago.



So here we are – we have the Universe, the Milky Way, the Solar System, the Planet Earth System, and the life on the surface of its terrestrial and aquatic part as well as within its atmosphere. With the existing input/output effects from superior systems, especially the Solar System, with evolved parts of the Earth system, etc., the climate change system became the provider, maker, holder, and guardian of living conditions within the biosphere.

5. Requisite Holistic/Systemic Thinking – Basic Principles Applied to the Climate Change System

System Thinking, synthesis, analysis, complex problem solving, case study approach, classical science, research and learning are prerequisites for increasing our knowledge of Nature, which in turn would help our civilization thrive. The preconditions of a sustainable future are directly linked with our civilization ability to support interdisciplinary systemic research applications.

We can discover the history and status of a system; we can also know information on its near future if it is continuous. However, we can only predict the future if the system itself has a stabile status. We have had over 10,000 years of stability, but we no longer do, due to destabilization of the Climate Change System. Triggering effects of our civilization and there unknown impacts on nature make it quite impossible to predict any relevant information of the future evolvement of the biosphere.

The facts described above, do not mean that we do not have impact on the Climate Change System. Our way of thinking, our behavior, our one-sidedness is quite natural and equally dangerous at the same time, potentially leading us to our own extinction. We need to start using holistic/systemic thinking.

Fig. 1: The Basic Seven Groups of Terms of Systems/Systemic/Holistic Thinking Versus Non-systemic Thinking

<i>SYSTEMS/SYSTEMIC / HOLISTIC THINKING</i>	<i>UNSYSTEMIC / TRADITIONAL THINKING</i>
<i>Interdependence, relation, openness, interconnectedness</i>	<i>Independence, one-way-dependence, closeness</i>
<i>Complexity</i>	<i>Simplicity</i>
<i>Attractors</i>	<i>No influential forces = isolation</i>
<i>Emergence</i>	<i>No process to make new attributes</i>
<i>Synergy, System, Synthesis</i>	<i>No new attribute resulting from relations between elements</i>
<i>Whole, holism, big picture</i>	<i>Parts and partial attributes only</i>
<i>Networking, Interaction, Interplay</i>	<i>No mutual influences</i>

The Climate Change System is an integral part of the planet Earth's Biosphere. It has no clear-cut borders with other natural systems, like we humans are used to see. The Climate Change System is rather a part of a complex natural system that actively takes, uses, puts, gives, inputs, influences, impacts, receives, outputs, all inferior and superior systems and



reflects the present ones (living conditions) at the very moment of observation. An observer can go back in the past but may not see in the future due to countless possible outcomes.

Let's have a look at the differences between the human's traditional thinking and the system thinking. When an observer looks at our civilization's achievements from a building and construction heritage point of view, it looks nice, everything looks in order, arcs are arcs, lines are in a geometric order and the whole construction follows a certain tradition, style, an architect's viewpoint. Of course not everyone thinks alike, the great architect from Catalonia, Gaudi, has demonstrated his differences with his innovative approach to churches and other constructions. The exterior and interior arrangements of our homes, our agricultural activities, our communications, our roads/railways, etc... follow a certain order, which does not resemble nature as it first was. Untouched nature looks like chaos to us and we do not understand that nature sees us exactly the same, as being chaotic. It is difficult to know whether the gap between nature and humans is big or small, but it is obvious that we humans have made many interventions, innovations, which go against the natural way of things. So, for conventional thinkers, nature is chaos and our life style is order. System Theory/Thinking would allow us to realize that nature's chaos is order and the human's view of order is actually chaos. When this ability is used by everyone, not only scientists, we shall have a more natural habitat.

When we apply the above findings to the Climate Change System, we may understand "Chaos" as interdependence, interaction and co-operation between many different natural systems, systems all part of the very complex Climate Change System. Of course, we should not forget that this thinking is based on human thinking, so it has the same qualities and flaws as humans have.

The Climate Change System is composed of natural systems constantly evolving, which support the biosphere; the space for living creatures. We have seen that the Climate Change is dependent of its superior systems. Let us look at the influences of these systems on the biosphere.

All changes/evolution of the Sun System have an absolute impact on the biosphere. These changes will then strongly impact Earth and most probably would have grave consequences. More scientific research should be directed towards understanding the effects of the Sun's evolvments on our biosphere. As the provider of heat and light, the Sun has a strong influence on our biosphere.

The Moon/Earth equilibrium has also a high ranking!

The meteorites from the Universe, the Milky Way Galaxy and the Solar System, as well as other forms of matter, energy, information, particles, rays, powers and forces, forms and systems not yet known to us, have influenced and will keep influencing our biosphere. Fortunately, their impacts are not frequent.

The Planet Earth's attributes studied by physics, geography, and biology have a most important position. Due to its permanent evolvement, interaction, interdependence, and co-operation, the forces of nature have created and maintained our biosphere. We can research its past and present. We can understand certain dynamics but not all of them. Our current



knowledge lacks system thinking, which would enable us to better understand the systems interdependencies, interactions, co-operation and dynamics.

The inner core of the Earth has some 1.500 miles in diameter and moves like a top at a different speed than the rest of the planet. Any change in the revolutions and direction of the movements could have a strong impact on the Earth's system. More research is needed, to understand this subsystem, its interdependence, interaction and co-operation with other subsystems.

The rest of Earth: its outer core, lower mantle, upper mantle and crust total some 3.200 – 3.250 miles in diameter and have a number of common interdependences, interactions, and co-operation which influence the biosphere. Earth's permanently changing under its surface, as it is broken into numerous crust plates, which are in constant motion with respect to each other because of powerful internal forces. Volcanic activities and earthquakes are products of large-scale crust plate collisions or separations. Both activities have complex impacts on our biosphere; the lava, ashes and land movements have disastrous impacts not only locally but also on the whole of the biosphere as large amounts of these products are sent in the atmosphere.

The natural powers such as gravitation, magnetic force, electricity, circular movements (like a top), joint movements within the Solar System, the Milky Way Galaxy and the Universe, as well as particle movements, quantum theory practices, nuclear technologies, etc., and system abilities are extremely important and not yet fully understood by our civilization. Even new comers The Information Theory of the Nature and the Environment theory could assist together with new approach to the society.

The Climate Change System – the provider, maker, guardian and holder of the living conditions within our biosphere, is composed of a large number of interdependent, interacting and co-operating systems, which have dynamics, are interdependent, interacting, co-operate and evolve into the present conditions all at the same time (at time of observation). Globally thinking, the Climate Change System can be observed as a series of patterns / expressions / variations, using different values such as temperature, moisture and currents.

The biosphere is composed of terrestrial, aquatic and atmospheric subsystems or basic systems. They are the frames of the Climate Change System, which has the role of providing, making, holding and guarding the living conditions.

Well known geographical facts of the Earth such as: latitude, longitude and altitude are qualities that currently determine the amount of heat and light received within a local environment. However, these qualities also differ if the environment is terrestrial or aquatic. Of course, when land and water environments meet, its bordering quality is more complex. The complex interdependences, interaction and co-operation of each system have to be taken into account, which all impact the Climate Change System.

From this point of view, the most important inferior system of our biosphere is life on the planet Earth. As soon as the primordial Earth was ready to host life, it was evolved. The anaerobic bacterial life was the first to influence all evolvments within ocean waters. Due to the exceptional richness of ocean waters full of inorganic compounds the first bacterial cells had an excellent living environment. The ocean water protected them against the UV rays and



its temperature was suitable. The light and heat from the Sun emitted lower radiation levels than they do today. Anaerobic life started around 3.8 billion years ago and ended with the creation of oxygen in the atmosphere, some 2 billion years ago. Bacteria have changed the Earth's biosphere in many ways: turning an oxygen free environment to an oxygen rich one, changing an unprotected environment to a protected one by forming an ozone layer, a UV rays protection shield. Sterile terrestrial lands were also changed to lands rich with life. After the change from the anaerobic to aerobic life, the biosphere was modified and many complex life forms evolved. Water cycles, oxygen cycles, carbon dioxide cycles, sulfur cycles, waste of organic compounds and life have all been an integral part of the biosphere's environment. They have influenced the transformation of fragile environments into life-friendly environments, resulting in protection of the Earth's surface against erosion and consequences such as destruction of lands, ocean water currents and air movements that have been established as permanent or temporary. The biosphere evolved and became an environment filled with life and living creatures. Physical, geographical, chemical, biological and systemic interdependence, interaction and co-operation provided the possibility for an environment to support life evolvments within the Earth's biosphere primordial conditions, as well as any later evolvments, which will follow in time. Our present biosphere has a countless number of biological subsystems, which along with their synergies make the continuity of life possible; in the current conditions and within future changed environments.

The terrestrial lands; from the frozen Arctic/Antarctic environments to the tropic ones, are home to a large number of different living creature systems, which may comfortably live together as long as they are interdependent, interact and co-operate with and within the system. All ethological differences are part of maintaining exchanges between environments, in which countless biosphere subsystems evolve in order to allow life to continue. The changes/evolvments result from the interdependence, interaction and co-operation between all the involved systems. The same applies to the evolvment of the aquatic and atmospheric environments.

The biological system is the moderator of the living conditions within the biosphere.

The Sun is energy – it is the provider of light and heat. Planet Earth has two protection systems: the ozone, which is a protection zone in the Stratosphere (15 - 24 kilometers) and the green house effect (composed of natural elements such as carbon dioxide, methane and nitrogen oxide). Both protection systems filter and transport radiant energy to the surface of the Earth and back to outer space. The current geography of Earth surface is divided as such: around 30% land and 70% water. The energy equilibrium is a result of inputs and outs of energy. Changes within inputs and/or outputs interfere with the energy balance and may result in cooling or warming of the planet Earth's biosphere. Due to complex system characteristics of Earth such as: changes in the atmosphere, changes of the terrestrial parts, changes in the ocean/sea waters, changes within the biology of the surface and anthropogenic inputs, the reaction of warming and cooling has different impacts and results. Adding to the complexity of things, air movements and ocean currents have an additional influence.

The energy balance is a most important life support system and changes within it are very destructive for the biology of our biosphere. Changes result in extinction of animals, plants and bacteria, as well as creation of new forms of life. Drastic changes are known as glacier or ice periods (ice age); in the past, Earth has experienced a number of them.



6. The Water Cycle – A Crucial Component of the Climate Change System

The water cycle is the main difference between Earth and the other terrestrial planets like Mars, Venus and Mercury. It is a part of the biosphere and was an integral part of Earth since its birth. The water cycle is a subsystem of the biosphere, which provides the basis of quantity/quality of the biosphere's environment. Soon after Earth's birth, after it cooled down enough, water appeared in liquid, solid and gas forms; the water cycle started its permanent action/evolvments. As an environment it has excellent transport and interaction abilities, combined with other subsystems such as: cloud formations and movements, lightening and natural electricity, it assisted the birth of life. Life appeared in aquatic environments and it took almost two billion years for life to move from the aquatic environment into the terrestrial lands. Ocean water represents 97.5% of Earth's water; the remaining 2.5% is fresh water. 68.7% of this fresh water is found in glaciers (which are rapidly disappearing due to the impact of the Climate Change System on the surface's mean temperature), 30.1% is underground water, and 0.8% is permafrost (which is also decreasing). The remaining 0.4% is our surface and atmosphere waters: lakes (67.4%), top soil moisture (12.2%), atmospheric waters (9.5%), swamps/marsh lands (8.5%), rivers and streams (1.6%) and biota waters in living creatures (0.8%). Water is a required quality of the biosphere and it's a precondition for life. Water is the main transport system within cells, tissues and bodies. Water is the main environment for chemical processes in nature. Water is also nature's main architect; it carves mountains, lakes, rivers and shapes the Earth's surface.

*Life and water,
Water and life,
Life,
Water.*

"Slovenia Yesterday, Today and Tomorrow, Water Management Challenge to Slovenians in the Third Millennium", Ecimovic/Jan/Vrhovsek, Ljubljana, Slovenia 1998 (in Slovene).

Water movements, ocean/sea currents are caused by temperature, salinity levels, trade winds and interdependence, interaction and co-operation with other systems – gravitation, Earth Movement, air movement, energy balance, Moon and Sun gravitation, etc. The present status of our oceans' currents has an important role within the Climate Change System. A change within the currents may have dramatic consequences on all other parts of the biosphere. Catastrophic disaster caused by tsunami at the end of 2004 was a demonstration of nature's power.

Air, lands and water are permanently interdependent, interacting and co-operating. Water changes from liquid to vapor and is transported through the air. When temperature changes in the process, water and vapor change into ice and liquid and this with the help of air particles (physical and biological), it then comes back down to the surface as precipitations. Mountains are water towers of the terrestrial surface, and their forests are water's primary filter and also provide a method of transportation to the underground. Rivers allow for water to travel to lower altitudes and with their biological system offer secondary



filters/conditioners. River waters offer a way for mineral components to travel from mountains and higher altitudes to lower altitudes and finally to the seas.

When water from higher altitudes does not find its way to lower altitudes, lakes are then created, and with their biological life form a lake water system is established. Of course, lakes can have river water input and river water output, but the water body of the lake is situated lower than the level of the water outtake. Lakes are the water storages of higher altitudes.

Swamps, swamp-forests and marsh land areas are the water's best biological filters and they are usually located at lower altitudes and act as estuaries. The biologically richest regions are where water (fresh or salt) meets land. The Earth's matter exchange is possible due to water actively fulfilling its transport role. The activities within biological rich environments help our health by purifying the water of the terrestrial surfaces.

The underground rivers transports water under the Earth's surface, and provide water to water springs. Earth's crust movements create large underground pools of water, and located at deeper terrestrial and ocean bottom levels. They are rich in minerals and usually sterile.

7. The Atmosphere – Another Crucial Part of the Climate Change System

The atmosphere is located between the Earth's body and outer space, covering a distance of up to 1,000 kilometers, and it is a large environment filled with gasses, rays, light, particles, natural powers and forces. This protection zone of the planet Earth is more commonly known as the atmosphere. This is the weather conditions manifest themselves and air movements are most frequent. It is here that clouds are formed. Living creatures can be found here; from microbial life forms to birds. The troposphere (the lowest layer of the atmosphere) ends into the stratosphere (the upper atmosphere!) 15 - 50 kilometers above Earth's Surface, this includes the ozone protection band (15 - 24 kilometers). The Mesosphere (the region between the stratosphere and the thermosphere) (50 - 85 kilometers) and Thermosphere (85 - 400 kilometers) ends into the exosphere, which ends into outer space at the altitude of around 1,000 kilometers. The atmosphere is a gaseous cover for the Earth's surface and it is an integral part of the biosphere and the whole Planet Earth System. It takes, transports, rebounds, and transforms the band of the Earth for the Sun's rays of light and warmth, as well as for any rays, particles, outer space bodies, natural powers, meeting with the planet Earth.

Two main gases make up 99% of the atmosphere: nitrogen (78%) and oxygen (21%). As everything in nature: its distribution, movements, and content may only change within limited possibilities. The remaining one percent is made of the natural presence of carbon dioxide, methane, water vapor, nitrogen oxides, argon, etc. Oxygen is present as dioxide, ozone, carbon dioxide and water vapor. As a contribution from our civilization, additional contents of gases have been put into the atmosphere which result into the green house effect such as: additional carbon dioxide, additional methane, nitrous oxide, chlorofluorocarbons CFCs, hydro fluorocarbons HFCs, per-fluorinated carbons PFCs. Photo chemically important gases are carbon monoxide, oxides of nitrogen and non-methane volatile organic compounds NMVOCs, which indirectly contribute to the green house effect.



The atmosphere, as the largest part of the biosphere, has an important role; support life with its oxygen concentration. Oxygen is the gas, amongst all other gases found in the atmosphere, and that makes life possible. Secondly, it is also in the atmosphere that water vapor is transported, where clouds are formed and allows the water cycle, important not only from the biology point of view.

The air movements, in the multidimensional space, have regular and irregular patterns and in our current Climate Change System extreme air movements are being recorded. Wind speeds in the last 20 years, has been recorded as fast as 500+ kilometers per hour. Air movement is of great importance for the biosphere as it transports life forms, supplies moisture and creates local weather. On the other hand, it is antagonistic to human constructions, which are usually demolished by the strength of high winds, tornados, typhoons, as they are not constructed to equal their standards.

The carbon cycle was probably the most important cycle during Earth's primordial times, as it caused the formation of the crust and deposition of the ocean bottom and land surface. It is a direct input/output of biology, and partly of the biosphere's chemistry processes.

Carbon is a constructing element of the biosphere. A very fast (less than 1 year) exchange of carbon is within plant life. It is today the second carbon exchange, which takes the first place when thinking of the very fast carbon exchange. Fast (1-10years) carbon exchange comes from soil and ocean/sea surface. Slow (10-100 years) is an exchange of carbon with the forest systems. Very Slow (more than 100 years) carbon exchange is important in the biosphere as deposition of carbon by microbial life and Calcium carbonate sediments/rocks. Due to the relatively slow carbon cycle process in nature and the relatively fast input of carbon into the biosphere by our civilization, we now have a situation, for which the biosphere's existing processes are not able to compensate. It is one of the reasons for global warming.

Nature's sulfur cycle has been a less important cycle of pre civilization times. It has its important role within nature. Our civilization on the other hand, causes damages to nature by the increased quantities of sulfur (acid rain) that it keeps producing. Sulfur is an essential element for the existence of life on Earth.

8. Our Civilization as a Hampering Precondition of the Climate Change System

Be it an inferior or a superior system of the biosphere, Planet Earth, the Solar System or the Universe; civilization is still a very small system, and however, it is an integral part of them all. Today civilization is discussing its problems with nature, space, and environment, and as well as speaking of protecting the environment (protection against whom?) As the great Greek Philosopher Plato, more than 2,000 years ago, stated:

“When there was still forest growing in the mountains of Attica, the rich soil received water and stored it, so that the absorbed mass slowly became distributed from the heights, feeding fountains. But now the fatty and rich soil has been washed away and just the merger framework of the landscape is still present – comparable to the skeleton of the body attacked by illness.”



We have not categorized the systems as being “important or unimportant systems”; every system is interdependent, interacting and co-operating with the others in order, which has resulted in the current biosphere’s status. Sadly, we humans have not followed nature’s instructions/information and have not developed enough interdependences, interactions and co-operations with other systems. The Dialectical System Theory may be a more promising tool than the General Systems Theory; for more information refer to the book “System Thinking and Climate Change System (Against a big “Tragedy of the Commons” of all of us)”, Ecimovic, Mulej, Mayur, 2002. ISBN: 961 – 236 – 380 – 3.

The Climate Change System, as an integral part of the Earth’s Biosphere, has a bigger influence on our civilization than we humans think and believe. In absolute terms, the climate change system is the provider, maker, holder and guardian of the living conditions that make life possible. However, we humans are too much concerned with our modern relations with nature and each other to be able to appreciate this fact, to harm the Climate Change System as much as we can, yet fortunately not as much as we think we may.

There is an anthropocentric interference theory in relation with the Climate Change System, one that tries to explain the reasons of the climate change caused by our civilization over the last 200 years (1800 - 2000). Let us assess the feasibility of such a theory.

The philosophy related to this issue was written many centuries ago; the story of David and Goliath. We are not viewing our David-like abilities and impacts. We do not know well: what we are; and what is our ability; and nor where we belong. What we do understand: how to make money and how to use the nature’s resources to obtain it. The question we should be asking ourselves: what are our civilization impacts on the planet Earth? We have to recognize the biosphere’s capacities; its interdependence, interaction and co-operation, which is our civilization source of life. *As long as we shall continue on the present paradigm and keep “putting our heads in the sand”, instead of taking long-term responsibilities for our civilization’s impacts on our own living environment, we shall keep increasing the difference/distance between our civilization and the nature.*

We are wrong to think that our civilization’s home is the Planet Earth, our home is only a small part of it; the biosphere.

What is our civilization’s current status? Does our civilization need holism? What are the interdependences, interactions and co-operations needed for a sustainable future of mankind? What are the “to be or not to be” related issues? When we answer these questions are we only considering our civilization’s well being or are we including everything else?

If we accept the origin of our ancestor, the Homo sapiens, dating some 200.000 years ago and their first settlements some 14.000 years ago (the first settlements in Eurasia), as well as the great cultures (China, India, Mesopotamia, Egypt, and Persian) some 3.000 - 7.000 years ago, we may then discuss the question of *where* we come from. However, the issue of *what* we are, from a natural science point of view (biology of the biosphere of the Planet Earth) this issue remains excluded from any old script or our predecessor’s philosophy. Religions – the permanent supports of our civilization – are creations of our predecessors, but they do not offer any information in relation to the origin of our civilization. Their focus has always been on human beings and how to take from people as much as possible. Existence, economics and



ideologies have always been interdependent. Warriors, kings, rulers, democrats from the past (such as the ancient Greeks some 2,500 years ago) and the present religious/spiritual leaders, politicians and many others, who have been self-appointed, elected or appointed, were products of their time and ruled as they ruled. Old tribe stories – written by people, chiefs, and spiritual leaders – describe what we are, but do not discuss what our purpose for living might be, nor does it explain our civilization's impact on the biosphere.

From a natural sciences' point of view: If we accept that we humans are an integral part of the Planet Earth's biosphere, nature and the peak of life tree on the Planet Earth, that we use the system theory as our thinking tool, we may say that we belong to the Planet Earth's biosphere as an independent part/content/living creature with fights for continuum as all other living creatures.

Our civilization is one of the many life systems inside the Planet Earth's biosphere and we may say that we are one of Planet Earth's civilizations. What other civilizations are there? From our research, many living creatures could be considered civilizations, as the amount of members they have out-number Homo sapiens many times over. Amongst the largest populations are microbial species. It is known that survival is based upon food/water/air/space/ availability. An individual member of specie may have a short lifespan, and however, specie may have been living in the biosphere for a very long period of time. Microbial cultures/parasites are an example of this. They destroy their host and themselves, however the species still goes on living. Nature takes care of matter transition within the Kingdome of life. The permanent matter transition system (from "ashes to ashes") does not rule humans but simply symbolizes the continuous cycle of matter within the biology of the biosphere.

Let us have a look at our part in this cycle. Our first settlements were placed where food, water, air and space were abundant. These settlements flourished. When settlements joined together, cultures and nations were established. As long as the food, water, air and space were abundant, the culture was in good shape. However, when food, water, air or space became restricted, the culture weakened. We have come to the age of Globalization and our civilization has become the ruler of the planet Earth. Still in the 60's (1960) food, water, air and space were abundant, but at the end of the second millennium, they are no longer. Space looks like it was but it isn't either. Is the end of our civilization approaching?

From the point of view of natural sciences, every culture in the biology of the biosphere lives its cycle: from birth, to childhood, to adulthood, to old age and finally become history.



9. Human Capacities for Requisite Holism – A Crucial Precondition for Benevolent Climate Change System Process Still Needs to be Attained

The novelty to be attained – and to be made innovation – could be the ability for the current Homo sapiens to think, understand and learn how to manage their civilizations affairs in a holistic manner. (Food, water, air and living space) We could achieve better results by using systems thinking.

The Climate Change System is an integral part of the Earth's biosphere and it has a multi-complex purpose of putting together, hold, make, protect and guard the basic conditions of life: temperature, water cycle, air/sea/ocean movements, as well as protect, manage and regulate/control the biology of the biosphere.

The Climate Change System is one of the subsystems of the biosphere. Which parts of the biosphere are more likely to be impacted by our civilization, is the question that we shall try to answer right now.

The biosphere's biology has many successful systems which are at different stages of life. The most successful and the most evolved are the rain forests. Of course the geography (longitude, latitude and altitude) of the environment and space have a great deal of impact on the life management and evolvement possibilities. Second to these conditions is the availability of water, which is in most situations closely linked to the biological systems' evolvements. In bordering (land and water) biology systems, many systems are successful such as: mangroves, corals, coastal, sea and ocean waters. However, the largest portion of the biosphere is made of water; oceans and seas, so it is very difficult for us to know and research the details of these systems which cover about 70% of Earth's surface. 95.7% of the Earth's water can be found in oceans and seas.

A general biology knowledge may indicate that the best biological systems on the terrestrial surface are the forests, second to these are grasslands and then come biotopes specialized by local conditions – swamps and marshes, bush lands, makia/gariga (Mediterranean), mountains, the Sub-Arctic, the Arctic and Antarctic regions, rivers and lakes, deserts, etc.

All natural systems are composed of physical, geographical and biological characteristics, which are the basis of their composition. The Climate Change System is the provider, maker, holder and guardian of the water, air and temperature conditions, which in turn provide and guard the systems evolvements. We may explore the past and witness the present of these systems, we cannot see their future evolvements, due to the many possibilities and influences.

Water and food are very interdependent, when it comes to the food production of our civilization. Water is a basic precondition for food production. Due to changes in the biosphere, our civilization has been replacing available natural water for food production naturally with water from other sources – rivers, lakes, artificial accumulation, etc. By doing so, the food production environments have become very similar to an artificial system and have been moving fast out of the biosphere's patterns.



Due to increased demands of food, new areas have been exploited. The artificial food producing systems are now being used on a long-term basis (reactions within the biosphere take as long as they need, since nature always has enough time, in other words: nature does not care for time). The reaction was very much limited to the production abilities, so our civilization was forced to innovate technologies for food production and protection (not to forget profit and monetary gain reasons) of the food production systems. Many pesticides were introduced. One-sidedness of the purpose for innovation has resulted in major damages within the biosphere. Sadly the impacts of the use of pesticides have gone far beyond our abilities to understand them. Synthetic chemical compounds should not be used on natural systems, because of their long-term damaging effects, impacting the different parts of nature's system such as: water pollution, desertification and loss of productivity of agriculture lands, etc.

We are now faced with the intoxication of our biosphere. It is a consequence of the lack of consideration for both complexity and complicatedness of our ONLY biosphere.

Due to an exaggerated growth of the needs of our civilization (drinking water, industrial consumption of water, etc) and demand for agriculture and food production, nature's water sources are becoming insufficient. Many innovations were used to solve this issue, but in turn may have significant impacts on the systems of the biosphere. Let us mention here the exaggerated use of fresh river/lake waters, resulting in the destruction of underground water deposits and lakes, with a lack of understanding the physics of the underground water deposits systems.

We currently face a large deficit of fresh water sources and the quality of the present sources is questionable, due to the pollution of synthetic chemical compounds and their long-term effects. Hormones and hormone-like substances are becoming more and more important. Today, we no longer have clean fresh water supplies, its quality has been affected by synthetic chemical compounds and other pollutants and the water supply is within the limits of allowed level of intoxication. From a water supply view point, our future does not look very nice.

Our civilization's settlements (over-concentration of people and self-creation of fragile environments – mega cities) have caused the pollution of all water sources in such regions, which includes surrounding sources as well, because as we all know, water travels. The pollution has been a result of city life (countless toxic substances, natural and chemical products, etc): individual kitchen outflows, sinks, toilets, sewage systems combined with the 'natural' flow of the rivers. Agriculture intoxicates lands and underground waters, which in turn intoxicate other connected lands and underground waters. This is all ending in the coastal sea and ocean waters, which are in different stages of pollution/intoxication.

Our civilization has used rivers as a sewerage transport system. To protect human settlements, citizens' properties and civilization's achievements against natural river floods, huge hydro constructions have been erected. By our civilization's standards; we believe to have straightened the natural river flows. By doing this, we have now destroyed the natural/biological river waters' 'filtering' systems. On a long-term basis, the floods are still there, but have now more damaging effects. A majority of the rivers now need eco remediation, as their natural abilities for hosting life and other qualities have been destroyed by our civilization.



Estuaries and coastal waters which in many cases have been reconstructed into businesses, settlements and tourist resorts, have now poor natural biosphere characteristics. We have reached new frontiers for coastal water pollution and by consequence are now polluting oceans and seas with all sorts of synthetic chemical compounds and other pollutants.

More than ever, human population is now living on littoral coastal lands. The pollution of coastal waters is dramatically increasing and soon we shall be able to see the results of our continuous damaging of the quality of our sea and ocean waters.

With our civilization constructions and developments, more and more land is changing natural characteristics. At present in Europe (2007), land use distribution is as follows: 47% agriculture, 36% forestry and 17% constructions and development or sealed land that is land lost to nature and the biosphere.

The above data brings us to the conclusion that many individuals and organizations need to learn and apply system/holistic thinking. Both the past and present experiences of our civilization impact a large number of natural systems and we need to protect nature, space and the environment from members of our civilization. In truth, we need the diffusion of holistic thinking, so that we may have a better and more suitable way of thinking, decision-making and action taking. This would be necessary in order to attain our civilization's long-term responsibility, and preserve Earth/Biosphere' nature, and rather than to suffer the global tragedy of the commons. ***Our recommendation is to establish UN working body for protection of the Biosphere against destructions done by our civilization.***

The Climate Change System operates under preconditions given by the dynamic evolvement of physics, geography and biology of the Earth and its environments. Over the last 300 years, during industrial and post-industrial ages, humans have proved, with their way of living, their ability to influence constructively and destructively their natural environment. They have gone beyond the limit of a sustainable living and have caused long-term ill effects on the biosphere of the Planet Earth. The findings exposed in the book 'Systems Thinking and Climate Change System' (2002) have demonstrated that human impacts on the Planet Earth's biosphere are both individual and organizational, their consequences are individual, local, regional, organizational, national, international, continental, global and perhaps even universal. Therefore, the selected problem is how would be possible that our civilization have a better and more systemic long-term responsibility of humans. This viewpoint considers the potential political measures towards this responsibility, it would be proper to think that the Age of Globalization requires a new approach.

The Climate Change System, as an integral part of the Earth's biosphere, is not its creator, but its provider, maker, holder and guardian of the living conditions. Humans have to find a new path towards future sustainability. Mutual relationships between our civilization and Planet Earth, and will emerge from newly evolved conditions. *The sustainable future of mankind could be defined as harmony of the present civilization with the nature of the Planet Earth.*

Knowledge, sciences, research, applied research, society, governances, economics, national and international institutions, all need to accept a broader view of the given evolvments in our biosphere and respond adequately to their new challenges.

The current pollution (on a global scale) caused by synthetic chemicals, nuclear technologies, CFCs, pesticides, genetic modifications GMO and GMP, hormones-like substances from our



civilization's synthetic chemical production, medication, technology impact, combustion engines, transport equipment, armaments, PCBs with impact on gene structure and many others, is only reflecting samples of our civilization's short-term thinking and actions. We need to become responsible for our civilization's impact on the biosphere, if we are to have a sustainable future.

Here we have distinguished the impacts of the ruler of our civilization profit and monetary gain. From our lack of knowledge and holism we barely understand the actual damages we are doing with our by-products. The main reason for global pollution is our need as a civilization to make profit with our PCBs, CFCs, pesticides, plastics, etc. We produce, promote, market them, but by doing so, these products have caused damages within our own living space and environment. The cases include the population's explosive reproduction and pollution of lands, oceans and seas, and the atmosphere.

We need to research and understand our environment to attain long-term responsibility for our civilization, in order to stop the irresponsible behavior of the current rulers, humans and our civilization's products. We need to stop our one-sided profit system, which causes failure to understand our long-term responsibility and hence causes irresponsibility.

The current status of the biosphere, nature, space and the environment, as well as the scientific and research knowledge at our disposal are driving our civilization in a dead alley. Individual, regional, national and international interests do not allow for humankind to take a new approach towards survival as it is controlled by social, financial, political and bureaucratic pressures, war philosophy and a lack of tolerance between people.

We, the people of the Earth, have to recognize the need for action towards the establishment of a world constitution, a world parliament and a world government as a possibility for our survival. They would have the responsibility to co-ordinate social issues, and harmonize the needs for humankind, nature, space, environment capabilities and our needs. The age of globalization is here, we need new approaches and behavior.

Co-ordination of important issues for the Earth and the biosphere from one united government could give us answers to practical application of research and help us correct the relationship between our civilization and the biosphere. It would offer proper global management of important issues and better possibilities for success. Global direct democracy (not monetary or political party's democracy) for the sustainable future for all mankind, and global governance is a proper recommendation for the beginning of the age of globalization.

The current practices on the Earth are:

- The destruction of nearly all water sources with synthetic chemicals, bio and air (rain included) pollution
- The destruction of the air through land, sea and air traffic
- The destruction of our living space with military actions – wars
- The destruction of the ozone layer
- The destruction of the fertility of our soil with our agricultural practices, including erosion and desertification
- Global warming and other impacts of the Climate Change System



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- And last but not least: the explosive reproduction of humankind, which needs to undergo transition, changes, research, learning and other approaches for a better tomorrow.

Such practices cannot be dealt with by simply taking national interests into account and by meeting them in mutual isolation. They should be a major priority of a world government.

The Climate Change System, the provider, maker, holder and guardian of our living conditions within the biosphere, needs special scientific research and world governing action. Nature, space and environment protection from members of our civilization also needs this special attention. Both are global systems that are reacting to the one-sidedness of humans, causing global entropy tendencies and require a global level of governance using holistic thinking.

The necessary scientific and applied research to cope with the above issues cannot be provided on the basis of our civilization's current scientific and research practices and capacities, due to the engagement of scientists with armaments/war efficiency development and the demands of bureaucracy. Therefore, a new approach is needed; a new direction is needed for our scientific work towards developing the knowledge and values needed to save nature, space, and environment and let's not forget, the Climate Change System impact.

10. The Requisite Holism – a Way to overcome the Blind Alley of Today

Scientific work, as a basic source of knowledge, needs special co-ordination at worldwide level and should be an integral part of the world governance. We need independent scientists, who work because of their scientific thinking/acting and practicing ability, and not because of need for daily/monthly/annual salary given to them by bureaucracy (democratic financial societal system), or commanded by army chiefs and militant governments, or marketing/profit oriented economy. The money system today has become a master/monster of its own, a monster which rules the entire civilization. It would be nice to put it back, in the frame where it belongs – the servant of humankind. Now, profit is killing profit by causing side effects having crucial impacts, including humankind's cost covered by company taxes.

It is obvious that corporate social responsibility is not a part of present mankind ethics, but declarations for promotion purposes only. When and if the corporate social responsibility and the individual social responsibility of humans will be a part of each and one representative of our species, the sustainable future of mankind will have better chances to prevail.

To be able to understand the need for world governance, humans should understand the systems within which we exist, and systems we consist of and that we create. It is important due to the known fact that any system in nature will remain as it is, as long as all systems and relations within it are in a similar mode. Together they make a living system that is trying to be a viable system. If and when any major or minor part of the system moves, changes the whole system will commence to move and change. It is not possible to predict in which direction the system will move and change. This is what is happening with the climate change



system at present. It is maybe also the answer to what is happening with human society at present.

The climate change system ultimately would change living conditions within the biosphere and geography of the Earth so much that our civilization will end. Therefore we are...

11. RECOMMENDING

One planet, one government is our first recommendation. Of course, The Planet Earth Federation Constitution is first and The Planet Earth Parliament and Government follow in line, after ratification of The Planet Earth Federation Constitution.

Secondly we recommend a new approach to the social order, which has to reflect the present experience and the establishment of a new contract, new approach, or new order for humankind living on the planet Earth. The goal is to prevent explosion of humankind reproduction, enforce ethics and tolerance amongst peoples of the Earth, and enforce (a globally holistic!) law and order, and with skilful governing allow the coming generations to live and have sustainable future on the planet Earth.

Thirdly we recommend redirections of scientific work from war armaments, too narrowly market-oriented and synthetic chemicals technologies, etc., to discovering viable global systems of nature, space, the environment and cosmos, as essential elements of knowledge needed for survival and sustainable future of mankind.

12. Literature: (Displayed at www.institut-climatechange.si)

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