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## The Philosophy of the Nature

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### **Abstract:**

Presentation was prepared from the Nobel Prize book »The Three Applications of the System Thinking«, ISBN 978-961-92786-0-4, 2010, T. Ecimovic.

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,

### **Keywords:**

Environment, Evolvement, History, Globalization, Holistic Thinking, Information, Invention and Innovation, Nature, Philosophy, Requisite Holism, System Thinking.

### **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 shall we be in the future.

The environment theory of the Nature is opening new frontiers for understanding present and the Nature.

The information theory of the Nature makes possibility for understanding of systems, processes and reasons for what we are.

The term system has many contents. 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 I 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 behaviour, 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 behaviour 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 centres, management of technologies without sustainability, lack of individual and corporate social responsibility<sup>1</sup>, uncontrollable human-population explosion, short- and often medium- 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

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<sup>1</sup> 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 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.

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; I am, 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 humankind – it requires sustainable future. Sustainability of local communities leads to the sustainable future of global human civilization<sup>2</sup>.

## **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 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 I have published "System Thinking and Climate Change System (Against a big "Tragedy of the Commons" of all of us)", with R. Mayur and M. Mulej, and co-authors, 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**.

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<sup>2</sup> 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](http://www.institut-climatechange.si)

The next in line was “The Information Theory of the Nature” published in 2006, and final part is “The Environment Theory of the Nature”, published in “The Three Applications of the System Thinking”, 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, I would rather say »The Environment Theory of the Nature« is commencement of systemic approach to the meaning of the environment, “*basic environment*”<sup>3</sup>, Universe and Cosmos as precondition for existence of the Nature.

Let me 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 my thinking and researching.

Mankind’s<sup>4</sup> 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 Galaxy we have to add even more countless number of the planets within the rest of the Universe.

To make it more complex, I 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 Nature<sup>5</sup>, 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.

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<sup>3</sup> “*The basic environment*” is novelty in understanding of the Universe as environmental precondition for having anything – The Nature and evolvments within it.

<sup>4</sup> 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](http://www.institute-climatechange.si).

<sup>5</sup> 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](http://www.institut-climatechange.si)

The present science has to undergo future evolution to be able to answer the basic questions about the Nature. That is why I am putting my recent research in this presentation in order to put on records new theories and possibilities for tomorrow. And of course, tomorrow I expect better environment for humankind and sustainable future<sup>6</sup> for our descendants.

»The Information Theory of the Nature« was published in 2006. Here I will present my recent research and new theory »The Environment Theory of the Nature«, which has been published at “The Three Applications of the System Thinking”, 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 and 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 neighbourhood within the basic environment - the Universe or the Cosmos.

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 centre 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

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<sup>6</sup> The sustainable future of mankind is harmony of our civilization with the nature of the planet Earth.

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, it is happening 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 is 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. I 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 my research I think this possibility is opening the door for researching further contents of the Nature.

To be able to conclude these case studies I 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 practically in 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 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 evolvement according to the direction of the evolvement 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 the beginning or the 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 it is making possible 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 centre 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, the Water, and the Atmosphere environments.
8. “The living Nature” in 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 land, 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 I 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:**

I am 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 word 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 Nature<sup>7</sup>**

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<sup>7</sup> From the book: »The Information Theory of the Nature, and .....«, Ecimovic, Timi, 2006, ISBN 961-91826-1-8

Thinking theory, system thinking, system analysis and synthesis are offering new thinking techniques to assist scientific, common, and whatsoever thinking patterns of our civilization, to restore natural thinking and acting towards a noble and a prestigious target of *sustainable future*<sup>8</sup> 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 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.

Our top international governing body The United Nations have been transformed from human society assistant to assistant of “money” democracies of “big” nations the USA<sup>9</sup>, 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 cooperation<sup>10</sup>. It is while talking 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

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<sup>8</sup> Sustainable Future is harmony of our civilization with the Nature (Ecimovic numerous statements).

<sup>9</sup> 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](http://www.institut-climatechange.si)

<sup>10</sup> Interdependencies, 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](http://www.institut-climatechange.si)

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 a 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;
- 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 me give two case stories. 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 is representing requisitely holistic unit to hold living nature as it is in our case and the Universe we are a part of. 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 - Introduction<sup>11</sup>**

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 21<sup>st</sup> 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 behaviour 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 (time conditionally used), and has three bases – Water, Land and Air environments. To be ready for changes, and mitigations due to the

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<sup>11</sup> From the book »The Climate Change System Introduction«, Ecimovic, Timi, and Mulej, Matjaz, October 2008.

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; money democracies; (poor) corporate social responsibility, nuclear technologies, combustion engines, 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 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. My recommendation is to:

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

I 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 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, land, 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 / man-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.

I 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 evolution 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.

I believe into the role of leadership (as a cooperative management and governance), but I 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 reactions 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 behaviour.

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 biosphere pollution.

***From energy and gases to planetary explorations, that's how the origin of the Earth from birth until present times can be summarized<sup>12</sup>.***

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 evolvement 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

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<sup>12</sup> From view point of our civilization (Ecimovic 2002).

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.

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 discipline's, 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:

$$\text{Energy (E) x Matter (M) x Information (I) + Time (T)}^{13} = \text{Life (L)}$$

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

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 in 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 feature<sup>14</sup>. 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. The amoeba could exist without mankind, opposite is impossible. 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.

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<sup>13</sup> TIME is conditionally used for sake of common understanding.

<sup>14</sup> Please see »The Information Theory of Nature, and .....« Ećimović, 2006 ([www.institut-climatechange.si](http://www.institut-climatechange.si))

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.

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 mankind 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 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 billions 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 humankind 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 of the nature. It consists of everything that exists anywhere in space and time (time conditionally used). The universe includes the Earth, everything on the Earth and within it, and everything in the Solar system.

Our Solar system contains nine/eight (eight by new classification) major planets (one planet missing?) and along with the tenth and eleventh as new-comers to the family (now mini planets or 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/knowledge 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, and distance from the Sun.

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.

They were recorded as Glacial or Ice periods<sup>15</sup>, 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.

## **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 billions 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 surface, 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 billions 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.

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<sup>15</sup> Please see the »Atlas« at [www.institut-climatechange.si](http://www.institut-climatechange.si)

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 19<sup>th</sup> 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 billions 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 %; I am 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 evolvement 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 is a natural complex entity/system. It consists of several subsystems and is a subsystem, too, of systems such as the Earth, the Solar system, the Milky Way and the Universe. It is very old and has been changing all the time, offering rather stable conditions to the life forms. In the current climate change system much more extreme changes have been taking place, over the centuries of industrialization and post-industrialization than ever before since the end of last ice age. We humans are not the only cause of this dangerous processes, but though an essential one, especially if our decisions and actions are based on a lack of systemic/holistic thinking/behaviour.

**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 I 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 millions 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 centre 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 centre of the Milky Way Galaxy at a speed of around 250 kilometres 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 observation.

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 neighbouring 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 systems<sup>16</sup>/entities of parameters. Our civilization has its chance to explore research and understand the Nature and our existence.

The birth of the planet Earth could be placed around 4.5 billions years ago. At that time the Sun provided the energy and matter for shaping its subsystems, planetary systems and other bodies. The Earth appeared as a gaseous mass which, by rotation like a top and orbiting around the Sun for a few hundred millions years, commenced shaping the planet. The composition at its birth, its distance from the Sun, and its interdependences, interactions and co-operations within the Solar system have been creating the Earth for 4.5 billions years.

## **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.

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 kilometres, 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 kilometres 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 Pluto<sup>17</sup> with around one fifth of the Earth's diameter.

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<sup>16</sup> 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.

<sup>17</sup> Data about the new 2 outer celestial bodies are not yet known to me; 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.

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.***

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 neighbouring 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 evolution 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 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 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 transformation; actually, anaerobic micro organisms 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 millions years ago. The human predecessors are dated some 8 millions years ago, and Homo sapiens, our predecessor, some 200.000 years ago.

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

## **Requisitely Holistic/Systemic Thinking/Behaviour – 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/behaviour. 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 behaviour, which is called holistic/systemic thinking/behaviour. It is briefed in the Table 1 as follows:

*Table 1: The Basic Seven Groups of Terms of Systems / Systemic / Holistic versus Non-systemic Thinking<sup>18</sup>*

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<sup>18</sup> 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](http://www.institut-climatechange.si)

<b>Systems / Systemic / Holistic Thinking</b>	<b>Unsystemic, Traditional Thinking</b>
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.

The difference between the human’s traditional thinking and the systemic thinking could be described as follows, when it concerns the climate change system: when observers look at our civilization’s achievement from the viewpoint of building and construction heritage, it looks nice, everything is in order, the arcs are arcs, lines are in a geometric order, and the whole construction follows a certain tradition/style/architect’s mind work. Of course, there is no absolute rule: e.g. the great architect from Catalonia, Gaudi, has demonstrated his innovative approach to churches and other constructions. Also our houses, exterior and interior arrangements, agricultural activities, communications, roads/railways etc., follow a certain order, which does not look like the virgin nature. To us humans from this civilization the virgin nature looks like chaos, and we are not able to see that Nature sees us as chaos too. It is also difficult to comment whether the discrepancy between nature and the human life style is now big or small, but obviously we humans have done many various interventions and innovations, which are not a natural way of acting. So, for the conventional thinking chaos of nature is chaos, and our life style is all right. On other hand the system theory/thinking may allow us humans to see the natural chaos as order and the human’s order as a sort of chaos. When not only scientists, but also common people in the local communities will have this ability, we shall have much more of a natural habitat as we do now.

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

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 evolvment, 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 totalling 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 billions years ago until the appearance of oxygen in the atmosphere around 2 billions 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 sulphur 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 creature. Physical, geographical, chemical, biological and systemic interdependences/interactions and co-operation enabled an environment supportive of evolvment 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 evolvment 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 are ozone protection zone in the Stratosphere (15 – 24 kilometres) and the green house 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 Nature.

Air and water are permanently interdependent, interacting and co-operating, when water changes from liquid to water vapour, which is transportable by air. When temperature changes

in the processes, assisted by the air particles (physical or biological), the water vapour 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 transporters 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 transporters 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 transporters 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 levelled 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 kilometres. The first ten to fifteen kilometres 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 kilometres from the Earth's surface, including the ozone protection layer (15 – 24 kilometres). Mesosphere (50 – 85 kilometres) and Thermosphere (85 – 400 kilometres) end into exosphere, which ends into outer space at the altitude of around 1.000 kilometres. 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 vapour, nitrogen oxides, argon etc. The oxygen is present as dioxide, ozone,

carbon dioxide, and water vapour. 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 PFCs 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 vapour transport, cloud formation, and the main transporters 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 + kilometres 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 sulphur 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 sulphur (acid rain) that have become fast a damaging factor. The sulphur 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 2.300 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 meagre 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; I 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 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 her 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.

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 shelter, food, water, air, and space for living. This task can be done better, if the systems 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 evolvment and management of life. Second to these conditions is availability of water, which in many cases is closely connected with evolvment 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-artic, Artic 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 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 sealed<sup>19</sup> 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/behaviour. 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 suitable behaviour, 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 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, 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 approach<sup>20</sup>.

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"<sup>21</sup>.

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<sup>19</sup> 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.

<sup>20</sup> 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.

<sup>21</sup> Taken from the book "The Sustainable (Development) Future of Mankind", Ecimovic at al., ISBN 978-961-91826-2-8, 2007, displayed at [www.institut-climatechange.si](http://www.institut-climatechange.si)

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 equipments, PCBs with impact on gene structure, etc.) reflects samples of our civilization's short-term and narrow-minded behaviour.

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 behaviour 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 holistic basis of behaviour, and our social system, are driving our civilization in a dead alley: the short-term and narrow-minded views are favoured 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 humankind, and the nature, space, and environment capabilities, needs, and possibilities. Age of globalization is asking for new – requisitely holistic – approaches and behaviour.

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 last 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 humankind 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 humankind 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 humankind at 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 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 Humankind« or harmony of our civilization with the Nature of the planet Earth<sup>22</sup>. 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, food, and credit 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.**

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 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.

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.**

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<sup>22</sup> Please see: Ecimovic et al: The Sustainable (Development) Future of Mankind, 2007, displayed at [www.institut-climatechange.si](http://www.institut-climatechange.si); and Bozicnik, Ecimovic, Mulej et al: Sustainable Future, Requisite Holism, and Social Responsibility, 2008, available at IRDO.

Therefore I am 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 I am

## RECOMMENDING<sup>23</sup>

*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 humankind* living on the planet Earth. The goal is to prevent explosion of humankind reproduction, enforce ethics and respect amongst peoples of the Earth, enforces (a globally holistic!) law and order, and with skilful governing allow the coming generations to live and have sustainable future<sup>24</sup> on the 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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