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**Prof Dr Timi Ecimovic and Prof Emeritus DDr Matjaz
Mulej**

Multilingual digital book

A n t h o l o g y 2 – 2001 - 2014

(The Fruits of the Past are making nice present!)

Content:

- 1. THE CLIMATE CHANGE SYSTEM INTRODUCTION – CANADA ENGLISH**
- 2. LA SYSTEME DE CHANGEMENTS CLIMATIQUES INTRODUCTION**
- 3. ZUM KLIMAWENDEL – EINE WISSENSCHAFTLICHE EINFUHRUNG**
- 4. THE PHILOSOPHY OF THE NATURE**
- 5. PHILOSOPHY OF THE HOMO URBANUS**

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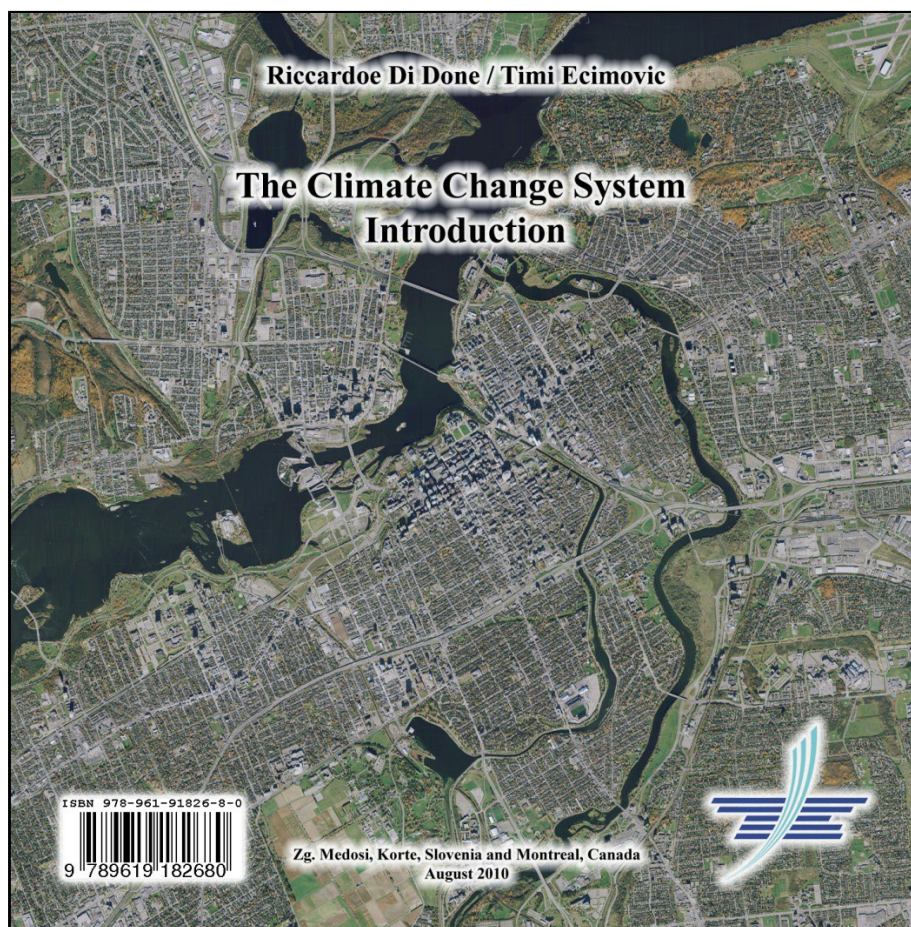


2010 was nice year for all researchers, colleagues and co-operating people of good will. We worked for fostering the new sustainability foundation needed for better tomorrow of the global community of humankind

The number of books on the climate change system introduction have been translated and published. At present world of human languages has lost a lot of respect from nations with large population. We believe the culture is not negotiable either it is or has been changed into history. The same is with languages. We think we have to learn how to respect the languages of other people.

1.

Let us commence with Canada English, On CD soft CD cover is Ottawa center from air. The book is as following;





The Climate Change System Introduction

(CANADIAN ENGLISH)



Riccardoe Di Done / Timi Ecimovic

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

ANSTED UNIVERSITY, BVI OF UK – SCHOOL OF ENVIRONMENTAL SCIENCES
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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 evolvement. 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
evolvment 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.

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 evolvement 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.

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.

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 of 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.

¹¹ 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 on 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 million years ago. The human predecessors are dated some 8 million 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.

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 stable 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 their unknown impacts on nature make it quite impossible to predict any relevant information of the future evolution 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>Non-SYSTEMIC / 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 evolvment, 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 then 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 greenhouse 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.

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.

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 greenhouse 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 greenhouse 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.

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.

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 evolution possibilities. Second to these conditions is the availability of water, which is in most situations closely linked to the biological systems' evolutions. 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, maquis/garrigue (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 evolutions. We may explore the past and witness the present of these systems, we cannot see their future evolutions, 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
- 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.



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...

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 skillful 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



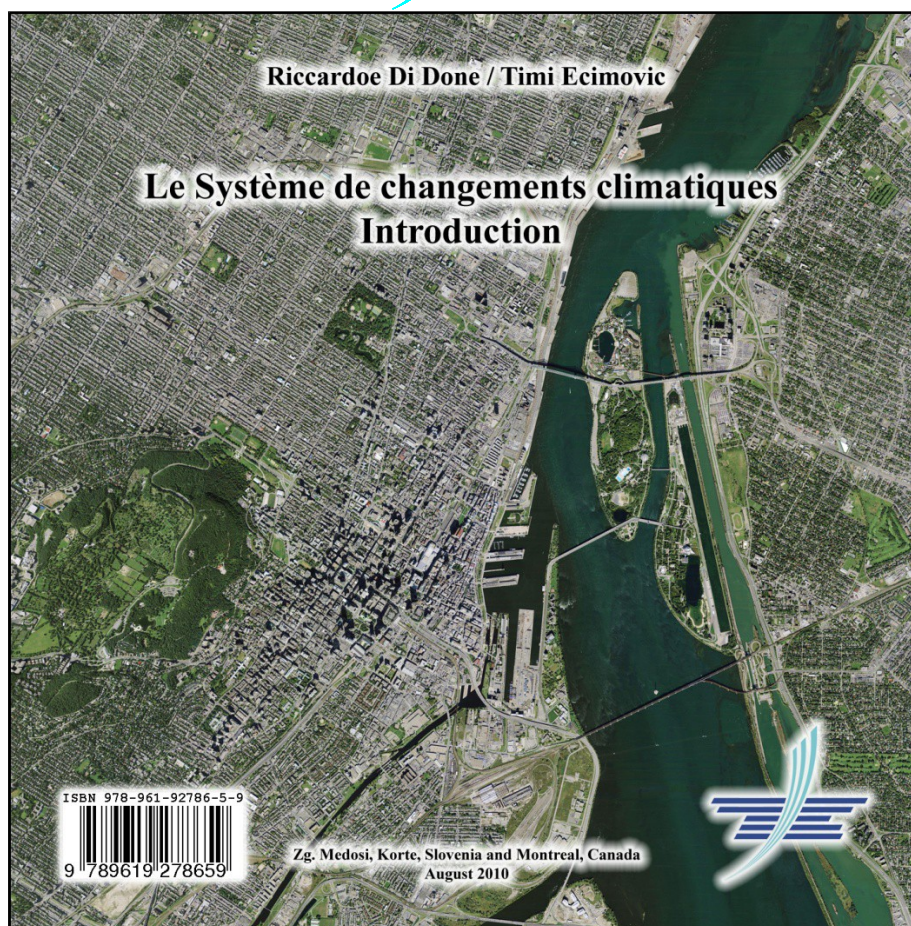
viable global systems of nature, space, the environment and cosmos, as essential elements of knowledge needed for survival and sustainable future of mankind.

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Le Système de changements climatiques Introduction

(LE FRANCAIS DU CANADA)



Riccardoe Di Done / Timi Ecimovic

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



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Anthology 2 – 2001 - 2014



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2. Le système de changements climatiques – Introduction

Dans la société mondiale actuelle, nul ne peut agir sans prendre en compte les données concernant le système de changements climatiques, notamment les chercheurs, les scientifiques, ceux qui travaillent à la résolution de problèmes complexes ou à l'élaboration d'études de cas. Ajoutons aussi que ceux œuvrant dans le domaine de l'éducation ou dans tout autres domaines touchant la vie quotidienne de l'Homo sapiens, autant à titre individuel que collectif. Le principal rôle du système de changements climatiques est de permettre l'évaluation des changements qui affectent la biosphère. Les risques découlant des modifications atmosphériques, qui ne cessent de s'accroître depuis la fin du XX^e siècle, et qui se font de plus en plus sentir, permettent de considérer ce système comme un outil essentiel à la recherche.

Le système de changements climatiques personnifie en quelques sortes un conservateur ou un gardien du maintien de l'existence de la biosphère, ceinturant la Terre et de sa qualité; son rôle est beaucoup plus important que pouvait le croire anciennement l'Homme. La biosphère a comme tâches primordiales de fabriquer, maintenir et préserver des conditions atmosphériques viables pour les êtres vivants. Suites aux modifications dans le système climatique, les conditions environnementales ont changés rapidement et ont malencontreusement menées à l'extinction de plusieurs espèces vivantes, petites et grandes.

La biosphère est caractérisée par l'interdépendance, l'interaction et la coopération de la matière, de l'énergie et de l'information dans un laps de temps donné. Elle est composée des trois principaux éléments environnementaux, soit l'eau, la terre et l'air.

Afin de se préparer d'avantage à faire face aux importants impacts des changements climatiques et à mieux gérer les mesures d'atténuation, chacun d'entre nous, connaisseur ou non, doit acquérir certaines connaissances de bases sur la biosphère.

De la révolution industrielle à ce jour, la recherche sur l'évaluation des risques de changements climatiques n'a pas suffisamment progressé. Des problématiques comme l'agriculture intensive, la production de produits chimiques synthétiques, les démocraties fondées sur le pouvoir de l'argent, la responsabilité sociale d'entreprise, les technologies nucléaires et les moteurs à combustion ont contribué à la libération de substances nocives dans notre environnement terrestre, marin et aérien. Les questions que l'on doit se poser sont à savoir à partir de quel moment se fera sentir l'impact de la biosphère terrestre sur les êtres vivants ? Qu'elle en sera la gravité et jusqu'à quel point sera-t-elle dommageable? La communauté scientifique et la population en général doivent comprendre la notion d'interdépendance de l'environnement, de l'énergie et de l'information ainsi que les notions d'interaction et de coopération entre ces éléments afin que notre civilisation puisse envisager un avenir viable. À cette fin, nous devons tous utiliser un mode de pensée systémique comme le suggère l'ouvrage *Dialectical Systems Theory* (Mulej, Slovénie) (ndt : la théorie des



systèmes dialectiques) ce qui permettrait d'accomplir un travail holistique et ainsi d'assurer le maintien d'un environnement sain.

Chaque individu et la société en général utilisent la nature, l'environnement et la biosphère comme s'il s'agissait de ressources inépuisables. Le concept même de la qualité de la nature devient de plus en plus complexe en raison de l'impact du système de changements climatiques. Les inondations soudaines, les épisodes de vents violents, les tremblements de terre, les tsunamis et autres événements environnementaux inhabituels sont tous le résultat de bouleversements au sein du système de changements climatiques, et leurs conséquences sont désastreuses.

Voici donc nos recommandations :

- Utiliser la pensée systémique basée sur le recueil *Dialectical Systems Theory* (la théorie des systèmes dialectiques), qui permet d'amalgamer le travail et la créativité de l'homme avec la pensée holistique, la prise de décision, l'action et l'innovation.
- Établir une relation d'interdépendance, d'interaction et de coopération avec la nature, afin d'améliorer nos conditions de vie actuelles et futures.

Nous estimons important de connaître les impacts potentiels du système de changements climatiques et les mesures d'atténuation qui s'y rattachent. De tels outils permettraient d'avoir une vision éclairer des gestes à poser et qui auront une incidence sur la société, la biosphère et la Terre.

Pour appuyer nos deux recommandations, nous nous attarderons sur certaines caractéristiques spécifiques du système de changements climatiques.

L'eau, le sol et l'air – ou, en somme, la biosphère – constituent le fondement de la vie sur notre planète. Bien peu de chercheurs ou d'individus ne connaissent les notions d'interdépendance, d'interaction et de coopération, qui sont pourtant nécessaires à la survie des êtres vivants. Dans le cadre de récentes recherches, la pensée systémique, qui a été employée afin d'étudier le système de changements climatiques, a grandement servi à améliorer notre connaissance sur la nature et de mieux comprendre les transformations environnementales.

À l'échelle de la nature, ce système constitue un tout, un écosystème, un ensemble complexe de conditions permettant un espace viable pour tous. Cet espace est nul autre que la biosphère elle-même et représente une infime portion du système planétaire terrestre. Connaître les enjeux climatiques et les prendre en considération lors de prises de décisions importantes ont toujours été deux choses bien distinctes et ce, particulièrement au courant des derniers siècles marqués par l'industrialisation et l'émergence d'une société restreinte de professionnels.



Il existe deux principales causes considérées comme responsables des changements climatiques : celles de sources naturelles et celles provoquées par l'Homme. En tant qu'êtres humains vivant sur terre, nous devons apprendre à faire la distinction entre ces deux éléments, de façon à accepter d'une part les changements naturels et leurs conséquences – soit les inondations, la sécheresse, la pollution de l'air et de l'eau –, et, d'autre part, afin de mieux comprendre et prévenir ceux créés des mains de l'Homme.

Tout système devrait être formellement identifié en fonction de sa taille (la taille étant ici relative à la complexité et non à la grosseur réelle de la structure au sens physique du terme) :

- Macro, méga, supérieur, très gros qualifient des systèmes tels l'Univers, le plus gros système connu, le système solaire, la planète Terre.
- Micro, inférieur, sous, sont des termes utilisés pour décrire de plus petits systèmes, qu'ils soient naturels, comme l'Homo sapiens, les plantes, les animaux et d'autres êtres vivants, ou conçus par l'homme, comme les villes, les cantons, les autos, les avions, les fusées et les satellites.

Il est important de prendre conscience que ces systèmes peuvent être qualifiés d'artificiels pour les uns et de naturels pour les autres et que l'activité humaine dans son ensemble ne peut être considérée comme faisant partie d'une seule discipline, comme les sciences sociales ou naturelles. Cependant, nous pensons que tous ces systèmes peuvent être considérés comme «naturels» dans la mesure où ils résultent directement de l'activité d'un être vivant. Nous n'ignorons point le fait que tous ne peuvent comprendre ou partager cette philosophie, mais nous espérons, qu'avec le temps, ils se rallieront à notre point de vue. Pour l'heure, nous utiliserons les deux termes, artificiel et naturel, afin de rendre le présent exposé le plus clair possible.

La théorie des systèmes, la pensée systémique et le processus de synthèse constituent nos meilleurs outils pour comprendre les problèmes complexes que posent les macrosystèmes et les microsystèmes. Il n'existe pas de système simple et nous ne pouvons affirmer que nous en maîtrisons toutes les subtilités. Nous pourrions démontrer cela en utilisant la pensée systémique, laquelle pourrait faire la nuance entre la pensée scientifique d'aujourd'hui et celle de demain.

Les défis qui se présentent à l'humanité d'aujourd'hui sont plus complexes que jamais. Nous avons atteint un sommet critique dans notre aptitude à comprendre le présent et notre relation avec la nature, l'espace et l'environnement s'est détériorée. Devenue hostile, cette relation devrait être empreinte de respect et de considération. La philosophie anthropocentrique de notre civilisation, l'ordre social contemporain, l'approche et les instances religieuses, les démocraties à la solde du profit, les dictateurs, le manque de tolérance entre différents groupes, les politiques décisionnelles qui engendrent la division (depuis l'antiquité), les bureaucraties locales, nationales, internationales et celle des Nations Unies, le mode de



pensée unique engendré par le monopole de l'information ainsi que les techniques organisationnelles sont autant d'aspects qui doivent être restructurés, modifiés, changés pour que nous puissions envisager un avenir meilleur. Pour déterminer si notre civilisation léguera un futur prospère, il faut se pencher maintenant sur la question avant de franchir le point de non-retour. Nous continuons d'avoir bon espoir en l'avenir et nous croyons notre civilisation capable de comprendre et de côtoyer amicalement la nature, l'espace, l'environnement, le système de changements climatiques, le cosmos et tout autre système. De nouvelles portes s'ouvriront à nous et elles permettront à tous les humains et créatures planétaires de jouir d'un avenir durable.

Notre vision anthropocentrique limite actuellement notre compréhension du système de changements climatiques. Par contre, des outils tels que la théorie des systèmes, la pensée systémique, l'analyse et la synthèse peuvent nous aider à mieux comprendre les notions d'interdépendance, d'interaction et de coopération. En ce qui a trait aux questions monodisciplinaires, transdisciplinaires, multidisciplinaires, interdisciplinaires et supradisciplinaires, elles font toutes parties intégrantes des systèmes inférieurs et supérieurs du système planétaire que du système solaire, de la Voie lactée et de l'Univers.

La Nature ne se répète jamais; elle suit toujours une seule et même direction, qui nous est inconnue, mais qui est le fruit d'une évolution dynamique et multidimensionnelle.

Toutes nos croyances, religions, talents innés, réussites sociales, technologies, gouvernements, collectivités locales, familles et réseaux de relations ont nourri notre ego à un tel point que nous en sommes venus à nous prendre en quelque sorte pour Dieu ou le maître légitime de la nature, de l'espace et de la biosphère. Lorsque vient le temps d'unir nos forces dans l'intérêt commun, d'assurer la survie de notre civilisation, nous excellons dans l'art de nous forger des excuses au nom, entre autre, du bien-être collectif et de la sécurité nationale. Ce ne sont que des mots vides de sens ayant pour but de défendre et protéger les individus, les gouvernants et ceux faisant partie de l'élite. Nous assumons un rôle de leader mais nous devons aussi nous assurer de maintenir un style de vie modéré, paisible et empreinte de tolérance et stabilité afin d'avoir une meilleure espérance de vie, car la nature l'exige.

Notre vision anthropogénique a influencé nos connaissances actuelles sur le système de changements climatiques. Elle émane des bureaucraties nationales et internationales, qui offrent des avantages pécuniaires aux scientifiques en échange de l'information écrite ou orale qu'ils désirent publier partout dans le monde. Il est facile pour les politiciens et les bureaucrates d'orienter la recherche scientifique, la recherche appliquée et les études théoriques à leur avantage, car ils sont bien aguerris en matière décisionnelle. Ils contrôlent les ressources et prennent des décisions ayant trait à l'évolution de la science et de la technologie en faisant preuve d'étroitesse d'esprit. Comment peut-on expliquer le développement considérable de l'armement et des produits chimiques synthétiques, les huit cent millions de moteurs à combustion (utilisés notamment dans les avions, les navires, les bateaux, les machines agricoles et autres véhicules motorisés), le marketing conçu uniquement pour augmenter les profits et la promotion de la mondialisation comme moyen de s'enrichir alors que nos scientifiques ne sont pas payés pour faire de la recherche



fondamentale et que la recherche essentielle à la connaissance des questions liées au système de la biosphère est négligée? Comment peut-on rester inactifs quand les actions humaines menacent la survie de notre civilisation et de la biosphère?

La réponse est simple: nous sommes présentement en train d'assister à la grande « dilapidation des biens communs ».

Le système de changements climatiques est un macrosystème naturel caractérisé par l'interdépendance des systèmes naturels supérieurs et inférieurs ainsi que par une certaine forme d'interaction et de « coopération » entre ces systèmes. Le système de changements climatiques réagit non seulement aux activités humaines, mais aussi aux règles et aux pratiques qui régissent les liens d'interdépendance, d'interaction et de coopération établis avec les autres régimes naturels. La raison pour laquelle nous ne comprenons pas le système de changements climatiques vient du fait que la recherche est mal gérée. C'est l'ordre social basé sur le mode de pensée unique qui prévaut actuellement, avec les démocraties qui recherchent le profit, les bureaucraties nationales et internationales, et plus particulièrement dans le cas des pays du G7 qui mènent présentement le monde. Le manque de vision globale donne lieu à des activités humaines biaisées.

Prenons, par exemple, le cas du CFC, un produit chimique synthétique qui altère la couche d'ozone, dont la production était uniquement basée sur une étude de marché. Le produit a généré des profits pour la compagnie plutôt que des bénéfices pour l'environnement et a donc amené le système climatique à réagir en subissant des changements qui pourraient causer la destruction totale de notre monde. Nous devons apprendre à nous autogérer. Il est vrai qu'au départ, nous ne connaissions pas les effets indésirables des CFC, mais maintenant, nous les connaissons. Il n'y absolument plus aucune raison de continuer à utiliser des procédés et des produits dont les effets indésirables à court ou à long terme demeurent inconnus. Les techniques pour modifier génétiquement les organismes, les technologies de guerre, le développement anarchique, l'utilisation de nouveaux produits chimiques synthétiques et de moteurs à combustion, les techniques d'information et la transmission d'énergie qui influencent les champs magnétiques et les bases de l'équilibre de la Terre, font présentement partie des activités les plus dangereuses pour notre monde. Il va sans dire que les technologies nucléaires feraient mieux de rester derrière les portes closes des laboratoires, au lieu d'être utilisées et de polluer la planète pour les millions d'années à venir.

Masse d'énergie et de gaz, à l'origine, jusqu'aux explorations modernes, voilà comment nous pouvons résumer l'évolution de la planète Terre.

Le climat, ou, en d'autres termes, le système de changements climatiques, est l'un des systèmes faisant partie de la biosphère. Il est responsable du maintien de nos saines conditions de vie. En tant que système naturel, il demeure inférieur à la biosphère, à la planète Terre, au Soleil, au système solaire, à la Voie lactée et à l'Univers. Plus loin, nous couvrirons en détail chacun de ces systèmes. À l'intérieur du système de changements climatiques, il existe un certain nombre de systèmes inférieurs : l'atmosphère, l'eau (mers et océans), le sol et d'autres



composantes de la biosphère. Certains de ces sous-systèmes possèdent également leurs propres systèmes inférieurs. Tous combinés, ils forment un seul écosystème holistique, celui de la biosphère. Chacun d'entre eux doit être considéré comme un système en mouvement, interdépendant, interactif, coopérant, dialectique, dynamique et en constante évolution. **Ils évoluent tous de manière dynamique, multidimensionnelle et unidirectionnelle.** Pour une personne qui ne s'intéresse pas à la nature, cette dernière peut sembler chaotique, mais, comme l'a fait remarquer le regretté professeur Helmut Metzner dans son ouvrage intitulé *Chaos to Bios*, si la nature nous semble chaotique, nos œuvres peuvent être chaotiques pour la nature. C'est donc dans cette perspective que nous devrions nous servir de nos connaissances holistiques et de l'éthique pour déterminer ce qui est bien et ce qui est mal.

Le système de changements climatiques est un système très complexe et interrelié avec un certain nombre de systèmes supérieurs ou inférieurs. Son principal rôle est de maintenir l'énergie en équilibre, c'est-à-dire la température, l'humidité, le système du cycle de l'eau, les courants marins et la composition de la troposphère et de l'atmosphère. D'autres sous-systèmes seront explicités plus loin.

On ne peut comprendre ou expliquer le système de changements climatiques ni effectuer de recherches à son sujet en se fondant uniquement sur les connaissances rattachées à une ou deux disciplines scientifiques courantes. On doit avoir recours à une approche de recherche scientifique holistique, supradisciplinaire et multidisciplinaire. De plus, elle doit être réalisée par une équipe de chercheurs ayant des habiletés supradisciplinaires, transdisciplinaires, multidisciplinaires et interdisciplinaires. Il est évident que les scientifiques doivent utiliser un éventail de méthodes comme la théorie des systèmes, la pensée systémique, l'analyse et la synthèse, la résolution de problèmes complexes et l'étude ou la recherche de cas pour être en mesure de bien explorer la nature.

Une formation supradisciplinaire, du point de vue de la recherche et des sciences naturelles, est un préalable pour être en mesure de comprendre les problèmes ardues associés aux systèmes complexes. La recherche et le travail supradisciplinaires débordent du cadre de la discipline scientifique classique, à tout le moins quand on tente d'en comprendre la nécessité du travail et des activités visant un système qui fonctionne dans des conditions normales ou particulières, interreliées au système lui-même et à ses systèmes inférieurs ou supérieurs.

Les conditions de vie ne sont pas considérées comme un ensemble, mais plutôt comme un système, un amalgame de qualités environnementales de la biosphère qui constituent des conditions requises à l'apparition de la vie. La théorie de l'évolution, celle de Gaïa ainsi que la théorie des systèmes, le passé connu et le présent ainsi que la situation de la biosphère démontrent la justesse de cette hypothèse.

L'origine du système climatique et le système de changements climatiques sont des éléments dynamiques de la planète Terre – son apparition et son existence, comme élément de l'apparition et de l'existence du système solaire, participent à la dynamique de l'Univers.



Le système de changements climatiques régit la vie à l'échelle de la planète, non pas en étant aux commandes, mais plutôt en devenant un phénomène d'interdépendance, d'interaction, de coopération, d'impact et de conséquences sur son dynamisme. Il est important de spécifier le rôle de l'homme et de la civilisation dans le système de changements climatiques qui, par son activité, est le déclencheur de la dynamique du système. Parmi les exemples de déclenchement, nous pouvons notamment rappeler la découverte et l'utilisation des CFC ainsi que d'autres substances chimiques synthétiques qui, lorsque les circonstances le permettent, s'élèvent dans les couches supérieures de l'atmosphère et transforment en oxygène les molécules d'oxygène trivalent (ozone) par l'activité du chlore ionique. La destruction de la couche protectrice d'ozone est la conséquence de l'introduction par l'homme de produits chimiques synthétiques à base de CFC à grande échelle sur la scène commerciale.

3. Bref historique sur la planète Terre en tant que sous-système de l'Univers

La planète Terre est apparue il y a environ 4,5 milliards d'années. Durant cette période, la planète ne ressemblait qu'à une sorte de sphère constituée d'énergie et de gaz, dont la température avoisinait les 7 000 degrés Celsius. Tranquillement, la planète a refroidi pour finalement transformer cette matière gazeuse en matière solide quelques 200 millions d'années plus tard. Il a été estimé que la plus ancienne roche découverte sur Terre remonte à 4,3 milliards d'années.

Notre planète est considérée comme l'un des systèmes inférieurs du système solaire, de la Voie lactée et de l'Univers.

L'Univers est le macrosystème le plus gros et le plus complexe que l'homme a eu l'occasion d'étudier ou d'explorer. Il est constitué de toutes les matières, de lumière et autres formes de radiations, d'énergie, de particules, de rayons, de puissances, de forces et d'autres éléments encore inconnus. L'Univers regroupe tout ce qui existe dans l'espace et dans le temps (y compris le « temps conditionnel ») et inclut donc la Terre elle-même, tout ce qui est sur la Terre, dans la Terre et tout ce qui fait partie du système solaire. Ce dernier compte huit planètes principales (la neuvième ayant perdu son statut). Il est aussi question d'une dixième et d'une onzième planètes, de milliers de comètes et de planètes mineures appelées astéroïdes et comprend également le Soleil, cette étoile autour de laquelle gravitent les planètes.

Si nous estimons à cent unités la somme totale des informations qui existent dans l'univers, le niveau de connaissance que nous possédons présentement serait équivalent à une ou deux unités. Il faudra mener encore beaucoup de recherches et d'explorations car l'évolution ainsi que la dynamique des systèmes demeurent bien au-delà de nos connaissances actuelles de l'Univers. Pour comprendre la nature holistique de l'Univers, il nous faut réaliser qu'il est en perpétuelle évolution et que sa dynamique se présente sous d'innombrables formes : transitions, expansions, big bang – petits et gros –, apparitions, extinctions, niveaux multidimensionnels, petites et grandes dimensions.



La Voie lactée, système dans lequel nous vivons, occupe une partie limitée de l'Univers et englobe environ 100 000 milliards d'étoiles, d'innombrables planètes, micro planètes ou astéroïdes, d'énergie sous toutes ses formes, de lumière, de matière, de particules, de rayons, de puissances, de forces et un certain nombre d'autres éléments inconnus à l'heure actuelle. Autant que possible, nous devons approfondir nos connaissances sur ce système et élever ce projet à un rang prioritaire.

Au sein de notre système solaire, la composition de la Terre est reconnue comme étant unique car elle est née d'un mélange de matière, d'énergie et d'informations. De nombreuses formes de lumière, de particules, de rayons et de matière sont entrées en collision avec la Terre depuis sa naissance et ont façonné le monde tel que nous le voyons aujourd'hui. Sa dynamique est en majeure partie tributaire du flux permanent d'énergie qui émane du Soleil et des collisions avec des astéroïdes qui viennent de l'espace extra-atmosphérique. Le fait de comprendre que les accidents avec l'espace orbital, telles les collisions avec les astéroïdes, peuvent avoir des conséquences importantes sur l'équilibre du système planétaire et avoir des répercussions sur le système de changements climatiques. Celles-ci aura une grande importance car cela nous permettra de mieux en saisir l'ensemble des changements climatiques.

Lorsque nous faisons un survol de l'histoire de notre planète, nous pouvons constater que des changements drastiques dans nos conditions de vie ont eu des conséquences importantes sur le système de changements climatiques. Par exemple, la période glaciaire a été une conséquence directe de changements radicaux des températures moyennes des continents et des océans. Bien sûr, il ne faut pas oublier que la masse continentale et celle de l'eau salée réagissent différemment aux variations de température moyenne car leurs propriétés sont différentes. Les conséquences de l'époque glaciaire ont donc été plus grandes sur la vie terrestre (les continents occupant environ 30 p. cent de la surface de la Terre) que sur la vie marine.

4. Interactions et liens d'interdépendance et de coopération entre la vie, le système de changements climatiques et la biosphère

Les interactions, les liens d'interdépendance ainsi que les liens de coopération entre la vie, le système de changements climatiques et la biosphère sont des facteurs qui ont influencé l'évolution des formes de vie et ont donné lieu aux conditions environnementales actuelles. À sa naissance, il y a 4,5 milliards d'années, la Terre était sans vie et ne ressemblait en rien à celle que nous connaissons aujourd'hui. L'air ne contenait pas d'oxygène et les nombreux effets météorologiques du système de changements climatiques que nous subissons aujourd'hui n'existaient pas encore. Ce système s'est transformé en fonction de ses composantes et de leurs interrelations et continue de le faire encore aujourd'hui.



L'évolution de la vie sur Terre témoigne des conditions qui y régnaient à l'origine ainsi que des attributs physiques et autres éléments que l'on pouvait y retrouver. La Terre a nécessité quelques 700 millions d'années pour créer la vie. Les premiers signes confirmant la présence de vie sur la planète remontent à 3,8 milliards d'années. Il a également fallu environ 1,2 milliard d'années à la Terre pour que la première forme de vie microbienne évolue et finisse par former la biosphère complexe que l'on connaît aujourd'hui. La vie microbienne a entraîné la première transition énergétique de la biosphère, c'est-à-dire le passage de la production d'énergie anaérobie à la production aérobie, responsable elle-même du changement atmosphérique majeur qu'a été la production d'oxygène. À un certain moment, le niveau d'oxygène contenue dans l'atmosphère a atteint 40 p. cent pour par la suite diminuer à 21 p. cent vers la fin du XIX^e siècle.

L'oxygène est l'élément qui a le plus contribué à améliorer les conditions de vie sur Terre et qui a fait une différence importante dans l'évolution de la biosphère. La concentration d'oxygène dans l'air ne doit en aucun cas descendre sous les 8 p. cent, soit le seuil minimum requis pour la survie des êtres vivants. Actuellement, dans certaines villes surpeuplées, elle atteint à peine 10 p. cent. Nous recommandons de surveiller de près la concentration d'oxygène, et ce, principalement dans les environnements très pollués, comme les grandes villes, car il s'agit d'une condition essentielle à notre survie et à celle de la planète.

Les premiers peuplements humains se sont établis il y a quelque 14 000 ans, grâce aux progrès sociaux réalisés par les hommes ayant vécu durant la période précédant l'Antiquité. En sol européen, les hommes se sont d'abord établis dans des marais pour des raisons de sécurité, regroupant alors une population de plus de 10 000 personnes. Il s'agissait là d'un résultat direct des changements dans la structure physique de la biosphère n'ayant jamais cessé d'évoluer depuis la fin de la dernière période glaciaire, il y a de cela 16 000 à 60 000 ans. La situation du système de changements climatiques sur la Terre avait alors atteint pratiquement le même niveau de qualité que présentement. Certes, quelques éléments diffèrent, mais aucun d'entre eux n'a été aussi draconien que ceux qui sont sur le point de se produire. La différence entre les conditions de vie d'aujourd'hui et celles d'il y a 200 ans se situe principalement au niveau de tout ce que notre époque fait subir à la biosphère : rejets de déchets, effets indésirables de la technologie nucléaire, utilisation de produits chimiques synthétiques et explosions, pour ne nommer que ceux-là. La destruction de la biosphère est imputable à la satisfaction égoïste des besoins de l'homme. Bref, nos activités et nos gestes demeurent l'élément déclencheur des modifications majeures qui surviennent au sein du système de changements climatiques.

Le système de changements climatiques forme un tout, un système naturel et complexe. Il est constitué de plusieurs sous-systèmes tout en étant lui-même un sous-système d'autres systèmes tels la Terre, le système solaire, la Voie lactée et l'Univers. C'est un très vieux système, en perpétuel changement, qui offre des conditions plutôt stables aux différentes formes de vie. Pendant des centaines d'années, des changements extrêmes l'ont affecté: il a notamment traversé les périodes glaciaires, la période de l'industrialisation et celle de la post-industrialisation. Nous ne sommes pas la seule et unique cause de tels épisodes dangereux, mais nous en sommes certainement une des plus importantes, d'autant plus que nos décisions et nos activités ne sont pas basées sur un système de pensée holistique.



Le système de changements climatiques fait partie intégrante de la biosphère terrestre. Il se situe quelque part entre ses systèmes inférieurs et supérieurs. Tous les systèmes, y compris celui des changements climatiques lui-même, ont des liens d'interdépendance et de coopération et ont aussi certaines interactions.

Comme nous l'avons déjà mentionné, l'Univers contient tout ce qui existe – matière, lumière et autres formes de radiation, énergie, particules, rayons, puissances, forces – autant dans le domaine du connu que de l'inconnu. L'Univers exerce une influence énorme sur le système de changements climatiques de la Terre. C'est le cas, notamment, lorsque des catastrophes affectant le système solaire se produisent ou bien lorsque la Terre entre en collision avec un corps céleste, comme cela s'est déjà produit et ce reproduira très certainement un jour. En l'occurrence, l'hypothèse selon laquelle l'extinction des dinosaures a été causée par la collision de la Terre avec un météorite cosmique il y a 65 millions d'années est toujours plausible.

Le plus gros système naturel supérieur est l'Univers. La probabilité d'une interaction destructrice entre la Terre et l'Univers est très mince. Étant donné qu'il y a d'innombrables systèmes stellaires et une immense quantité d'autres formes d'existence dans l'Univers, il y a peu de risques que les activités du système que constitue l'Univers donnent lieu à un phénomène de destruction massive.

Vu de la Terre, le système solaire est un très gros système. Par contre, il est de très modeste taille en regard à la dimension de la galaxie et encore plus petite par rapport à l'envergure de l'Univers. Le Soleil et ses planètes forment un petit sous-système au sein de la Voie lactée qui possède en fait, des centaines de milliers de systèmes stellaires.

Le Soleil est l'étoile centrale de notre système solaire et représente 99,8 p. cent de sa masse totale. Le soleil est la source de toute l'énergie ainsi que de toute la matière que renferme notre système. Il est, bien sûr, un système nettement inférieur par rapport à la Voie lactée dont la masse est évaluée à 100 000 milliards de fois plus importante. Notre système solaire gravite autour du centre de la Voie lactée à une vitesse d'environ 250 kilomètres par seconde.

Pour le système planétaire de la Terre, le Soleil est la source de tout et cela depuis sa genèse jusqu'à nos jours. En effet, nous existons parce que le Soleil fournit de l'énergie, de la chaleur, de la lumière ainsi que d'autres composantes importantes qui sont interdépendantes, qui interagissent entre elles et qui entretiennent des liens de coopération. Le système de notre planète dépend entièrement du Soleil. Nos conditions de vie découlent, entre autres, de notre situation physique, géographique et biologique actuelle.

Bien sûr, le Soleil n'est pas la seule source d'influence au sein du système solaire. Les planètes, des corps de différentes grosseurs qui ressemblent à des planètes – comme la Lune – et d'autres formes d'énergie, de matière et de forces naturelles ont des interactions ainsi que



des liens d'interdépendance et de coopération entre eux. Par rapport à la Terre, Vénus est plus proche du Soleil et Mars en est plus éloignée. Avec Mercure, ces trois dernières forment des planètes telluriques. Les quatre autres planètes – Jupiter, Saturne, Uranus et Neptune – sont de gigantesques boules de gaz et se situent dans le système solaire externe. Pluton n'est pas toujours la plus éloignée, car le parcours ovale de son orbite la place parfois avant Neptune. Récemment, deux nouvelles planètes alignées avec le Soleil ont été découvertes au delà de Neptune.

Le système solaire est essentiellement stable. Par contre, lorsque certaines de ses caractéristiques se modifient, cela affecte tout le système. Les plus importantes composantes du système solaire sont le flux d'énergie qui émane du Soleil en direction des planètes et les caractéristiques de chaque système planétaire. Les caractéristiques du système solaire ne dépendent pas uniquement de la composition de chaque planète, mais également de la distance entre chacune d'elles et le Soleil. Le courant de lumière et de chaleur qui provient du Soleil rend la vie possible sur la Terre. Les caractéristiques du système solaire ainsi que sa composition unique et la distance exacte qui sépare le Soleil de la Terre sont des éléments d'interdépendance, d'interaction et de coopération du système de protection de la vie sur Terre.

Il est important que nous ayons une vision claire des nombreuses puissances et forces que l'on retrouve dans la nature telles la gravité, le magnétisme et l'énergie ainsi que du processus de transformation de la matière, du rôle des rayons et des particules, des différents mouvements (orbital, galactique et universel), du système solaire, du Soleil et des planètes (y compris la nôtre). Ceci nous permettra de comprendre les caractéristiques de l'interdépendance, des interactions et de la coopération au sein de tout le système.

Le Soleil possède un diamètre 109 fois plus grand que celui de la Terre et 400 fois plus grand que celui de la Lune. Les neuf planètes traditionnelles du système solaire (puisque une onzième à fait sont apparition et une autre a perdu son statut de planète) et tous les autres corps qui en font partie gravitent autour du soleil. Le Soleil et toutes les planètes se déplacent comme des toupies dans la Galaxie. Il faudrait étudier tous ces mouvements afin de mieux comprendre les puissances initiales qui résultent des rapports d'interdépendance et de coopération ainsi que des interactions entre les éléments du système solaire. Ce système, comme d'autres, fonctionne selon son propre mode de fonctionnement ou selon l'ensemble de ses paramètres. Nous avons maintenant la chance d'explorer, d'étudier et de comprendre la nature ainsi que notre existence.

La genèse de la Terre pourrait avoir eu lieu il y a environ 4,5 milliards d'années. Le Soleil fournissait alors l'énergie et la matière nécessaires à la formation de ses propres sous-systèmes, de ses systèmes planétaires et d'autres corps célestes. La Terre est d'abord apparue sous la forme d'une masse gazeuse, qui a ensuite tourné comme une toupie et gravité autour du Soleil pendant quelques centaines de millions d'années, pour finalement prendre la forme d'une planète.



5. La Terre et son système planétaire

Le système planétaire de la Terre est très robuste. À l'heure actuelle, notre planète possède un noyau interne de 2 420 kilomètres de diamètre, entièrement composé de fer et de métaux lourds, un noyau externe de 2 250 kilomètres, un manteau inférieur de, lui aussi, 2 250 kilomètres, un manteau supérieur de 650 kilomètres ainsi qu'une croûte terrestre variant entre 3 et 72 kilomètres d'épaisseur.

À la surface de cette croûte, des changements dynamiques se produisent en permanence. Ces derniers sont provoqués par les forces naturelles qui ont toujours modelé et qui modèlent encore la surface de la Terre. L'atmosphère recouvre et protège la biosphère de la planète. On la retrouve jusqu'à 1 000 kilomètres d'altitude là où l'exosphère ouvre sur l'espace. Les principaux sous-systèmes de la Terre sont sa structure planétaire, la Lune et son atmosphère. Sa structure planétaire présente un diamètre de 13 000 kilomètres, faisant de la Terre la cinquième planète en importance. La plus grosse demeure Jupiter, qui possède un diamètre onze fois plus grand que celui de notre planète tandis que la plus petite est Pluton dont le diamètre est cinq fois plus petit. Les données sur deux nouvelles planètes éloignées ne sont pas encore connues; de plus, la composition d'une planète éloignée amène un questionnement à propos du statut du système solaire actuel.

La surface de la Terre et son atmosphère constituent la biosphère. Il s'agit de l'endroit où nous évoluons et où la vie elle-même a pris forme comme élément d'un système, il y a plus de 3,8 milliards d'années. C'est en effet vers cette époque que serait apparue la première forme microbiologique de vie sur notre planète.

Parmi les éléments qui rendent possible la vie sur la Terre, l'oxygène en est le plus important. Il entre dans la composition de :

- deux oxydes inorganiques – l'eau et le dioxyde de carbone –, qui sont nécessaires à la vie;
- l'atmosphère (les molécules d'oxygène sont présentes dans l'air que nous respirons);
- la couche d'ozone, qui nous protège des rayons ultraviolets.

Après la mise en place d'un tel scénario dans le système de la biosphère, l'apparition de la vie sur Terre n'a été qu'une question de temps.

L'élément extérieur à la Terre, essentiel à la vie, est le flux de lumière et de chaleur provenant du Soleil. Dans le cas de la Terre, la distance entre la planète et le Soleil est propice à la vie alors qu'il s'agit du contraire dans le cas des planètes voisines, Vénus et Mars.



La composition unique de la Terre et la distance qui la sépare du Soleil constituent deux éléments primordiaux qui ont évolué parallèlement au développement du système solaire. Ils sont à la base de ce qui rend possible l'éclosion de la vie sur Terre.

La croûte terrestre est constituée d'une partie solide, qui recouvre aujourd'hui environ 30 p. cent de la surface, ainsi que d'une partie liquide (les mers et les océans), qui représente 70 p. cent de la surface de la planète. Le rapport entre les océans et la terre ferme a changé progressivement au fil de l'évolution dynamique de la surface de la Terre. La première apparition de l'eau sur Terre a été déterminante dans la formation de la surface terrestre et de l'atmosphère. Quand l'atmosphère s'est refroidie, elle était épaisse et beaucoup plus basse qu'elle l'est maintenant. À l'origine, l'atmosphère était sans oxygène. L'un des principaux changements qui a marqué son évolution a été à l'apparition de la première forme de vie, soit des organismes microbiologiques anaérobies, qui vivaient sans oxygène. Ils obtenaient l'hydrogène nécessaire à leur synthèse de divers composés de carbone organique issus de la dissolution de composés de carbone inorganique. Il leur a fallu des centaines de millions d'années pour faire évoluer la Terre primitive du stade anaérobie au stade aérobie. Leur importante contribution a été l'immersion du dioxyde de carbone, lorsque leurs cellules mortes se sont sédimentées dans le fond des océans et se sont transformées en de nombreux composés carboniques, que nous connaissons aujourd'hui sous le nom de combustibles fossiles. Cela a donné lieu à la première transformation énergétique; en fait, ces organismes transformaient des molécules de sucre pour gagner deux unités d'énergie par molécule.

La génération suivante de micro-organismes a été en mesure de diviser les molécules d'eau à l'aide de la lumière du soleil pour ainsi utiliser l'hydrogène s'en dégageait afin de réduire les molécules de dioxyde de carbone. Cette photosynthèse a produit une biomasse imposante. Le résultat final de cette réaction a été l'oxygène moléculaire, qui était un poison pour les organismes vivants de l'époque, ce qui a complètement bouleversé la vie. La nouvelle génération de micro-organismes a été capable d'utiliser l'oxygène comme moyen d'oxydation de la biomasse par la respiration. Cela a engendré la première transition énergétique sur Terre, car, de cette transformation de la molécule de sucre, les micro-organismes gagnaient 36 unités d'énergie, soit 18 fois plus que les micro-organismes anaérobies.

Vu sa solubilité, le dioxyde de carbone se retrouvait dans l'eau. L'oxygène n'étant pas soluble dans l'eau, est devenu une partie intégrante de l'atmosphère. La concentration de l'oxygène dans l'atmosphère a augmenté pour se fixer à 21 p. cent ; il y avait 78 p. cent de nitrogène et le 1 p. cent restant était constitué de dioxyde de carbone, de méthane et d'autres éléments gazeux. Avec l'apparition de l'oxygène dans l'atmosphère et l'influence de la radiation du Soleil, la molécule d'oxygène s'est scindée et a fait place à l'oxygène élémentaire qui, dans la couche supérieure de l'atmosphère, a donné la molécule d'oxygène trivalent, c'est-à-dire l'ozone. Avec le temps, l'ozone a formé un écran imperméable aux rayons UV – la couche d'ozone –, qui nous protège contre les rayons ultraviolets du Soleil, lesquels sont responsables de la décomposition des molécules de dioxyde. La biosphère de la Terre s'est adaptée et a suivi l'évolution. La vie bactérienne a migré de l'eau vers la terre ferme et la vie s'est intensifiée. Les organismes vivants ont formé à la surface de la croûte terrestre une riche couverture de carbone, qui est devenue graduellement ce que nous appelons maintenant le sol. Le système de la Terre a continué d'évoluer, et il a créé les conditions propices à l'apparition de formes complexes de vie il y a 700 millions d'années. Les mammifères terrestres sont apparus il y a environ 350 millions d'années. Pour leur part, les prédécesseurs de l'homme



sont apparus il y a approximativement 8 millions d'années et l'Homo sapiens a vu le jour il y a 100 000 ans.

En conclusion, il y a l'Univers, la Voie lactée, le système solaire, le système de la planète Terre et la vie à sa surface sous toutes ses formes, soit sur la terre ferme, dans l'eau ou dans les airs. Grâce à ses interactions (intrants et sortants), avec les systèmes supérieurs surtout avec le système solaire, les éléments évolués et autres composantes du système de la Terre, le système de changements climatiques est devenu le fournisseur, le fabricant, le dépositaire et le gardien des conditions de vie dans la biosphère.

6. Nécessité de la pensée holistique et systémique - Les principes de base appliqués au système de changements climatiques

La pensée systémique, la synthèse, l'analyse, la résolution de problèmes complexes, les études de cas, la science classique, la recherche et l'apprentissage sont autant de préalables à l'accroissement des connaissances sur la nature, qui est le but visé par la recherche et qui est essentiel à l'épanouissement de notre civilisation. Les conditions préalables à un avenir viable sont directement liées à la capacité des hommes à mener des recherches interdisciplinaires à cette fin.

Nous pouvons découvrir l'historique et la composition d'un système. Nous pouvons également obtenir de l'information sur sa situation à court terme s'il évolue régulièrement. Cependant, nous ne pouvons en prédire l'avenir que s'il est stable. Nous avons connu plus de 10 000 ans de stabilité, mais cette période est maintenant terminée à cause de la déstabilisation du système de changements climatiques. Les effets déclencheurs de notre société et la façon dont la nature réagit rendent presque impossible toute prédiction pertinente sur l'évolution de la biosphère.

Cela ne signifie pas pour autant que nous ne pouvons plus influencer le système de changements climatiques. Notre manière de penser, notre comportement et notre vision à sens unique sont à la fois naturels, dangereux et ont le potentiel de nous mener vers notre propre extinction. Nous devons commencer à utiliser la pensée holistique et systémique.

Pensée holistique/systémique	PENSÉE NON SYSTÉMIQUE/TRADITIONNELLE
Interdépendance – Relation – Ouverture,	Indépendance – Dépendance unilatérale – Fermeture
Complexité	Simplicité
Attracteurs	Absence de forces influentes – Isolation
Émergence	Pas de processus de création de nouveaux attributs
Synergie – Système – Synthèse	Pas de nouveaux attributs émergeant des relations entre éléments
Tout – Holisme – Vision du monde	Éléments isolés et attributs partiels seulement
Réseau – Interaction – Influence réciproque	Absence d'influence réciproque



Fig. 1 : Termes résumant la pensée holistique et systémique par opposition à ceux décrivant la pensée non systémique

Le système de changements climatiques fait partie intégrante de la biosphère de notre planète. Il n'existe pas de frontières bien délimitées avec d'autres systèmes naturels au sens où nous avons l'habitude de les concevoir. Le système de changements climatiques constitue plutôt un élément d'un système naturel complexe qui, de toutes les façons possibles et d'une manière active, interagit avec tous les systèmes inférieurs et supérieurs, dans un jeu d'actions, d'influences et de répercussions réciproques. De plus, il reflète les systèmes actuels (les conditions de vie, par exemple) au moment précis de l'observation. Un observateur peut remonter dans le passé, mais il ne peut pas présumer de l'avenir à cause des innombrables éventualités qui peuvent survenir.

Voyons maintenant les différences entre la manière de penser habituelle et la pensée systémique. Prenons le cas de l'architecture. Pour un observateur qui regarde les réalisations de l'homme sous cet angle, le tableau est attrayant. Tout semble bien fait. Les arcs sont bien arqués, les lignes suivent un plan géométrique et les constructions satisfont à certains critères traditionnels de style et d'architecture. Cependant, tous les acteurs dans le domaine ne pensent pas la même chose. Prenons par exemple le cas du grand architecte catalan Gaudi, qui a eu une vision innovatrice de l'architecture d'églises et d'autres constructions. Les aménagements extérieurs et intérieurs de nos maisons, nos activités agricoles, nos communications, nos routes, nos chemins de fer, etc. suivent un certain ordre qui s'éloigne de la nature à son origine. La nature vierge nous paraît chaotique et nous ne pouvons imaginer que nous pouvons nous-mêmes produire le chaos dans la nature. Il est difficile de savoir si le fossé entre la nature et l'homme est profond ou non, mais il est évident que l'homme est intervenu souvent et a apporté de nombreuses innovations qui ne relèvent pas d'une démarche naturelle. Tout de même, pour un penseur conventionnel, la nature représente le chaos et notre style de vie, l'ordre. La pensée ou la théorie systémique nous permettrait de réaliser plutôt que le chaos dans la nature est l'ordre et ce que l'homme perçoit comme l'ordre est, en fait, le chaos. Quand cette théorie sera mise en pratique par tous et non seulement par les scientifiques, nous pourrions bénéficier d'un habitat plus naturel.

Quand on applique ce qui est dit plus haut au système de changements climatiques, on peut comprendre la notion de « chaos » dans la perspective de l'interdépendance des divers systèmes naturels, qui sont tous des éléments du système complexe de changements climatiques, ainsi que des interactions et de la coopération entre ces systèmes. Il ne faut cependant pas oublier que cette théorie est basée sur la pensée humaine et qu'elle possède donc les mêmes qualités et les mêmes failles que l'homme.

Le système de changements climatiques se compose de systèmes naturels en perpétuelle évolution, qui entretiennent la biosphère comme espace de vie. Nous avons vu, également, que le système de changements climatiques dépend de ses systèmes supérieurs. Voyons maintenant les influences qu'exercent tous ces systèmes sur la biosphère.



Tout changement ou toute évolution dans le système du Soleil a un impact certain sur la biosphère. Ces changements vont avoir des répercussions importantes sur la Terre et très certainement de graves conséquences. On devrait mener plus de recherches scientifiques en vue de comprendre les effets de l'évolution du Soleil sur notre biosphère, car étant fournisseur de lumière et de chaleur, il a une influence énorme sur celle-ci.

L'équilibre entre la Terre et la Lune joue aussi un rôle prépondérant.

Des météorites arrivant de l'Univers, de la Voie lactée et du système solaire comme d'autres formes de matière, d'énergie, de particules, de rayons, de forces, de formes et de systèmes encore inconnus ont déjà percuté notre biosphère et cela pourrait se reproduire. Heureusement, ces collisions sont rares.

Les caractéristiques de la Terre, étudiées par la physique, la géographie et la biologie, occupent une place non négligeable. Étant donné la constante évolution, ainsi que l'interaction, l'interdépendance et la coopération des forces de la nature entre elles, celles-ci ont créé et entretenu la biosphère. Nous pouvons étudier le passé et le présent de la biosphère et nous pouvons également comprendre certaines de ses dynamiques, mais pas toutes. Nos connaissances actuelles doivent aller de pair avec un système de pensée qui nous permettrait de mieux comprendre les relations d'interdépendance et la dynamique des systèmes.

Le noyau interne de la Terre a un diamètre d'environ 2 500 kilomètres et tourne comme une toupie, à une vitesse différente de celle de la planète. Toute modification des révolutions et de la direction du mouvement pourrait avoir des conséquences énormes sur le système de la Terre. Il faudra encore d'autres études pour comprendre ce sous-système et ses liens d'interdépendance et de coopération et ses interactions avec d'autres sous-systèmes.

Les autres couches du globe terrestre (noyau externe, manteau inférieur, manteau supérieur et croûte) ont entre 5 000 et 5 200 kilomètres d'épaisseur au total. Elles partagent un certain nombre d'interactions qui se répercutent dans la biosphère. La Terre se modifie continuellement sous sa surface, car sa croûte est scindée en plusieurs plaques qui sont en perpétuel mouvement les unes par rapport aux autres, mues par de puissantes forces internes. L'activité volcanique et les tremblements de terre sont le résultat de collisions ou de ruptures de plaques tectoniques à grande échelle. Ces deux formes d'activité ont des répercussions complexes sur la biosphère. La lave, les cendres et les mouvements du sol provoquent des conséquences désastreuses non seulement localement, mais aussi à l'échelle de toute la biosphère, car de grandes quantités de ces produits atteignent l'atmosphère.

Les forces naturelles (gravitation, la force magnétique et l'électricité), les mouvements de rotation (comme une toupie) et les mouvements combinés dans le système solaire, dans la Voie lactée et dans l'Univers, aussi bien que les mouvements de particules et les caractéristiques propres aux systèmes, toutes ces forces sont extrêmement importantes malgré qu'on ne les connaisse pas encore à fond.



Le système de changements climatiques – fabricant, fournisseur, gardien et dépositaire des conditions de vie dans la biosphère – se compose d'un grand nombre de systèmes interdépendants qui interagissent, coopèrent et évoluent dans les conditions qui prévalent maintenant (dans un bloc temps donné). Globalement, le système de changements climatiques peut être vu comme une série de modèles, d'expressions ou de variations utilisant différentes valeurs comme la température, l'humidité et les courants.

La biosphère comprend des sous-systèmes terrestres, aquatiques et atmosphériques. Ces derniers constituent les charpentes du système de changements climatiques qui fabrique, fournit, entretient et de conserve les conditions de vie.

La latitude, la longitude et l'altitude sont des caractéristiques géographiques bien connues. Elles déterminent la quantité de chaleur et de lumière reçue dans un endroit précis. On sait que ces données varient selon que l'environnement est terrestre ou aquatique et, bien sûr, quand les environnements terrestre et aquatique se rencontrent, les caractéristiques à la frontière sont plus complexes. Il faut prendre en compte la complexité de l'interdépendance, de l'interaction et de la coopération entre les systèmes, car le système de changements climatiques en subit les contrecoups.

De notre point de vue, le système inférieur le plus important de la biosphère, c'est la vie sur Terre. Dès que la Terre primitive a été prête à recevoir la vie, celle-ci est apparue. La vie microbiologique anaérobie a été la première forme de vie dont les effets se sont fait sentir sur tout ce qui a évolué dans les eaux des océans. Vu l'exceptionnelle étendue des océans, pleins de composés inorganiques, les premières cellules bactériennes ont joui d'un environnement très propice à la vie. L'eau des océans les protégeait des rayons UV et sa température était adéquate. La lumière et la chaleur provenant du Soleil émettaient des niveaux de radiation plus faibles que ceux d'aujourd'hui. La vie anaérobie a éclos il y a environ 3,8 milliards d'années et s'est éteinte avec la création de l'oxygène dans l'atmosphère, il y a quelque 2 milliards d'années. Le monde bactérien a métamorphosé la biosphère terrestre de bien des manières, notamment en transformant un environnement sans oxygène en environnement riche en oxygène et en changeant un environnement non protégé en environnement protégé par une couche d'ozone qui sert d'écran de protection contre les rayons UV. Les terres stériles se sont alors mises à foisonner de vie. Après le passage de la vie anaérobie à la vie aérobie, la biosphère s'est transformée et de nombreuses formes complexes de vie se sont développées. Le cycle de l'eau, le cycle de l'oxygène, le cycle du dioxyde de carbone, le cycle du soufre, les déchets de composés organiques et la vie elle-même sont devenus des parties intégrantes de la biosphère. Ils ont tous joué un rôle dans la transformation d'environnements fragiles en environnements propices à la vie ; ils ont contribué à protéger la surface de la Terre contre l'érosion et d'autres catastrophes (comme la destruction de territoires), provoquées par les courants océaniques et les mouvements de l'air. La biosphère a évolué jusqu'à devenir un environnement regorgeant de vie et d'êtres vivants. L'interdépendance, l'interaction et la coopération physiques, géographiques, chimiques, biologiques et systémiques ont fait en sorte que, dans les conditions primitives de la biosphère, s'instaure un processus d'évolution de la vie, dans un certain environnement, qui a perduré. La biosphère compte maintenant une infinité de sous-systèmes biologiques, qui



agissent en synergie pour assurer la continuité de la vie dans les présentes conditions et dans tout environnement.

Les territoires continentaux, aussi bien les environnements arctiques, antarctiques que tropicaux, sont l'habitat d'un grand nombre de systèmes d'êtres vivants qui peuvent très bien cohabiter tant et aussi longtemps qu'ils sont interdépendants, qu'ils interagissent et qu'ils coopèrent avec le système. Toutes les différences éthologiques contribuent aux échanges entre les éléments environnementaux dans lesquels évoluent les innombrables sous-systèmes de la biosphère et permettent ainsi à la vie de perdurer. Les changements qui s'opèrent et l'évolution sont le résultat des liens d'interdépendance, d'interaction et de coopération entre tous les systèmes concernés. On peut dire la même chose de l'évolution des environnements aquatiques et atmosphériques. Le système biologique est l'élément modérateur des conditions de vie dans la biosphère.

Le Soleil est synonyme d'énergie; il fournit lumière et chaleur. La planète Terre possède deux systèmes de protection : l'ozone, zone de protection dans la stratosphère (de 15 à 24 kilomètres) et l'effet de serre naturel (composé d'éléments naturels comme le dioxyde de carbone, le méthane et les oxydes d'azote). Ces deux systèmes de protection filtrent et transportent l'énergie de rayonnement à la surface de la Terre, puis la retournent dans l'espace. Actuellement, la Terre est composée d'environ 30 p. cent de terre ferme et 70 p. cent d'eau. L'équilibre énergétique est la différence entre les entrées et les sorties d'énergie (intrants et sortants). Des modifications à l'intérieur de celles-ci jouent sur l'équilibre des énergies et peuvent causer un réchauffement ou un refroidissement de la biosphère de notre planète. Vu les caractéristiques complexes du système de la Terre, comme les changements dans l'atmosphère, les changements dans la partie continentale, les changements dans la partie aquatique (mers et océans), les changements au sein de la biologie à sa surface et les intrants anthropogéniques, la réaction de réchauffement ou de refroidissement offre des scénarios et des résultats variés. De plus, l'influence des mouvements de l'air et des courants océaniques ajoute encore à la complexité.

L'équilibre énergétique est un système de maintien de la vie parmi les plus importants. Les changements qui l'affectent ont de puissants effets destructeurs sur la biologie de notre biosphère. Ces changements peuvent mener à l'extinction d'animaux, de plantes et de bactéries aussi bien qu'à la création de nouvelles formes de vie. Par le passé, des changements draconiens ont eu lieu à plusieurs reprises sur la Terre. On n'a qu'à penser aux périodes (époques ou âge) glaciaires.

7. Le cycle de l'eau: une composante cruciale du système de changements climatiques

Le cycle de l'eau constitue la grande différence entre la Terre et les autres planètes telluriques que sont Mars, Vénus et Mercure. C'est maintenant un élément de la biosphère qui a d'ailleurs fait partie intégrante de la Terre dès sa naissance. Le cycle de l'eau est un sous-système de la biosphère qui définit les fondements de l'environnement de la biosphère, en



qualité et en quantité. Rapidement après la naissance de la Terre et une certaine période de refroidissement, l'eau est apparue sous ses formes liquide, solide et gazeuse, et l'eau a dès lors entamé son cycle incessant et permanent. Comme élément de l'environnement, il joue un rôle de transporteur et, à ce titre, ses interactions sont importantes. Combiné à d'autres sous-systèmes, comme la formation et le mouvement des nuages ainsi que la foudre et d'autres phénomènes électriques naturels, il a contribué à la naissance de la vie. Celle-ci est d'abord apparue dans les milieux aquatiques et il a fallu près de 2 milliards d'années pour qu'elle migre vers la terre ferme. Les océans renferment 97,5 p. cent de toutes les eaux de la Terre tandis que les eaux douces représentent les 2,5 p. cent qui restent. L'eau douce se répartit comme suit : 68,7 p. cent du volume se retrouve dans les glaciers (qui sont rapidement en train de disparaître à cause des effets du système de changements climatiques sur les températures à la surface du globe), 30,1 p. cent se retrouve dans le sous-sol, 0,8 p. cent entre dans la composition du pergélisol (qui s'amenuise également) et, finalement, 0,4 p. cent se retrouve à la surface de la Terre et dans l'atmosphère. L'eau de surface et de l'atmosphère se répartit à son tour comme suit : les lacs (67,4 p. cent), l'humidité du sol arable (12,2 p. cent), l'eau de l'atmosphère (9,5 p. cent), les marches et les marais (8,5 p. cent), les fleuves, les rivières et les ruisseaux (1,6 p. cent) et l'eau biologique contenue dans les êtres vivants (0,8 p. cent). L'eau constitue une caractéristique essentielle de la biosphère, une condition sine qua non pour la vie. L'eau constitue le système de transport principal au sein des cellules, des tissus et de l'organisme. Elle constitue aussi l'environnement par excellence dans lequel se produisent les processus chimiques de la nature. L'eau est également le grand architecte de la nature. Elle sculpte les montagnes, les lacs et les rivières et façonne la surface de la Terre.

Vie et eau,

Eau et vie,

Vie,

Eau.

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

Les mouvements de l'eau, en l'occurrence les courants marins, sont causés par la température, les niveaux de salinité, les vents alizés ainsi que par les interactions, la coopération et les liens d'interdépendance avec d'autres systèmes – gravité, mouvements de la Terre, mouvements de l'air, équilibre énergétique, gravité de la Lune et du Soleil, etc. La configuration actuelle des courants marins joue un rôle important dans le système de changements climatiques. Une modification des courants peut avoir de graves répercussions sur le restant de la biosphère. Nous avons d'ailleurs assisté à une démonstration de la puissance de la nature lorsque des tsunamis ont causé de nombreux désastres à la fin de l'année 2004.

L'air et l'eau nouent perpétuellement des liens d'interdépendance, d'interactions et de coopération. L'eau passe de l'état liquide à l'état vapeur et voyage dans l'air. Lorsque la température modifie les conditions du processus, et avec l'aide de particules (physiques et



biologiques) présentes dans l'air, l'eau et la vapeur passent respectivement à l'état de glace et de liquide, puis retombent à la surface de la Terre sous forme de précipitations.

Les montagnes sont des châteaux d'eau à la surface de la Terre et leurs forêts sont les premières à se charger de filtrer l'eau et de l'acheminer jusque dans le sous-sol. Les cours d'eau présent dans les montagnes font voyager l'eau vers de plus basses altitudes et leur système biologique sert de filtre et de purificateur de deuxième ligne. Les cours d'eau offrent aux composés minéraux un moyen de transport pour voyager des montagnes et des hautes altitudes vers de plus basses altitudes et atteindre enfin la mer.

Quand l'eau des hautes altitudes ne se fraie pas de chemin vers les basses altitudes, des lacs se créent et, avec leur flore biologique, ils forment un système d'eaux lacustres. Les lacs sont alimentés par des cours d'eau et se déversent dans d'autres, mais il n'en demeure pas moins qu'ils sont situés plus bas que leur source et on peut dire que ce sont les bassins de stockage des hautes altitudes.

Les marais, les forêts marécageuses et les marches constituent les meilleurs filtres à eau biologiques. Ils se situent habituellement en basse altitude comme dans les estuaires. Les régions les plus riches en matières biologiques se situent à la rencontre de l'eau (douce ou salée) avec la terre. Ce type d'échanges sur la Terre est possible grâce à l'eau qui remplit activement son rôle de transporteur. Les activités au sein des environnements riches en matières biologiques sont bénéfiques pour notre santé, car elles contribuent à favoriser la salubrité de l'eau et du sol.

Les cours d'eau souterrains transportent l'eau sous la surface de la Terre et alimentent les sources. Les mouvements de la croûte terrestre créent d'immenses cuvettes d'eau souterraines, riches en minéraux et le plus souvent stériles, situées au plus profond de la Terre et sous les fonds océaniques.

8. L'atmosphère : un autre élément capital du système de changements climatiques

Entre la terre et l'espace, sur une distance de 1 000 kilomètres, se trouve un vaste environnement constitué de gaz, de rayons, de particules, de puissances et de forces naturelles. Il s'agit de l'atmosphère. C'est là que les conditions météorologiques se manifestent, que les mouvements de l'air sont les plus fréquents et que les nuages se forment. On y retrouve des êtres vivants, à partir des microorganismes jusqu'aux oiseaux. La troposphère (la couche la plus basse de l'atmosphère) s'étend jusqu'à la stratosphère (la haute atmosphère), qui s'étend de 15 à 50 kilomètres au dessus de la Terre, incluant la couche d'ozone (de 15 à 24 kilomètres). La mésosphère (de 50 à 85 kilomètres) et la thermosphère (de 85 à 400 kilomètres) mènent à l'exosphère, qui ouvre sur l'espace à une altitude d'environ 1 000 kilomètres. L'atmosphère, cette enveloppe gazeuse qui entoure la Terre, fait partie intégrante de la biosphère et de tout le système de la planète Terre. Elle capte, transporte, fait rebondir ou transforme les rayons de lumière et de chaleur qui proviennent du Soleil et en



protège ainsi la Terre. Elle fait d'ailleurs de même pour tout rayon, particule, corps spatial, force naturelle que rencontre la Terre.

Deux gaz composent 99 p. cent de l'atmosphère : l'azote (78 p. cent) et l'oxygène (21 p. cent). Comme pour tout ce qui est dans la nature, sa composition, sa distribution et ses mouvements ne peuvent varier que dans une certaine mesure. Dans la portion qui reste (1 p. cent), il y a présence naturelle de dioxyde de carbone, de méthane, de vapeur d'eau, d'oxydes d'azote, d'argon, etc. L'oxygène est présent sous la forme de dioxyde, d'ozone, de dioxyde de carbone et de vapeur d'eau. Les hommes ont contribué à introduire dans l'atmosphère des gaz qui ont produit l'effet de serre. Il s'agit du dioxyde de carbone et du méthane en excès ainsi que de l'oxyde nitreux, de chlorofluorocarbures (CFC), d'hydrofluorocarbures (HFC) et de perfluorocarbures (PFC). Le monoxyde de carbone, les oxydes d'azote et les composés organiques volatils non méthaniques (COVNM) sont tous des gaz importants qui participent à la photochimie de l'ozone et qui contribuent indirectement à l'effet de serre.

Étant la partie de la biosphère la plus vaste, et grâce à sa concentration en oxygène, l'atmosphère joue un rôle très important pour le maintien de la vie. En effet, parmi tous les gaz le composant c'est l'oxygène qui rend la vie possible. De plus, c'est dans l'atmosphère que voyage la vapeur d'eau et que se forment les nuages. Ce sont les étapes principales du cycle de l'eau et, du point de vue de la biologie, elles sont fondamentales.

Les mouvements de l'air dans l'espace multidimensionnel présentent des configurations régulières et irrégulières de telle sorte que dans notre système actuel de changements climatiques, nous enregistrons des mouvements d'air extrêmes. Dans les 20 dernières années, on a vu le vent atteindre des vitesses de plus de 500 kilomètres à l'heure. Les mouvements de l'air ont une grande importance dans la biosphère, car ils transportent les formes de vie, apportent l'humidité et créent les conditions climatiques ambiantes que nous connaissons. Par contre, les réalisations de l'homme ne répondent pas aux standards des éléments de la nature et leurs constructions ne résistent habituellement pas aux grands vents, aux tornades ni aux typhons.

À l'origine de la Terre, le cycle du carbone était probablement le plus important, car il a engendré la formation de la croûte terrestre ainsi que du sol et des fonds marins. Il s'agit d'un processus de réactions directes (entrant/sortant) de la biologie et, partiellement, des processus chimiques de la biosphère.

Le carbone participe à la formation de la biosphère. La vie des plantes permet d'illustrer un échange de carbone très rapide (moins d'une année). C'est présentement le deuxième plus important échange de carbone, mais il tient le premier rang si on considère sa très grande rapidité. Un exemple d'échange de carbone rapide (de 1 à 10 ans) nous est fourni par l'échange entre la terre ferme et des mers et océans. L'échange de carbone avec les systèmes de la forêt est lent (de 10 à 100 ans). Dans la biosphère, un échange de carbone très lent (plus de 100 ans) se produit lorsqu'il y a dépôt de carbone par les microorganismes et les sédiments



ou roches de carbonate de calcium. À cause du processus relativement lent du cycle du carbone dans la nature et de l'apport actuel relativement rapide de carbone dans la biosphère, nous faisons maintenant face à une situation problématique. En effet, cette fois, les processus à l'œuvre dans la biosphère ne pourront peut-être pas compenser. C'est là un des facteurs du réchauffement de la planète.

Le cycle du soufre dans la nature n'a pas occupé une place prépondérante au temps de la préhistoire. Il tient tout de même un rôle important dans la nature, et même s'il est un élément essentiel à l'existence sur la Terre, les quantités excessives (contenues dans les pluies acides) que nous produisons maintenant causent du tort à la nature.

9. Notre civilisation : une entrave au système de changements climatiques

Qu'il s'agisse d'un système inférieur ou supérieur de la biosphère, de la planète Terre, du système solaire ou de l'Univers, si petit que soit le système de la civilisation, il n'en demeure pas moins une partie intégrante de chacune de ces entités. Notre société est prête à discuter de ses problèmes environnementaux concernant la nature et l'espace et parle même de protection de l'environnement (mais contre qui?). Comme le disait, il y a plus de deux mille ans, le philosophe grec Platon:

«Lorsque la forêt croissait dans les montagnes de l'Attique, le sol riche recevait l'eau et l'emmagasinait de telle sorte que la masse absorbée était lentement distribuée à partir des hauteurs, sources nourricières. Mais maintenant, le sol riche et fertile a été lavé, et il ne reste aujourd'hui qu'un maigre aperçu du paysage, tel le squelette d'un corps ravagé par la maladie. »

Nous n'avons pas établi de catégories qui permettent de séparer les systèmes importants de ceux qui ne le sont pas; chaque système est interdépendant et il agit en interaction et en coopération avec les autres systèmes, selon un ordre préétabli. La situation actuelle de la biosphère est le résultat de cette activité. Malheureusement, nous, les humains, n'avons pas suivi les instructions de la nature et n'avons pas développé suffisamment les liens d'interdépendance et de coopération ni les interactions avec les autres systèmes. La théorie dialectique des systèmes semble être un outil plus prometteur que la théorie générale des systèmes. (Pour en savoir plus, voir notre ouvrage *Système de pensée et système de changements climatiques*.)

Le système de changements climatiques, comme partie intégrante de la biosphère terrestre, exerce sur notre civilisation une influence plus grande que nous pouvons le croire. En termes absolus, les changements climatiques sont le fabricant, le fournisseur, le dépositaire et le gardien de nos conditions de vie; ils rendent la vie possible. Toutefois, nous, les humains, sommes beaucoup trop préoccupés par nos relations de tous les jours avec la nature et celles qui nous unissent les uns aux autres pour être en mesure d'apprécier cette vérité. Nous faisons donc du tort au système de changements climatiques autant que nous le pouvons, mais nous pensons qu'il n'en est rien.



Il existe une théorie anthropocentrique de l'interférence en relation avec le système de changements climatiques, qui tente d'expliquer les raisons du changement climatique provoqué par notre civilisation depuis les deux cents dernières années (de 1800 à 2000). Voyons la faisabilité de cette théorie.

La philosophie rattachée à cette question date d'il y a longtemps, elle provient de l'histoire de David et Goliath. Nous ne voyons pas nos impacts et nos habiletés comme les « David » de l'histoire. Nous ne savons pas ce que nous sommes, ni quelles sont notre nature et notre appartenance. Ce que nous comprenons, toutefois, c'est comment faire de l'argent et comment utiliser les ressources naturelles à cette fin. La question que nous devrions nous poser est la suivante : Quels sont les impacts de notre civilisation sur la Terre? Nous devons reconnaître les possibilités de la biosphère, ses liens d'interdépendance et de coopération et ses interactions, qui sont les fondements de la vie. Aussi longtemps que nous pratiquerons la politique de l'autruche et que nous continuerons sur la lancée de ce paradigme, au lieu de prendre des responsabilités à long terme concernant les impacts de notre civilisation sur notre biosphère, nous ne ferons qu'élargir le fossé entre notre civilisation et la nature.

Nous avons tort de croire **que la planète Terre** est notre demeure; notre demeure n'en est qu'une petite portion, et c'est la biosphère.

Quelle est la situation actuelle de notre civilisation? Est-ce que notre civilisation a besoin d'une pensée holistique? Quels sont les liens d'interdépendance et de coopération ainsi que les interrelations nécessaires pour faire en sorte qu'on ait un avenir viable? Quels sont les enjeux de la question fatidique « être ou ne pas être »? Lorsque nous répondons à ces questions, considérons-nous seulement notre propre bien-être ou incluons-nous tout le reste?

Si nous acceptons que les origines de notre ancêtre, l'Homo Sapiens, remontent à environ 100 000 ans et celles des premiers établissements humains, à près de 14 000 ans (en Eurasie), et que les grandes cultures (celles de la Chine, de l'Inde, de la Mésopotamie, de l'Égypte et de la Perse) datent de 3 000 à 7 000 ans, alors nous sommes en mesure de répondre à la question « D'où venons-nous? ». Toutefois, la problématique entourant la question « Que sommes-nous? » du point de vue des sciences naturelles (la biologie de la biosphère de la planète Terre) reste absente de tous les vieux écrits ou de la philosophie de nos prédécesseurs. Les religions, appuis permanents de notre civilisation, sont des créations de nos prédécesseurs, mais n'offrent aucune information quant à l'origine de notre civilisation. Leur centre d'intérêt a toujours été l'être humain et la manière d'en profiter le plus possible. L'existence, l'économie et les idéologies ont toujours été interdépendantes. Les guerriers, les rois, les dictateurs et les démocrates du passé (comme les Grecs de l'Antiquité, il y a environ 2 500 ans), qui se sont imposés, qui ont été élus ou qui ont été nommés à leur poste, étaient des produits de leur époque et ont dirigé comme ils ont pu. À l'heure actuelle, les chefs religieux ou spirituels, les politiciens et bien d'autres font la même chose. D'anciennes histoires tribales, écrites par des individus, des chefs ou des leaders spirituels, décrivent ce que nous sommes, mais ne mentionnent pas ce que pourraient être nos raisons de vivre ni n'expliquent l'impact de notre civilisation sur la biosphère.



Du point de vue des sciences naturelles, si nous acceptons que nous, les humains, sommes une partie intégrante de la biosphère de la planète Terre et de la nature, que nous sommes au faîte de l'arbre de vie sur la planète Terre et que nous utilisons la théorie des systèmes comme un outil de pensée, nous pouvons dire que nous appartenons à la biosphère de la planète Terre comme une partie, une créature vivante ou un élément indépendant.

Notre civilisation est l'un des nombreux systèmes de vie que nous retrouvons à l'intérieur de la biosphère de la planète Terre et nous pouvons dire que nous sommes l'une des civilisations de la planète Terre. Quelles sont les autres civilisations? D'après nos recherches, de nombreuses créatures vivantes peuvent être considérées comme des civilisations, car le nombre de leurs membres dépasse bien des fois celui des Homo Sapiens. Au nombre des plus grandes populations, on retrouve diverses espèces de microbes. On sait que la survie repose sur la disponibilité de la nourriture, de l'eau, de l'air et de l'espace. Un individu d'une espèce peut avoir une brève espérance de vie, mais cette espèce peut tout de même avoir vécu dans la biosphère pendant une très longue période. Les cultures microbiennes et les parasites en sont des exemples. Ils détruisent leurs hôtes et se détruisent entre eux, mais l'espèce existe toujours. La nature prend soin de la transition de la matière au royaume de la Vie. Le système de transition perpétuelle de la matière (selon lequel ce qui est poussière retournera poussière) ne régit pas les humains, mais symbolise simplement le cycle continu de la matière dans la biologie de la biosphère.

Regardons maintenant notre rôle dans ce cycle. Nos premiers peuplements se sont établis là où la nourriture, l'eau, l'air et l'espace étaient abondants. Ces peuplements se sont multipliés et, quand ils se sont regroupés, les notions de culture et de nation sont nées. Tant que la nourriture, l'eau, l'air et l'espace étaient abondants, la culture se portait bien. Par contre, lorsque la nourriture, l'eau, l'air et l'espace se faisaient rares, la culture s'appauvissait. Nous sommes arrivés à l'âge de la mondialisation et ces quatre éléments sont devenus les maîtres de notre civilisation et de la planète Terre. Dans les années 1960, la nourriture, l'eau, l'air et l'espace étaient encore abondants, mais depuis la fin du second millénaire, ils ne le sont plus. L'espace semble être resté comme il était, mais il n'en est rien. Est-ce que la fin de notre civilisation approche?

Du point de vue des sciences naturelles, chaque culture dans la biologie de la biosphère vit son propre cycle : chacune passe de la naissance, à l'enfance, à l'âge adulte, à la vieillesse pour finalement devenir un autre chapitre de l'Histoire.

10. La pensée holistique: condition indispensable dans un processus « harmonieux » du système de changements climatiques

La nouvelle cible à atteindre pour l'Homo sapiens – et cela serait une innovation – pourrait être l'aptitude à penser, à comprendre et à apprendre à gérer les questions qui le touchent (nourriture, eau, air et espace vital) d'une manière holistique. Il pourrait atteindre de meilleurs résultats en utilisant une pensée systémique.



Le système de changements climatiques est un élément constitutif de la biosphère de la Terre. Il a pour tâche complexe de donner naissance aux conditions de vie fondamentales, de les rassembler, de les conserver et de les maintenir (température, cycle de l'eau, mouvements de l'air et de l'eau) ainsi que de protéger, de gérer et de contrôler ou réguler la biologie de la biosphère.

Le système de changements climatiques n'est qu'un des sous-systèmes de la biosphère. Quels éléments de la biosphère seront les plus touchés par notre civilisation? Voilà la question à laquelle nous tenterons maintenant de répondre.

La biologie de la biosphère compte un certain nombre de systèmes qui fonctionnent très bien et qui sont à différents stades de vie. Les plus efficaces et les plus évolués sont les forêts tropicales humides. Bien sûr, la géographie physique (longitude, latitude et altitude) de l'environnement et de l'espace a des répercussions importantes sur les possibilités d'organisation et d'évolution de la vie. En second lieu, il faut prendre en compte la disponibilité de l'eau, qui, la plupart du temps, est liée de près à l'évolution des systèmes biologiques. Aux frontières de deux systèmes biologiques (terre et eau), de nombreux systèmes sont florissants, comme les mangroves, les coraux, les littoraux (mers et océans). La biosphère est couverte en majeure partie par l'eau des mers et des océans et il nous est très difficile de connaître ces systèmes en détail ou de mener des recherches exhaustives sur ceux-ci, car il s'agit d'environ 70 p. cent de la surface de la Terre et de 95,7 p. cent de l'eau du globe.

Une connaissance générale en biologie permet de savoir que les forêts constituent les systèmes biologiques les plus complets sur la surface de la Terre. Viennent ensuite les prairies et, finalement, les biotopes caractérisés par des conditions locales : marais et marécages, forêts vierges, maquis et garrigues (en région méditerranéenne), montagnes, régions subarctique, arctique et antarctique, lacs et rivières, déserts, etc.

Tous les systèmes naturels présentent des caractéristiques physiques, géographiques et biologiques qui servent de fondements à leur composition. Le système de changements climatiques fabrique, maintient et dispense les conditions de l'eau, de l'air et de la température. À leur tour, ces conditions permettent et maintiennent l'activité des systèmes. Nous pouvons explorer le passé et être témoins du présent de ces systèmes, mais nous ne pouvons pas prévoir leurs activités futures à cause des multiples possibilités et influences.

L'eau et la nourriture sont des éléments très interdépendants quand il s'agit de notre production alimentaire, car l'eau en est l'élément essentiel. À cause de changements dans la biosphère, nous avons remplacé les sources d'eau naturelle disponible pour la production par de l'eau provenant d'autres sources : rivières, lacs, accumulations artificielles, etc. En agissant de la sorte, nous avons quasiment converti les environnements naturels pour la production alimentaire en systèmes artificiels qui ne suivent plus les règles de la biosphère.



Pour répondre à la demande alimentaire croissante, on exploite maintenant de nouvelles avenues. Les systèmes artificiels de production alimentaire sont devenus choses courantes à long terme (les réactions dans la biosphère prennent le temps requis, car la nature a tout son temps et ne se préoccupe pas de cela). Les méthodes de productions étaient limitées et nous avons dû innover dans le domaine technologique pour améliorer tant la production que la protection des systèmes de production (il ne fallait pas oublier le profit). On a ainsi mis au point de nombreux pesticides et nos œillères par rapport à l'innovation nous ont empêchés de voir les dommages importants causés à la biosphère. Malheureusement, les conséquences de l'usage de pesticides ont dépassé notre entendement. Les composés chimiques synthétiques ne doivent pas être utilisés en conjonction avec des systèmes naturels à cause des dommages à long terme qu'ils leur infligent : pollution de l'eau, désertification et perte de productivité de terres agricoles.

Nous sommes maintenant confrontés à l'intoxication de notre biosphère. C'est la conséquence d'un manque de considération à l'égard de la complexité et de la complication de notre UNIQUE biosphère.

En conséquence de la croissance exagérée de nos besoins (en eau potable, à des fins industrielles, etc.) ainsi que de la demande pour l'agriculture et pour la production alimentaire, les sources d'eau naturelles sont devenues insuffisantes. De nombreuses innovations ont permis de solutionner ce problème, mais elles pourraient avoir en retour des conséquences graves sur les systèmes de la biosphère. Mentionnons ici l'utilisation exagérée de l'eau douce des lacs et des rivières, qui engendre l'assèchement des nappes d'eau et des lacs souterrains, dont nous ne comprenons pas encore toutes les incidences physiques.

La pollution causée par les composés chimiques synthétiques et leurs effets à long terme nous placent devant un déficit important en sources d'eau douce et on peut même se questionner sur la qualité de celles qui restent. Les hormones et les hormonoïdes sont de plus en plus populaires de telle sorte qu'aujourd'hui, nous n'avons plus de réserves d'eau propre. En effet, la qualité en a été altérée par des composés chimiques synthétiques et d'autres polluants. Notre avenir demeure incertain aussi sur ce point.

Les établissements de population du monde moderne (avec la surpopulation et la création d'environnements fragiles – mégapoles) ont engendré la pollution de toutes les sources d'eau de ces régions et des régions avoisinantes, car, comme on le sait, l'eau voyage. La pollution est une conséquence de la vie urbaine : la population des villes déverse dans la nature son lot de substances toxiques, de produits naturels et chimiques, etc., comme les déchets d'éviers de cuisine et de lavabos, l'eau de rinçage des W.- C. et les eaux des systèmes d'égouts qui se mêlent aux cours « naturels » des rivières. L'agriculture intoxique les terres et les eaux souterraines qui, à leur tour, polluent les terres et les nappes phréatiques adjacentes. Tout finit par se déverser dans les eaux côtières des mers et des océans, qui en sont toutes à différents stades de pollution et d'intoxication.



Les hommes ont utilisé les rivières comme système d'égout. Pour protéger leurs installations, leurs propriétés et leurs constructions contre les crues des rivières, ils ont érigé d'énormes barrages. Nous disons avoir harnaché le cours naturel des rivières, mais nous avons plutôt détruit les systèmes naturels et biologiques de filtration de l'eau des rivières. À long terme, les inondations se produisent encore et causent des dommages encore plus grands. La majorité des cours d'eau ont besoin d'une solution écologique, car leurs capacités naturelles à abriter la vie, entre autres, ont été détruites par les hommes.

Les estuaires et les eaux côtières, qui, en bon nombre d'endroits, ont été convertis en places d'affaires, en établissements et en centres touristiques, présentent maintenant un appauvrissement des caractéristiques naturelles de la biosphère. La pollution des eaux côtières a repoussé ses limites et, par conséquent, les mers et les océans regorgent de composés chimiques synthétiques et de produits nocifs de toutes sortes.

Plus que jamais, la population humaine vit sur les terres du littoral. La pollution des eaux côtières a augmenté de façon spectaculaire et, bientôt, nous pourrions constater dans les mers et les océans les résultats des coups répétés que nous portons à la qualité de l'eau.

À force de développements et de constructions, les hommes modifient de plus en plus les caractéristiques naturelles du territoire. À l'heure actuelle, en Europe, le territoire se divise comme suit : l'agriculture correspond 47 p. cent des terres, la forêt à 36 p. cent tandis que les constructions et le développement urbain occupent 17 p. cent. Une partie du territoire est perdu à jamais pour la nature et la biosphère.

Les données qui précèdent nous amènent à la conclusion que beaucoup d'individus et d'organismes doivent apprendre et appliquer la pensée holistique et systémique. Nos expériences du passé et du présent ont des conséquences sur un grand nombre de systèmes naturels. Nous devons protéger la nature, l'espace et l'environnement contre les agissements de certains des nôtres. En fait, nous devons diffuser l'information sur la pensée holistique afin d'acquérir une méthode de réflexion plus adéquate et qui s'appliquerait aussi à nos prises de décisions ainsi qu'à nos actions. Cela s'avère indispensable afin que nous prenions nos responsabilités à long terme et que nous préservions la biosphère et toute la Terre. Sinon, nous risquons de souffrir de la « tragédie mondiale des biens communs ».

Le système de changements climatiques agit en fonction de conditions établies par les dynamiques physiques, géographiques et biologiques des environnements de la Terre. Depuis trois cents ans, pendant les périodes industrielle et postindustrielle, les hommes ont démontré par leur style de vie comment ils pouvaient influencer sur leur environnement naturel d'une façon constructive ou destructrice. Ils ont franchi les limites des conditions de vie durables et ont causé des dommages à long terme à la biosphère de notre planète. Dans notre livre *Systèmes de pensée et système de changements climatiques*, nous en arrivons à la conclusion que la présence humaine – tant à l'échelle individuelle qu'organisationnelle – se fait sentir sur la biosphère de la Terre et que les répercussions touchent tous les niveaux : individuel, local, régional, organisationnel, national, international, continental, mondial et peut-être même



universel. Le problème qu'il reste à résoudre est de savoir comment les hommes assumeront leurs responsabilités à long terme d'une manière systémique et plus efficace. À cet égard, il faut prendre en compte la possibilité de mesures politiques. Il serait opportun de penser que l'ère de la mondialisation exige une nouvelle approche.

Comme partie intégrante de la biosphère, le système de changements climatiques n'en est pas l'élément constituant, mais il est plutôt le fabricant, le dépositaire, le fournisseur et le gardien des conditions de vie. Les hommes devront trouver une nouvelle avenue vers un avenir viable. Les liens qui uniront les hommes et la planète Terre émergeront de toutes nouvelles conditions, dont le fondement sera l'harmonie entre les hommes et la nature de leur planète.

Dans tous les domaines de la connaissance, des sciences, de la recherche fondamentale et appliquée, de la société, de la gouvernance, de l'économie, des institutions nationales et internationales, tous doivent adopter une vision plus large sur l'évolution de notre biosphère et faire face adéquatement aux nouveaux défis.

La pollution actuelle (à l'échelle mondiale) causée par les produits chimiques synthétiques, par la technologie nucléaire, par les CFC, par les pesticides, par les manipulations génétiques et par les hormonoïdes, tous issus de la production chimique synthétique, de la production de médicaments, de l'impact de la technologie, des moteurs à combustion, de l'industrie du transport, de l'armement, des PCB et de leurs effets sur la structure génétique, pour ne nommer que ceux-là. Toute cette pollution, donc, n'est qu'un aperçu et ne fait que refléter nos actions et notre mode de pensée à court terme. Si nous voulons hériter d'un avenir viable, nous devons nous sentir responsables des impacts de notre civilisation sur la biosphère.

Nous venons de définir les conséquences d'une réglementation orientée vers le profit. À défaut de connaissances adéquates et d'une pensée holistique, nous comprenons à peine les dommages réels que nous causons avec nos sous-produits. La raison principale de la pollution mondiale demeure notre besoin de faire des profits avec les PCB, les CFC, les pesticides, les matières plastiques, etc. La production, la promotion et la mise en marché de ces produits ont fini par causer des dommages à notre propre espace vital et à notre environnement : l'accroissement explosif de la population et la pollution de l'atmosphère.

Nous devons continuer la recherche et comprendre notre environnement afin d'assumer une responsabilité à long terme. Il nous faut mettre un terme à l'irresponsabilité des hommes, des gouvernants et des producteurs de tout acabit. Nous devons aussi cesser la course aux profits d'un système aveugle qui, faute de raisonnement, agit en irresponsable.

L'état actuel de la biosphère, de la nature, de l'espace, de l'environnement aussi bien que la connaissance et les recherches scientifiques dont nous disposons nous mènent droit vers un cul de sac. Les intérêts individuels, régionaux, nationaux et internationaux ne permettent pas à l'humanité de prendre un nouveau virage pour sa survie, car ils sont biaisés et contrôlés par des pressions sociales, financières, politiques et bureaucratiques, sans oublier la philosophie de guerre et le manque de tolérance.



Nous devons reconnaître la nécessité d'une action visant à établir une constitution mondiale, un parlement mondial et un gouvernement mondial, qui seraient notre chance de survie. Ils auraient pour tâche de coordonner les questions sociales ainsi que d'harmoniser les besoins de l'humanité, de la nature, de l'espace et de l'environnement. À l'ère de la mondialisation, nous avons besoin de renouveler nos approches et notre comportement.

La coordination des enjeux importants pour la Terre et la biosphère par un gouvernement central pourrait fournir des réponses à la recherche appliquée et nous aider à corriger notre relation avec la biosphère. Cela pourrait permettre une meilleure gestion des problèmes importants et améliorer nos chances de les résoudre. Une démocratie mondiale (et non une démocratie monétaire) visant un avenir viable pour toute l'humanité, c'est-à-dire une gouvernance mondiale, demeure une recommandation appropriée pour amorcer la mondialisation.

Nous assistons actuellement:

- à la destruction de presque toutes les sources d'eau par l'ajout de produits chimiques synthétiques et par la pollution biologique de l'eau (y compris les pluies) et de l'air;
- à la destruction de l'air par la circulation routière, maritime et aérienne;
- à la destruction de notre espace vital par la guerre;
- à la destruction de la couche d'ozone;
- à la dégradation de la fertilité des terres par les pratiques agricoles, incluant l'érosion et la désertification;
- au réchauffement de la planète et aux autres impacts subis par le système de changements climatiques;
- à l'explosion démographique de l'humanité, qui doit se plier à des changements pour amorcer une transition vers un avenir meilleur.

On ne peut faire face à ces problèmes en ne prenant que l'intérêt national en compte et en s'isolant. Ils doivent figurer en priorité dans le programme d'un gouvernement mondial.

Le système de changements climatiques, fabricant, fournisseur, dépositaire et gardien de nos conditions de vie au sein de la biosphère, exige que des recherches scientifiques spéciales soient menées et que des mesures émanant d'un gouvernement mondial soient prises à son égard. De plus, la protection de la nature, de l'espace et de l'environnement par tous nos concitoyens demande une attention spéciale semblable. Ce sont des systèmes mondiaux qui réagissent à l'étroitesse d'esprit des hommes, principale cause de l'entropie mondiale, et qui exigent une gouvernance à l'échelle mondiale utilisant une méthode de pensée holistique.

Les recherches scientifiques et appliquées requises pour faire face aux problèmes déjà mentionnés ne peuvent pas être menées sur la base des pratiques et des habiletés scientifiques actuelles à cause de l'implication des scientifiques dans le développement des armements et de l'art de la guerre et à cause aussi des exigences de la bureaucratie. Il faut donc envisager une nouvelle approche et une nouvelle orientation pour le travail scientifique, qui doit être axé



vers le développement de la connaissance et des valeurs essentielles à la sauvegarde de la nature, de la science, de l'environnement, sans oublier le système de changements climatiques.

11. La pensée holistique: une solution au cul-de-sac actuel

Le travail scientifique, source fondamentale de connaissances, exige une certaine coordination à l'échelle internationale et devrait faire partie intégrante du mode de gouvernance. Nous avons besoin de scientifiques indépendants qui sont mus par leur mode de pensée et d'agir scientifique ainsi que par leur désir de mettre leurs compétences à profit plutôt que par le souci d'obtenir une rémunération régulière versée par des bureaucrates (issus d'un système sociétal de financement démocratique) au nom d'une économie centrée sur le profit. Le système monétaire actuel est devenu son propre maître, un monstre qui gouverne le monde. Il serait bon de le ramener dans le cadre qui est le sien, c'est-à-dire au service de l'humanité. De nos jours, le profit se sabote lui-même en causant des effets secondaires qui ont des répercussions graves et qui entraînent des coûts pour l'humanité qui sont couverts, notamment, par des taxes imposées aux compagnies.

Visiblement, la responsabilité sociale ne fait pas partie de l'éthique des entreprises actuelles mais sert plutôt à mousser leur publicité. Lorsque les entreprises et les individus auront intégré la responsabilité sociale, nous pourrons enfin envisager un avenir viable.

Afin de comprendre la nécessité d'une gouvernance mondiale, les hommes doivent d'abord comprendre les systèmes dans lesquels ils évoluent, ceux dont ils sont constitués et ceux qu'ils créent. Il est important de savoir que, dans la nature, tout système restera tel qu'il est s'il en est de même pour les autres systèmes et les relations qui les unissent. Ensemble, ils constituent un système vivant qui essaie de rester un système viable. Ainsi, quand une partie importante ou négligeable du système évolue ou change, tout le système fait de même. On ne peut prédire le cap que suivra l'évolution du système. Voilà ce qu'il en est du système de changements climatiques et c'est peut-être aussi l'explication qu'on peut donner à ce que la société humaine vit actuellement.

À la limite, le système de changements climatiques pourrait changer les conditions de vie dans la biosphère et la géographie de la Terre, à tel point que notre civilisation serait sur le point de s'éteindre.

12. C'est pourquoi nous faisons les trois recommandations suivantes :

1. Une planète, un gouvernement– L'élaboration d'une constitution de la planète Terre est, bien sûr, notre première recommandation, puis après ratification, suivra la formation d'un parlement et d'un gouvernement planétaires.



2. Une nouvelle approche en ce qui concerne l'ordre social – Elle devra refléter l'expérience actuelle et engendrer un nouveau contrat social pour les hommes qui vivent sur la planète Terre. Son but est de prévenir l'explosion de la reproduction humaine, de favoriser le développement d'un sens de l'éthique et d'un sentiment de tolérance à l'égard des différents peuples, d'appliquer la loi et de faire régner l'ordre (selon une approche holistique à l'échelle du globe), et, finalement, grâce à une gouvernance avisée, de transmettre aux générations futures un avenir viable² sur la planète Terre.
3. Une réorientation du travail scientifique – Cette dernière recommandation est actuellement axée principalement sur les marchés ainsi que sur les technologies chimiques et synthétiques. Il faudra délaissier également l'industrie de l'armement et se tourner vers les systèmes globaux et viables de la nature, de l'espace, de l'environnement et du cosmos. Ce qui permettra de bien saisir dans quelle mesure ils sont autant d'éléments de connaissances essentiels pour assurer un avenir viable et la survie de l'humanité.

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- Eine wissenschaftliche Einführung -

von

J. Hamann, T. Ecimovic und M. Mulej



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Einleitung²

Weltweit haben sich Wissenschaftler mit der Lösung komplexer Probleme des Klimawandels auseinandergesetzt. Derartigen Aktivitäten kommt eine tragende Rolle im Hinblick auf das Verstehen von Änderungen in der Biosphäre zu, da es sich um die risikoreichsten Belange des 21. Jahrhunderts handelt.

Das System des Klimawandels hat als Basisfaktor der Lebensbedingungen innerhalb der Biosphäre einen weitaus bedeutenderen Einfluss, als die Menschheit sich bisher vorstellte. Für die Erdbiosphäre besitzt der Klimawandel eine zentrale Bedeutung zum Aufrechterhalten von Lebensbedingungen der verschiedenen Kreaturen. Bislang hat der Klimawandel schon zum Aussterben von kleineren aber auch größeren Tierarten geführt.

Die Erdbiosphäre beinhaltet Wechselbeziehungen zwischen Materie, Energie und Information innerhalb eines Zeitraumes und besteht aus drei Grundelementen – Wasser, Land und Luft.

Jeder Mensch sollte sich mehr Informationen über die Basiselemente der Biosphäre und die Natur aneignen, um gegenüber Klimaeinflüssen besser gewappnet zu sein.

Studien zur Risikoabschätzung wurden weder während der industriellen Revolution noch heute intensiv durchgeführt. Hieraus resultierte, dass unverantwortlich lange Zeit Bereiche wie intensive Landwirtschaft, Produktion synthetischer Chemikalien und die *Geld-Demokratie* (Gemeinschaften mit sozialer Verantwortung, nuklearen Technologien und Verbrennungsmotoren) Schadstoffe in die Natur abgegeben haben – in Seen und Ozeane, Land und Luft. Hieraus ergibt sich heute die Frage, wann und wie schädlich wird dieser risikobehaftete Eintrag für die Lebewesen der Erdbiosphäre sein. Wissenschaft und Bevölkerung sollten Wechselbeziehungen innerhalb der Umwelt besser verstehen können. ***Dann werden sie erkennen können, dass die gesamte Materie, Energie und Information eine nachhaltige Zukunft unserer Zivilisation ermöglichen.*** Es sollte das Systemdenken angewendet werden, wie z. B. die dialektische Systemtheorie (Mulej, Slovenien), um diese Aufgaben ganzheitlich und dadurch erfolgreich lösen zu können. Neuerdings betrachten Individuen aber auch Gesellschaften, Natur, Umwelt und Biosphäre als Güter zur freien Verfügung. Heute jedoch muss dies im Hinblick auf die multifaktorielle Qualität der Natur und die Einflüsse des Klimawandels komplexer gesehen werden. Durch den Klimawandel ausgelöste bedeutende Beeinträchtigungen der Gesellschaft wie z. B. unvorhergesehene Überschwemmungen, Stürme, Erdbeben, Tsunamis und Änderungen der lokalen Umwelt können negative Auswirkungen zeigen.

² Dieser Beitrag beruht auf dem Buch: „System Thinking and Climate Change System“, ECIMOVIC, MULEJ and MAYUR, 2002“.



Unsere Empfehlungen bestehen daher im Folgenden:

- Anwendung von Systemdenken, z. B. Dialektische Systemtheorie mit ihrer Verbindung zur menschlichen Arbeit und ihrer Kreativität des ganzheitlichen Denkens, der Entscheidungsfindung, der Handlungsweisen und ihren Innovationen;
- Definition der Abhängigkeit von der Natur, woraus eine bessere Beziehung zur Natur hervorgeht.

Zur Entwicklung eines besseren Verständnisses jedes Einzelnen für die Notwendigkeit einer ganzheitlichen Betrachtungsweise des Klimawandels versucht diese Schrift auf die einzelnen Komponenten des Systems Klimawandel näher einzugehen.

Beginnend mit staatlichen Bürokratieabläufen zur Regelung des Klimawandels und der Beschreibung des Klimawandels als Naturereignis in Form eines multidimensionalen dynamischen System ohne vorbestimmte Zielrichtung, über die Entstehung der Planeten Erde als einem Subsystem des Universums werden die Interaktionen zwischen Leben, Klimawandel und Biosphäre dargestellt.

Als fundamentale Komponenten werden Wasserkreislauf, Atmosphäre und unsere Zivilisation als Beispiele detaillierter erläutert.

Das Buch endet mit dem Aufzeigen von Möglichkeiten und Grenzen des erforderlichen Holismus zur Problemlösung und erörtert abschließend Folgerungen.

Staatliche Bürokratieabläufe im Hinblick auf den Klimawandel

Wir Menschen mit all unseren Vorstellungen, Religionen sowie natürlichen, sozialen und technischen Errungenschaften, Technologien, Techniken, Herrschaftssystemen, Familien und Beziehungen, denken früher oder später, wir sind Götter mit der Verpflichtung, Natur, Weltraum und Umwelt der Biosphäre zu beherrschen.

Wenn die Zeit für gemeinsame Aktionen zum Überleben unserer Zivilisation reif ist, werden Entschuldigungen für eine Nichtbeteiligung angeführt, die sich auf nationale Interessen, nationale Sicherheit, nationalstaatliches Wohlergehen, etc. beziehen. Doch dies sind alles leere Phrasen, die die Herrschenden verteidigen und sowohl Individuen oder Kollektive als auch nationale Eliten schützen. Wir glauben an die Rolle eines Führungsanspruches, doch wir glauben auch an den moderaten Lebensstil, der ein langes Leben, Toleranz, Frieden und Stabilität gewährt, weil die Natur dies erfordert.

Wie abhängig ist das heutige Verstehen des Klimawandels von anthropogenen Einflüssen? Wir vermögen das am besten mit der Vorherrschaft von nationalen/internationalen Bürokratien zu erklären. Diese sind finanziell ausreichend ausgestattet, um Wissenschaftler zu bezahlen, die dann das Erwünschte sagen und schreiben. Neuorientierung von



Wissenschaften, angewandter Wissenschaft und theoretischer Wissenschaft ist solange kaum möglich, als einseitig ausgerichtete Geschäftsleute, (ihre) Politiker und Bürokratien die Ressourcen verwalten: Sie haben zu herrschen gelernt, jedoch nicht wie man einen gesamtheitlichen anstelle eines engen einseitigen Fortschrittes in Wissenschaft und Technologie des Systems des Planeten Erde erreicht. Wie sind folgende Fakten sonst zu verstehen: Fantastische Entwicklung der Rüstung, der synthetischen chemischen Produkte, 800 Millionen und mehr Verbrennungsmotoren (für Flugzeuge, Schiffe, Boote und landwirtschaftliche Maschinen), Marketing und gewinnbringende Produkte, Transportsysteme, Förderung der Globalisierung als Element des Geldverdienens. Zudem werden Wissenschaftler nicht für wissenschaftliche Grundlagenforschung bezahlt, sodass sie notwendige Forschungsarbeiten vernachlässigen, die erforderlich sind, die Belange der Biosphäre zu verstehen. Die Biosphäre bedroht unsere Zivilisation als Folge des Klimawandels und aller vom Menschen ausgelösten Änderungen.

Die große bevorstehende „Allmendeproblematik“ wird für uns alle gemanagt, wie es aussieht.

Der Klimawandel stellt ein Makrosystem der Natur basierend auf Wechselbeziehungen von übergeordneten und untergeordneten natürlichen Systemen dar. Der Klimawandel ist nicht nur verantwortlich für unsere Zivilisations-Aktivitäten, sondern auch für Verfahren und Vorgänge anderer Natursysteme. Wenn wir den Klimawandel nicht ausreichend verstehen, können auch keine entsprechend fundierten wissenschaftlichen Studien vorgenommen werden. Dies hat nichts mit Normalbürgern zu tun, jedoch mit der Einseitigkeit der gegenwärtigen Sozialordnung und der gewinnorientierten Demokratien. Dies trifft insbesondere auf die Nationen der G8-Länder zu, die die Zivilisation anführen und internationalen wie auch nationalen Bürokratien. Ihnen fehlt es an Holismus und damit schaffen sie den Raum für die Einseitigkeit menschlicher Aktivitäten.

Nehmen wir als Beispiel die CFC (Fluorkohlenwasserstoffe), Ozon verbrauchende synthetische Chemikalien, die aus Gründen marktorientierter Studien und Gewinnaussichten produziert wurden, nicht jedoch, um positive Effekte zu bewirken. CFC führten zu Klimaänderungen, die potenziell eine totale Zerstörung unserer Zivilisation auslösen können: Dies bedeutet: **Wir haben zu lernen, wie wir uns am besten selbst verwalten.** Wenngleich es stimmt, dass die Bevölkerung ursprünglich die Seiteneffekte der CFC nicht kannte, liegt heute jedoch diese Information vor. Daher besteht keine Veranlassung mit der bisherigen Praxis der Anwendung dieser Substanzen fortzufahren, deren Einwirkung in Form von Mittel- und als Langzeiteffekten unbekannt ist. Solche Effekte können sich für genetisch modifizierte Organismus-Techniken, Kriegstechnologien, unkontrollierte Entwicklung und Anwendung von neuen chemischen Syntheseprodukten und Verbrennungsmaschinen, die derzeit die gefährlichsten Aktivitäten unserer Zivilisation ausmachen, ergeben. Hinzukommen Informationstechnologien und Energieübertragung, die magnetische Felder beeinflussen und weitere Elemente des Gleichgewichtes der Erde. Letztendlich sind hier auch



Nukleartechnologien zu nennen, die lieber hinter verschlossenen Türen bleiben, denn angewendet werden sollten, da sie zu einer Verseuchung über Millionen von Jahren führen.

Klimawandel – ein Naturereignis auf der Basis einer dynamischen multidimensionalen Entwicklung

Das Klima oder das System des Klimawandels gehören zu den Biosphären-Systemen, die für die Aufrechterhaltung von Lebensbedingungen verantwortlich sind. Als ein natürliches System ist es kleiner als die Biosphäre, der Planet Erde, die Sonne und das Solarsystem. Später werden wir einen Blick auf separate Systeme werfen. Das System des Klimawandels umfasst zahlreiche kleinere Systeme wie: Atmosphäre, Wasser – Seen/Ozeane, terrestrische und weitere Flächen, die zur Biosphäre gehören. Alle diese genannten Systeme besitzen weitere kleinere Systeme, die zusammen die Gesamtheit der Biosphäre ausmachen. Diese Systeme sollten als sich bewegende, unabhängige, interagierende, dialektische und dynamische Systeme aufgefasst werden, die sich laufend weiter entwickeln. ***Die Entwicklung folgt ausschließlich einer dynamischen multidimensionalen Richtung.*** Für einen nicht speziell interessierten Betrachter mag sich die Natur wie ein Chaos darstellen. Wie jedoch der späte Prof. Dr. Helmut Metzger in seinem Buch „Chaos to Bios“, schrieb, die Natur mag uns Menschen als Chaos erscheinen, doch mögen unsere Errungenschaften der Natur wie Chaos vorkommen und nicht wie eine Ordnung, wie wir glauben. Ganzheitliches Wissen und Ethik müssen darüber entscheiden, was richtig oder falsch ist.

Die bedeutsamste Zweckbestimmung des Systems des Klimawandels besteht in dem Aufrechterhalten von Energiegleichgewichten, mittleren Temperaturen, Feuchte/Wasser-Kreislaufsystemen, Zusammensetzung der Troposphäre, Atmosphäre und Ozeanströmungen. Zahlreiche weitere involvierte Subsysteme werden später erklärt werden.

Das System des Klimawandels kann definitiv nicht mit einem oder zwei der derzeitig bekannten wissenschaftlichen Disziplinen definiert werden. Hingegen sollte ein entsprechender wissenschaftlicher Denkansatz ganzheitlich, überdisziplinär und multidisziplinär ausgelegt sein und von einem Team von Wissenschaftlern bearbeitet werden, die ein gemeinsames Ziel verfolgen. Offensichtlich benötigen Wissenschaftler Techniken der Systemtheorie, des Systemdenkens, von Analyse und Synthese, des Lösens komplexer Probleme sowie Fallstudien, um erfolgreich die Erforschung der Natur bearbeiten zu können.

Supradisziplinarität im Bereich unserer Wissenschaft ist unter naturwissenschaftlichen Gesichtspunkten eine Voraussetzung für den Einzelnen, die interaktiven Probleme der komplexen Systeme zu verstehen. Die supradisziplinäre Forschung steht oberhalb der klassischen Wissenschaftsdisziplinen, zumindest insoweit, als es das Verstehen der Notwendigkeit von Forschung mit dem Ziel angeht, Systemabläufe unter regulären und anderen Bedingungen zu erfassen. Systemabläufe stehen in Wechselbeziehungen zu dem System als solchem und seinen kleineren und größeren Systemen.



Die Lebensbedingungen sind nicht eine festgesetzte Zusammenstellung, sondern vielmehr ein System bzw. eine Gesamtheit von Qualitäten der Biosphären-Umwelt und ergeben die Voraussetzungen zum Leben überhaupt. Die Evolutionstheorie, die Gaia Theorie, die Systemtheorie, aktuelles und vergangenes Wissen und der Status der Biosphäre belegen, dass die o. a. Hypothese korrekt ist.

Der Ursprung des Systems von Klima und Klimawandel sind Kräftespiele des Planeten Erde, seiner Entstehung und Existenz als Teil der Entstehung und Existenz des Solarsystems und als Teil der Dynamik des Universums.

Das System des Klimawandels herrscht über den Lebensstatus auf dem Planeten Erde, nicht auf Anordnung, sondern durch Integration, Abhängigkeiten, Wechselbeziehungen, Interaktionen, Kooperationen, Einwirkungen und Konsequenzen des Systems der Dynamik. Hier mag man zur Rolle der Menschheit bzw. jetzigen Zivilisation auf das System des Klimawandels Stellung nehmen, die als Auslöser des Systems der Dynamik aufgrund von menschlichen Aktivitäten beschrieben werden kann. Einer dieser auslösenden Effekte bestand in der Entdeckung und Nutzung von CFC und ähnlichen chemischen Substanzen, die zu Verschiebungen in höhere Schichten der Atmosphäre führen können. Ein weiterer Effekt bezieht sich auf das Chlor-Ion, das Ozon trivalente Sauerstoffmoleküle in Sauerstoff umsetzt. Die Zerstörung der Ozonschutzschicht war das Ergebnis der vom Menschen eingeführten, kommerziell interessanten, chemischen Produkte auf der Basis von CFC's.

Kurze Historie des Planeten Erde als ein Subsystem des Universums

Der Planet Erde erschien erstmalig ungefähr vor 4,5 Milliarden Jahren (4,500,000.000). Zu dieser Zeit handelte es sich bei der Erde um einen Ball voller Energie und Gasen mit einer Temperatur von ungefähr 7000 °C. Innerhalb von Millionen Jahren kühlte der Planet ab und die feste Materie wurde innerhalb von zweihundert Millionen Jahren gebildet. Für die ältesten Felsen der Erde wurde ein Alter von 4,3 Milliarden Jahren ermittelt.

Der Planet Erde ist ein kleineres System im Vergleich mit dem Sonnensystem, der Milchstraße und dem Universum.

Das Universum ist das größte und komplexeste aller Systeme, die von Menschen erforscht werden mögen. Es besteht aus der Gesamtheit von Energie, Materie, Information³ und allem Licht und weiteren Formen von Strahlung, Partikeln, Lichtstrahlen, Mächten, Kräften und bisher nicht bekannten Inhalten. Das heißt, es existiert aus allem, was irgendwo vorhanden ist in Raum und Zeit (bedingte Zeit inbegriffen). Das Universum umfasst die Erde, alles auf und in der Erde und alles innerhalb des Solarsystems. Unser Solarsystem enthält neun Hauptplaneten (einen vermissten Planeten)⁴ und zusammen mit Nr. 10 und Nr. 11 als neue

³ Der Begriff Information, wie hier verwendet, ist definiert in: "The Information Theory of nature, and ...", book by Timi ECIMOVIC, 2006.

⁴ Entsprechend der Hypothese, dass zwischen Erde und Mars ein inzwischen explodierter Planet vorhanden war.



Planeten Tausende an Kometen und kleinere Planeten, genannt Asteroide. Zum Universum zählt auch die Sonne, als der Stern, der sich umgeben von Planeten dreht.

Wenn man die gesamte heute existierende Information über das Universum gleich 100 setzt, so dürfte der Wissensstand der Zivilisation zwischen 1 und 2 Einheiten ausmachen. Wir müssen vielmehr erforschen als bisher. Natürlich sollten wir dabei nicht das System der Dynamik und Entfaltungen vergessen, die sich beide auf Bereiche außerhalb des derzeitigen Kenntnisstandes des Universums erstrecken. Zum Verstehen der ganzheitlichen Natur des Universums haben wir zu erkennen, dass die Dynamik des Universums sich in unzähligen Formen, Übergängen, Ausdehnungen, kleinen und großen Treffern, Erscheinungen und Verschwinden, multidimensionalen Werten, kleinen und großen Dimensionen und unzähligen Ereignissen und entsprechenden Reaktionen manifestiert. An zweiter Stelle nach dem Universum folgt das System Milchstraße als begrenzter Teil des Universums, in dem wir Menschen leben. Dies ist unser erstes Forschungsziel, von dem wir soviel als möglich in Erfahrung bringen sollten. Die Milchstraße besteht aus ungefähr 100.000 plus einer Milliarde und mehr Sternen als System gleich welcher Form, unzähligen Planeten, Mikroplaneten und Asteroiden und allen anderen Formen an Energie, Materie, Information, Licht, Partikeln, Strahlen, Mächten, Kräften und zudem bisher unbekannten Inhalten jedweder Art.

Die Zusammensetzung der Erde als einem Planeten innerhalb unseres Sonnensystems ist einzigartig, aufgrund von Information, Materie und Energie während ihrer Entstehung. Jedwede existierende Form während der Entstehung ist in dem Erdsystem vorhanden. Ferner weitere Formen des Universums wie Licht, Partikel, Strahlen, Materie und Energie, die von der erstmaligen Erscheinung bis heute mit der Erde kollidierten. Haupteinflüsse auf die Erddynamik entstammen dem permanenten von der Sonne ausgehenden Energiezufluss und der Kollision mit Asteroiden, die aus dem Weltraum die Erde erreichen. Es erscheint bedeutsam, diese Kenntnisse zu besitzen, die unterstützend wirken können im Rahmen der Erforschung des Systems des Klimawandels. Das System des Klimawandels wird vom Weltall durch Asteroide und andere gefährliche Kollisionen beeinflusst. Imbalancen des Planeten Erde aber auch des Systems des Klimawandels können eintreten.

Aus der Vergangenheit können wir anhand einer Vielzahl von Beispielen erkennen wie das System des Erdklimawandels mit dramatischen Änderungen der Lebensbedingungen für den Menschen reagiert hat. Diese Zeitperioden wurden als Eiszeiten benannt, in denen eine abnehmende Temperatur für Land und Ozeane auftrat. Natürlich sollten wir hierbei nicht vergessen, dass Landmasse und Salzwasser entsprechend ihren Fähigkeiten auf die Temperaturänderungen unterschiedlich reagieren. Die Landmasse reagiert schneller als das Salzwasser. Demzufolge hat sich das Leben auf dem terrestrischen Anteil der Erde (ungefähr 30 % der Erdoberfläche) stärker geändert als das in den Ozeanen.

Wechselbeziehungen, Interaktionen und Kooperationen von Leben, Klimawandel und Biosphäre



Wechselbeziehungen, Interaktionen und Kooperationen von Leben, System des Klimawandels und Biosphäre sind dynamische Faktoren für die Entwicklung von Lebensformen und entsprechenden Umweltbedingungen. Die ursprüngliche Erde vor ungefähr 4,5 Milliarden Jahren war ohne Leben und ohne jeden heutigen Zivilisations-Standard. Die Luft war sauerstofffrei und zahlreiche heute bekannte Subsysteme des Systems des Klimawandels bestanden nicht. Das System des Klimawandels entwickelte sich entsprechend den Teilen, Komponenten und Beziehungen des Systems, wie es auch heute abläuft.

Der Beginn des Lebens auf der Erde spiegelt die Bedingungen der ursprünglichen Oberfläche und ihre physikalischen und sonstigen Verhältnisse wider. Die Entwicklung des Lebens auf der Erde dauerte ungefähr 0,7 Milliarden Jahre. Der erste Nachweis für Leben ist 3,8 Milliarden Jahre alt. Ausgehend vom mikrobiologischen Leben der Ursprungszeit bis zur Entwicklung der komplexen Biosphäre ungefähr vor 1,2 Milliarden lag eine Zeitspanne der Entwicklung der Biosphäre. Die erste biosphärische Übertragung von anaerober zu aerober Energieproduktion durch Mikroben war der Beginn für die Änderung der Atmosphäre von Sauerstofffreiheit zu Sauerstoffanreicherung. Zu Beginn lag der Sauerstoffgehalt der Luft bei 40 %, jedoch mit der Zeit erfolgte eine Absenkung auf 21 %. Diese Konzentration entspricht der zum Ende des 19. Jahrhunderts.

Der Sauerstoffgehalt war die größte Verbesserung der Lebensbedingungen, die die Differenz ausmachte zwischen der Urzeit und der Zeit der Biosphäre, d. h. der Zeitspanne von vor 1,2 Milliarden Jahren bis zur heutigen Zeit. Die Sauerstoffkonzentration in der Atemluft von lebenden Kreaturen sollte nicht unter 8 % fallen, da dies die Grenzkonzentration zum Überleben darstellt. Zurzeit kann es passieren, dass in völlig überbevölkerten Mega-Städten die Sauerstoffkonzentrationen gerade oberhalb von 10 % liegen. Wir empfehlen deshalb, die Sauerstoffkonzentrationen als eine Vorsichtsmaßnahme zum Überleben von Menschen gerade in Megastädten laufend zu kontrollieren.

Die ersten Siedlungen unserer Zivilisation wurden ungefähr vor 14000 Jahren als ein Ergebnis der Verbesserung des sozialen Lebens der Vorzeitmenschen erstellt. Die ersten europäischen Siedlungen entstanden aus Sicherheitsgründen in Moorgebieten mit einer Gesamtpopulation von ungefähr 10000 Menschen. Diese Entwicklung war das Ergebnis der veränderten Bedingungen innerhalb der Biosphäre, die sich nach der letzten Eiszeit, die vor 60000 bis 16000 Jahren endete, einstellte. Seitdem waren die Bedingungen des Systems des Klimawandels auf der Erde den Heutigen nahezu qualitativ gleichwertig. Natürlich kamen Änderungen vor, jedoch nicht in der extremen Weise, wie sie heute beobachtet werden. **Die Differenz von heute zu der Situation von vor 200 Jahren ist ein Ausdruck des extremen Eintrags unserer Zivilisation in die Biosphäre:** z. B.: Alle Arten von Abfall, Nebenprodukte der Nukleartechnik, synthetische Chemikalien, rasche Bevölkerungszunahme mit ihren Konsequenzen der Zerstörung der Biosphäre durch die Art und Weise der Bedürfnisbefriedigung von Menschen. Kurz gesagt, wir werden die o. a. Aspekte näher



beleuchten, mit ihren Gründen und Einflüssen, die als Konsequenz verursachen, dass die Zivilisation Klimaänderungen auslöst.

Das System des Klimawandels ist eine natürliche komplexe Gesamtheit. Es besteht einerseits aus zahlreichen Subsystemen und ist andererseits selbst ein Subsystem von Systemen wie Erde, Solarsystem, Milchstraße und Universum. Es ist sehr alt und hat sich fortwährend geändert und damit ziemlich stabile Voraussetzungen für unterschiedliche Lebensformen ermöglicht. In dem jetzigen System des Klimawandels traten häufig extremere Änderungen sowohl über die letzten Jahrhunderte der Industrialisierung als auch in der Zeit der Postindustrialisierung auf, als sie jemals zuvor seit Ende der letzten Eiszeit beobachtet wurden. ***Wir Menschen sind nicht die alleinige Ursache dieser gefährlichen Entwicklung, obgleich ein wesentlicher Teil, besonders dann, wenn unsere Entscheidungen und Maßnahmen sich nicht auf ein systemisches bzw. ganzheitliches Denken beziehen.***

5.1. Das System des Klimawandels als integraler Bestandteil der Erdbiosphäre

Wie zuvor bereits erwähnt, enthält das Universum jegliche Materie, Energie, Information, Partikel, Strahlen, Mächte, Kräfte und bisher unbekannte Inhalte. Auf das System des Klimawandels auf der Erde kann das Universum dramatische Einflüsse ausüben, im Falle von katastrophalen Änderungen das Solarsystem beeinflussen und bei Kollisionen der Erde mit Weltraumkörpern die Existenz der Erde infrage stellen. Derartiges trat auf und kann und mag sich wiederholen. Es besteht z. B. die Hypothese, dass eine Kollision der Erde mit einem kosmischen Meteoriten ungefähr vor 65 Millionen Jahren dazu führte, dass die Dinosaurier ausgelöscht wurden.

Das größte und überlegenste System der Natur besteht im Universum. Die Wahrscheinlichkeit einer die Erde zerstörenden Interaktion mit dem Universum ist sehr gering. Der Grund hierfür besteht darin, dass eine Vielzahl von Sternsystemen und anderen Formen innerhalb des Universums vorliegen, sodass die Erde nur eine geringe Chance hat, durch Universum-Aktivitäten zerstört zu werden. Zudem stellt die Erde auch nur einen sehr kleinen Teil des Universums dar.

Das Solarsystem ist unter den Aspekten unserer Zivilisation ein besonders großes System, doch ein sehr Kleines im Vergleich zur Milchstraße und noch weitaus kleiner als das Universum. Die Sonne mit ihren neun Planeten stellt ein kleines Subsystem der Milchstraße dar. Die Milchstraße besteht aktuell aus Hunderttausenden von Sternsystemen und unser Sonnensystem ist nur eines davon.

Die Sonne ist der zentrale Stern des Solarsystems und besitzt 99,8 % der Masse des Solarsystems. Die Sonne ist das Zentrum dieses Systems und die Quelle aller Energie, Materie und Information dieses Systems. Im Vergleich zur Milchstraße ist es allerdings ein



untergeordnetes System, da diese eine um mehr als 100.000 Milliarden Mal größere Masse aufweist als das Solarsystem. Das Solarsystem umkreist das Zentrum der Milchstraße mit einer Geschwindigkeit von ungefähr 250 km pro Sekunde.

Für das System des Planeten Erde ist die Sonne die Quelle jeglichen Geschehens von Anbeginn des Planeten, da wir nur existieren, weil die Sonne uns mit Energie, Wärme, Licht und allen anderen wichtigen Dingen, wie physikalischen und weiteren Komponenten und wechselseitigen, interagierenden und kooperierenden Vorgängen versorgt. Das System unseres Planeten ist vollständig von der Sonne abhängig. Unsere Gegenwart spiegelt physikalische, geografische und biologische, etc. Zustände wider, die derzeit vorliegen.

Natürlich wird der Gesamteinfluss des Solarsystems nicht allein durch die Sonne verursacht, sondern auch durch eine Anzahl von wechselseitigen, interaktiven und kooperierenden Beziehungen zwischen benachbarten Planeten, planetenähnlichen Körpern von unterschiedlicher Größe, dem Mond und weiteren Formen an Energie, Materie, Information und natürlichen Kräften. Der am nächsten liegende Planet ist Venus, der äußerste Planet ist Mars. Zusammen mit Merkur ergeben sie die Erdplaneten des Solarsystems. Die weiteren vier Planeten Jupiter, Saturn, Uranus und Neptun sind gasförmige gigantische Planeten des äußeren Teils des Solarsystems. Der noch zu benennende Planet ist Pluto, mit seiner ovalen Erdumlaufbahn, die ihn manchmal vor Neptun stellt, jedoch ist er die meiste Zeit der am weitesten von der Sonne entfernte Planet. Erst kürzlich wurden zwei neue Planeten in der Nähe zur Sonne, jedoch hinter Neptun, entdeckt.

Das Solarsystem ist stabil, sodass qualitative Änderungen dieses Systems das gesamte System betreffen. Die bedeutsamsten Anteile des Sonnensystems sind der Energiefluss von der Sonne zu den Planeten und die Qualität jedes einzelnen Planeten. Nicht nur die Zusammensetzung des einzelnen Planeten, sondern auch sein Abstand von der Sonne sind die bestimmenden Faktoren für die Qualität des Solarsystems. Licht- und Wärmeströmungen von der Sonne ermöglichen Leben auf der Erde. Beides, die Qualität des Sonnensystems und die einzigartige Zusammensetzung bzw. Entfernung von der Sonne stellen unabhängige, interagierende und kooperierende Anteile dar, die das Leben auf der Erde unterstützen.

Versteht man viele Kräfte der Natur wie gravitationsbestimmte und magnetische, Energie, Materie und Informationsübertragung, Strahlungen, Partikel etc., Planeten – und Universumbewegungen, so sind Solarsystem, Sonne und Planeten unter Einschluss der Erde wichtig und ergeben zusammen integrale Charakteristiken, Wechselbeziehungen, Interaktionen und Kooperationen des gesamten Systems.

Die Sonne hat einen um 109- fach größeren Durchmesser als die Erde und einen 400-fach größeren Durchmesser als der Mond. Alle 9 (11) Planeten und sonstigen Elemente des Solarsystems umkreisen die Sonne. Die Sonne und übrigen Planeten bewegen sich wie ein Kreisel und rotieren alle zusammen innerhalb der Milchstraße. Die Gesamtheit dieser



Bewegungsabläufe sollte intensiver erforscht werden, um diese Basiskräfte und daraus resultierenden integralen Wechselbeziehungen, Interaktionen und Kooperationen zwischen den Elementen des Solarsystems besser zu verstehen. Das Solarsystem wie auch alle anderen Systeme sind funktionsfähig auf der Grundlage der ihnen zugeordneten Systeme⁵ bzw. der Gesamtheit an Parametern. Unsere Zivilisation hat die Möglichkeit der Entdeckung, der Erforschung und des Verständnisses für die Natur und unserer Existenz.

Die Entstehung des Planeten Erde liegt 4,5 Milliarden Jahre zurück. Zu jener Zeit lieferte die Sonne Energie und Materie zur Gestaltung ihrer Subsysteme, Planetensysteme und weiterer Strukturen. Die Erde erschien als eine gasförmige Masse, die als Kreisel rotierend und die Sonne für einige Hundert Millionen Jahre umkreisend, die Formgestaltung des Planeten einleitete. Die Zusammensetzung der Erde bei ihrer Entstehung, ihre Entfernung zur Sonne und ihre integralen Wechselbeziehungen, Interaktionen und Kooperationen innerhalb des Solarsystems haben die Erde während 4,5 Milliarden Jahren erschaffen.

Das Planetensystem Erde

Das Planetensystem Erde ist sehr robust. Der innere Kern hat einen Durchmesser von 2300 km und besteht aus Eisen und Schmelzmetallen, der Durchmesser des äußeren Kerns weist 2150 km auf, der der unteren Hülle 2150 km, der der oberen Hülle 615 km und der Durchmesser der Erdkruste beträgt zwischen 3 und 70 Kilometern.

An der Oberfläche der Erdkruste finden permanent dynamische Änderungen aufgrund natürlicher Kräfte, die auch für die Gestaltung der Erdkruste verantwortlich waren, statt. Die Atmosphäre bedeckt, schützt und vervollständigt die Biosphäre des Planeten bis zu 1000 Kilometern. Dann mündet die Exosphäre in den äußeren Weltraum. Die wichtigsten Subsysteme der Erde sind folgende Planetenelemente: Mond und Atmosphäre. Ihr gesamtes Planetensystem beträgt 12300 km im Durchmesser. Die Erde hat den fünft größten Durchmesser, wobei der Jupiter der größte ist (11 Mal größerer Durchmesser als die Erde) und Pluto⁶ den geringsten Durchmesser aufweist mit einem Fünftel des Erddurchmessers.

Die Oberfläche der Erde bildet zusammen mit der Atmosphäre ihre Biosphäre, in der wir leben und wo das Leben einen Teilbereich des Systems seit mehr als 3,8 Milliarden Jahren ausmacht. Zu jener Zeit trat historisch gesehen auch erstmalig mikrobiologisches Leben auf der Erde auf.

⁵ Wir verwenden SYSTEM anstelle von GRUPPE, da in der Systemtheorie ein System aus zwei Gruppen im mathematischen Sinne besteht: zum einen der Gruppe seiner Elemente und zum anderen der Gruppe an Beziehungen zwischen ihnen (und ihrer Umwelt), sodass sich synergistische Attribute für das gesamte System ergeben, wenngleich nicht für die einzelnen Elemente. Folglich würde die Bezeichnung Gruppe nur die traditionelle Übersicht zu Beziehungen und ihre ausschlaggebende Bedeutung umfassen.

⁶ Zwei neue äußere Planeten sind der Größe nach den Autoren nicht bekannt; ferner ist der vermisste Planet hinsichtlich seiner Größe nicht in das jetzige Sonnensystem einzuordnen.



Von allen das Leben ermöglichenden Faktoren auf der Erde stellt Sauerstoff den wichtigsten Faktor dar. Sauerstoff bildet:

- Zwei anorganische Oxide, Wasser und Kohlenstoffdioxid, die das Leben ermöglichen und
- Atmosphäre mit Sauerstoffmolekülen in der Atmungsluft und
- Die Ozonschicht als Schutz vor UV-Strahlen.

6.1. Entstehung von Leben auf der Erde

Der Äußere das Leben fördernde Teil auf der Erde ist der Eintrag von Licht und Wärme durch die Sonne. Dies wird dadurch ermöglicht, das die Erde⁷ aktuell eine angemessene Entfernung von der Sonne hat, wodurch Leben auf der Erde unterstützt und nicht verhindert wird, was jedoch für die Nachbarplaneten Venus und Mars zutrifft.

Die einzigartige Zusammensetzung des Planeten Erde und seine Distanz von der Sonne ergeben die beiden Hauptfaktoren, die in Verbindung mit der Entwicklung des Solarsystems auftraten und die das Entstehen von Leben ermöglichten und es sich bis heute entwickeln ließen.

Die Oberfläche der Erdkruste besteht aus einem terrestrischen Anteil, der rund 30 % der Oberfläche ausmacht und aus Ozeanen und Meeren, die die restlichen 70 % bedecken. Das Verhältnis von Wasser und Land wurde geändert und wird sich in Abhängigkeit von der Dynamik der Erdoberflächenentwicklungen weiter ändern. Mit dem ersten Vorkommen von Wasser auf der Erde kam der entscheidende Faktor für die Bildung von Oberfläche und Atmosphäre zum Tragen.

Nach dem Abkühlen war die Atmosphäre dicht und viel geringer als heute. Die Uratmosphäre war sauerstofffrei. Eine große Änderung trat mit dem ersten Aufkommen von Leben ein, das aus anaeroben Mikroorganismen bestand, die keinen Sauerstoff benötigen. Sie erhielten den benötigten Wasserstoff für die Synthese verschiedener organischer Kohlenstoffverbindungen von gelösten anorganischen Kohlenstoffverbindungen. Es dauerte Hunderte von Millionen Jahren bis die Anaerobier eine Änderung der Urerde vom anaeroben in den aeroben Status herbeiführen konnten. Ihr bedeutsamster Beitrag bestand in der Ableitvorrichtung von Kohlenstoffdioxid, indem ihre toten Zellen zu Sedimenten auf dem Grund von Ozeanen wurden. Dort wurden sie in verschiedene Kohlenstoffverbindungen umgewandelt, die wir heute als fossile Brennstoffe bezeichnen. Dies war die Zeit der ersten Energietransformation, während heute die gleichen Bakterien Zuckermoleküle derart umwandeln, dass zwei Energieeinheiten aus einem Zuckermolekül hervorgehen.

Die nächste Generation der Mikroben konnte Wassermoleküle mithilfe des Sonnenlichtes spalten und verwendete den freigesetzten Wasserstoff um Kohlenstoffdioxide zu reduzieren.

⁷ Die Erdposition liegt innerhalb des Solarsystems auf einer das Leben förmernden Umlaufbahn



Durch diese Fotosynthese entstand eine mächtige Biomasse. Als Endprodukt aus diesem Prozess ging molekularer Sauerstoff hervor, der jedoch für die lebenden Kreaturen giftig war. Hierdurch änderte sich das Leben vollständig und die neue Generation von Mikroben konnte Sauerstoff verwenden, indem ihre Oxidation der Biomasse über die Atmung erfolgte. Dies war der erste Energieübertrag auf der Erde, da mit einer derartigen Transformation der Zuckermoleküle diese Mikroben 36 Energie-Einheiten oder 18-Mal mehr im Vergleich zu den anaeroben Mikroben erzielten.

Kohlendioxid war ein Bestandteil des Wassers aufgrund seiner Löslichkeit, und Sauerstoff, nicht löslich in Wasser, wurde zu einem wesentlichen Bestandteil der Atmosphäre. Die Konzentration von Sauerstoff in der Atmosphäre stieg an, änderte sich und stabilisierte sich dann bei 21%, der Stickstoffgehalt betrug 78% und die restlichen 1 Prozent verteilten sich auf Kohlenstoffdioxid, Methan und weitere gasförmige Elemente. Mit dem Auftreten von Sauerstoff in der Atmosphäre und dem Einfluss der Sonnenstrahlung erfolgte die Spaltung des Sauerstoffmoleküls in elementaren Sauerstoff. Hierdurch entsteht in den oberen Schichten der Atmosphäre dreiwertiger Sauerstoff, das Ozon. Mit der Zeit bildete Ozon einen UV undurchdringbaren Schirm oder besser eine Ozonschutzschicht gegen solche Sonnenstrahlen, die für den Abbau der Dioxid-Moleküle verantwortlich waren, die UV-Strahlen. Die Biosphäre der Erde erwiderte dies mit einer Entwicklung des Lebens, ihrer Intensivierung und Übertragung von Wasser auf die terrestrischen Anteile der Erde.

Das bakterielle Leben verbreitete sich auf dem terrestrischen Teil der Erdoberfläche und bildete auf der Erdkrustenoberfläche eine kohlenstoffreiche Schicht aus, die wir heute vermutlich als Boden bezeichnen. Das Erdsystem strukturierte sich weiter bis zu einem Stadium, in dem komplexe Lebensformen entstehen konnten. Dies geschah ungefähr vor 700 Millionen Jahren und Landwirbeltiere entstanden ca. vor 350 Millionen Jahren. Die Vorfahren des Menschen sollen vor 8 Millionen Jahren existiert haben, die Vorfahren des Homo sapiens hingegen gibt es erst seit einigen 100.000 Jahren.

Heute bedeutet das – wir haben das Universum, die Milchstraße, das Solarsystem, das System des Planeten Erde und einen Lebensraum mit terrestrischen und wässrigen Anteilen der Erdoberfläche wie auch in der Atmosphäre. Mit den vorhandenen Eingabe/Ausgabe-Effekten übergeordneter Systeme, insbesondere dem Solarsystem, mit den entwickelten Anteilen des Erdsystems, etc. wurde das System des Klimawandels zum Unterstützer, Auslöser, Bewahrer und Wächter der Lebensbedingungen innerhalb der Biosphäre.

Erfordernis von Ganzheitlichem- und Systemdenken

Systemdenken, Synthese, Analyse, Lösung komplexer Probleme, Fallstudienansätze, klassische Wissenschaft, Forschung und Lernen, Lernen und wiederum Lernen sind die Voraussetzungen, um sich die Kenntnisse über die Natur zu erschließen. Hierin besteht das bedeutsamste Ziel von Wissenschaft und Erfolg unserer Zivilisation. Die Voraussetzung für



eine nachhaltige Zukunft steht in direkter Beziehung zur Fähigkeit des Menschen, diese Zielsetzung mit Hilfe von interdisziplinärer Forschung zu unterstützen.

Historie und Status des Systems können bekannt sein, auch die nahe Zukunft im Falle von Kontinuität, jedoch kann eine Vorhersage über die Zukunft nur dann getroffen werden, wenn ein stabiler Status des Systems vorliegt.

Zwar hatten wir für 10000 Jahre Stabilität, jedoch aktuell nicht mehr aufgrund der Destabilisierung des Systems des Klimawandels. Wegen des Auslösens von Effekten durch unsere Zivilisation und die darauf folgenden natürlichen Reaktionen ist es derzeitig nahezu unmöglich, irgendeine bedeutsame Information über die zukünftige Entwicklung der Biosphäre vorherzusagen.

Diese beschriebenen Tatsachen bedeuten allerdings nicht, dass von Menschen keine Beeinflussung auf das System des Klimawandels ausgeht. Menschen initiieren Auswirkungen, deren Umfang entscheidend von ihrem Denken und Verhalten abhängt.

Unsere Einseitigkeit ist ganz natürlich und gleichermaßen gefährlich zur gleichen Zeit, was potenziell zu unserer eigenen Auslöschung führen kann. Als Vorbeuge sollten wir uns daher besser mit Gedanken wie dem sogenannten ganzheitlichen bzw. Systemdenken auseinandersetzen. Tab. 1 fasst die Basiselemente eines derartigen Systemdenkens zusammen (Mulej, „The Dialectical Systems Theory“, 2002).

**Tab. 1: Die sieben Basisgruppen der Bezeichnungen für Systeme/Systemisch/
Ganzheitlich im Vergleich mit denen des nicht-systemischen Denkens (Mulej, 2002)**

Systeme/ Denken	Systemisches/Ganzheitliches	Unsystematisches, Denken	Traditionelles
Wechselbeziehungen, Offenheit, Vernetzung	Beziehungen,	Eigenständigkeit, Geschlossenheit	Einseitigkeit,
Komplexität (plus Kompliziertheit)		Einfachheit oder Kompliziertheit	
Attraktoren		Keine beeinflussenden Kräfte, jedoch Isolation	
Auftreten, Vorkommen		Kein Ansatz für neue Merkmale	
Synergie, System, Synthese		Keine neuen Eigenschaften aus Beziehungen zwischen Einzelelementen	
Gesamtheit, Holismus,		Teile und partielle Eigenschaften	
Netzwerk, Interaktion, Wechselwirkung		Keine wechselseitigen Einflüsse	



Das System des Klimawandels stellt einen wesentlichen Bestandteil der Erdbiosphäre dar. Es bestehen keine klaren Abgrenzungen mit anderen Systemen der Natur, wie wir Menschen dies gewöhnlich denken und verstehen. Das System des Klimawandels ist vielmehr ein Anteil und ein komplexes natürliches System. Dieses löst Einflüsse und Belastungen aus, erhält Informationen, erfährt Einwirkungen von allen kleineren und größeren Systemen und reflektiert die Jetzigen – als Lebensbedingungen, wie gegenwärtig zu beobachten. Beobachter können in der Geschichte der Entwicklungen zurückblicken, jedoch aufgrund von zahllosen Möglichkeiten nicht in die Zukunft.

Der Unterschied zwischen Traditionellem und Systemdenken kann im Hinblick auf den Klimawandel wie folgt beschrieben werden:

Betrachtet man die Errungenschaften unserer Zivilisation im Hinblick auf Gebäude und Konstruktionsmodule, so sehen sie nett aus, alles scheint eine Ordnung zu haben, da Kreisbögen wie Kreisbögen aussehen, die Linienführung zeigt eine geometrische Anordnung, und die Gesamtanlagen folgen einem gewissen traditionellen Stil bzw. den Überlegungen eines Architekten. Natürlich nicht als eine ganzheitliche Norm, da z. B. der große Architekt Kataloniens, GAUDI, seine innovativen Lösungsansätze besonders für Kirchen und andere Gebäude vorstellen konnte. Auch unsere Häuser, die äußeren und inneren Gestaltungsformen, landwirtschaftliche Nutzräume, Straßen und Schienen etc. folgen einem gewissen Ordnungsprinzip, das jedoch nicht wie unberührte Natur aussieht. Derzeitige Menschen fassen demgegenüber die unberührte Natur als Chaos auf, wobei wir nicht in der Lage sind, die Sicht der Natur über uns zu verstehen. Ob der Abstand zwischen Natur und dem vom Menschen geschaffenen Ökosystem bzw. seinem Lebensstil groß oder klein ist, kann kaum beurteilt werden. Offensichtlich sind jedoch die zahlreichen vom Menschen hervorgerufenen Eingriffe und Neuerungen, die nicht der natürlichen Vorgehensweise entsprechen. Daher besteht nach konventionellem Denken das Chaos der Natur als Chaos, während unser Lebensstil als in Ordnung angesehen wird. Auf der anderen Seite mag uns das Systemdenken ermöglichen das Chaos der Natur als eine Ordnung zu bewerten und die menschliche Ordnung als eine Art von Chaos.

Wenn nicht nur Wissenschaftler, sondern auch ortsansässige, durchschnittliche Bürger diese Fähigkeit des Einsehens besitzen, wird dies zu einem weitaus natürlicherem Lebensraum als heute vorhanden, führen.

Wenn wir diese Erkenntnisse auf das System des Klimawandels übertragen, können wir das Chaos als Wechselbeziehungen und – Wirkungen sowie Kooperationen zahlreicher verschiedenartiger Systeme der Natur verstehen, die aus den Teilen des sehr komplexen Systems des Klimawandels hervorgehen. Natürlich sollten wir hierbei nicht vergessen, dass diese Vorstellungen von Menschen stammen, mit allen guten und schlechten Attributen, die Menschen besitzen.



Das System des Klimawandels stellt eine ganzheitliche Anordnung einer permanenten Entwicklung natürlicher Systeme dar, das die Biosphäre als einen Raum für lebende Kreaturen innerhalb der Natur unterstützt.

Wir haben die Abhängigkeiten des Klimawandels von seinen übergeordneten Systemen gesehen, sodass wir zuerst die Einflüsse ansprechen wollen, die von den übergeordneten Systemen auf die Biosphäre einwirken.

Alle Änderungen und Entwicklungen des Sonnensystems beeinflussen absolut die Biosphäre und den Planeten als Einheit. Sie üben einen massiven Einfluss auf die Erde aus und führen sehr wahrscheinlich auch zu erheblichen Konsequenzen. Es sollten daher verstärkt wissenschaftliche Studien durchgeführt werden, die sich im Sinne eines besseren Verständnisses mit den Effekten der Sonne auf unsere Biosphäre auseinandersetzen. Die Sonne hat den größten Einfluss auf unsere Biosphäre, da sie uns im Wesentlichen mit Licht und Energie versorgt.

Dem Mond-Erde-Gleichgewicht kommt ebenso eine große Bedeutung zu.

Die Meteoriten des Universums, die Milchstraße und das Sonnensystem wie auch andere Formen an Materie, Energie, Partikeln, Strahlungen und unbekannte Formen bzw. Kräfte und Systeme beeinflussen die Biosphäre und werden dies auch zukünftig tun. Glücklicherweise treten ihre Auswirkungen nicht sehr häufig auf.

Physikalische, geografische und biologische Attribute der Erde sind dominant wichtig. Bedingt durch permanente ganzheitliche und lokale Entwicklungen und Wechselbeziehungen sowie Kooperationen etc., haben Naturkräfte unsere Biosphäre geschaffen und halten sie auch weiterhin zusammen. Menschen können Vergangenheit und Gegenwart der Biosphäre wahrnehmen. Wir verstehen die Dynamik einiger der genannten Systeme und Kräfte, doch bei Weitem nicht alle. Unser heutiges Verständnis mangelt an Systemdenken als Möglichkeit eines besseren Verständnisses von Systemwechselbeziehungen, -abhängigkeiten und -dynamik.

Der innere Kern der Erde beträgt ca. 2300 km im Durchmesser und bewegt sich wie ein Kreisel mit unterschiedlicher Geschwindigkeit im Vergleich zu den übrigen Teilen des Planeten. Jede Änderung der Drehung und Richtung der Bewegung kann maßgebliche Einwirkungen auf das System Erde ausüben. Auch hier wird mehr Forschung benötigt, um dieses Subsystem zu verstehen und seine ganzheitlichen Wechselbeziehungen und – Wirkungen und Kooperationen mit anderen Subsystemen einordnen zu können.

Der restliche Teil der Erde, der äußere Kern, die untere und obere Hülle und die Erdkruste betragen insgesamt 4900 – 5400 km im Durchmesser. Die permanenten Änderungen der Erde haben unterhalb ihrer Oberfläche zu zahlreichen Krustenplatten geführt, die sich in dauernder



Bewegung in Abhängigkeit ihrer mächtigen inneren Kräfte befinden. Vulkanaktivitäten und Erdbeben stellen Produkte von in großem Umfang stattfindenden Kollisionen oder Teilungen dar. Beide Aktivitäten haben komplexe Auswirkungen auf unsere Biosphäre, von der lokalen verhängnisvollen Einwirkung durch Lava, Asche und Landverschiebungen bis hin zu den extremen Auswirkungen im Falle von massiven Eruptionen und intensiven Einträgen von Asche in unsere Atmosphäre. Hieraus resultieren Folgen auf die Biosphäre insgesamt.

Natürliche Kräfte wie Schwerkraft, Magnetismus, Elektrizität, etc., Kreiselbewegungen und gemeinsame Bewegungsabläufe innerhalb des Raumes von Solarsystem, Milchstraße und Universum sind extrem bedeutsam und bisher nicht völlig verstanden von unserer Zivilisation. Dies gilt gleichermaßen auch für die Partikelbewegungen und die Systemleistungsfähigkeit.

Das System des Klimawandels – Ausrichter und Bewahrer der Lebensbedingungen innerhalb unserer Biosphäre - besteht aus einer großen Anzahl von Systemen, die interagieren und ganzheitlich Wechselbeziehungen aufweisen sowie kooperieren, um das gegenwärtige System gleichzeitig weiterzuentwickeln. Bei globaler Betrachtungsweise kann das System des Klimawandels als mancherlei Modell oder Äußerung oder Variation angesehen werden, das in verschiedenen Bereichen von Temperatur, Luftfeuchte und Strömungen auftreten kann.

Die Biosphäre besteht aus terrestrischen, aquatischen und atmosphärischen Subsystemen. Ihre Merkmale bilden das Grundgerüst, innerhalb dessen das System des Klimawandels seine Rolle als Ausrichter und Bewahrer der Lebensbedingungen wahrnimmt.

Gutbekannte geografische Fakten der Erde, wie Breite, Länge und Höhe ergeben die Merkmale, die entscheidend sind für Wärme und Licht, die in Abhängigkeit von der Beschaffenheit der lokalen Umwelt reflektiert werden. Auf der anderen Seite hängt die Verteilung dieser Beschaffenheit von den Grundmerkmalen der terrestrischen oder aquatischen Umwelt ab. Wenn Unterschiede an benachbarten Umweltregionen aufeinandertreffen, ist natürlich eine komplexere Beschaffenheit gegeben. Die Berücksichtigung komplexer ganzheitlicher Wechselbeziehungen, -wirkungen und Kooperationen aller verschiedenartigen Systeme, die am System des Klimawandels beteiligt sind, stellt sich nicht einfach dar.

Von einem selektierten Gesichtspunkt aus kann das Leben auf der Erde als das wichtigste Subsystem unserer Biosphäre bezeichnet werden. Sobald die ursprüngliche Erde in der Lage war, Leben zu beherbergen, entstand auch Leben. Anaerobes bakterielles Leben in Meerwasser war als Erstes in der Lage, die gesamte spätere Entwicklung zu beeinflussen. Aufgrund der außergewöhnlichen Verläufe der Meere, gefüllt mit anorganischen Verbindungen, hatten die ersten Bakterienzellen exzellente Lebensbedingungen. Das Meerwasser schützte sie vor UV-Strahlen und die Wassertemperaturen waren sehr bakteriengerecht. Licht und Wärme der Sonne hatten eine geringere Strahlungsintensität als heute. Sämtliche Phasen des anaeroben Lebens dauerten von ihrer Entstehung vor ungefähr 3,8



Milliarden Jahren bis zum Auftreten von Sauerstoff in der Atmosphäre vor ca. 2 Milliarden Jahren. Bakterien haben die Erdbiosphäre von einer sauerstofffreien in eine sauerstoffreiche und von einer vor UV-Licht ungeschützten Umwelt in eine mit einer Ozonschicht als UV-Schutz ausgestatteten Umwelt, geändert. Sterile Landregionen wandelten sich zu mit Leben erfüllten Gegenden. Nach dem Wechsel von anaeroben zu aerobem Leben änderte sich die Biosphäre und es entstanden zahlreiche komplexe Lebensformen. Der Wasserkreislauf, der Sauerstoffkreislauf, der Kohlenwasserstoffkreislauf, der Schwefelkreislauf und Reststoffe organischer Verbindungen zusammen mit dem Leben als solchem sind zu einem ganzheitlichen Anteil der Umwelt an der Biosphäre geworden. Der fundamentale Einfluss bestand in der Transformierung von anfälligen Umweltformen in lebensbejahende Umweltsysteme, wodurch ein Schutz der Erdoberfläche gegenüber Erosionen und Konsequenzen wie Zerstörung von Land, Meeresverläufen und Luftbewegungen resultierte, die regelmäßig oder temporär auftraten. Die Biosphäre entwickelte sich und wurde zum Raum für Leben und lebende Kreaturen. Physikalische, geografische, chemische, biologische und systemisch ganzheitliche Wechselbeziehungen, -wirkungen und Kooperationen ermöglichten Leben und unterstützten es. Heutzutage können wir parallel innerhalb der Erdbiosphäre ursprüngliche Bedingungen und sich später Entwickelte auffinden. Unsere gegenwärtige Biosphäre weist zahllose biologische Subsysteme auf, die zusammen mit ihren Synergien die Kontinuität des Lebens in der Gegenwart und zahlreiche andere mögliche und geänderte Umweltbedingungen sichern.

Die terrestrischen Regionen, von den gefrorenen arktischen und antarktischen Umweltbedingungen bis zu den Tropen, sind die Heimat einer großen Anzahl von Systemen lebender Kreaturen. Sie alle haben zusammen ein komfortables Leben solange sie den systemischen ganzheitlichen Wechselbeziehungen und –Wirkungen sowie Kooperationen Folge leisten. Alle ethologischen Differenzen sind Bestandteil der Aufrechterhaltung des Austausches von Umweltmaterie, in der sich zahllose biosphärische Subsysteme gebildet haben, um das Leben aufrechtzuerhalten. Die Änderungen und Entwicklungen sind Konsequenzen von ganzheitlichen Wechselbeziehungen aller involvierten Systeme. Das Gleiche gilt für die Entwicklung der aquatischen und atmosphärischen Umweltbedingungen. ***Das biologische System ist der Moderator der Lebensbedingungen innerhalb der Biosphäre.***

Die Sonne ist der Lieferant von Energie, Licht und Wärme. Das Schutzsystem für den Planeten Erde besteht aus einer Ozonschicht in der Stratosphäre (15 – 24 Kilometer) und dem Gewächshauseffekt (die natürlichen Anteile von Kohlenstoffdioxid, Methan und Stickstoffoxid). Beide Schutzsysteme filtern bzw. transportieren Energie zur Oberfläche der Erde und zurück zum Weltraum. Die Oberfläche der Erde besteht derzeit aus einem terrestrischen Anteil von 30 % und zu 70 % aus Wasser (Meere, Ozeane). Das Energiegleichgewicht ist das Ergebnis von Eintrag und Ausgabe von Energie. Änderungen von Input und Output interferieren mit dem Energiegleichgewicht, woraus sich als Konsequenzen Erwärmung oder Abkühlung ergeben. Aufgrund der komplexen



Systemcharakteristika der Erde, wie Änderungen der Atmosphäre, Änderungen der terrestrischen Anteile, Änderungen der aquatischen Anteile, Änderungen des biologischen System auf der Erdoberfläche und vom Menschen ausgelöste Einträge, zeigen die Reaktionen von Erwärmung oder Abkühlung unterschiedliche Muster. Luftbewegungen und Meeresströmungen üben zusätzliche Einflüsse auf die Komplexität des Systems aus.

Die Energiebalance stellt das wichtigste lebensunterstützende System dar. Änderungen dieses Systems sind sehr schädlich für die Biologie unserer Biosphäre.

Änderungen resultieren in Vernichtung von Tieren, Pflanzen und Bakterien sowie neuen Lebensformen. Drastische Änderungen sind bekannt als Gletscher- oder Eiszeitperioden; in der Vergangenheit erfuhr die Erde zahlreiche solcher Ereignisse.

Fundamentale Komponenten des Klimawandels

Der Wasserkreislauf, die Atmosphäre und unsere Zivilisation können als die ausschlaggebenden Komponenten des Klimawandels bezeichnet werden. Daher werden sie nachstehend detaillierter besprochen.

8.1. Der Wasserkreislauf

Durch den Wasserkreislauf unterscheidet sich der Planet Erde von den übrigen terrestrischen Planeten Mars, Venus und Merkur. Er ist ein Teil der Biosphäre und besteht seit Entstehung der Erde. Der Wasserkreislauf ist ein Subsystem der Biosphäre, das die Grundlagen für Menge und Qualität der Biosphären-Umwelt ermöglicht. Mit der Entstehung der Erde trat, nachdem sie ausreichend abgekühlt war, Wasser als Flüssigkeit, Eis oder Gas auf. Der Wasserkreislauf nahm seine permanente Aktion und Entwicklung auf. Als ein Umweltelement hat er ausgezeichnete Fähigkeiten zu Transport und Wechselwirkungen, welche wahrscheinlich zusammen mit anderen Subsystemen: Wolkenbildungen und –Bewegungen, Blitz – oder natürlicher Energie die Entstehung von Leben begünstigten. Leben zeigte sich zuerst in wässriger Umgebung und es vergingen nahezu 2 Milliarden Jahre bis zum Auftreten in terrestrischer Umgebung. Ungefähr 97,5 % des Wassers der Erde befindet sich in Ozeanen und Meeren, während Frischwasser nur 2,5 % ausmacht: davon 68,7 % in Gletschern (welches durch den Klimawandel - Erhöhung der Oberflächentemperatur - reduziert wird), Untergrundwasser 30,1% und Dauerfrostboden 0,8 % (mit abnehmender Tendenz) sowie Oberflächen – und Atmosphärenwasser mit 0,4 %. Oberflächen- und Atmosphärenwasser bestehen aus: Seen mit 67,4 %, oberste Bodenkrume mit 12,2 %, Atmosphärenwasser mit 9,5 %, Feuchtgebiete 8,5 %, Flüsse und Bäche 1,6 % und Wasser in Flora und Fauna 0,8 %. Wasser ist jedoch eine erforderliche Beschaffenheit der Biosphäre, die als Voraussetzung für Leben gilt. Die meisten lebenden Kreaturen haben einen Wassergehalt zwischen 75 und 90 % oder höher in ihrem Körper. Wasser ist das wichtigste Transportsystem innerhalb der Zellen, Gewebe und des gesamten Körpers. Wasser ist das entscheidende Milieu für chemische



Prozesse in der Natur. Wasser ist der bedeutsamste Architekt der Natur, indem es Gebirge, Seen, Flüsse und die Erdoberfläche gestaltet.

Leben und Wasser,
Wasser und Leben,
Leben,
Wasser.

Aus dem Buch "Slovenia Yesterday, Today and Tomorrow, Water management Challenge to Slovenians in the Third Millennium" (ECIMOVIC, JAN, VRHOVSEK, Ljubljana, Slovenia, 1998, in Slovene).

Wasserströmungen der Ozeane und Meere resultieren aus Temperatur- und Salzgehaltsunterschieden, Passatwinden und ganzheitlichen Wechselbeziehungen und –Wirkungen sowie Kooperationen übriger Erdsysteme wie Schwerkraft, Erdbewegung, Luftbewegung, Energiebalance, Mond und Sonnengravitation, etc. Der gegenwärtige Status der Meeresströmungen hat eine bedeutsame Rolle für das System des Klimawandels. Änderungen innerhalb der Meeresströmungen können dramatische Konsequenzen für alle Bereiche der Biosphäre nachsichziehen. Die Tsunamikatastrophe Ende 2004 hat eindrucksvoll die Macht von Naturkräften dargestellt.

Luft und Wasser stehen permanent in einer ganzheitlichen Wechselbeziehung und zeigen dies eindrucksvoll, wenn Wasserflüssigkeit verdampft, die dann über die Luft transportiert werden kann. Wenn Temperaturen sich während dieser Prozesse ändern, (unterstützt durch Luftpartikel physikalischer oder biologischer Art), wandelt sich der Wasserdampf zu Eis und Flüssigkeit findet sich auf der Oberfläche als Niederschlag.

Die Gebirge sind die Wassertürme der terrestrischen Oberflächen und der Wald stellt sich als primärer Filter für Wasser und dessen Transport zum Untergrund dar. Flüsse bringen das Wasser zu niedrigeren Höhenlagen, wobei ihr biologisches System als zweites Filter für das Wasser wirkt. Das Flusswasser agiert als Haupttransportsystem für Mineralien von den Gebirgen und Höhenlagen zu den Tälern und letztlich zu den Meeren.

Wenn Wasser von den Gebirgslagen seinen Weg zu den niedrigeren Höhenlagen nicht findet, entstehen Seen, die dann über ihre biologische Aktivität ein Seenwassersystem ausbilden. Natürlich können Seen Flusszuläufe und –abläufe haben, jedoch ist das Seeniveau immer tiefer als der Flussauslauf. Daher stellen Seen die Wasservorräte in höheren Regionen dar.

Moore, Moorwälder und Marschland sind die besten biologischen Wasserfilter, die sich gewöhnlich im Flachland befinden und als Flussmündungsgebiete auftreten. Überall wo Wasser (frisch oder salzig) und Land zusammentreffen, finden sich die biologisch reichsten Regionen. Der Austausch von Materie auf der Erde wird durch die aktive Rolle des Wassers



als Transportsystem und die Aktivitäten von Gegenden mit biologischem Reichtum möglich, wodurch unsere Gesundheit durch Reinigung des Wassers der terrestrischen Erdoberfläche unterstützt wird.

Das Untergrundwasser transportiert Wasser unter der Erdoberfläche und ermöglicht damit die Versorgung der Wasserquellen. Es bestehen große Untergrundwasserspeicher unterhalb der terrestrischen und aquatischen Tiefpunkte, die sich hier aus Gründen der Erdkrustenbewegungen befinden. Diese Speicher als Untergrundseen sind reich an Mineralien und steril.

Die Bewegung des terrestrischen Oberflächenwassers ergibt sich aus Gründen der Höhenlage und der Gravität. Wasser hat die „goldene“ Fähigkeit sich abwärts zu bewegen (Gravität) und im Stand eine abgeflachte Oberfläche aufzuweisen. Terrestrisches, biologisches und atmosphärisches Wasser machen weniger als ein Prozent des gesamten Erdwassers aus, doch aufgrund des Wasserkreislaufs stellen sie ein bedeutsames Subsystem der Biosphäre dar.

8.2. Die Atmosphäre

Zwischen der Erde und dem Weltall besteht bis zu 1000 Kilometern eine riesige Umgebung von Gasen, Strahlen, Partikeln, Naturkräften und Kräften, die als Atmosphäre bezeichnet wird. Die ersten 10 bis 15 Kilometer stellen die Troposphäre dar, den unteren Teil der Atmosphäre. Dies ist die Wetter-bestimmende Region mit den häufigsten Luftbewegungen. Hier bilden sich Wolken und setzen sich in Bewegung und man findet lebende Kreaturen, von Vögeln bis zu mikrobiologischen Lebensformen. Die Troposphäre mündet in die Stratosphäre, d. h. 15 - 50 km von der Erdoberfläche unter Einschluss der Ozonschicht (15 -24 km). Die Mesosphäre (50 -85 km) und die Thermosphäre (85 – 400 km) enden in die Exosphäre, die wiederum einmündet in den Weltraum bis zu einer Höhe von 1000 km. Die Atmosphäre ergibt eine gasförmige Hülle der Erdoberfläche und ist ein ganzheitlicher Teil der Biosphäre und des gesamten Systems des Planeten Erde. Sie ist verantwortlich für Transport, Reaktion, Transformationen der Erdschichten für Sonnenlichtstrahlung und Wärme als auch für das Erreichen der Erde als Gesamtheit durch jedwede Strahlungen, Partikel, Weltraumkörper und Naturkräfte.

Zwei Hauptgase machen 99 % der Atmosphäre aus: Stickstoff mit 78 % und Sauerstoff mit 21 %. Wie jedes Teil der Natur ändern sich ihre Verteilung, Bewegung und Konzentration innerhalb gewisser Grenzen. Der verbleibende Anteil (bis auf 100 %) von einem Prozent steht für die natürliche Anwesenheit von Kohlenstoffdioxid, Methan, Wasserdampf, Stickstoffoxide, Argon etc. zur Verfügung. Sauerstoff liegt vor als Dioxid, Ozon, Kohlenstoffdioxid und Wasserdampf. Als Beitrag unserer Zivilisation werden *zusätzliche* Gase (Treibhausgase) in die Atmosphäre abgegeben, wie: Kohlenstoffdioxid, Methan, Stickstoffoxid, Chlor-Fluor-Kohlenwasserstoffe (CFCs), Hydrofluorcarbonate (HFCs) und perfluorierte Kohlenwasserstoffe (PFCs). Als bedeutsamste fotochemische Gase sind



Kohlenstoffmonoxid, Stickstoffoxide und Nicht-Methan-flüchtige organische Verbindungen (NMVOCs) an den Treibhausgaswirkungen beteiligt.

Die Atmosphäre als der größte Teil der Biosphäre hat die bedeutsame Funktion der Ermöglichung von Leben aufgrund seiner Konzentration an Sauerstoff, welches das lebenswichtigste Gas aller Atmosphärgase darstellt. Zum Zweiten sind der Bereich des Wasserdampftransportes, die Wolkenbildung und die Hauptaufgabe als Transportsystems des Wasserzykluses unter biologischen Aspekten wichtig.

Die Luftbewegung in dem multidimensionalen Weltraum hat reguläre und irreguläre Verhaltensmuster, wobei derzeit während des Klimawandels extreme Luftbewegungen verzeichnet werden. Die Windgeschwindigkeit innerhalb der letzten 20 Jahre wurde mit bis zu mehr als 500 km pro Stunde gemessen. Für die Biosphäre ist die Luftbewegung von großer Bedeutung als Transportsystem von Lebensformen, für die Feuchteversorgung und die lokale Wettergestaltung. Auf der anderen Seite wirkt sie antagonistisch gegenüber menschlichen Gebäuden, die gewöhnlich zerstört werden, wenn sie mit auf der Grundlage von Standards errichtet wurden, die unterhalb der Stärken von Wind, Tornados bzw. Taifunen liegen.

Der Wasserstoffzyklus war wahrscheinlich der bedeutsamste Zyklus während der ursprünglichen Epoche der Erde, da er die Bildung der Erdkruste hervorrief und die Kohlenstoffablagerungen am Grunde von Ozeanen und Meeren als auch auf der Landoberfläche. Dies ist ein direkter Eintrag bzw. Ausstoß von biologischen und teilweise chemischen Prozessen in der Biosphäre.

Kohlenstoff stellt ein gestaltendes Element der Biosphäre dar. Ein sehr rascher (weniger als ein Jahr) Austausch von Kohlenstoff findet in lebenden Pflanzen statt. Ein schneller (1 – 10 Jahre) Kohlenstoffaustausch erfolgt von den Oberflächen des Landes und der Meere. Ein langsamer Austausch (10 – 100 Jahre) ergibt sich für den Wald. Sehr langsame (> 100 Jahre) Austauschraten sind wichtig für die Biosphäre in Form von mikrobiologischen Kohlenstoffablagerungen und Kalzium-Kohlenstoffsedimenten bzw. Felsen. Aufgrund der recht langsamen Prozesse des Kohlenstoffzyklus in der Natur und den relativ schnellen Kohlenstoffeinträgen in die Biosphäre durch unsere Zivilisation ergibt sich eine Situation, in der die bestehenden Prozesse in der Biosphäre die Einträge nicht kompensieren können. Dies ist mit einer der Gründe für die globale Erwärmung.

In der Zeit vor unserer Zivilisation hatte der Schwefelkreislauf in der Natur eine geringere Bedeutung. Er hat eine wichtige Rolle innerhalb der Natur, jedoch verursacht unsere Zivilisation Schäden in der Natur durch angestiegene Mengen an Schwefel (Saurer Regen), die rasch zu einem zerstörenden Faktor wurden. Schwefel stellt insgesamt ein essentielles Element für das Leben auf der Erde dar.

8.3. Unsere Zivilisation



Sei es ein untergeordnetes oder übergeordnetes System von Biosphäre, Planet Erde, Sonnensystem oder Universum, unsere Zivilisation ist ein vergleichsweise kleines System, jedoch ein wesentlicher Teil des Ganzen. Wir diskutieren heute unsere Probleme der Natur, des Weltalls und des Umweltschutzes (Schutz gegenüber wem??), doch der große griechische Philosoph Plato hat schon vor mehr als 2000 Jahren festgestellt:

“Wenn wir immer noch wachsenden Wald in den Bergen von Attika finden, bedeutet, dass, das der gute Boden Wasser speichert und bindet, sodass die absorbierte Masse nur langsam von den Bergen freigegeben wird und die Brunnen versorgt. Jetzt aber wurden die reichen und guten Böden fortgeschwemmt, sodass nun nur die spärlichen Gerüste der Landschaft vorhanden sind, vergleichbar mit dem Körperskelett nach schwerer Krankheit“.

Die Systeme sind nicht präzise als bedeutsam und unbedeutend benannt worden. Sie sind alle Systeme und im Wesentlichen voneinander abhängig, interaktiv wirksam und kooperierend, um die gegenwärtigen Ergebnisse der Biosphäre hervorzubringen. Doch die Menschen folgen nicht den Informationen der Natur, sodass wir ausreichend über wesentliche Wechselbeziehungen und –Wirkungen sowie Kooperationen nachdenken sollten. Die Dialektische Systemtheorie könnte eine viel versprechendere Möglichkeit als die Allgemeine Systemtheorie darstellen; dieses wurde ausführlich in dem Buch „System Thinking and Climate Change System, 2002“, diskutiert.

Das System des Klimawandels als ein wesentlicher Teil der Erdatmosphäre hat einen größeren Einfluss auf unsere Zivilisation als Menschen unserer Zivilisation annehmen und glauben. In absoluten Angaben lässt sich feststellen, dass der Klimawandel als Wegbereiter, Gestalter und Bewahrer unserer Lebensbedingungen erst das Leben ermöglicht. Aber wir als Menschen versuchen zumeist das Beste in unserer Beziehung zur Natur zu tun, obwohl das von vielen nicht eingesehen wird, sodass das System des Klimawandels häufig massiv gestört wird, doch glücklicherweise nicht, soviel wie wir denken, es vertreten zu können.

Es besteht die Theorie der anthropozentrischen Beeinträchtigung des Systems des Klimawandels, die versucht die Klimaänderung mit der Zivilisation der letzten 200 Jahre - 1800 – 2000 - zu erklären. Wir werden dies diskutieren und die Wahrscheinlichkeit einer derartigen Theorie beurteilen.

Die Philosophie zu diesem Bereich wurde vor vielen Jahrhunderten festgelegt, als die Geschichte von David und Goliath aufkam. Unsere Standards lassen es für Menschen nicht zu, Davidähnliches Vermögen und Einflüsse als allgemein verfügbar anzusehen. Zudem wissen wir nicht, was wir darstellen, welches unser natürliches System ist, mit welchen Systemen wir Wechselbeziehungen bzw. Wechselwirkungen pflegen und mit welchen wir zusammenarbeiten und letztlich, wo wir hingehören. Wir wissen zwar sehr gut auch außerhalb unserer Zivilisation und Natur, Geld zu verdienen und wie wir dafür den Reichtum der Natur Nutzen können. Was bewirken unsere Einflüsse und was könnte daraus folgern? Die meisten Menschen kümmern sich nicht um diese Fragen. Wie steht es um das Leben unserer



Zivilisation auf Erden? Hierbei haben wir die größeren Kapazitäten der Biosphäre für uns als Erfolgskonzept denn als Beeinträchtigung anzuerkennen. Es ist nicht nur ein Wettstreit, sondern meistens sind es auch wesentliche Wechselbeziehungen und –Wirkungen sowie Kooperationen, welche das Leben unserer Zivilisation ermöglichen. Solange wir mit dem gegenwärtigem Denkmuster leben werden, das als ein „Straußenkopf“, und nicht als eine Langzeitverantwortlichkeit für die Beeinflussung der Biosphäre durch unsere Zivilisation angesehen werden kann, solange werden wir die Distanz zwischen unserer Zivilisation und unserer Natur bzw. Biosphäre vergrößern.

Es ist **nicht der Planet Erde**, der die Heimat unserer Zivilisation darstellt, es ist **vielmehr die Biosphäre**, die einen winzigen Teil des Planeten ausmacht. Die Verwundbarkeit dieser beiden Systeme sind zwei nicht gerade vergleichbare Belange.

Worin besteht der Status unserer gegenwärtigen Zivilisation? Sehen wir unsere Zivilisation in ausreichendem Maße ganzheitlich – als ein System? Was sind wesentliche Wechselbeziehungen und –Wirkungen sowie Kooperationen, die für eine nachhaltige Zukunft unserer Zivilisation benötigt werden? Entscheiden diese Problemkreise über Sein oder Nichtsein und sind sie nur für Wohlergehen unserer Zivilisation bedeutungsvoll und möglicherweise für ihre Existenz.

Wenn wir akzeptieren, dass der Ursprung unserer Vorfahren, dem Homo sapiens, auf einige Hunderttausend Jahre zurückzudatieren ist und die ersten Siedlungen ca. 14000 Jahre alt sind (erste Siedlungen in Eurasien) und große Kulturen (China, Indien, Mesopotamien, Ägypten, Persien) vor 7 – 3000 Jahren bestanden, können wir über unsere Herkunft diskutieren. Aber was wir unter naturwissenschaftlichen Gesichtspunkten oder biologischen Aspekten - Biologie von Biosphäre und Planeten Erde – sind, ist weder in alten Schriften noch der Philosophie unserer Vorfahren enthalten. Religionen als permanente Träger unserer Zivilisation stellen die Innovationen unserer Vorfahren dar, doch wurde der Ursprung unserer Zivilisation nie diskutiert. Ihr Schwerpunkt lag immer auf den Menschen und wie man möglichst viel von Menschen gewinnt. Leben, Ökonomie und Ideologie waren immer voneinander abhängig. Krieger, Könige, Fürsten, Demokraten der Vergangenheit (wie z. B. die altertümlichen Griechen vor ca. 2500 Jahren) und die gegenwärtigen religiösen und intellektuellen Führer, Politiker und viele andere, die selbst ernannt, gewählt oder ernannt waren, stellen Produkte ihrer Zeit dar und herrschten, wie sie herrschten. Die Stammesgeschichten, über und von Menschen, Vorgesetzten und intellektuellen Führern, beschreiben, was wir sind, jedoch diskutieren sie nicht was wir für unser Dasein tun, und was unsere Zivilisation auf die Biosphäre bewirkt.

Wenn wir akzeptieren, dass Menschen unter naturwissenschaftlichen Gesichtspunkten einen wesentlichen Teil der Erdbiosphäre ausmachen und als Teil der Natur, an der Spitze des Lebensbaumes der Erde stehen, und dann als unser Denkwerkzeug die Systemtheorie nutzen, kommen wir vermutlich zu dem Schluss, dass wir zu der Erdbiosphäre als wesentlicher voneinander abhängigem Anteil bzw. Gehalt oder lebendige Kreatur gehören.



Daher stellt unsere Zivilisation eine von vielen Lebenssystemen innerhalb der Erdbiosphäre dar, sodass wir sagen können, eine der Erdzivilisationen zu sein. Und welches sind die übrigen Zivilisationen? Wissenschaftlich gesehen mögen wir auf zahlreiche lebendige Kreaturen und große Zivilisationen hinweisen, die den Homo sapiens vielfach durch die Anzahl ihrer Mitglieder übertreffen. Unter den größten Populationen sind mikrobielle Arten zu nennen, etc. Man weiß, dass Überleben von der Verfügbarkeit an Nahrung, Wasser, Luft und Raum abhängt, doch was bisher nicht beachtet wurde, ist die durch verschiedene Arten ausgeübte Beeinflussung auf die Verfügbarkeit von Nahrung, Wasser, Luft und Raum. In der Natur sind zahlreiche Arten bekannt, die ein kurzes Leben als Individuen bzw. individuelle Repräsentanten ihrer Art haben, die jedoch schon sehr lange als Art innerhalb der Biosphäre auftreten. Klassische Beispiele hierfür sind Mikrobekulturen als Parasiten, die ihren Wirt und sich selbst zerstören, jedoch nicht als Art, sondern als vorhandene Kultur, die einen Wirt besiedelt. Dies ist eine Lebensgeschichte, eine von vielen anderen. Und die Natur hat für diese Materienübertragung innerhalb aller Bereiche des Lebens vorgesorgt. Es ist ein permanentes System der Übertragung von Asche zu Asche, nicht zum Beherrschen der Menschen verwendet, symbolisiert es den Materienkreislauf innerhalb der Biologie der Biosphäre.

Wo stehen wir selbst in diesem Zusammenhang? Die ersten vereinzelt Siedlungen entstanden dort, wo Nahrung, Wasser, Luft und Raum reichlich vorhanden waren, sodass die Siedlungen blühten. Sobald sich Siedlungen verbanden, entstanden Kulturen und Nationen. Solange Nahrung, Wasser, Luft und Raum reichlich vorhanden waren, hatte Bildung einen guten Rahmen, während sie im Falle von Mangel an Nahrung, Wasser, Luft oder Raum abnahm. Schließlich mündete unsere Zivilisation in das **Zeitalter der Globalisierung** ein und wurde unser und zugleich globaler Machthaber des Planeten Erde. Nach wenigen Tausend Jahren waren noch reichlich Nahrung und Wasser vorhanden (in den 1960-ern) und auch heute – zu Beginn des dritten Jahrtausends ist Luft reichlich verfügbar und Raum scheint es auch zu sein. Jedoch waren schon gegen Ende des zweiten Jahrtausends Nahrung, Wasser und Luft nicht mehr reichlich vorhanden, während ausreichend Raum zu bestehen schien, was jedoch in der Tat nicht weiterhin so sein wird. Kommt uns daher das Ende unserer Zivilisation entgegen?

Menschliches⁸ Aufnahmevermögen für den erforderlichen Holismus – eine ausschlaggebende Voraussetzung zur Erzielung eines akzeptablen Prozesses des Klimawandels

Diese Neuigkeit zu erzielen und Innovationen aufzuzeigen - könnte die Fähigkeit des modernen Homo sapiens sein, derartig zu denken, zu verstehen und zu lernen, wie wir unsere eigenen Zivilisationsprobleme mit erforderlichen ganzheitlichen Ansätzen

⁸ Die Philosophie eines derartigen Denkens wurde von Prof. em. DDr. Matjaz Mulej, Universität Maribor, Slowenien, definiert.



behandeln, wie z. B. für alle Menschen: ausreichend Nahrung, Wasser, Luft und Raum zum Leben. Diese Aufgabe kann besser gemeistert werden, wenn wir uns des Systemdenkens bedienen.

Das System des Klimawandels ist ein wesentlicher Bestandteil der Erdatmosphäre und hat einen vielfachkomplexen Funktionsbereich zu Zusammenhalt, Bewahren, Initiieren und für grundlegende Kontrollfunktionen unserer Lebensvoraussetzungen wie: Temperatur, Wasserkreislauf, Luft-Wasser-Bewegungen, Sicherung, Management und Regulation bzw. Kontrolle der Biologie der Biosphäre.

Das System des Klimawandels ist ein Subsystem der Biosphäre. Welche Teile der Biosphäre durch unsere Zivilisation betroffen werden, ist eine Frage, die wir auch jetzt versuchen sollten, zu beantworten.

Die Biologie der Biosphäre besitzt zahlreiche erfolgreiche Systeme, die sich in unterschiedlichen Entwicklungsstadien befinden. Das erfolgreichste und am besten entwickelte System ist das des Regenwaldes. Natürlich beeinflussen Längengrad, Breitengrad und Höhenlage der Umgebung und das Raumangebot die Bedingungen und Möglichkeiten für Entwicklungen und Ausprägungen des Lebens. An zweiter Stelle hinter diesen Bedingungen steht die Verfügbarkeit von Wasser, die häufig grundlegend verantwortlich ist für die Entwicklung biologischer Systeme. In vielen Fällen schließen biologische Grenzen von Regionen zwischen unterschiedlichen Umweltarten wie Land und Meer, Binnengewässer und Land etc. sehr erfolgreich Systeme wie Mangrovenwälder, Korallen, Küstenwasser und Ozeane etc. ein. Jedoch besteht der größere Anteil der Biosphäre aus Ozeanen und Meeren (ca. 70 % der Erdoberfläche ist Wasser, wobei 97,5 % des gesamten Wassers auf der Erde auf Ozeane und Meere entfällt) die wenig wissenschaftlich untersucht und sehr schwierig im Detail zu verstehen sind.

Der generelle biologische Kenntnisstand mag zeigen, dass das beste biologische System auf der terrestrischen Oberfläche der Erde die Wälder sind, an zweiter Stelle das Grünland und dann folgen die lokal spezialisierten Biotope wie – Moore und Marschen, Wildnis, mediterrane Gebiete, Gebirge, Subarktis, arktische und antarktische Regionen, Flüsse und Seen, Wüsten etc. Im Küstenwasser von Ozeanen und Meeren finden sich Korallen, Mangroven und zahlreiche weitere biologische Systeme, als sehr erfolgreiche Beispiele.

Alle natürlichen Systeme bestehen aus physikalischen, geografischen und biologischen Merkmalen, die die Basis für ihre Zusammensetzung ergeben, während das System des Klimawandels Verwalter, Versorger, Erzeuger und Bewahrer der Bedingungen (Wasser, Luft, Temperatur) ist, um die weitere Entwicklung zu ermöglichen. Wir können die Vergangenheit erforschen und die jetzigen Systeme betrachten, jedoch können wir nicht zukünftige Entwicklungen voraussehen, weil darin zahlreiche Möglichkeiten und Einflüsse involviert sind.



Wasser und Nahrung sind sehr stark voneinander abhängig, wenn wir die Nahrungsmittelproduktion unserer Zivilisation behandeln. Wasser stellt die fundamentale Basis der Nahrungsproduktion dar. Aufgrund von Änderungen der Biosphäre ersetzte unsere Zivilisation das natürlich für die Nahrungsproduktion zu Verfügung stehende Wasser durch Wasser von anderen Quellen wie Flüssen, Seen, Stauseen, etc. Gegenwärtig wurde durch diese Verfahrensweise das nahrungsproduzierende Umfeld artifiziellen Systemen sehr ähnlich und bewegte sich rasch außerhalb des Biosphärenrasters.

Bedingt durch die Zunahme der Nahrungsnachfrage wurden neue Gebiete erschlossen, die zuvor nicht für diesen Zweck genutzt wurden. Die artifiziellen Nahrungsproduktionssysteme wurden zu einer langfristigen Nutzung (Reaktionen in der Biosphäre brauchen Zeit, solange wie sie benötigen, da die Natur immer genügend Zeit hat oder die Natur sorgt sich nicht um die Zeit, etc.). Die Reaktion limitierte sehr stark das Produktionsvermögen, sodass unsere Zivilisation gezwungen war, neue Technologien zur Nahrungsmittelproduktion und den Schutz (nicht zu vergessen die Gründe um Profit bzw. Kapital zu erzielen) von Nahrungsproduktionssystemen zu entwickeln. Zahlreiche Pestizide wurden erfunden und dann verändert. Die Einseitigkeit des Ziels der Innovationen resultierte in Schädigungen innerhalb der Biosphäre, die weit außerhalb unseres Verständnisses liegen, im Vergleich zu dem, als wir mit der Anwendung von Pestiziden begannen. Heute sollten am besten keine synthetischen Pestizide aufgrund von Langzeiteffekten auf verschiedene Teile der natürlichen Systeme wie z. B. Wasservergiftungen, Versteppung, Produktivitätsverlust von Agrarland, Zerstörung von Genstrukturen lebender Kreaturen, etc., die natürlichen Systeme belasten.

Zurzeit gehen wir gegen eine intensive Intoxikation der Biosphäre mit Pestiziden an. Dies ist eine Konsequenz der mangelnden Beachtung sowohl von Komplexität als auch Kompliziertheit unserer (einzigen) Biosphäre.

Aufgrund des massiven Bedarfswachstums unserer Zivilisation für Trinkwasser, Industriewasser, etc. und für landwirtschaftliche und Nahrungsmittelproduktion, werden die Wasservorräte in der Natur knapp und nicht ausreichen. Zahlreiche Innovationen wurden eingesetzt, um dieses Problem zu lösen, wobei viele von ihnen eine Beeinflussung der Biosphäre mit sich brachten. Hier kann angeführt werden: übertriebene Nutzung von Süßwasser aus Flüssen und Seen, die eine Zerstörung der Untergrundwasserreserven auslöste.

Gegenwärtig gehen wir gegen ein großes Defizit an Süßwasserquellen an. Die Qualität der jetzigen Quellen ist fragwürdig aufgrund von Vergiftungen mit synthetischen Chemikalien und ihren Langzeiteffekten. Seit Kurzem wird auch der Einfluss von Hormonen und hormonähnlichen Substanzen zunehmend als bedeutsam angesehen. Heute haben wir keine Versorgung mit sauberem Süßwasser, jedoch eine Versorgung mit Süßwasser, mit einer Wasserqualität innerhalb der toxikologisch zugelassenen Höchstwerte für synthetische



Chemikalien und anderer Giftstoffe. Unter dem Gesichtspunkt der zukünftigen Wasserversorgung sieht das nicht zufriedenstellend aus.

Die Siedlungen unserer Zivilisation der jüngeren Vergangenheit und gegenwärtig (Überbelegung mit Menschen, brüchige Umweltstrukturen, Megastädte, etc.) haben zu einer Schadstoffbelastung des gesamten Wassers in derartigen Regionen geführt, eingeschlossen die Gebiete, in die das kontaminierte Wasser fließt. Aktuell, stellt sich die Schadstoffbelastung als kombinierter Effekt der Belastung durch Städte (unzählige toxische Substanzen – natürliche und synthetische Produkte, etc.), die einmündet in das Abwasser individueller Küchen und Waschbecken, Toiletten und Kläranlagen und die „natürlichen“ Flüsse, dar. Zum Zweiten sind die allgemein kontaminierten Agrarflächen sowie das Untergrundwasser und weitere Wasserläufe verbunden mit kontaminierten Flächen und Untergrundgewässern zu nennen. Schließlich mündet dies alles in Küstengewässer der Meere und Ozeane ein, die somit unterschiedliche Stadien der Kontaminationsbelastung aufweisen.

Unsere Zivilisation benutzte Flüsse zum Transport von Abwasser. Um die kombinierten Effekte des Schutzes von menschlichen Siedlungen, von Eigentum der Bürger und Errungenschaften der Zivilisation vor den natürlichen Flussläufen zu erreichen, wurden riesige Kanäle errichtet. Tatsächlich haben wir auf der Grundlage unserer Zivilisations-Standards die natürlichen Flussläufe begradigt und dadurch das System der natürlichen, biologischen Filterfunktion der Flussläufe außer Kraft gesetzt. Wir erreichten damit eine schnellere Geschwindigkeit der Flussläufe, aber nur dies, weil wir keine Schutzvorkehrungen trafen für Siedlungen und Errungenschaften gegenüber Hochwasser. Langzeitbetrachtungen zeigen jedoch, dass Risiken für Überschwemmungen noch vorhanden sind, und zwar mit einem deutlich stärkeren Zerstörungseffekt. Die Mehrheit der Flüsse benötigt eine ökologische Sanierung ihrer natürlichen Möglichkeiten Leben und weitere Fähigkeiten zu forcieren, die durch die Zivilisation zerstört wurden.

Ein weiterer Gesichtspunkt für einen vergleichbares Verhängnis betrifft Flussmündungen und Küstengewässer, die in zahlreichen Fällen zu Wirtschaftsgebieten, Niederlassungen und Fremdenverkehrsorten mit geringen natürlichen Charakteristika der Biosphäre umgebaut wurden. Diese schaffen neue Grenzen für die Verunreinigung der Küstengewässer und als Konsequenz werden die Meere und Ozeane mehr und mehr mit synthetischen Chemikalien und weiteren Materialien kontaminiert. Heute lebt ein größerer Anteil der Menschheit als je zuvor in Küstenregionen. Hierdurch kommt es zur Verschmutzung der Küstengewässer, sodass wir bald die Konsequenzen der kontinuierlichen Beeinträchtigung des See- und Meerwassers erfahren werden.

In Zusammenhang mit den Zivilisationsbauten und Entwicklungen verliert das Land mehr und mehr seine natürlichen Merkmale. Die aktuelle Landnutzung in Europa zeigt folgende Verteilung: 47 % Landwirtschaft, 36 % Wald und 17 % (2006) Gebäude und betonierte Flächen, die für immer für Natur bzw. Biosphäre verloren sind.



Diese kurz dargestellten Daten lassen uns folgern, dass viele Einzelpersonen und Organisationen das ganzheitliche Systemdenken erlernen und anwenden sollten. Sowohl die vergangene als auch die gegenwärtige Beeinträchtigung einer großen Anzahl von natürlichen Systemen durch unsere Zivilisation verlangen nach mehr effektivem Schutz von Natur, Weltall und Umwelt durch Angehörige unserer Zivilisation. In der Realität benötigen wir eine größere Diffusion ganzheitlichen Denkens für eine umfassende Beeinflussung im Hinblick auf eine bessere und geeignetere Art und Weise von Denken, Entscheiden und Agieren. Nur so kann die Langzeitverantwortlichkeit unserer Zivilisation erreicht und die Natur unserer Erde bzw. Biosphäre bewahrt werden, anstelle an der Tragik der Allmende zu leiden.

Das System des Klimawandels operiert unter Voraussetzungen, die durch eine dynamische Entwicklung von Physik, Geografie und Biologie der Erde und ihrer Umwelt bestimmt werden. Die Menschheit hat mit ihrem Lebensstil im Verlauf der letzten 300 Jahre, geprägt von industrieller und postindustrieller Zivilisation, gezeigt, dass sie die natürliche Umwelt konstruktiv aber auch destruktiv beeinflussen kann. Die Menschheit ist ferner über die Grenze eines umweltverträglichen Lebens und ihres Langzeiteinflusses auf die Biosphäre des Planeten Erde hinausgegangen. Die Befunde des Buches „System Thinking and Climate Change System (2002)“ veranschaulichen, dass die Beeinflussung des biosphärischen Systems des Planeten Erde durch den Menschen von Individuen und Organisationen ausgeht, und ihre Konsequenzen sich als individuell, lokal, organisatorisch, kontinental, global und vielleicht sogar universell darstellen. Daher besteht das definierte Problem darin, wie eine bessere und mehr systemisch ausgerichtete Langzeitverantwortlichkeit der Menschen erreicht werden kann. Dieser ausgewählte Gesichtspunkt berücksichtigt die potentiellen politischen Maßnahmen im Hinblick auf diese Verantwortlichkeit. Es wäre notwendig anzunehmen, dass die Epoche der Globalisierung nach einem neuen Denkansatz verlangt.

Das System des Klimawandels ist ein wesentlicher Teil der Erdbiosphäre, nicht jedoch ihr Schöpfer, aber ihr Lieferant, Ausrichter, Inhaber und Bewahrer der Lebensbedingungen. Menschen müssen neue Wege zu Nachhaltigkeit oder nachhaltiger Zukunft aufzeigen, die zu wechselseitigen Beziehungen zwischen Zivilisation und dem Planeten Erde unter neu entwickelten Konditionen führen. Die nachhaltige Zukunft der Menschheit könnte definiert werden als eine Harmonie der jetzigen Zivilisation mit der Natur des Planeten Erde⁹.

Erkenntnisse, Wissenschaften, Forschung und angewandte Wissenschaft, Gesellschaft und alle Regierungen, Ökonomie, nationale, internationale Einrichtungen, etc. müssen eine breitere Betrachtungsweise der Entwicklung unserer Biosphäre berücksichtigen und entsprechend auf diese Herausforderungen reagieren.

⁹ Aus dem Buch „The Sustainable (development) Future of Mannkind“, Ecomovic et al., ISB 978-961-91826-2-8, 2007, abrufbar unter: www.institut-climatechange.si



Die gegenwärtige Kontamination im Weltmaßstab reflektiert Beispiele des Denkens und Handels unserer Zivilisation wie (Fluorchlorkohlenwasserstoffe (CFCs) und ähnliche Substanzen, Pestizide, genetische Modifikationen, hormonähnliche Substanzen aus chemischer Produktion und medizinischer Anwendung, Beeinflussung durch Technologien – Verbrennungsmotoren und andere, Transportsysteme, Waffen und weitere Kriegsausrüstungen, PCBs mit Beeinflussung von Genstrukturen, etc.). Was wir für unsere nachhaltige Zukunft benötigen, ist unsere Langzeitverantwortung für die zivilisationsbedingte Beeinflussung der Biosphäre.

Hierbei haben wir zwischen den Regelfaktoren unserer Zivilisation zu unterscheiden – Geld oder Gewinnstreben und dem Verstehen dieses Systems und den aktuellen Beeinträchtigungen, die wir über Begleiterscheinungen verursacht durch den Mangel an Verständnis und Holismus erfahren. In zahlreichen Fällen war das Gewinnstreben unserer Zivilisation der Hauptgrund für globale Kontaminationen wie (PCBs, CFCs, Pestizide, Plastikmaterialien, etc.), die produziert werden und wurden, angepriesen und als Verbesserungen vermarktet werden. Gleichzeitig haben diese Substrate eine Schädigung unseres Lebensraumes oder unserer Umwelt verursacht. Beispiele schließen sowohl explosionsartige Vermehrung der Bevölkerung aber auch die Kontamination der Atmosphäre ein.

Wir benötigen Forschung und Verständnis für die Langzeitverantwortung unserer Zivilisation, um das unverantwortliche Geschehen der jetzigen Regelsysteme, der Menschen und zivilisationsinduzierter Produkte wie einseitiges Gewinnstreben, das Mängel zum Verständnis der Langzeitverantwortung verursacht und daher zu Verantwortungslosigkeit führt, beendet.

Der gegenwärtige Status von Biosphäre, Natur, Weltall und Umwelt als auch die wissenschaftlichen Kenntnisse, die der Menschheit zur Verfügung stehen sowie unser soziales System führen unsere Zivilisation in eine Sackgasse. Offensichtlich erlauben individuelle, regionale, nationale und internationale Interessen der Menschheit nicht einen neuen Ansatz zu unternehmen, um ein Überleben mit ihren sozialen, finanziellen, politischen und bürokratischen Belastungen, Kriegsphilosophie und Mangel an Toleranz zwischen Menschen zu sichern.

Wir als Bewohner der Erde müssen die Notwendigkeit von Aktionen im Hinblick auf die Etablierung einer Weltkonstitution, eines Weltparlamentes und einer Weltregierung als eine Möglichkeit für unser Überleben ansehen, mit der Verantwortung die sozialen Belange zu koordinieren und die Bedürfnisse der gesamten Menschheit und gleichzeitig Natur, Weltraum und Umweltressourcen, Bedürfnisse und Möglichkeiten zu harmonisieren. Die Epoche der Globalisierung erfordert neue Ansätze und Verhaltensweisen.

Die Koordinierung bedeutsamer Belange für die Erde und Biosphäre über eine geeinte Gesamtregierung könnte Antworten geben im Hinblick auf die praktische Anwendung von



Forschungen und die Notwendigkeit für korrekte Beziehungen zwischen unserer Zivilisation und der Biosphäre. Zumindest könnten wir ein geeignetes Management bedeutsamer Belange mit mehr oder weniger Aussicht auf Erfolg erwarten. Eine weltumfassende Demokratie (nicht jedoch eine geldbezogene Demokratie) für eine nachhaltige Zukunft der Menschheit und eine Weltregierung könnten geeignete Empfehlungen zu Beginn des Zeitalters der Globalisierung darstellen.

Die gegenwärtige Praxis auf der Erde stellt sich wie folgt dar:

- Die Zerstörung von nahezu allen Gewässern durch synthetische Chemikalien sowie Kontaminationen von Boden und Luft (regeninduziert)
- Beeinträchtigung der Luft durch Transport auf Land-, See- und Luftweg
- Zerstörungen durch Kriege
- Zerstörungen durch die Ozonschicht
- Zerstörung der Bodenfruchtbarkeit durch landwirtschaftliche Verfahrensweisen unter Einschluss von Erosionen und Versteppung
- Globale Erwärmung und weitere Einflüsse des Systems des Klimawandels und natürlich
- Die explosive Vermehrung der Menschheit mit Anteilen, die Wechsel, Änderungen, Forschung, Lernen und weitere Ansätze für eine bessere Zukunft durchlaufen müssen.

Solche Praktiken können nicht erledigt werden, indem man nationale Interessen in Kauf nimmt und diese in gemeinsamer Isolierung aufgreift. Diese sollten die Hauptverantwortlichkeit einer Weltregierung darstellen.

Das System des Klimawandels, das als Ausstatter, Ausrichter, Inhaber und Bewahrer der Lebensbedingungen innerhalb der Biosphäre anzusehen ist, erfordert spezielle wissenschaftliche Studien und weltregulierende Aktionen. Natur-, Weltall-, und Umweltschutz durch Mitglieder unserer Zivilisation, die auf die Bewahrung der Biosphäre auszurichten ist, benötigt auch spezielle wissenschaftliche Untersuchungen und weltregulierende Aktionen. Beide Gruppen der Themen sind zwei weltumspannende Systeme, die auf menschliche Einseitigkeit reagieren, indem sie globale Entropien verursachen, die einen globalen Level des erforderlichen Holismus erfordern, sodass sich die Menschheit mit diesen auseinandersetzen kann.

Die erforderliche Wissenschaft und angewandte Wissenschaft zur Bewältigung der genannten Themen kann nicht auf der Basis des gegenwärtigen Wissens und der Forschungspraxis sowie -Kapazitäten der Zivilisation erfolgen, bedingt durch das Engagement der Wissenschaftler mit der Entwicklung von Waffen und Kriegseffizienz und den Anforderungen der Bürokratie. Daher ist eine neue Ausrichtung der wissenschaftlichen Arbeit im Hinblick auf erforderliches Wissen und Möglichkeiten zu Bewahrung von Natur, Wissenschaft und Umwelt unter Einschluss des Systems des Klimawandels nötig.



Der erforderliche Holismus – eine Möglichkeit die heutige Einbahnstraße zu beenden

Wissenschaftliche Arbeit – als eine fundamentale Quelle von Wissen, erfordert eine spezielle Koordination auf weltweitem Level und sollte ein wesentlicher Teil einer Weltregierung sein. Wir brauchen unabhängige Wissenschaftler, die aus ihrem wissenschaftlichen Verständnis und praktischem Vermögen heraus und nicht aus Gründen der finanziellen Vergütung arbeiten, die ihnen durch die Bürokratie (demokratisch-finanziell-soziales System), Militärbefehlshaber und oder eine Marketing-Gewinn-orientierte Ökonomie gewährt wird. Das heutige Geldsystem ist sein eigener Herr geworden, ein Monster, das die gesamte Zivilisation beherrscht. Es wäre wünschenswert dies zurückzusetzen in einen Rahmen, in den es gehört, - als Diener der Menschheit.

Derzeitig vernichtet Gewinn, Gewinn durch das Verursachen von Seiteneffekten mit wesentlichen Auswirkungen, eingeschlossen der Aufwendungen für die Menschheit, die durch die Unternehmenssteuer abgedeckt werden.

Es ist offensichtlich, dass derzeit die gesellschaftliche soziale Verantwortlichkeit nicht einen Teil der menschlichen Ethik darstellt, sondern vielmehr Erklärungen für die Förderung von Zielsetzungen. Nur wenn die gesellschaftliche soziale Verantwortlichkeit und die individuelle menschliche soziale Verantwortlichkeit zu jedem Bevollmächtigten unserer Spezies gehören, hat eine nachhaltige Zukunft der Menschheit Chancen sich besser durchzusetzen.

Um die Notwendigkeit einer Weltregierung zu akzeptieren, sollten die Menschen die Systeme verstehen, in denen sie leben, aus denen sie bestehen und die sie hervorbringen. Es ist bedeutsam, aufgrund der bekannten Tatsache, dass jedes System in der Natur so lange besteht, wie es ist, das heißt solange alle Systeme und seine Beziehungen dazu in einem vergleichbaren Modus vorhanden sind. Zusammen ergeben sie ein lebendes System, das ein wachstumsfähiges System zu sein versucht. Wenn irgendein größerer oder kleinerer Teil des Systems sich ändert, kann das gesamte System beginnen, sich zu wandeln und ändern. Es ist nicht möglich vorherzusagen, in welche Richtung sich das System bewegen wird. Dies entspricht dem System des Klimawandels. Hierin besteht möglicherweise die Antwort auf die Frage, was mit der jetzigen menschlichen Gesellschaft geschehen wird.

Das System des Klimawandels würde letztlich die Lebensbedingungen innerhalb der Biosphäre und der Geografie der Erde so intensiv ändern, dass das Ende unserer Zivilisation eintritt.

Folgerungen

Wir empfehlen daher Folgendes:



Ein Planet mit einer Regierung ist unsere erste Empfehlung. Natürlich muss zuerst eine Konstitution „Federation des Planeten Erde“ geschaffen werden, gefolgt von entsprechenden Institutionen wie Parlament und Regierung, nachdem die o. a. Federation ratifiziert wurde.

Zweitens empfehlen wir eine neue Struktur der sozialen Ordnung, die die gegenwärtige Erfahrung sowie die Etablierung eines neuen Kontraktes der Menschheit, um auf dem Planeten Erde zu leben, reflektieren sollte. Das Ziel besteht in der Verhinderung einer explosionsartigen Vermehrung der Menschheit, in einer größeren Geltung von Ethik und Toleranz zwischen der Erdbevölkerung, mehr Nachdruck (global ganzheitlich) von Gesetz und Ordnung und mit einer fachkundigen Regierung, die es kommenden Generationen erlaubt, auf diesem Planeten zu leben und eine nachhaltige Zukunft zu haben.

Zum Dritten empfehlen wir eine Umkehr der wissenschaftlichen Arbeit von Waffenentwicklungen zu, auch eng marktorientierten Technologien und synthetischen Chemikalien, Erforschung von entwicklungsfähigen globalen Systemen von Natur, Weltall, Umwelt und Kosmos, als essenziellen Elementen des erforderlichen Wissens für das Überleben der Menschheit und zur Sicherung einer nachhaltigen Zukunft.

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4,

During 2010 we continue with reporting on philosophical importance of other sciences content. At many gathering we have presentation on philosophy of sustainability, basics of the nature, system thinking, requisite holism, operational research, case studies, complex problem solving. In December 2010 we send our contribution to Lucknow, India and were as follows:

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Zg. Medosi, Korte Slovenia, October 2010

The Philosophy of the Nature

Anthology 2 – 2001 - 2014



»The Philosophy of the Nature« has been prepared for December, 2010, City Montessori School event at Lucknow, India, as information on novelty approach for present the nature and society understanding by: Prof. Dr. Timi Ecimovic, Slovenia, Prof. Dr. Alexander Chumakow, Russia, Riccardoe Di Done, Canada, Prof. Dr. Mark Esposito, France, Sir Prof. Dr. Roger B. Haw, Malaysia, Prof. Dr. Jorn Hamann, Germany, Anita Hrast, Slovenia, Prof. Dr. Zinaida Ivanova, Russia, Prof. Dr. Glen T. Martin, USA, Prof. Emeritus Dr. Dr. Matjaz Mulej, Slovenia, Prof. Dr. Philippos, Nicolopoulos, Greece, Prof. Dr. H A Shankaranarayana, India, Prof. Dr. T. N. Sreedhara, India, Dr. Elmar A. Stuhler, Germany, Prof. Dr. Rayarama Tolpadi, India, Prof. Dr. Seminur Topal, Turkey. .

Abstract:

Presentation was prepared from the Nobel Prize nomination book »The Three Applications of the System Thinking«, ISBN 978-961-92786-0-4, 2010, T. Ecimovic, and many years of co-operation with scientist and researchers around the Globe.

It is new approach to the challenging questions of the origin of the nature. It presents hypothetical and real issues of the philosophy and search for the knowledge and understanding of the nature and meaning of the life and universe. Present of the mankind civilization, sustainable future and globalization have been discussed,

For »Sustainable Future of Mankind« the institution of the World Government could make difference for better tomorrow. Possibility of it has been result of a good work of enthusiastic group of philanthropist and people of good will on content and option for establishment of the World Constitution, World Parliament, and World Government (please see »Our Common Enemy - The Climate Change System Threat«, 2006, Ecimovic at all, displayed at www.institut-climatechange.si).

Keywords:

Environment, Evolvment, History, Globalization, Holistic Thinking, Information, Invention and Innovation, Individual Social Responsibility, Nature, Philosophy, Requisite Holism, System Thinking, World Constitution, Parliament and Government.

Introduction:

The vision of the sustainable future of mankind has a magic power, because it is presenting the Nature and mankind not as separate issues, systems, requisitely holistic approach, but it is letting us know how we have come to the present, what the present is, and what could we be in the future.

The environment theory of the Nature (Ecimovic at all. 2010) is opening new frontiers for understanding present and the Nature.

The information theory of the Nature (Ecimovic at all. 2007) enables understanding of systems, processes and reasons for what we are.



The term system has many contents (Ecimovic and Mulej, 2002, 2009, 2010). Here it will mean to us neither the mental picture about the event or process dealt with nor a usual method of neither work, nor a socio-economic or other order nor a network/complex of plants or stones or humans fitting together somehow.

The term system will here rather mean to us a feature/event/process that is so complex in its components, relations and influences between them and their consequences that it is difficult to comprehend and even more difficult to control.

This is why we call the climate change a system.

Understanding and/or controlling it per parts is not very helpful, because as a whole a system has attributes that differ essentially from attributes of each one of its parts alone. Clear cases: the edible salt is a synergy/system of two poisons; water is a synergy/system of two gases; an organization is a synergy/system of many – different from each other, unavoidably, and hence complementary – professionals; a house is a synergy/system of bricks/concrete/wood, doors, windows, electric, water and other installations etc.

Synergies emerging from their attributes provide to the new whole/system new attributes. Therefore, the truth will be easier to discover, and difficulties and development easier to control, if the feature/event/process is considered as holistically as possible rather than per single parts. This is called systemic or systems thinking. A total holism of human behavior, i.e. monitoring, perception, thinking, emotional and spiritual life, decision making and action, and a total wholeness of insights and outcomes, is usually impossible to attain, but a single specialization – a single viewpoint of profession – limits humans to fictitious holism providing for fictitious wholeness.

This fact makes us apply the Mulej/Kajzer (1998) law of requisite holism as the suitable one. In the case of the climate change system this would mean the understanding that synergies of insights from physics, chemistry, biology, history, technology, economy and several more disciplines and practices are needed. One would chose and collect professions and viewpoints that one would consider essential and interdependent for mutual completing up by differences.

Following the ancient Greek philosophy one would link them on the basis of their interdependence or – in the Greek wording – dialectics. A dialectical system would show up (Mulej, 1974, see Mulej 2008). In this case a system is not meant to be a complex feature, but a mental picture about it, which we introduce in order to attain the requisite holism of human behavior and requisite wholeness of its outcomes.

A systemic approach to the climate change must consider “The Age of Globalization”, the present status of our civilization, unnatural life of humans in poly/mega and similar urban centers, management of technologies without sustainability, lack of individual and corporate social responsibility¹⁰, uncontrollable human-population explosion, short- and often medium-

¹⁰ Social responsibility is an attribute of humans and their organizations. It prevents or diminishes, at least, the danger of humans' abuse of their influence leading to damage experienced by their co-workers, other business or personal partners, broader society or nature on which the human existence or quality of life, at least, depend. This is a short summary of definitions in international official documents. Other references see in social responsibility an upgrading of the innovation effort/support called improvement or total quality management or business excellence. Further



and even long-term ('side-')effects of the: synthetic chemicals; modern technologies, weapons, combustion engines, transport system, nuclear technologies, industrial and agricultural production, national and international political distribution of power and administration, and their influences on the scientific global, national and local communities; they are causing a gap between needs and results of the cohabitation of Homo-sapiens-civilization with the nature on the planet Earth.

This gap threatens this civilization to disappear.

This gap surfaces as the climate change system and global human community impacts, and consequences are: strong winds, large droughts and floods, tsunamis, earthquakes, large air pollutions by industrial, city life's and transport system's emissions, changes in local climatic patterns, global warming, depletion of the ozone layer, pollution of all three basic environments of the biosphere: soil, seas/oceans and air.

They are due to huge misunderstanding of the climate change system by the population in local communities around the Globe.

Simple language for simple people and understandable explanations are needed for sustainable future of mankind or harmony of mankind civilization with the nature on the planet Earth.

It is as it is; we are, at least, trying to present the contemporary scientific approach to the present most important issue of mankind.

Whether we shall understand the climate change system or not has a crucial importance for the local community life, and gives questionable chances to the long-term of survival of mankind – it requires sustainable future. Sustainability of local communities leads to the sustainable future of global human civilization¹¹.

Discussion:

Present status at the Biosphere of the planet Earth, living conditions and daily events or living of Homo Sapiens present civilization and the rest of the living creatures are showing signs of adaptation to the changing living conditions resulting from changes in the planet Earth's Biosphere environment.

After 1960's the visible changes have become more as just cyclic events within the Solar system and the planet Earth system. Most acute issues have been changes within the weather

references see it closely linked with systemic behaviour; yet further ones link it with efforts aimed at peace in the world (Hrast et al., ed., 2006, 2007, 2008, etc.). The current dangerous state of climate change system results to an essential extent from a lack of responsible behaviour of humans over centuries of industrialization and all times until today.

¹¹ For details see our publications: »Our Common Enemy (The Climate Change System Threat)« by Ecimovic at al, 2006, and recent books: »The Sustainable (Development) Future of Mankind« by Ecimovic at al, 2007, »Sustainable Future, Requisite Holism, and Social Responsibility« by Bozicnik, Ecimovic and Mulej, 2008; "The Sustainable Future of Mankind III", Ecimovic, Esposito, Mulej, and Haw, 2010; and "The Three Applications of the System Thinking", Ecimovic, 2010, all are displayed at: www.institut-climatechange.si



patterns and most significant change was commencement of the ozone layer destruction because of the chlorofluorocarbons CFC's introduction to the atmosphere by our civilization.

After 20 years of research works we have published "System Thinking and Climate Change System (Against a big "Tragedy of the Commons" of all of us), T. Ecimovic, R. Mayur, M. Mulej, and coauthors, 2002, ISBN 961-236-380-3, a book 302 pages, soft cover paper edition and CD. It was our first publication in the book form after many presentations worldwide on systemic background of the climate change and introduction of the **climate change system**.

The next in line was "The Information Theory of the Nature" (Ecimovic at all, 2006), and final part is "The Environment Theory of the Nature", published in the book "The Three Applications of the System Thinking", (T. Ecimovic, 2010). As usually in our life the things are having a turned-around following order and the last should be the first.

Discussing that the philosophy is the search for knowledge and understanding of the Nature, and meaning of the universe and life, we would rather say »The Environment Theory of the Nature« is commencement of systemic approach to the meaning of the environment, "**basic environment**"¹², Universe and Cosmos as precondition for existence of the Nature.

Let us present the case studies of two recent theories »The Theory of the Environment« and »The Information Theory of the Nature«, which are the most recent research results of our thinking and researching.

Mankind's¹³ local communities include variety of many different contents of the human life styles, etc. A major part of it has connections with origin of the people living within the local community, and with the natural characteristics of their environment, within which the local community lies. Geography, biology, physics, chemistry, and history cover in general the main deciding contents.

Common thinking and understanding are day-by-day life issues, local events and communal life stories. All of us are living in a local community, but very seldom we understand individuality of the local community. Countless local communities of the humans on the planet Earth are countless individual approaches of the humans to make living. Beside the family the local community is the basic unit of the present human civilization.

It is very difficult not to see similarity with star systems, planets, galaxies and other energy/matter forms within the known Universe.

As we seldom have opportunities to see individuality of the local community of mankind on the planet Earth, so it is even more difficult or impossible to understand individuality of other planets and the planet Earth. To the countless number of the planets within the Milky Way

¹² "**The basic environment**" is novelty in understanding of the Universe as environmental precondition for having anything – The Nature and evolvements within it.

¹³ From the book »The Sustainable Future of Mankind III«, ISBN 978-961-92786-2-8, 2010, Ecimovic at all please see at: www.institute-climatechange.si.



Galaxy we have to add even more countless number of the planets within the rest of the Universe.

To make it more complex, we have to say, that what we understand of the Universe is a very small part of it, and even less we know how small part of it is our Universe in reality.

The Nature¹⁴, the origin of the planet Earth, the origin of humans, etc., are parts of large content we call »The Nature«. It is hard to answer to all questions of the Nature. But some of them need to be answered for sake of philosophy and understanding of the life and other issues connected with it.

The present science has to undergo future evolvement to be able to answer the basic questions about the Nature. That is why we are putting our recent research in this presentation in order to put on records new theories and possibilities for tomorrow. And of course, tomorrow we expect better environment for humankind and sustainable future¹⁵ for our descendants.

»The Information Theory of the Nature« was published in 2006. Here we will present our recent research and new theory »The Environment Theory of the Nature«, which has been published at "The Three Applications of the System Thinking", (T. Ecimovic, 2010), and which is opening new horizons for research of all issues of the Nature. It is an environment-centric theory, which offers understanding of the present in general and allows for new dimension of research of the Nature.

The environment theory of the Nature is taking environment as precondition for anything.

»Basic environment« of the Nature is the Universe or the Cosmos. Within it the Nature exist in countless forms, dimensions and contents as **»interdependence, interaction and co-operation«** of all matters, energy, information, dimensions, light, rays, powers, forces, particles and yet unknown contents of the Nature.

The beginning or end of the basic environment does not exist, but it is **»continuum«** of the Nature, which makes/holds/transforms all contents. The basic environment (the Universe or the Cosmos) should get proper description, which according to system thinking does not commence with beginning or end, but it exists as **»continuum«**.

The present thinking ability of humans could not accept reality of the immensity of the basic environment - the Universe or the Cosmos. For present researching techniques the basic environment is immeasurable. At present we have researching possibilities for exploring our neighborhood within the basic environment - the Universe or the Cosmos.

¹⁴ From the book »The Sustainable Future of Mankind III«, and partly from the books »The Sustainable (Development) Future of Mankind«, Ecimovic et al, 2007, and digital book »Sustainable Future, Requisite Holism, and Social Responsibility (Against the current abuse of free market society) edited by Bozicnik, S., Ecimovic, T., and Mulej, M., 2008, all displayed at: www.institut-climatechange.si

¹⁵ The sustainable future of mankind is harmony of our civilization with the nature of the planet Earth.



Our horizon is limited with our techniques and researching abilities/possibilities. For our understanding of the dimensions within the Universe, we are also limited by our scientific language – mathematics, which is not yet evolved for the needs of the Universe researching.

That is why humans have discovered the Big-bang theory, black holes, unified theory, strings, particles and even expected “divine particle”, and many more brilliant thoughts and applications of the researchers, but could not properly describe the basic environment or the Universe.

Putting the “continuum” at center of the Nature is making a huge difference in possibilities for research.

So we have now the basic environment and the continuum, we have basic relationships such as **interdependence, interaction, and co-operation** of all matter, energy, information, light, rays, powers, forces, particles, dimensions and yet unknown contents of the Nature, where some of statements need to be described, for instance the information theory of the Nature.

The present understanding of the Nature has been going on as long as the present civilization has been evolving. As mentioned before in 2006 the book “The Information Theory of the Nature, and” by Ecimovic, T., ISBN961-91826-1-8 was published with the Information Theory of the Nature, and before within this presentation “The Environment Theory of the Nature” was discussed.

The novelty of the information theory of the nature is research of the term “information”, which has been researched in connection with the system thinking, and the philosophy. The “information” was understood as a system of the abilities, quantities, qualities, relationships, instructions of each and every matter, energy, light, rays, powers, forces, particles, dimensions and yet unknown contents of the Nature under prerequisite of **interdependence, interaction and co-operation**.

Transformation of the matter and energy with their information happens simultaneously according to the environment qualities/information. New transformation has its information in same manner as the genetic code of living creatures. It is precondition of their continuum, and it is composed at the moment of transformation. In living creatures it is according to prearranged (by the nature) genetic structure, and in the other parts of the Nature the genetic structure is exchanged for abilities, qualities, quantities and other characteristics of the environment, within which the transformation of matter and energy takes place. By the continuum the systemic process is upgrading all characteristics of the Nature.

It is important to discuss the system – as a complex entity, rather than mental picture in living creatures’ mind - from the operational content. Any system is in stable mode as long time as all its internal systems are in stable mode. Whenever external reasons or instability of internal system have been moved/changed/impacted, or etc., the system as complex entity commences to move. It is not possible to predict the direction of the movement of the system.



For instance, after “Big-bang” (Hawking) had happened, being responsible for our part of the Universe, the transformation of matter and energy has resulted with formation of the Milky Way Galaxy, countless star systems and our star Sun system. From commencement of the Big-bang the energy and matter transformation resulted in new transformed contents, and it has been simultaneously enriched with information of its abilities, and so on. We think a major part of the information is composed by characteristics of the environment within which various processes were and are going on. Of course the environment’s characteristics are also changing or transforming accordingly.

Finally, some 4.560.000.000 years ago the star Sun system evolved in the planetary systems including with our planet Earth. Each part of the system has its own information according to which the evolvments are possible. In our research we think this possibility is opening the door for researching further contents of the Nature.

To be able to conclude these case studies we have to present a short discussion about the time.

Here we have to rethink/discuss our human achievement called the TIME. We humans have a long history of use of the time as practiced. At present the time is a very important dimension of our living. Practically it is very difficult to imagine our living without the time in practical use.

When looking from the Nature’s viewpoint, we may see it does not use the time. **The Nature is always in the present.** We may discuss it as the Nature is taking as much time as needed for a certain process. And due to its systemic abilities the Nature is evolving in only one direction – “the multidimensional evolvment ahead”. Direction of the evolvment is not known, but it is result of interdependences, interaction and co-operation in the case.

I think the TIME is our civilization imaginative dimension, which is very useful to our living, thinking, discussing, researching, etc., but the Nature does not have the time as its dimension. Processes in the nature are having their evolvment according to the direction of the evolvment and the information, which is assisting it, and it exist only at present.

Due to its systemic quality and human understanding of it by the requisite holism principle of the human approach (Mulej, M., Kajzer, S., 1998), based on the concept of the “dialectical system” as a network of all essential viewpoints by Mulej, M., (1974), the system qualities, and environment within which the requisite holism and wholeness of the nature exist THE PRESENT is viable (to our understanding) or not as a continuum, but it has constant continuum be it to us understandable or not.

The environment definitions:

1. The **basic environment** (the Universe or the Cosmos) it is environment within which the Nature exist as **continuum** of all matter, energy, information, rays, particles, dimensions, powers and forces, and yet unknown contents of the Nature. The basic environment (the Universe or the Cosmos) does not have beginning or end, but has countless forms of matter, energy and information transformations, dimensions and systems and it is a system of the Nature.
2. Second to the basic environment (the Universe or the Cosmos) are countless form of matter, energy and information of larger and smaller dimensions of star systems, the galaxy systems, and within them individual star systems, such as our star Sun system.,



3. The basic environment (the Universe or the Cosmos) as system enables the **interdependence, interaction and co-operation** of all matter, energy, information, rays, particles, dimensions, powers and forces and yet unknown contents of the Nature. Consequently each and every case system under observation: big and small bangs, seen or dark energy, black holes, galaxies, star systems, particles and even expected “divine particle”, and all other forms of systems within it are having their contents and characteristics (individuality).
4. The star system environment it is a particular star system with its internal and external environments and systems.
5. The planetary system is a part of the star system and it has its external and internal environments and systems.
6. The star Sun system is a part of the Milky Way Galaxy, which has 100.000.000.000+ other star/planets systems and countless meteorites and other forms/systems of matter or energy. All of them are moving like a top and circular movement around each other. According to **interdependences, interactions and co-operation** the star Sun system is moving like a top and with app 800 000 km/hour speed circling around the center of the Milky Way Galaxy. The circular movement is the main physical characteristic of all larger and smaller forms of matter and energy within the Nature.
7. The planet Earth is one of eight planets, but only one of them with environmental characteristics allowing “the living Nature”. The planet Earth contains its three basic environments (the planet Earth basic environments): the Land (terrestrial), the Water (seas and oceans), and the Atmosphere (air) environments.
8. “The living Nature” at the planet Earth’s natural system has countless living creature’s larger and smaller forms and systems, amongst which there it is also Homo sapiens’ civilization. All of them share the environment or the Biosphere, which is a tiny and thin part of the planet Earth system’s surface, within the water and atmosphere’s lower part.
9. The Homo sapiens’ civilization has its own environment of different characteristics but in the third millennium the urban environment prevails as its internal environment made by humans. Other forms include: rural areas; agriculture; forestry; transport means systems including roads, railways, airports and ports; industry; sports including sport facilities, etc.; military with barracks, armaments and other facilities; education with schools, universities, researching facilities, etc.; healthcare system with hospitals, researching and other facilities etc.; and etc. In 2008 in Europe (EU) 17 % of total area has been sealed land or land taken from the Nature and occupied by the Homo sapiens’ civilization.
10. The living creatures’ environment could be divided in: internal and external environment. Typical internal environment (within the body) is cell liquid or blood as environment for blood cells etc., while the external one consist of family, local community, society, surrounding, water (bathing, drinking, etc.), air for breathing, etc.
11. Man-made system has internal and external environment – for instance the car has its combustion engine as a part of its internal environment, and roads as part of its external environment. Homo sapiens’ civilization’s environment and its natural environment are parts of the general natural environment.

There are many word uses and definitions about environment connected with content of issues like the nature environment or surrounding, etc.



Here we would like to discuss the environmental sciences, which are quest for knowledge and understanding of environment and there are so many sciences as many environments. Generally I think that “the basic environment” (the Universe, the Cosmos) as the largest possible environment and the only environment with only internal environments could be commencement of the environmental sciences and other could follow. Our civilization should commence The Book of Physics with Environment (“basic environment” the Universe or the Cosmos).

Recommendations:

We are recommending as follows:

- Rethinking of the present use of the term environment and it is necessary to use better or more proper terms.
- Introduction of the system thinking for any use of environment-related work or issues.
- Introduction of the environmental sciences as humans’ scientific approach to the Nature and “basic environment” (the Universe or the Cosmos), and other environment systems.
- System thinking should be included as research tool. One should combine systems theories working on a requisitely holistic approach such as Dialectical System Theory by Prof. Dr. (economics) and Dr. (management) Matjaz Mulej with nature-describing systems theories such as the complexity and chaos theories etc. to provide the requisite wholeness of understanding and description and preciseness in its elaboration per parts/viewpoints.

The Information Theory of the Nature¹⁶

Thinking theory, system thinking, system analysis and synthesis are offering new thinking techniques to assist scientific, common, and whatsoever thinking patterns of humans and our civilization, to restore natural thinking and acting towards a noble and a prestigious target of *sustainable future¹⁷* of mankind.

Seeking sustainable (development) future or harmony with the Nature is a path for survival of mankind. Present achievements have to be re-examined with aim of possible evolvments of present society towards sustainable future society. The target is very complex and far from being achieved by present practice of our society, with narrow thinking and acting for benefits of individuals, national elites, top sportsmen, artists and show-men.

Our mega cities have reached the peak of “non-human” environment in which humans live on human (good citizens and elite) style and non-human style for unlucky ones that live in slums (at present there are 2.000.000.000+ people living in slums). Our civilization has reached the status where the lands are no more abundant, water is restricted, and the air is more and more polluted.

Our living environment is rapidly changing, and the climate change system is threatening to change it from manageable one to unmanageable one.

¹⁶ From the book: »The Information Theory of the Nature, and«, Ecimovic, Timi, 2006, ISBN 961-91826-1-8

¹⁷ Sustainable Future is harmony of our civilization with the Nature (Ecimovic numerous statements).



Our top international governing body The United Nations have been transformed from human society assistant to assistant of “monster money” democracies of “big” nations the USA¹⁸, G7/25, etc. At present UN in New York is mega millions dollars business for the USA.

Present leadership has put UN in the role of obedient servant of “developed world”, multinational corporations and globalization, with no rights for other nations and peoples of under-developed world. The UN Council for Human Rights is missing basic understanding of what is what. UN should establish the Council for The Nature Rights Protection against attacks of human society (what 17 % of sealed land area in Europe is absolute proof of that).

To provide solutions, one has to re-examine the relevant system. Research is being conducted on a massive scale to understand systems operating within our biosphere. The “climate change system” has been introduced. This leads to studies of the system operating in the environment. Consequently the Information Theory of Nature has been invented. To explain the systemic background of nature three operative but “non-scientific” words are needed – interdependencies, interactions and cooperation¹⁹. It is while discussing about impact that we arrive at the “Information Theory of Nature.”

The question then arises as to what is this “The Information Theory of the Nature”? It is a system that is subsumed under a holistic unit of the natural system, including the planet Earth. Nature exists as a system, whether we choose to interact with its mechanism or not. Our civilization has assumed the prerogative to interpret it. There is thus, a dual interpretation to nature. Science understands it as it is, more or less, as a mechanism. Civilization sees nature in a different way. Both these interpretations do influence each other but not in the required holistic manner

If this thinking is applied to our environment then the Universe, and the Earth are holistic units and the biosphere is the living environment/sphere of the planet Earth. The basic relations amongst the earth-nature factors are interdependences, interactions and co-operations.

The Information theory of the Nature has been devised as the basic quality of nature as a matter, energy and information where the information is an integral part of the nature as is matter and energy. Evolution of matter and energy is interconnected with evolution of information. All this should be within an *environment* and under the practice of interdependence, interaction and cooperation.

The information theory of nature is a case study of system theory/thinking implementation, as contribution towards a better understanding of the nature by mankind civilization. Information should not be misconstrued. It does not mean the process of communication or transmission of messages or a collection of data, its storage/retrieval or any other use of the word. “Information” as used in the Information Theory of the Nature deals with:

- Information as an integral part of basic environment;

¹⁸ Please see complementary book Our Common Enemy – The Climate Change System Threat, Ecimovic at all., 2006 displayed at coming chapters or at www.institut-climatechange.si

¹⁹ Interdependences, interaction and cooperation as part of the Nature have been introduced by Ecimovic/Mayur/Mulej at “The System Thinking and the Climate Change System”, 2002, displayed at www.institut-climatechange.si



- Information as an integral part of matter and energy;
- Information is not only as a part of the existing energy and matter but also of the evolving ones;
- Information, matter and energy do not exist if they are not integral part of the system/environment/basic environment/universe/cosmos in any dimension;
- Information, energy and matter are evolving within the interdependences/interaction and co-operation practices of all levels of systems within basic environment, and are making evolution of the Nature in case (requisitely holistic unit);
- Information as a part of »Information Theory of the Nature« is the ability/quality of environment, matter, energy, information, dimensions, particles, rays or any form of matter, energy or natural powers and forces, and yet non known contents within the Universe, to make impact. This theory is a theoretical approach addressing basic problems in understanding the Nature. It fills in the need for a holistic presentation of the nature.

The Information Theory of the Nature can explain any whole, part, unit, mezzo, micro or macro dimensions in an infinite cosmos. One can understand evolved environment, evolution within environment, energy, matter, dimensions, rays, particles, natural powers, forces and not yet known contents of the Nature regulated by interdependencies, interaction and co-operation practices. The rules do not exist but are the result of a particular case content. We may mention environmental characteristics of the case deciding on the rules – like liquid methane rivers and lakes on the planet Saturn moon – Titan. Using this theory one can understand any processes like transformation of matter energy and information within environment under interdependencies, interaction and co-operation principles up to the present. The solution for a sustainable (development) future lies in maintaining harmony between nature/biosphere of the planet Earth and all users of it. This is the answer to the future of our civilization. Systems theory, especially dialectical system theory (Mulej) as a science of interdependence methodology through interdisciplinary co-operation is the core of the future.

The Information Theory of the Nature is commencing point of Environmental Sciences to become a chapter at the beginning of the Book of Physics. It is seen and known when heard and understood, but not yet used at scientific and research work as well as practice or applied research due to need for evolvement of new part of the Mathematics as scientific language of our civilization. The characteristics of the environment are making evolvement within the nature possible.

Let us present two case studies:

- When Plasmodium the causing agent of malaria enters human blood by mosquito, it is introduced into best possible environment. It reproduces and causes malaria. If not cured it may cause death of plasmodium and host the human.
- Big bang theory provides answers to almost 99 % of the theoretical approach to the beginning of Universe. Figuratively expressed the environment is changing our Universe into many other requisitely holistic Universes or one Universe of which our Universe is just a part.



Many more explanations could be elaborated from, the simple systems as combustion engine, human society, rocket etc. to finally largest to us known system The Universe, which could be explained by using system theory, system thinking, analysis and synthesis. The planet Earth as a part of Universe, Milky Way Galaxy, and Solar System, and it is representing requisitely holistic unit to hold living nature as it is in our case. Understanding reality of it is a treasure of Nature given to humanity as path for survival and existence.

The Information Theory of the Nature is a missing part needed for the new frontiers of science movement towards sustainable future of mankind. By evolvement of other contents human society may have option of sustainable future and large explorations within the Nature. It incorporates present knowledge and opens an option for confirmation and reintegration of it. All big achievements as: Big Bang Theory, Unified Field Theory, Strings Theory, Particles research, dimensions research, use of geometry and algebraic operations, reconfirmations of present knowledge, and many more possibilities will be achievements in the future of mankind.

The Climate Change System - Introduction²⁰

Worldwide researchers and scientists in complex problem solving, case study research, education, and many other activities of Homo sapiens as individuals and society today must take into account the climate change system affairs, which have a critical role for changes within the biosphere, and include most risky issues at the beginning of the 21st century.

The Climate Change System provides, makes, holds and guards living conditions within the biosphere of the Earth; it has a more important role as humans were thinking in the past. To these conditions all living creatures must adjust to survive. A number of the extinctions of species, smaller and larger alike have resulted from changed environmental qualities, caused by changes in the climate change system.

Systemic behavior enables us, better than single specialists alone, to see that the Earth's biosphere is made as a synergy resulting from *interdependences, interactions and co-operation* of matter, energy, and information within the time frame (conditionally used), and has three bases – Water, Land and Air environments. To be ready for changes, and mitigations due to the climate change system impacts, all of us single representatives of human race must learn more about the basics of the biosphere.

Assessment of risk of the (side-effects of) research has not been well developed during the industrial revolution and recent times; issues like: intensive agriculture; synthetic chemical production; “monster” money democracies; (poor) corporate social responsibility and lack of the individual social responsibility, nuclear technologies, combustion engines, GMO and GMP, have put substances into the Nature environments - sea ocean waters, lands and air – harming them for an irresponsibly long time. Today there is no question, whether or not, but when and how harmful, the impact of the Earth biosphere will be for the living creatures. Scientist and other people/s must understand the interdependences, interactions and co-operation within the environment, and of all matter, energy, and information, to work for sustainable future of our civilization. They should use systems thinking by the Dialectical

²⁰ From the book »The Climate Change System Introduction«, Ecimovic, Timi, and Mulej, Matjaz, October 2008.



Systems Theory (Mulej, 1974, see Mulej et al, 2008) to do this job requisitely holistically and therefore successfully.

For millennia, but especially over the centuries of industrialization and even more so recently, individuals/society have practiced the use of nature, environment and biosphere as commodities free of charge. But, today this is more complex: the nature quality is worse due to the impact of the climate change system and human global population. Major impacts of the climate change system on society, such as sudden floods, strong winds, earthquakes, tsunamis and changes within the local environment, may produce bad results. Our recommendation is to:

- Apply systems thinking, e.g. the Dialectical Systems Theory linking human work and its creativity with holism of behavior, especially thinking, decision making, action, and with innovation;
- Clarify humans' relationship with their Nature, which will allow better relationship of Nature to humankind.

We think it is advisable to learn to know limits and possibilities of the impact on and by the climate change system, to make clear vision of changes, which may affect human society, biosphere and the Earth. We will now briefly present some basic features of the climate change system in order to support the two suggestions.

The water/land/air systems or biosphere make the bases of life (the living nature) on the planet Earth. Not many researchers and public at large are familiar with interdependences, interactions and co-operation needed for survival of living creatures. The latest research on system thinking and the climate change system has important impact on knowledge of the Nature for humans to better understand their environmental impacts.

From the Nature's viewpoint the climate change system alias the climate, the climate change – is a system as a complex entity of conditions within the living space of the biosphere. Actually the living space is the biosphere itself, which is a tiny part of the Earth planetary system.

Watching the climate, and taking it into consideration when humans have been making their decisions – these have been two very separated issues, especially in the recent centuries in which the industrial life has been taking the lead and has caused a narrow professional specialization to reign and prevail. One-sided insights were misleading and still are so due to oversight of synergies.

There are two main sources of the climate change: the natural ones and the ones caused by humans.

We humans should understand both of them in order to accept the natural ones and to possibly prevent their tough impact on our-selves, such as floods, droughts, air and water pollution etc. But we should better understand and cope with our own tough impacts and prevent them, too.



The natural systems (as complex entities rather than mental pictures of them) could be formally set according to their size as follows:

- MACRO / MEGA / SUPERIOR / SENIOR / VERY BIG etc., systems such as the Universe, the biggest system known to humans, the Milky Way, the Solar System, the planet Earth system etc., and
- MICRO / INFERIOR / JUNIOR / SUB etc. systems that are smaller and are either natural such as Homo sapiens / plant / animal / living creature/s, and or artificial / human-made systems such as a township / car / aircraft / rocket / satellite, etc.

Of course, the above artificial and natural systems cause a need for differentiation of sciences to natural, technical, and social sciences, of which none includes all human activities as an integral part of the nature. We think there are no artificial and natural systems, but all of them are natural as long as they are results of living creatures' activity. Let us use the terms artificial and natural systems for the time-being.

The system theory, system thinking, analysis, and synthesis are the best assistants available today for humans to understand complex problems, which both the macro and micro systems are.

There is no simple system, and there is no system of which we may say that humans know everything about it. This could be stated more rightfully when one uses system thinking, which could make the difference between the scientific thinking of today and of tomorrow.

The challenges to us humans of today are much more complex than ever before, because we have reached a sort of a critical peak of our ability to understand the present time. The proof for this is our relationship with nature, space and environment, which is going to become unfriendly to humans, rather than a good friend, as it was and should be.

Our civilization's anthropocentric philosophy, its present social order, its religious approaches/governances, profit-based democracies, local, national, international and United Nations' bureaucracies, totalitarian rulers, lack of respect between different people/s on the Earth, policies of divide and rule, bread and games (from antique times until today), ruling by information monopoly – are organizational techniques, which need innovation-of-habits/restructuring/transition/new approach for a better, or even any, tomorrow. Whether our civilization will have a better tomorrow or not is a question, which we better answer before its breakdown will happen.

We think optimistically, that tomorrow will enable our civilization to understand nature, space and environment/climate change system, Universe/Cosmos, and other systems. As a result this will open large doors to sustainable future for all of humans and other living creatures on the planet Earth.

The current understanding of the climate change system is limited by anthropocentric and other views; this is less so, when using systems theory, system thinking, analysis and synthesis. They could help us better understand the interdependences, interactions, and co-operation on mono, trans, multi, inter, and supra-disciplinary issues, all of them as an integral part of the inferior and superior systems, within the system of the planet Earth, and further on the Solar system, the Milky Way, and the Universe.



The Nature does not repeat itself, but it always goes in only one direction - multidimensional dynamic evolvement ahead. Its direction is not known.

We humans, with all our beliefs, religions, natural, social and technical achievements, technologies, techniques, governances, local communities, families and relationships, sooner or later think we are Gods, which have to rule the nature, space and environment of the biosphere.

When it comes to the point of joint action, “mutual interest” and survival of our civilization, many excuses are handy such as national interest, national security, national citizens’ wellbeing, etc. But all of them are empty phrases defending/protecting individual/collective rulers, and national elites.

We believe into the role of leadership (as a cooperative management and governance), but we believe also into the moderate life style, which allows for long life, respect, peace, and stability, because the Nature requires it.

The current understanding of the climate change system is limited by anthropocentric views. It may be explained with rule of international/national bureaucracies, who have sufficient monetary resources to pay scientists to speak and write as they wish.

Redirection of scientific research, applied research, and theoretical work is hardly possible, as long as one-sided businesspersons, (their) politicians and bureaucracies are handling resources: they learned how to rule, but not how to make a holistic rather than narrow-minded progress in sciences and technologies of the planet Earth systems.

How can one explain the tremendous, but biased, development of armaments, chemical synthetic products, 1.000.000.000+ and more combustion engine motor vehicles, and many more combustion engines, used in aircrafts, ships, boats and agricultural machines, marketing and profit-making oriented products, GMO/GMP, transport system, promotion of “globalization” as a tool for making money, while scientists are not paid to do their basic research work, and must neglect the research needed for understanding issues of the biosphere system, which is threatening our civilization with impacts of the climate change system and the whole Biosphere to human actions?

The pending big “tragedy of the commons” of all of us
is overseen, that’s how. It results from human lack of holism behavior.

The climate change system is a macro system of the nature made of interdependences, interactions, co-operations of superior/inferior natural systems. The climate change system is responding not only to our civilization’s activities, but also to rules/practices – interdependences, interactions and co-operations – of other systems in nature.

If we do not understand the climate change system, it is so 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, especially in nations of the G 7/25 countries leading our civilization, and international as well as national bureaucracies. They lack the requisite holism and make room for one-sidedness of human actions.



Let's us take the case of CFCs, the ozone depleting synthetic chemical products, which were produced because of the market-oriented research and production aimed at profit rather than human benefit, and caused the climate change system to react with its change, which may respond with a total destruction of our civilization: **we humans must learn** how to manage ourselves.

It is true that humans did not know of the side-effects of CFC's, but now we do: there is no reason to continue with the previous practice of using materials about which we do not know how they interact in medium and long term. They include the genetically modified organisms' techniques, war technologies, uncontrolled development and use of new synthetic chemical products, and combustion engines; these are currently the most dangerous activities of our civilization, not to mention information techniques and energy transmissions influencing magnetic fields and basics of the Earth equilibrium. And last, but not least, let us mention nuclear technologies, which would better have remained behind locked laboratory doors, instead of going into use, and resulting in millions of years of the pollution.

From energy and gases to planetary explorations, that's how the origin of the Earth from birth until present times can be summarized²¹.

The climate or the climate change system has been one of the biosphere systems, which is responsible for the maintenance of living conditions. As a natural system it is inferior to the Biosphere, the planet Earth, the Sun and the Solar system, the Milky Way system, and the Universe. Later on we shall look into separate systems. The climate change system has many inferior systems like: atmosphere, water - seas/oceans, terrestrial, and other areas related to biosphere, and all the mentioned systems have inferior systems, which all together make a whole biosphere system.

All mentioned should be understood as dynamic, interdependent, interacting, co-operating, i.e. dialectical systems, which always evolve. The moving direction is **only dynamic multidimensional evolvment ahead**. To an uninterested walking person the nature may look like chaos, but as the late Prof. Dr. Helmut Metzner wrote in "Chaos to Bios", the nature may look like chaos to us humans, but also our achievements may look to nature like chaos, and not like order, as we believe. It is a requisitely holistic knowledge and ethics, which has to decide on right or wrong.

The climate change system is a very complex system, which is interrelated with a number of superior and inferior systems, and the main purpose of the climate change system is to maintain living conditions within the Biosphere, the energy equilibrium, mean temperature, moisture/water circle system, composition of troposphere, atmosphere and ocean's currents. Many more subsystems exist.

Definitely the climate change system cannot be explained/understood/researched with the knowledge of one or two of the presently known scientific disciplines, but the scientific research approach should be requisitely holistic, supra, inter, multidisciplinary, and done by a team of scientists working for a common goal on a supra/trans/interdisciplinary basis.

²¹ From view point of our civilization (Ecimovic 2002).



It is obvious that scientists need techniques of the system theory, system thinking, analysis and synthesis, complex problem solving, and case research studies to work successfully on the explorations of the nature.

The supradisciplinarity in terms of our research, from the natural sciences point of view, is a precondition for the individual to be able to understand the complex problems of the complex systems.

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

The main purpose of the climate change system is the maintenance of the living conditions within the biosphere, and is calling for explanation of life. From our research in natural sciences and other findings we think that the life could be explained by the hypothesis in the following equation:

$$\text{Energy (E) x Matter (M) x Information (I) + Time}^{22} \text{ (T) = Life (L)}$$

$$E \times M \times I + T = L$$

The life should be understood here as life appearance on the planet Earth, which has a unique composition/place/physics/geography/biology and is permanently evolving its own nature, space, and environment quality, reflecting the present status of the system and its superior and inferior systems' qualities.

An integral part of the evolvement of the biosphere is information, which is interdependent, interacting and co-operating with energy and matter in defining the essence of a specific living creature and feature²³. Basic information connected with life itself is in their gene structures, which are composed by four amino acids in different combinations to systems, specific of every species for which it has been simultaneously (by evolution) composed.

The first life information has evolved simultaneously by evolvement of the first life structure, and the later evolvements have been a reflection of the evolution. All this is evolving within environment, and by interdependences, interaction and co-operation of all matter, energy, information, dimensions, particles, rays, powers, forces and yet unknown contents of the Nature.

The living conditions are not a set, but rather a system/entity of the biosphere's environment qualities, and are preconditions for life to appear and to be. The theory of evolution, the Gaia theory, the system theory, the known past and present, and 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 a part of the Solar system's appearance and existence, and as a result of the Universe's dynamics.

²² Time is conditionally used as per present understanding of it.

²³ Please see »The Information Theory of Nature, and« Ećimović, 2006 (www.institut-climatechange.si)



The climate change system rules over the life status on the planet Earth, not by command, but by interrelations, interdependences, interactions, co-operation, impacts and consequences of the system dynamics.

Here we may comment on the role of humankind/present civilization in the climate change system, which may be described as triggering the system dynamics by our activities.

One of triggering effects was when humans discovered and introduced CFC's and other synthetic chemical substances, which under certain circumstances move in higher layers of atmosphere, and distort by action of chlorine ion the ozone – trivalent oxygen molecules – into oxygen. Destruction of ozone as the protecting layer was result of humankind introduction of commercially important synthetic chemical products based on CFC's.

Brief history of the planet Earth as one of 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 like a ball of energy and gases with temperature of around 7.000 degrees Celsius. Within millions of years the planet was cooling down, and the firm matter was formed within two hundred million years. The oldest rocks on the Earth have been dated at 4.3 billion years ago (4.300.000.000).

The planet Earth is an inferior system to the Solar System, the Milky Way, and the Universe.

The Universe is the macro, largest, most complex of all the systems mankind may research and explore, and it consists of all matter, information, light and other forms of radiation, energy, dimensions, particles, rays, powers, forces and yet unknown contents. It consists of everything that exists anywhere in space and time (conditionally time included). The universe includes the Earth, everything on the Earth and within it, and everything in the Solar system.

Our Solar system contains nine (eight by new classification) major planets (excluding of one planet missing) and along with the tenth and eleventh as new-comers to the family (now asteroids together with Pluto, which was planet before), and 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 existing information in the Universe as 100 units as of now, our civilization's knowledge may be between one and two units.

We have to explore and research much more as we have until now. Of course, we should not forget the system dynamics and evolvments, which both reach beyond our present



knowledge of the Universe. Understanding the holistic nature of the Universe, we have to understand that the Universe's dynamics take countless forms, transitions, expansions, big and small bangs, appearances and disappearances, multidimensional levels, large and small dimensions, and all countless features/evolvments.

Second to the Universe is the Milky Way galactic system, which is a limited part of the Universe within which we humans exist.

It is our first exploration target and a system about which we have to learn as much as possible. The Milky Way consist of about 100.000 billion and more stars as systems of whatever form, and a countless number of planets, micro planets or asteroids, and all other forms of energy, light, matter, information, dimensions, particles, rays, powers, forces and yet unknown contents of any kind.

The composition of the Earth, as a planet inside our Solar System, is “unique” because of the information, matter and energy at its birth.

All forms existing at the moment of appearance are included within our Earth System, and so are many more other forms of the Universe such as light, particles, rays and matter that over the time from the appearance until now have collided with the Earth.

Major influences on the Earth dynamics come from the permanent energy flux from the Sun, and from collisions with asteroids, which arrive from the outer space.

It is important to have this knowledge, which may help us in researching and exploring the climate change system, because the first outside effect on the climate change system is coming from the outer space as asteroids and other dangerous collisions, which have been changing and may change the equilibrium of Earth planetary system as well as the climate change system.

From the past we may learn about a number of occasions on which the Earth climate change system has been reacting with dramatic changes of the living conditions (please see foot note 15).

They were recorded as Glacial or Ice periods²⁴, which resulted from cooling of mean land and ocean temperatures. Of course, we should not forget that land mass and salt water mass react to the change of mean temperature according to their different abilities. Land mass reacts faster, than the salt water mass. Consequently, the life on the terrestrial part of the Earth (total app. 30 % of Earth surface) has been affected more than the marine life, during ice periods.

²⁴ Please see the »Atlas« at www.institut-climatechange.si second PDF under the book “System thinking and Climate Change System”



Interdependences, Interactions and Co-operations of the Life, Climate Change System, and Biosphere

Interdependences, interactions and co-operations of the life, climate change system, and biosphere are dynamic factors for the evolution of the life forms, and the resulting 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 known today did not exist. The climate change system itself was evolving according to the components and relations of the system as it does even today.

The rise of the life on the Earth reacted to conditions of the primordial biosphere, and its physical and other contents. It took Earth something like 0.7 billion years to evolve the life. The first evidence of the life is dated 3.8 billion years ago. From microbial life of primordial time to final evolving of the complex biosphere around 1.2 billion years ago there was the time period within which the biosphere evolved.

The first biosphere energy transition from the anaerobic to the aerobic energy production by microbial life was responsible for the change of the atmosphere from the oxygen-free to the oxygen-rich one. The oxygen-content was around 40 % and with time it has been diminishing to 21 % as it was at the end of the 19th century.

The oxygen-content in the air was the major improvement of life conditions, which made the difference from the primordial time to the time of biosphere, from 1.2 billion years ago till the present time.

The concentration of the oxygen in the air for living creatures to breathe should not fall below 8 % that is somehow a minimum needed for survival. At present in some heavily populated areas of big cities, the concentration of the oxygen could fall to as much as just above 10 %; we are recommending monitoring of oxygen concentration as a precondition for survival of humans in the fragile and heavy polluted environments (big cities).

Our civilization's first settlements were built some 14.000 years ago, as a result of social life evolution of pre-antiquity humans.

First settlements on European area were built on swampy areas, for security reason, and population was up to 10.000 people. It was a result of the changed conditions within the biosphere that evolved after the last ice period, which was ending some 60.000 – 16.000 years ago. Since then the climate change system conditions on the Earth were almost at the quality of the present time. Of course, changes have existed but not as extreme ones, as the ones coming up now.



The difference between today and 200 years ago is due to the extreme input of our civilization's output into biosphere such as: all sort of waste, and side-effects of nuclear etc. technologies, synthetic chemicals, human population explosion and its consequences; destruction of biosphere resulted from covering the current needs of humans. In short, and we shall work out the above-mentioned later on, those are reasons/impacts, which cause the triggering effects of our civilization on the climate change system, as consequences.

The climate change system as an integral part of the Earth biosphere is somehow between its inferior and superior systems; all of them together with the climate change system itself have a number of mutual interdependences, interactions, and co-operations.

As we have mentioned before, the Universe contains all matter and energy, particles, rays, information, dimensions, powers, forces and yet unknown contents. The Universe may have a dramatic influence on the Earth's climate change system, in the case of catastrophic changes affecting the Solar system, and in the case of the Earth's collisions with space body/bodies influencing the Earth's existence.

It happened and may/can happen again. There is e.g. the hypothesis that a collision of the Earth with a cosmic meteorite some 65 million years ago caused Dinosaurs to get extinct.

The largest and most superior system of the Nature is the Universe. The probability of a destructive interaction of the Earth with the Universe system is very small. Because there is a countless number of star systems and other forms within the Universe, the Earth has a little chance to experience major destruction caused by the Universe system activities. The Earth system is namely just a very small part of it.

The Solar system is a very large system, from our civilization's point of view, but a very small one from the galactic point of view, and even much smaller from the Universe point of view. The Sun and its eight planets make one small sub-system of the Milky Way Galaxy. Actually the Milky Way Galaxy has hundred billion+ of star systems, and our Solar system is just one of them.

The Sun is the central star of the Solar System, and has 99.8 percent of the Solar system mass. It is the center of its system, and source of all energy and matter within it. Of course, it is an inferior system to the Milky Way Galaxy, which is over 100.000 billion times bigger in mass as the Solar system.

The Solar system revolves around the center of the Milky Way Galaxy at a speed of around 250 kilometers per second.

For our Earth planetary system the Sun is the source of everything from birth of the planet onward, and we exist because the Sun is providing us energy, warmth, light, and all other important inputs – physical and other components and interdependent, interacting and co-operating matters. Our planet system is completely dependent on the Sun. Our present time and experience is mirroring physical, geographical and biological etc. statuses at which we are at this very moment.



Of course, the influence from the Solar system is not caused only by the Sun, but also by a number of interdependent, interacting and co-operating relations with neighboring planets, planet-like bodies of different size, Moon and other forms of energy, matter, and natural powers. The planet Venus is the closest to Sun, and the outer planet is Mars. Together with Mercury they are presenting terrestrial planets of the Solar System.

The other four planets Jupiter, Saturn, Uranus, and Neptune are gaseous gigantic planets on the outer part of our Solar system. The last planet (not more planet but asteroid) is Pluto, but it is not always the last one, because of its oval-shaped orbit, which places it sometimes before Neptune, but most of time it is the most distant one from the Sun. Recently 2 new celestial bodies have been discovered in line from the Sun and after Neptune/Pluto.

The Solar system is stable, and changes in its system qualities are reflecting/influencing its entire 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. Not only each planet's composition, but also its distance from the Sun is a deciding factor for the quality of the Solar system. The life stream of light and warmth from the Sun enables life on the planet Earth.

Both the quality of the Sun system and unique Earth's composition/distance from Sun make interdependent, interacting, and co-operating parts of the life-support system on the Earth.

Understanding of many powers and forces of nature is important. They include gravitational, magnetic, energy, matter and information transformations, rays and particles etc., dynamics/movements (like the top, orbital, galactic, and of the Universe), the Solar system, the Sun and planets including our planet the Earth. Synergistically, they make characteristics, interdependences, interactions and co-operations of the whole system.

The Sun has a diameter that is 109 times bigger than the one of the Earth, and 400 times larger than the one of our Moon. All eight planets and all other formations within the Solar system are orbiting around the Sun. The Sun and all planets move like a top and all together orbit within the Milky Way Galaxy. All this movement should be more researched to allow us to understand the basic powers resulting in interdependences, interactions, and co-operation among parts of the Solar system. The Solar system as well as all other systems is functioning according to their given systems²⁵/entities of parameters. Our civilization has its chance to explore research and understand the Nature and our existence.

The Earth Planetary System

The Earth planetary system is very robust. At present we are having 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, upper mantle of 400 miles and the crust of 2 – 45 miles in diameter.

²⁵ We say »system« rather than »set«, because in the systems theory a system consists of two sets, mathematically: the set of its elements and the set of relations between them (and with its environment) resulting in synergetic attributes that the entire system has, but its elements alone do not. Hence, speaking of a set would mean the traditional oversight of relations and their crucial importance.



On the top of the crust, there are permanent dynamic changes caused by the natural powers by which the Earth's surface has been and is shaped. The atmosphere covers, protects and completes 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 8.000 miles or 13.000 kilometers in diameter. The Earth is the fifth planet by diameter, the largest one is Jupiter with an eleven times longer diameter, and the smallest one is Pluto²⁶ with around one fifth of the Earth's diameter.

The surface of the Earth together with its atmosphere makes 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 the most important element. It forms:

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

After establishment of such a support within the biosphere system the appearance of life on Earth was just a matter of time (time conditionally used).

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

The unique composition of the planet Earth and its distance from the Sun are two major qualities that have evolved with evolvement of the Solar system, and make the basic possibility for life to appear on the Earth.

The Earth crust surface is at present made of a terrestrial part, which covers around 30 percent of the surface, and of ocean/sea waters cover taking the remaining 70 percent of the surface. The ratio between oceans and lands was changing with dynamic changes of the Earth surface evolvments. 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 came from the appearance of the first life forms. These were the 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. Change of the primordial Earth from its anaerobic to its aerobic stage took hundreds of millions of years. Bacterial life significant contribution was the sink of carbon dioxide, when their dead cells settled as sediment on the oceans bottom. There they have been transformed into numerous carbon compounds that we see today as fossil fuels. It was the time of the first energy

²⁶ Data about the new 2 outer celestial bodies are not yet well known; one missing planet might also have a questionable content within the present status of the Solar system. Pluto has been re-classified and is not more recognized as the planet.



transformation; actually, anaerobic microorganisms transformed sugar molecules to gain two units of energy per molecule.

In the next generation microbes were able to split water molecules by using 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 critically: the new generation of microbes was able to use oxygen in 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.

The carbon dioxide was a part of water due to its solubility, while oxygen that was not solvable 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 has 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 to the terrestrial part of the surface, forming on it 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 700 hundred millions years ago. Land mammals appeared some 350 million years ago. The human predecessors are dated some 8 million 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.

Requisitely Holistic/Systemic Thinking/Behavior – Basic Principles Applied to the Climate Change System

System thinking, synthesis, analysis, complex problem solving, case study approach, as well as the traditional science and research and learning, are prerequisites for opening of the Nature's knowledge box. This is a crucial goal for research and success of our civilization. Preconditions for sustainable future are directly related to human ability to support supra, multi, and interdisciplinary research applied toward this purpose.

History and status of the system could be known, the near future also, in case of continuity, but predicting the future could be done only in the case of a stable status of the system. The



Earth had over 10.000 years of stability, but no more now, due to destabilization of the climate change system. It has been triggered by impact of our civilization and natural responses to that effect: when the system has been destabilized, it is quite impossible to predict any relevant information on future evolvments, and it is situation with our Biosphere.

The described facts, though, do not mean that there is no impact of us humans over the climate change system. We do have an impact for sure, and its contents depend a lot on our own thinking/behavior. Our one-sidedness is quite natural and equally dangerous at the same time, potentially leading to our own extinction. We should better add something to our behavior, which is called holistic/systemic thinking/behavior. It is briefed in the Table 1 as follows:

Table 1: The Basic Seven Groups of Terms of Systems / Systemic / Holistic versus Non-systemic Thinking²⁷

Systems / Systemic / Holistic Thinking	Non-systemic, Traditional Thinking
Interdependence/s, Relation/s, Openness, Interconnectedness	Independence, One-way-Dependence, Closeness
Complexity (plus complicatedness)	Simplicity, or Complicatedness only
Attractor/s	No influential force/s, but isolation
Emergence	No process of making new attributes
Synergy, System, Synthesis	No new attributes resulting from relations between elements
Whole, holism, big picture	Parts and partial attributes only
Networking, Interaction, Interplay	No mutual influences

The climate change system is an integral part of the planet Earth biosphere. It has no clear-cut borders with other systems in the nature, like we humans are used to think and see. The climate change system is rather a part and complex natural system that actively takes/uses/puts/gives inputs/influences/impacts, receives outputs/influences/impacts from all inferior and superior systems, and reflects the present ones – as living conditions at the very moment of observation. Observer can go back in the history of evolvments, but cannot go into the future, due to countless possibilities involved.

When we apply the above findings to the climate change system, we may understand “chaos” as interdependences, interactions, and co-operation of many different systems of nature resulting from parts of the very complex climate change system. Of course, we should not forget that this thinking is human thinking with all good and bad attributes.

The climate change system is a composition of a permanent evolution of the natural systems, which support the biosphere as the space for living creatures within nature. We have seen dependences of the climate change system on its superior systems; let us first list the influences, which may occur from them to the biosphere:

- All changes/evolvments of the Sun system have an absolute impact on the biosphere. They have a strong impact on the Earth, and most probably grave consequences, when changes at

²⁷ See M. Mulej's The Dialectical Systems Theory, presented also in the book “System Thinking and Climate Change System” displayed at www.institut-climatechange.si



the Sun system evolve. More scientific research should be directed towards understanding of effects from the Sun on evolvments of our biosphere. As the major provider of warmth 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 and the Solar system as well as other forms of matter/energy/particles/rays and the forms/powers/systems not yet known to us humans have influenced and will influence our biosphere. Fortunately, their impacts are not so frequent.

- The planet Earth's attributes studied by physics/geography/biology have a very important position. Due to permanent evolvement, interdependences, interactions, and co-operation, etc., the powers of nature have created our biosphere, and keep creating it. We humans can see its past and present. We can understand dynamics of some of the mentioned systems/powers, but not of all of them. Our current knowledge is failing to use system thinking, as a possibility to better understand the system inter/dependencies and dynamics.

- The inner core of the Earth has some 1.500 miles in diameter and is moving like a top with a different speed than other parts of the planet do. Any change in the revolutions and directions of the movements could have a strong impact on the Earth system. More research is needed, to understand this subsystem, and its interdependences, interactions and co-operations with other subsystems.

- The rest of the Earth – outer core, lower mantle, upper mantle and crust totaling some 3.200 – 3.250 miles in diameter have a number of common interdependences, interactions, and co-operation which influence the biosphere. Earth's permanent changing under its surface is broken into numerous crust plates, which are in constant motion with respect to each other because of the powerful internal forces. Volcanic activities and earthquakes are products of large-scale crust plate collisions or separations. Both activities have complex impact on our biosphere, from the local direct disastrous impacts by lava, ashes and land movements, to the even tougher impacts in cases of strong eruptions and large inputs of ashes into our atmosphere. They result in impacts on the biosphere as a whole.

- The natural powers such as gravitation, magnetic force, electricity, etc., circular movements like a top and joint movement within the space of the Solar system, the Milky Way, and the Universe are extremely important and not yet fully understood by our civilization, as well as the particles movements and system abilities.

- The climate change system – **the provider, maker, guardian, and holder** of living conditions within our biosphere has been composed of a large number of systems, which are interdependent, interacting, and co-operating to evolve into the present condition at the place of observation, all at same time. Thinking globally, the climate change system could be observed in some of patterns or expressions or variations, which show up in different values of temperature, moisture, and currents.

- The biosphere is composed of terrestrial, aquatic and atmospheric subsystems. Their characteristics are basically the frames, within which the climate change system has its role as the provider, maker, holder and guardian of living conditions.



- Very well-known geographical facts of the Earth, such as latitude, longitude, and altitude are qualities decisive for warmth and light, which are reflected in the quality of local environment. On the other hand the distribution of this quality depends on the basic characteristic of land or aquatic environment. Of course, when differences meet, at bordering environments, their quality is more complex. And it is not so simple, when taking into account complex interdependences/interaction/co-operation of all different systems together, which have something to do with the climate change system.

From the selected viewpoint, 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 appeared. In ocean waters the anaerobic bacterial life was the first to influence all latter evolvments. Due to the exceptional reaches of ocean waters full of inorganic compounds the first bacterial cells had an excellent life environment. The ocean waters protected them from UV rays and the temperature of waters was suitable. The light and warmth from the Sun had a lower radiation than today. All phases of the anaerobic life lasted from its commencement on from around 3.8 billion years ago until the appearance of oxygen in the atmosphere around 2 billion years ago.

The bacteria have changed the Earth's biosphere from an oxygen-free to an oxygen-rich one, from an environment unprotected against UV rays, to environment with ozone layer as UV protection zone. Sterile terrestrial lands changed to lands rich with life. After the change from the anaerobic to the aerobic life the biosphere changed, and many complex life forms evolved.

The water cycle, the oxygen cycles, the carbon dioxide cycles, the sulfur cycle, and waste of organic compounds together with life itself have been an integral part of the biosphere's environment. The basic influence transferred the fragile environments into life-friendly environments, and resulted in protection of the Earth surface against erosion and its consequences such as destruction of lands, ocean water currents, and air movements that have been established as regular or temporary.

The biosphere was evolving and became the space for life and living creatures. Physical, geographical, chemical, biological and systemic interdependences/interactions and co-operation enabled an environment supportive of evolvement of life. Today, we may find at the same time within the Earth biosphere primordial conditions as well as any later evolvments, which followed them later on. Our present biosphere has a countless number of biological sub-systems, which are, along with their synergies, ensuring the life continuity in the present and many other possible and changed environments.

The terrestrial lands, from the frozen Arctic/Antarctic environments to the tropic conditions, are home of a large number of different living creatures systems, which all together make a comfortable living as long as they follow the system interdependence/interactions and co-operation.

All ethological differences are a part of the maintenance of environmental matter exchange, in which numberless biosphere sub-systems evolved for the life to continue. The changes/evolvments are consequences of interdependences/interactions and co-operation of all systems involved. The same apply to the evolvement of the aquatic and atmospheric environments. ***The biological system is a moderator of living conditions within the biosphere.***



The Sun provides energy – light and warmth. The planet Earth protection systems within the atmosphere are ozone protection zone in the Stratosphere (15 – 24 kilometers) and the greenhouse effect (the natural parts of which are carbon dioxide, methane and nitrogen oxide). Both protection systems are filtering/transporting radian energy to the Earth surface and back to the outer space. In geographical terms, the Earth surface has now around 30 % of terrestrial and 70 % of water areas (oceans/seas). The energy equilibrium results from inputs and outputs of energy. Changes within inputs and outputs interfere with energy balance, and their consequences is either cooling or warming. But due to the complex system characteristics of the Earth such as: changes in the atmosphere, changes at the terrestrial part, changes at the oceans/seas waters, changes within the biology of the surface, and anthropogenic inputs, its reaction to warming or cooling follows different patterns. The air movements and oceans/seas currents have an additional influence adding to this complexity. ***The energy balance is a most important life supporting system, and the changes within it are very destructive for the biology of our biosphere.*** Changes result in extinctions of animals, plants and bacteria, and appearances of new forms of the life. Drastic changes are known as glacial or ice periods; in the past the Earth experienced a number of them.

The Water Circle – a Crucial Component of the Climate Change System

The water circle makes the difference between the planet Earth and the other terrestrial planets Mars, Venus, and Mercury. It is a part of the biosphere and has surfaced at the birth of the Earth. The water cycle is a sub-system of the biosphere, which provides the basis of quantity/quality of the biosphere environment. After birth of the Earth, as soon as it had become cool enough, water appeared in liquid, ice, and gas forms; the water cycle commenced its permanent action and evolvments. As an environment it has excellent transport and interaction abilities, which probably, together with other sub-systems: cloud formation and movements, lightening and natural electricity, assisted the birth of life. Life appeared in aquatic environment, and it took almost two billions years for life to move from the aquatic environment into terrestrial lands. 97.5 % of the Earth water is there in oceans/seas, and fresh water makes 2.5 %, of which: 68.7 % is there in glaciers (which are diminishing due to the climate change system impact on the main surface temperature), 30.1 % in underground waters, 0.8 % in permafrost (also decreasing), and 0.4 % in surface and atmosphere waters. Surface and atmospheric waters are: 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 %. Yet water is a needed quality of biosphere, as a precondition of life. Most living creatures have between 75 and 95 % and more of water content within their bodies. Water is the main transport system within cells, tissues and all the body. Water is the main environment for chemical processes in nature. Water is the main architect of nature, when carving mountains, lakes, rivers, and shaping the Earth surface.

The water movements/currents of oceans and seas result from the temperature and salinity difference, winds and interdependences/interactions and co-operation of other Earth systems – gravitation, Earth movement, air movement, energy balance, Moon and Sun gravitation, etc. The present status of oceans currents has an important role within the climate change system. Changes within them may have dramatic consequences for all other parts of Biosphere. Tsunami catastrophic disaster in last days of 2004 has demonstrated the power of the Nature.



Air and water are permanently interdependent, interacting and co-operating, when water changes from liquid to water vapor, which is transportable by air. When temperature changes in the processes, assisted by the air particles (physical or biological), the water vapor changes into ice and liquid form and comes down to the surface as precipitation.

Mountains are water towers of the terrestrial surface, and the forest is the primary filter of water and its transporter to the underground. Rivers take water to lower altitudes; with their biological system they are secondary filters/conditioners of water. The river waters are the main transporter of mineral components from mountains and higher altitudes to lower altitudes and finally to the seas.

When waters from higher altitudes do not find their way to lower altitudes, lakes show up, and with their biological life they form the lake waters systems. Of course, lakes can have river water input and river water output, but the lake water body is placed under the level of water outtake. Lakes are the water storages at higher altitudes.

Swamps, swamp-forests and marshland areas are the best biological filters of water, and they usually are placed at lower altitudes and as estuaries. At all locations where water (fresh or salty) and land meet, there are the biologically richest regions. The planet Earth matter exchange is possible due to water's active transporter role, and the activity of environment with biological richness, which helps our health by purifying the terrestrial surface waters.

The underground waters transport water under the Earth's surface and provide water in water springs. There are large underground waters at deeper levels of terrestrial and ocean/seas bottom levels, which are there because of the Earth crust movements. They are underground lakes of waters rich with minerals and usually sterile.

The terrestrial surface water movement results from both the altitude and gravitation: water has the golden ability to move downward (gravitation), and it has a leveled surface when staying. The terrestrial, biological and atmospheric waters are less than one percent of total waters on the Earth, but due to water circle they are an important sub-system of biosphere.

The Atmosphere as another Crucial Part of the Climate Change System

Between the Earth body and outer space there is a large environment of gasses, rays, particles, nature powers and forces called atmosphere reaching up to 1.000 kilometers. The first ten to fifteen kilometers are called the troposphere, the lower part of the atmosphere. It is the weather-impacting subsystem where the air movement is most frequent. It is here that clouds are formed and move; here, one can find living creatures, from birds to microbial life forms. Troposphere is followed by the stratosphere reaching 15 – 50 kilometers from the Earth's surface, including the ozone protection layer (15 – 24 kilometers). Mesosphere (50 – 85 kilometers) and Thermosphere (85 – 400 kilometers) end into exosphere, which ends into outer space at the altitude of around 1.000 kilometers. The atmosphere is a gaseous cover of the Earth surface and it is an integral part of the biosphere and of the whole the planet Earth system. It takes, transports, rebounds, transforms the cover of the Earth for the Sun's rays of light and warmth, as well as for any rays/particles/outer space bodies/nature powers meeting the Earth as a whole.



Two main gases make 99 % of the atmosphere: nitrogen 78 %, and oxygen 21 %. As everything in nature their distribution, movement, and content change within limited possibilities. The remaining one percent is made of the natural presence of carbon dioxide, methane, water vapor, nitrogen oxides, argon etc. The oxygen is present as dioxygen, ozone, carbon dioxide, and water vapor. Our civilization has contributed additional contents of gases into atmosphere such as: additional carbon dioxide, additional methane, nitrous oxide, chlorofluorocarbons CFCs, hydro fluorocarbons HFCs, per-fluorinated carbons PFC's as green-house gases. As photo-chemically important gases there are carbon monoxide, oxides of nitrogen, and non-methane volatile organic compounds NMVOCs, which indirectly contribute to the green-house effect.

The atmosphere is the largest part of biosphere. It has an important role of making life possible by oxygen concentration, which is the life-supporting gas amongst the atmosphere gases. Secondly it is the area of water vapor transport, cloud formation, and the main transporter of the water circle, important from the biology point of view.

The air movement in the multidimensional space has regular and irregular patterns, and now during the climate change system movement the extreme air movements are recorded. The wind speed of up to around 500+ kilometers per hour has been recorded in the last 20 years. For the biosphere, the air movement is of great importance as a transporter of life forms, moisture supplier, and local weather maker. On the other hand it is antagonistic to the human constructions, which are usually demolished, if they are constructed at too low standards of the wind/tornado/typhoon strength, when it occurs.

The carbon cycle was probably the most important cycle during the primordial Earth times, because it caused the crust formation and carbon layers deposition at ocean/seas bottom and on land surface. It is a direct in/output of biology, and partly of the biosphere chemistry, processes.

Carbon is a constructing element of the biosphere. A very fast (less than 1 year) exchange of carbon is typical of the plant life. It is today the second carbon exchange, which takes the first place as the very fast carbon exchange. Fast (1 – 10 years) carbon exchange comes from soil and oceans/seas surface. Slow (10 – 100 years) is exchange of carbon within 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 processes within the carbon cycle in nature, and the relatively fast input of carbon by our civilization into our biosphere, we face a situation, which the existing processes in the biosphere are not able to compensate. It is one of the reasons for the global warming.

The sulfur cycle has been a less important cycle in the nature during the time when our civilization did not exist. It has its important role within nature, but our civilization causes damages in nature by increased quantities of sulfur (acid rain) that have become fast a damaging factor. The sulfur is an essential element for the life to exist on Earth.

Our Civilization as a Hampering Precondition of the Climate Change System



Be our civilization an inferior or a superior system of the biosphere, the planet Earth, Solar system or Universe, it is a small system, but an influential integral part of the whole. Today we are discussing our problems of nature, space and environment protection (protection against whom?), but even the great Greek philosopher Plato stated more than 2.000 years ago:

“When there still were forests 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 meager framework of the landscape is still present – comparable to the skeleton of the body attacked by illness”.

The systems have not been properly named “important and unimportant systems”; all of them are systems and interacting/interdependent and co-operating to produce the results present in the Biosphere now. But we humans did not follow the nature’s instructions that we should think of interdependences, interactions, and co-operations enough, so far. The Dialectical System Theory may offer a more promising possibility/tool than the General Systems Theory; we have discussed that in our book “System Thinking and Climate Change System”.

The climate change system as an integral part of the Earth Biosphere’, has a bigger influence on our civilization as we humans of our civilization think and believe. In absolute terms the climate change system is provider, maker, holder, and guardian of the living conditions, which are making our life possible. But we humans are one-sided, although mostly trying to do our best in our modern relations to nature and each other; thus, we do not to appreciate this fact, but harm the climate change system as much as we can, yet it could be even worse.

There is a theory of the anthropocentric interference with the climate change system, trying to explain reasons for the climate change caused by our civilization over the last 200 years, 1800 – 2000, and we would like to discuss it and to assess feasibility of such a theory.

The philosophy about this issue was written many centuries ago when the story of David and Goliath appeared. But by our standards we humans do not view our David-like abilities and impacts as a general practice, and we do not know what we are, what is our natural system, which systems are we interacting/interdependent/interrelating and co-operating with, and where do we belong. What too many humans do understand is how to make money out of our civilization and how to use/misuse/abuse the nature’s richness for it. What are our impacts and what could be their consequences, most of us humans do not care. For our civilization to survive on the Earth, we have to recognize the biosphere’s limited capacities for our, human, species to be successful rather than to harm ourselves. It is not only competition but also, and most of all, interdependences, interactions and co-operation, which enables our civilization’s life. As long as we shall live on the present paradigm, which could be seen as hiding the reality and misusing/abusing the Nature, rather than take the long-term responsibilities for our civilization’s impact on our own biosphere, we shall be increasing the discrepancy between our civilization and our nature/our biosphere – and diminish our benefit from it.

It is ***not the planet Earth*** that is the home of our civilization, but ***the biosphere***, which is a tiny part of the planet Earth. Vulnerability of the two is two, not even comparable, issues.



The present status of our civilization says, that humans do not see our civilization requisitely holistically – as a system, and overlook what are interdependences/interactions and co-operation needed for a sustainable future of our civilization. Though, these are the issues of “to be or not to be” and important for our civilization’s well-being.

If we accept that the origin of our ancestor, the Homo sapiens has been dated some 200.000 years ago and our first settlements some 14.000 years ago (the first settlements in Eurasia), and great cultures (China, India, Mesopotamia, Egypt, Persia) 7.000 – 3.000 years ago, we may discuss *from where* we are. But *what* we are, from the point of view of the natural sciences – biology of the biosphere and planet Earth, this issue is not included into any old script or our predecessors’ philosophy. Religions – the permanent supporters of our civilization are our predecessors’ innovations, but they have never discussed the origin of the civilization. Their focus has always been on human being and how to take from people as much as possible. Existence, economics, and ideology have always been interdependent. Warriors, kings, rulers, democrats from the past (such as the ancient Greeks some 2.500 years ago) and 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. The tribe stories – on and by people, chiefs, and spiritual leaders – describe what we are, but do not discuss what are we doing for our living, and what is our civilization’s impact on the biosphere.

If we accept that we humans are an integral part of the planet Earth biosphere – nature, and the peak of the life tree on the planet Earth, from the natural sciences point of view, and take system theory as our thinking tool, we may say that we belong to the planet Earth biosphere as interdependent part/content/living creature system.

Thus, our civilization is *one of the many living systems* inside the planet Earth biosphere and we may say that we are one of the planet Earth civilizations. Which are the other civilizations? From our research we may point to many living creatures and large civilization, which are out-numbering Homo sapiens by the number of their members many times. Among the largest populations are microbial species, etc. It is known that survival is based upon availability of food, water, air, and space, but what has never been considered, is the impact of the species on the food/water/air/space availability. In nature many species are known, which have a short lifetime, as individuals/individual representatives of their species, but as species they have been around for very long time. The classical case are microbial cultures – parasites, which destroy their host and themselves, but not as species, but as a present culture invading the host. This is a life story, one among many others. And the nature has taken care of matter transition within the kingdom of life. It is a permanent system of matter transition from “ashes to ashes”, not used for ruling the humans but presenting the circling of matter within the biology of the biosphere.

Let us see ourselves in this context. First scattered settlements were where the food, water, air, and space were abundant, and settlements flourished. When settlements had joined, the cultures/nations were established. And as long as the food, water, air, and space were abundant the culture was in good shape, but when food, water, air or space became restricted, the culture went down. So finally our civilization has come to ***Age of Globalization*** and became our and global ruler of the planet Earth. After a few millennia, food has still been abundant (in 1960’s), and water was abundant (in 1960’s), and air is abundant (at the



beginning of the third millennium), and space looks like being abundant. But at the end of second millennium the food was no more abundant, the water was no more abundant, the air was no more abundant and only space still looked like abundant, which in fact is neither so any more. Is the end of our civilization approaching us?

From the natural sciences point of view: yes, it is. But, any culture in the biology of the biosphere has its time of birth, childhood, adulthood, old ages, and history, anyway.

Human Capacity of Requisite Holism – a Crucial Precondition of Benevolent Climate Change System Process Still to be attained

The novelty to be attained – and to be made innovation – could be the ability of the current Homo sapiens to think, understand, and learn, how to *requisitely holistically* manage our own civilization affairs, e.g. provide to all humans food, water, air, and space for living. This task can be done better, if the system thinking is used, but rather the Dialectical Systems Theory addressing the human attribute and interdisciplinary cooperation than those systems theories that focus on precise description of a feature from a single viewpoint.

The climate change system is an integral part of the Earth's biosphere and it has a multi-complex purpose to provide, hold, make, and guard basic conditions of the life: temperature, water cycle, air-sea-ocean movements, protection, management and regulation/control of the biology of the biosphere.

The climate change system is one of sub-systems of the biosphere. Which parts of the biosphere system could be affected by impact of our civilization is a question, which we shall try to indicate an answer to, now.

Biology of the biosphere has many successful systems, which are in different stages of life. The most successful and the best evolved is the rain forest. Of course the geography, i.e. longitude, latitude and altitude of the environment and space impact the conditions and possibilities for evolvement and management of life. Second to these conditions is availability of water, which in many cases is closely connected with evolvement of the biological system. In many cases the biology of bordering regions between two different environments land/see, fresh water/land etc., include very successful systems like mangroves, corals, coastal sea and ocean waters etc. But the bigger portion of the biosphere is made of oceans and seas (around 70 % of the earth surface are oceans/seas and 97.5 % of all water on the Earth is in the oceans and seas) and they are less researched and more difficult to know in details.

A general biological knowledge may indicate that the best biological systems on the terrestrial surface are the forests, the second are grasslands, and then come the biotopes specialized according to local conditions – swamps and marshes, bush lands, makia/gariga (Mediterranean), mountains, the Sub-arctic, Arctic and Antarctic regions, rivers and lakes, deserts, etc. In coastal waters of oceans and seas there are corals, mangroves, and many more as biological systems belonging to successful stories.



All natural systems are composed of physical, geographical and biological characteristics, which make a basis for their composition, while the climate change system provides, makes, holds, and guards the living conditions (water, air, temperature) to provide/guard their evolvments. We may explore the past and see the present of these systems, but we cannot see future evolvments, due to many possibilities and influences involved.

Water and food are very interdependent, when we discuss the food production of our civilization. Water is a basic precondition for food production. Due to changes in the biosphere our civilization was replacing water available for food production naturally with water from other sources – rivers, lakes, artificial accumulations, etc. Actually, by doing so, the food producing environments have become very similar to the artificial systems, and have been moving fast out of the nature/biosphere patterns.

Due to increased demand for food, new areas have been put into exploitation, which have not been used before. The artificial food producing systems entered a long-term use (reactions in the biosphere are taking time as long as they need, since nature always has enough time, or nature does not care for time, etc.). The reaction was very much limiting the production ability, and our civilization was forced to innovate technologies for food production and protection (not to forget the profit/money-gaining reasons) of the food production systems. Many pesticides were invented and then innovated. One-sidedness of the purpose of innovation has been resulting in damages within the biosphere that have gone far beyond our ability to understand them, when we commenced to use pesticides. Today the synthetic chemical compounds should better not enter the natural systems, because of their long-term damaging effect on various parts of nature systems such as water pollution, desertification and lost productivity of agricultural lands, etc.

Now we face a large intoxication of the biosphere with pesticides. It is a consequence of lack of consideration of 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, the water sources in the nature are becoming insufficient. Many innovations were used for solving this problem, of which many have had an impact on the biosphere systems. Let us mention here the exaggerated use of fresh river/lakes waters, resulting in the destruction of underground deposits and lakes of water, and combined with a lack of understanding the physics of the underground water deposits systems, etc.

At present we face large deficit of fresh water sources, and quality of present sources is questionable, due to pollution by synthetic chemical compounds and their long-term effect. Recently, also the influence of hormones and hormone-like substances are becoming more and more important. Today we do not have clean fresh water supply, but fresh water supply, of water quality within the limits of allowed level of intoxication by synthetic chemical compounds and other pollutants. From water supply viewpoint our future does not look nice.

Our civilization's settlements of near past and present (over-concentration of people and self-creation of the fragile environment – mega-cities etc.) has caused the pollution of all waters in such regions, including areas as far as such polluted waters travel. Actually, the pollution has been a combined effect of pollution from city life (countless toxic substances – natural and synthetic chemical products, etc.) ending in the waters from individual kitchen outflows and



sinks, toilets and sewage systems, and from the “natural” rivers flows. Secondly, the usual agriculture intoxicates lands and underground waters and further waters connected with intoxicated lands and underground waters. Finally all this is ending into coastal sea and ocean waters, which are in different stages of pollution/intoxication.

Our civilization has used/uses rivers as sewerage transport system. To achieve the combined effects of the protection of human settlements, citizen’s properties, and civilization’s achievements against the natural river waters floods, huge hydro constructions were introduced. Actually, by our civilization’s standards, we have straightened the natural river flows, and by doing this, we destroyed the natural/biological river waters “filtering” systems. We achieved a fast running of the river waters, and only this, because we did not protect civilization settlements and achievements against floods. In the long-term the floods are still there, but with a much more damaging effect. A majority of the rivers need eco-remediation of their natural abilities to host life and other qualities destroyed by our civilization.

A further topic with a comparable destiny tackles estuaries and coastal waters, which in many cases were reconstructed into businesses, settlements, and tourist resorts with poor natural biosphere characteristics. They are opening new frontiers for pollution of coastal waters and as a consequence the oceans/seas waters are getting more and more pollution by synthetic chemical compounds and other pollutants.

At present majority of human population of our civilization has settlement at coastal lands. The pollution of coastal waters is taking place, and soon we shall be able to read results of our continuous action damaging the quality of sea and ocean waters. They will be unpleasant.

With our civilization constructions and developments more and more land is changing natural characteristics. At present in Europe land use distribution is: 47 percent agriculture, 36 percent forestry and 17 percent constructions and developments or sealed²⁸ land, taken from the Nature/Biosphere.

The data briefed here make us conclude that many individuals and organizations need to learn and apply system/holistic, actually a requisitely holistic thinking/behavior. Both the past and present experiences of our civilization’s impact on a large number of natural systems are calling for more effective nature, space, and environment protection from members of our civilization. In reality, we need diffusion of the requisitely holistic thinking for a broader impact towards better and more sustainable behavior, in order to attain our civilization’s long-term responsibility and preserve our nature of our Earth/Biosphere rather than to suffer a global tragedy of our commons.

The climate change system operates under preconditions given by the dynamic evolvement of physics, geography, and biology of the Earth and its environment. The humans, with their life practice over the last 300 years of industrial and post-industrial civilization, have been proving their ability to influence constructively and destructively their natural environment, and are going beyond the border of a sustainable life and its long-term influence on the biosphere of the planet Earth. Our findings exposed in our book “System Thinking and Climate Change System” demonstrate that the human impacts on the planet Earth’s biosphere

²⁸ Sealing of lands is process of putting human eco-sphere in human rather than natural order, or constructing and building living environments for humans and livestock, constructing infrastructure, industry and other facilities, churches and religious centres, education and sport facilities etc.



system are both individual and organizational, and their consequences are individual, local, organizational, regional, national, international, continental, global, and perhaps even universal. Therefore the selected problem is how to attain a better and more systemic long-term responsibility of humans to humans (individual social responsibility), including the one towards the nature. The selected viewpoint considers the potential political measures toward this responsibility. It would be proper to think that the Age of Globalization is asking for a new approach²⁹.

The climate change system as an integral part of the Earth biosphere is not its creator, but its provider, maker, holder and guardian of the living conditions. Humans have to find a new path towards sustainability or sustainable future, which will provide for more holistic mutual relationship of this civilization and the planet Earth in the newly evolved conditions. The sustainable future of humankind could be defined by “harmony of the present civilization with the nature of the planet Earth”³⁰.

Philosophy, knowledge creators and its users, sciences, basic and applied research professionals, development specialists, society, and all governing, economic, national, international institutions/subjects, etc. need to accept a broader – requisitely holistic – view at the given evolvments in our biosphere, and to respond adequately to their new challenges.

The present pollution on the global scale (synthetic chemicals, nuclear etc. technologies, CFCs and similar substances, pesticides, genetic modifications, hormones-like substances from our civilization’s synthetic chemical production and medication, technologies’ impact – combustion engines and others, transport equipment, armaments and other war equipment, PCBs with impact on gene structure, etc.) reflects samples of our civilization’s short-term and narrow-minded behavior. What we need for our sustainable future is our long-term social responsibility together with individual social responsibility of each and one, for our civilization’s impact within the biosphere; it impacts us via nature.

Here we have to distinguish the impacts of the ruler of our civilization – money or profit motive – from the understanding of it and the actual damages done by by-products caused by the lack of knowledge and holism. In many cases of global pollution the profit motive of our civilization was the main reason for large pollution – PCBs, CFCs, pesticides, plastics, etc. – which were and are produced, promoted, and marketed as improvements, but have resulted in damages in our own living space or environment. Cases include the population’s explosive reproduction, and pollution of the atmosphere.

We need research, understanding and values/culture/ethic/norms supporting the long-term responsibility of our civilization in order to stop the irresponsible behavior of the present rulers in economies and societies, the humans. Our civilization’s products such as the one-sided profit system, which causes a failure of understanding of the long-term responsibility, and hence causes irresponsibility, are detrimental to our-selves, at least in a longer term.

The present status of the biosphere, nature, space and the environment, as well as the scientific and research knowledge available to mankind, but not applied on a requisitely

²⁹ New approach has been researched by Prof. Dr. Slavko Kulic, IOM, from Zagreb, Croatia, and his research has been done many years ago, but it is still waiting for its implementation.

³⁰ Taken from the book “The Sustainable (Development) Future of Mankind”, Ecimovic et al., ISBN 978-961-91826-2-8, 2007, displayed at www.institut-climatechange.si



holistic basis of behavior, and our social system, are driving our civilization in a dead alley: the short-term and narrow-minded views are favored too much. Individual, regional, national and international interests do not permit mankind to take a new – requisitely holistic – approach to survival by their social, financial, political, and bureaucratic pressures, war/redistribution rather than creation-oriented philosophy, and lack of respect between people.

We, the people of the Earth, have to recognize the need for action towards the establishment of an honest and requisitely holistic world constitution, world parliament, and world government as a possibility for our survival, with responsibility to co-ordinate social issues, and to harmonize the needs of the entire mankind, and the nature, space, and environment capabilities, needs, and possibilities. Age of globalization is asking for new – requisitely holistic – approaches and behavior.

Co-ordination of important issues for the Earth/Biosphere by a united single government could respond to research results by practical application of them and requisitely holistic and honest rather than one-sided and biased relationship between our civilization and the Biosphere. At list we may have proper management of important issues with more or less good possibility for success. Global direct democracy (but not money democracy) could be proper recommendation for entering age of globalization with a sustainable future of mankind by global governance.

The present practice on the Earth such as:

- The destruction of nearly all waters with synthetic chemicals, bio and air (rain-induced) pollution,
- The destruction of air by the land, sea, and air traffic,
- The destruction by the results of war actions,
- The destruction of the ozone layer,
- Destruction of the soil fertility by the agriculture practice, including erosion and desertification,
- Global warming and other impacts from the climate change system,
- The explosive reproduction of humankind, and
- Diminishing motives for hard work and creation on the part of the affluent minority of population, because affluence has always caused the cult of laziness and hence destruction.

All of these and similar attributes should be parts, which have to undergo transition, changes, researching, learning and requisitely holistic approaches for a better tomorrow of all and survival of the current civilization.

The given practice cannot be dealt with by simply taking narrow-minded and short-term oriented individual, local or national interests into account and meet them in mutual isolation. The crucial ones should be a major responsibility of the world government.

The climate change system, which provides, makes, holds, and guards the living conditions in our biosphere, needs special scientific research, and world governing action. Nature, space,



and environment protection by and from members of our civilization, which should take care of the biosphere, need special scientific research and world governing action, too.

Both groups of topics are two global systems reacting to the human one-sidedness by causing global entropy tendencies, which require a global level of the requisite holism in mankind's dealing with them. 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 practice and capacities, due to the engagement of scientists with armaments/war and other misuse/abuse efficiency development, and the demands of bureaucracy.

Therefore, a new approach is needed for a redirection of scientific work towards the needed knowledge and values capable of saving the nature, science, and the environment including the climate change system – for mankind to survive.

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 the world-wide level and should be an integral part of the world governance, but a requisitely holistic rather than a biased one. 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 profit-based/dependent societal system), or narrow-minded and short-term focused marketing/profit oriented economy. The money system today has become a master 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 mankind. Now, profit is killing profit by causing side-effects having crucial impacts, including mankind's cost covered by company taxes or piled up to be covered in near future in huge sums and tough consequences.

It is obvious that corporate social responsibility and individual social responsibility of each and one are not a part of present mankind ethics, but declarations for promotion purposes only, mostly. 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 that 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, whole system will commence to move, change. It is not possible to predict in which direction the system will move, change. This is what is happening with the climate change system. It is maybe the answer to what is faced by human society now.

Otherwise, the climate change system ultimately would change living conditions within the biosphere and nature of the planet Earth so much that our civilization will end.

The Philosophy of the Sustainable Future of Mankind



Philosophy of sustainable future of mankind is the search for knowledge and understanding of the nature and meaning of the universe and life. The knowledge is most important achievement of Homo sapiens present civilization.

Under the progressing the threat of the impact of the climate change system to the biosphere of the planet Earth, which is changing living conditions, our civilization has to meet the challenges and establish a path for long term survival.

Present global social order, life style, education, ethics and daily practice of humans needs to undergo a fundamental renewal to meet the needs for long term survival during and after the third millennium.

The discussion present a contemporary sciences approach to the present the *Nature, energy, drinking water, food, credit and societal crisis* of mankind at 2008/2009/2010. The present civilization or our mankind is facing the largest complex societal crisis, which is also closely inter-related with the impact of the climate change system or evolving the planet Earth Biosphere »crisis«.

The impact of the climate change system may in the long run change: biology, geography and living conditions within the biosphere, from suitable ones of the last 12.000 years, to environment not suitable for Homo sapiens to live. It is making more complicated or complex of the present social crisis of: energy, drinking water, food and credit. In 2009/2010 we are entering difficult times for mankind.

The corporate and individual social responsibility (C&ISR) is a part of our society with much more importance as we are thinking at present. The possibility for survival is closely connected with social technology/technique of the »Sustainable Future of Mankind« or harmony of our civilization with the Nature of the planet Earth³¹. The corporate and individual social responsibility will have to play a more important part in future, for new great achievement of our civilization to overcome the crisis of living conditions within the biosphere of the planet Earth and present credit, energy, drinking water, and food, crisis of our global community.

The sustainable future of mankind or harmony of our civilization with the nature of the planet Earth is an option for mankind to survive approaching impact of the climate change system at the biosphere of the planet Earth. Somehow it is evolvement from sustainable development work during end of 20th and beginning of 21st century

The question which we are putting forward is the sustainable future of mankind. The integrated complex system thinking style is needed for analyzing it. Globalization age has its complex issues as they are, regardless humankind does see them or not. Or otherwise very complex issue of the humankind problems of 2008/2009/2010 should be put into the frame of living space/environment of humans – the biosphere, taking into account the simultaneous problems evolving within the biosphere, plus their synergies.

³¹ Please see: Ecimovic et al: "The Sustainable (Development) Future of Mankind", 2007, displayed at www.institut-climatechange.si; Bozicnik, Ecimovic, Mulej et al: "Sustainable Future, Requisite Holism, and Social Responsibility", 2008, available at IRDO, and "Sustainable Future of Mankind III", Ecimovic et al, 2010.



To be ready for changes, and mitigations due to the climate change system impacts, all of us single representatives of mankind must learn more about the basics of the biosphere and the Nature.

Life, even survival of us, the modern civilization, depends on conditions provided by the *Nature* in which we human all live, and by the climate change system as an integral part of it.

The Nature, Cosmos/Universe, Milky Way, Solar System, Earth, Biosphere, climate and climate change systems, terrestrial, water and air environments are *no simple systems* (features, entities, and processes), but very complex and complicated.

The sustainable future or harmony of global society with the Nature of the planet Earth, and its coexistence with other creatures in nature as a part of the Earth's biosphere is the solution, to the best of our knowledge, which should be adopted as the vision for our survival.

We need a society wide global approach, and not the dilution of scarce financial means, for ***it is impossible to buy the survival of mankind with a financial approach however great.***

People, values and knowledge have been making an epic song of our civilization, which has been going on since humans have existed. And so has other nature, including ***whole*** Universe; Milky Way; The Solar System; The planet Earth; Biosphere; etc. down to fundamental particles – quarks, protons, neutrons, electrons, relativity theory, and the information theory of the Nature, the environment theory of the Nature, quantum mechanics, atom structural understandings, and discovery of expected “divine particle”. We people are a part of nature, although this has been admitted less over the last three centuries than ever before.

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 presenting the climate change system as common enemy of our civilization, and sustainable future concept as path for survival or future of our civilization, and we are

RECOMMENDING³²

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

Secondly recommendation is a new approach to the *social order*, which has to reflect the present experience, and the establishment of a *new contract for mankind* living on the planet Earth. The goal is to prevent explosion of mankind reproduction, enforce ethics and respect amongst peoples of the Earth, enforces (a globally holistic!) law and order, and with skillful governing allow the coming generations to live and have sustainable future³³ on the planet Earth.

³² Text has been taken from The Recommendations written at the book Our Common Enemy (The Climate Change System Threat).

³³ Sustainable future is harmony of mankind and the Nature/Biosphere of planet Earth.



Third recommendation is *redirections of scientific work* from innovations of war armaments techniques and technologies for destruction, too narrowly market and money-oriented synthetic chemicals technologies, too narrowly market and money-oriented energy technologies, too narrowly market and money-oriented genetic manipulation techniques, societal management based on money monster - the master practices, etc., to discovering viable global systems of nature, space, the environment and universe/cosmos, as essential elements of knowledge needed for survival and sustainable future or harmony of our civilization with the Nature.

In conclusion: “Be the change you want to see in the world” (Gandhi).

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5.

We think it was important presentation regarding even today present. In coming years the Homo urbanus was discussed many times.

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PHILOSOPHY OF THE HOMO URBANUS

Zg. Medosi, Korte, Slovenia, March 2010

Presentation of “**Philosophy of the Homo urbanus**³⁴” has been prepared by: Prof. Dr. Dr. h.c. Timi Ecimovic³⁵, for the conference “Social-humanitarian problems of town-building complex”, Moscow, Russia, April 12 – 13, 2010.

The Abstract

Philosophy of sustainable future (0-3.4., 4.–53., 56., 58.) of the Homo urbanus is the search for knowledge and understanding of the nature and meaning of the universe and life. The knowledge is most important achievement of Homo sapiens present civilization.

Homo urbanus is part of Homo sapiens population, which is living within human eco sphere or the artificial environment made by humanity as result of cultural, historical, construction, and societal heritage.

Total history of Homo sapiens (3.3., 3.4., 57., 58.) is somehow approximately 200.000 years old. From commencement to present global Homo sapiens community (3.3., 3.4.) has experienced many ups and downs. Since industrial revolution 1750 – 1900 (57) global

³⁴ Homo urbanus term introduced by Prof. Dr. Timi Ecimovic is centering urban population by modus vivendi as part of Homo sapiens global civilization, which is living within the urban environment.

³⁵ Prof. Dr. Dr. h. c. Timi Ecimovic is professor and chair of Environmental Sciences at Ansted University, BVI, The Honorable Chairman for life of SEM Institute for Climate Change, first Chairman of the World Thinker's Forum, and active member of the European Academy of Sciences and Arts. He has been three times nominee for the Nobel Prize: in 2003 for climate change system, in 2007 for physics - The Information Theory of the Nature, and in 2009 for 2010 running nomination for physics, The Environment Theory of the Nature.



community of humankind is changing from rural to urban life. Last forecast is showing that by 2030 (3.3., 3.4.) 80% of global mankind community will be Homo urbanus civilization, which has incorporated/self-produced the second largest global mankind community of “*Homo slumus*”³⁶ pore dwellers of multi, mega, million + and many more terms for large heavily populated places called towns and their slums.

Complexity of the social-humanitarian problems of town building activity is very large. Regardless of the all other issues like population explosion, societal issues, availability of food, drinking water, shelter, clothes, and life security, I think from natural sciences view point, it is very important to know what impact to the planet Earth biosphere system the Homo sapiens is doing.

With present the globalization age we may put closure to the humanity achievements during last 12.000 years of evolution. To me the globalization age has come with third millennium, and it is where we are at present.

The Key Words

Biosphere, Environment, nature and space protection, Globalization, Homo sapiens, Homo urbanus, Homo slumus, Planet Earth, Societal problems of urban life, Sustainable future, System thinking

The Introduction

There is one non answered question: Whether Homo sapiens present civilization has future or not.

I think we do have possibility for sustainable life (0. – 3.4., 4. 53., 56.) at the planet Earth biosphere environment.

The limits for success are not within our civilization only, but they are closely connected with the nature itself (the biosphere, living conditions within it, and evolution ahead) out of which our present civilization is a small, tiny part (3.3., 3.4.).

Survival of our civilization could be successful only by understanding of the nature, and our civilization impacts to the biosphere of the planet Earth (3. – 3.4.)

The biosphere is tiny part of the planet Earth from the surface of the water and land environments to the lower part of the atmosphere. That is where our civilization exists (3. – 3.4.).

Our civilization at present is a living system of 7.000.000.000 + living humans of Homo sapiens with genetic code living creatures. It is increasing by numbers every day and never in history larger population existed, and it is by each day new height. Our total number of individual representatives is only limit, which is connecting our civilization and possibilities for survival in the future (Ecimovic 2010).

³⁶ Homo slumus new term for people living within slums of large towns of present civilization (Ecimovic, 2010).



Second to that, and only reason for it, is our civilization practice of making town building complexes as living space for ever increasing population.

The Discussion

First settlements and towns of the Stone Age (57) and antiquity are commencements of the modern urban environment. From lake-dwellers communities to first towns of antiquity took time of up to 4.000 years. Among first towns was Uruk in Mesopotamia (today Iraq) established between 4.800 and 3.800 years BC. Around 2.800 year BC was covering app. 250 hectares of land and had population of app. 5.000 inhabitants.

Evolution of the history and society has been driving forces for urban development. Largest towns once upon time like Tenochtitlan, Aztec, having 250.000 inhabitants app. 300 years after Christ, medieval town of the Europe, and Asian large towns at medieval times have been large, complex, and heavy populated sites. Till the time of bubonic and other plagues they have been success stories from the humankind point of view. During and after 14 century due to plague caused by *Yersinia pestis* and *Pasteurella multocida* out of 80 million total population of the Europe 50 million have passed away (57).

Second medieval time experience for humankind population at Europe was town fires due to wooden constructions used at those times (57). It is interesting to know, that the impact of medieval urban population needs has changed the nature environment throughout the whole Europe. Actually it happened because of the needs for large constructions of urban centers, the best trees at near and more distant locations have been cut down. As usually whatsoever *Homo sapiens* is doing so was also at that time, consumed trees have been replaced by different tree species as were cut down. It was first time of human interferences with the composition of the forests within the nature of the European environment. Coniferous trees were used for new plantations due to their fast growing. Basically it was large interference with the water cycle. As results many hundred years after we are facing situation of defect natural water cycle, which under the climate change system impact, will not be able to feed the fountains of the Europe. Consequences are (Ecimovic 2010):

- changed composition of the forests, which does not allow water transport from precipitation to underground deposits and transports,
- fast transport of the water from precipitation to the sea shore,
- changed water supply, and
- landslides smaller and larger alike,

At the Industrial ages 1750 – 1900 (57.) due to development of industries, trade and society the urban developments have been changing.

First five largest towns of mankind (57) at the biosphere of the planet Earth in 19 century were: Istanbul, Turkey, Edo, Japan, Guangzhou, China, London, England and Peking, China. Only Peking was with over one million inhabitants. By 20 century largest towns were; Chicago, USA, less as two millions, Berlin, Germany, less as three millions, Paris, France, over three millions, New York, USA, over 4 million and London, UK, over 6 million. By end of 20 century many more cities were with population in millions.



At “Our Common Future” report (43.) 1987 most significant statement on urban issues was: “The Urban Challenge” – “In 1940, one person in eight lived in urban center, while about one in 100 lived in city with a million or more inhabitants (a “million city”)”, and

By 1960, more than one in five persons lived in urban center, and one in 16 in a “million city”.

By 1980, nearly one in three persons was urban dweller and one in 10 a “million city” resident.

Artificial urban mankind environment was under very fast development hardly it could be described as evolution, and actually easily could be described as deviation. I think it was time when the mankind population explosion commenced (Ecimovic 2010).

At present we are facing the situation of the consequences of the mankind explosive population growth. It is basically reason for present urban crisis at the global mankind community.

By third millennium urban mankind population prevailed and by 2030 there are expectancies that 80 % of total world mankind population will be urban dwellers or Homo urbanus civilization.

The global mankind community during 1950 has reached 3 billion people, the six billions were after 1990 and by 2050 there are expectations than the global mankind community will have 9 billion representatives (55.).

Let us see what was happening with mega-towns. Due to very fast urbanization as result of needs for many monster reproduction the master of our civilization and done by investors supported by social system under supervision of the World Bank advices and policies. Also done by people who are representing less as one per cent of present population, but handling large share of total wealth, by 2010 we are having global situation (Ecimovic 2010).

Largest problem is not action of the people resulting with urbanization, but urbanization resulting with emerging societal issues of Homo urbanus society and Homo slumus society (Ecimovic 2010 for this presentation).

Homo urbanus in my research is town dweller with reasonably established societal status from very important people (politicians, bureaucrats, scientist, reach people etc.) to small clerks, soldiers, policeman and similar group of inhabitants, who are living in the urban environment with reasonable sanitation, communal services and paying taxes.

Homo slumus (term is first time introduced in this presentation) are people of large part of mega-town’s population living in the slums (Ecimovic 2010).

By 1950 (55.) 86 towns have been with population over a million inhabitants. By 2010 400 towns are with population of over a million inhabitants, and by 2015 there are expectations that 500 such towns will come out of our civilization activities called urbanization.



For instance Ciudad de Mexico had 3 million inhabitants by 1950 and today it is 22 million inhabitants town. Many cities have been changing like Ciudad de Mexico, just to name some: Mumbai, Delhi, Calcutta, Cairo, Manila, Karachi, Lagos, American and Chinese towns, and on the top is: Metropolitan region of Sao Paulo with 37 million inhabitants, and in total up to 400 cities by 2010 (55.).

Fast development of the towns is closely followed by fast development of the slums. By 2030 total population of the slums over the planet Earth will reach 2 billion of the total global mankind community. The population of the slums over the Earth is increasing by 25 million per year (55.).

Societal dimension of urbanization is most difficult issue of present global mankind community. Developing situation is most dangerous for future of mankind at the planet Earth. Of course it is from point of view of global mankind society issues. Watching film news from Haiti and Chile after earthquakes at commencements of 2010, I have seen possible content of future scenarios because of the societal crisis development.

Let us have a look at the present of urban society development and future. Due to history and heritage today we are having on the ground constructions as usual practice for urban building development. It was not always like today. During the visit of Cappadocia (2009) in today Turkey (54.), I have seen “The Cradle of the History”³⁷ where urban centers were built underground.

Of course local environmental qualities have make it possible to build underground cities and to practice underground urban life 5.000 years before Christ and up today open for information. Second to mention is Hypogeum at Malta, tiny island in “center” of the Mediterranean Sea, where some 5.000 years BC the temple was constructed. Constructors have built underground reflection of on the ground temple.

Of course on the ground temple was destroyed, but at the commencement of the 20 century the underground construction was discovered (today it is protected by UNESCO). Those two cases have been reason for researching feasibility of present urbanization.

The climate change system impact to the biosphere of the planet Earth will change physics of the environmental conditions within the biosphere.

Strongest winds could have over 500 kilometers per hour speed and questionable force. Tsunamis, movement of the geological plates with consequent earthquakes, changes of local climate conditions, floods and droughts, changes within the biology of the biosphere, and cooling or warming of the biosphere will have significant changes to the urban constructions as well as to the whole present global mankind community (Ecimovic 2010).

Conclusions:

I would rather prefer new title for this conference from “Social-humanitarian problems of town building complexes” to “Social-humanitarian problems of urban civilization of the global mankind community”.

³⁷ Please see Cappadocia, cradke of history, Omer Demir, ISBN975-7334-07-3, in English a book on Cappadocia history.



The sustainable future of present mankind is not in artificial on the ground constructions, but in use of the nature sciences and social sciences working together for the noble humanitarian goal of preservation of the present mankind global community.

And, finally, global mankind community needs global government for complex problems solving possibly of the sustainable future of mankind.

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