HOW TO AVOID THE GLOBAL CATASTROPHE?
The Information Basis for Sustainable Development Policy and Economy

by
Leslaw Michnowski[1]
Saint Cross University in Kielce (Poland)
High School for Management in Legnica (Poland)
Al. 3 Maja 2 m. 164, 00-391 Warszawa, Poland
tel/fax: +48 22 7681019, +48601264164
kte@psl.org.pl elmamba@poczta.onet.pl

Abstract

To avoid the global catastrophe it is necessary to create a wisdom-based global information society, which would be far-sighted and flexible. To achieve sustainable development (SD[2]*) of the world society it is also necessary to possess knowledge regarding the limits to growth and methods of overcoming them.*

For these ends we have to build FEED FORWARD into the world's socioeconomic inter-relationships, based on large development and widespread of the System Dynamics. We need commonly accessible World (integrated and distributed) Sustainable Development Information System for Monitoring, Prediction and Measurable Evaluation - of effects of policy, work and other changes in the life conditions of human- and other beings.

These conclusions have been elaborated by means of system analysis with general conceptual model of reality: System of Life, which contains the knowledge about the logic and dynamics of limits to growth as well as means for crossing them in developmental way[3]*.*

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[1] Leslaw Michnowski (www.psl.org.pl/kte):
cyberneticist of development, Chairman of Sustainable Development Creators' Club, retired mechanic engineer working in the field of the flexible automation of industry,
member of:

- The Committee for Futures Studies "Poland 2000 Plus" of The Polish Academy of Sciences,
- The People's Science-Culture Society,
- The Polish Association for the Club of Rome,
- The International Society for Universal Dialogue,

author of appeals:

- *Eco – development message from the Warsaw Meeting (1993 -* http://www.psl.org.pl/kte/jzemes.htm ,
- *To create eco-humanistic economics with the aid of the U.N. Security Council, The Polish Initiative For a Sustainable Development of the World Society (1997) -* http://www.psl.org.pl/kte/polinit.htm ,
- *Appeal for Ecohumanism and the Creation of Information Basis for Sustainable Development (1999) -* http://www.psl.org.pl/kte/appealk.htm ,

and over 250 publications, two books - http://www.psl.org.pl/kte/wpubllm.htm , http://www.psl.org.pl/kte/books.htm .

[2] In this paper I use SD as acronym of sustainable development.

[3] This paper is continuation of my paper on 20th SDS Conference in Palermo (2002):

Key words: limits to growth, sustainable development, feed forward, intellectual evolution, general conceptual model.

Contents

(…) Another model says that the limits are real and close, and that there is not enough time, and that people can not be moderate, or responsible or compassionate. (…) the result will also be Collapse (…).

- Beyond the Limits (1993)[4]

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(…) the sustainable development of our people (…) comprehensive vision for the future of humanity (…) poverty eradication, changing consumption and production patterns (…) pillars of sustainable development – economic development, social development and environmental protection (…)

– Johannesburg Declaration (2002)[5].

World Integrated Warning Forecasting System Based on System Dynamics Principles as a Basic Factor in Sustainable Development - http://www.psl.org.pl/kte/740Michnowski.pdf .

[4] See: D.H. Meadows, D.L. Meadows, J. Randers, *Beyond the Limits, Global Collapse or a Sustainable Future,* Earthscan, London 1993, p.. 236.

[5] UN World Summit on Sustainable Development 2002, *The Johannesburg Declaration on Sustainable Development*, p. 5.

1. Introduction

World is in the global – socio-economic and (nature) environmental - crisis[6]. It is the result of obsolete patterns of science-technology and economy development. The world society needs for survival quite new – System Dynamics aided - forms of development.

In this paper I propose a new method of getting access to knowledge that is necessary to achieve the sustainable development (SD). I propose namely – in accordance to systems engineering-based formulation process (Sage, 1977) - to combine general conceptual *System of Life* model with System Dynamics and build some sort of world-wide integrated system for using system dynamics to regular providing updated information on future conditions.

This system allows to make easier *"consensus building"* and *"conflict resolution"*- the important goals of our Conference.

To avoid global catastrophe and to achieve sustainable development (SD) we ought to know what is the essence of global crisis and what are the main causes of it. We should understand also the essence of process of the world society development and know consecutive transformations (qualitative changes) in socioeconomic relations, which are indispensable to overcome its limits to growth, i.e. to cross them in developmental way.

The searching of such knowledge was the aim of 20th SDS Conference: Organizational Change Dynamics - Understanding Systems, Managing Transformation.

For looking answers for above questions I use some conceptual model of real world: *System of Life*[7]. The *System of Life* model may be helpful in shaping proper SD-policy and SD-economy. Therefore it can help to overcome limits to growth of world society.

In this paper I use main outcomes from *System of Life* model for justification of my conclusions connected with building of such information society, that is capable for avoiding global catastrophe and achieving sustainable development of the world society

The main cause of this global crisis is the short-sighted and not flexible enough economy, without complex accounting of costs and profits, including socio-environmental components of it. The lack of access to comprehensive knowledge does not allow to internalize externalities.

This economy is not adequate to present state of change and risk. This state is a result of big scientific and technological progress, as well as of big inertia of many highly developed organizations. Science and technology progress causes rapid changes in socio-economic environment, i.e. in life-conditions. The risks are the result of lack of full knowledge about future impacts (effects) of new technology used in new, approaching life-conditions.

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[6] In accordance with John Paul II, *The crisis of civilization should be overcome by shaping new form of civilization - love-civilization*, (John Paul II, 1994, 2003). See also: (Michnowski 1999).

Also Adam Schaff calls for - based on *agape* principle - civilization transformation. It is necessary to adopt human beings to live in era of high science and technology.
See: (Schaff 1993, pp. 64, 60, 120, 1997, pp. 106, 107, 108, 109).
See also: (Pajestka 1994, Townsend 2004).

[7] General (homomorfic) conceptual model called the *System of Life*, see:
(Michnowski 1989, 1995, 2002a, 2002b, 2002c),
General conclusions from looking - with the help of *System of Life* model - for information conditions of sustainable development of the world society, see: (Michnowski 1994, 1999).

In order to live in the state of change and risk we must properly change policy as well as economy making system. We need new economy: far-sighted, flexible and capable to produce in excess reserves of intellectual-material resources that might be necessary to avoid unpredicted dangerous.

This will allow us to build SD-economy - based on account of complex benefits and costs with its social and nature elements.

This new, SD-economy will allow to introduce the intellectual evolution (forward selection in virtual reality), as a basic means of development generating (Sajdak-Michnowska, Michnowski 2001a). To overcome global crisis, a large-scale - international scientific, technological and social – operation, for creation of information basis for sustainable development, should be undertaken.

Therefore I propose to recommend for World Summit on the Information Society (Tunis 2005) submitted proposal of building - with help of System Dynamics Society - commonly accessible World (integrated and distributed) SD-Information System for Comprehensive Monitoring, Long-term Prediction and Measurable Evaluation - of effects of policy, work and other changes in the life-conditions of human- and other beings[8].

This World SD-Information System ought to enable overcoming the limit of time, which is necessary for changing our patterns of consumption and production into ones fitted to the state of change and risk.

2. The information basis for SD-policy

The necessity of World SD-Information System follows that we are living now in the STATE OF CHANGE AND RISK. The changes in conditions of human and natural life (life-conditions: access to resources, state of natural environment, technology, electromagnetic field, food, the range of increasing human destructiveness of natural environment, other external conditions of life, and so on) occur presently very rapidly.

It is mainly the result of science and technology progress: *In the course of the last century, industrial production* (of world economy - L. M.) *increased 50 times, of*

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[8] In 1997, 165 prominent persons of Polish science, culture, politics, religion life, proposed to introduce such proposal into Rio+5 United Nations General Assembly. See: *Polska Inicjatywa na rzecz Trwałego Rozwoju Świata (Polish Initiative for World Sustainable Development)*, http://www.psl.org.pl/kte/Polinicj.htm ,
http://www.psl.org.pl/kte/Lista.htm ,
also: (Michnowski 1997, 2004).

As a result of this initiative, in Geneva, December 2003, Professor Michal Kleiber, Chief of Polish Government Delegation, addressed World Summit on Information Society:

(…) We believe that the Internet and other ICTs technologies can be an effective tool for forecasting and preventing global threats. It can also be a perfect means to support the implementation of the idea of sustainable development.

In my opinion, ways in which the world situation tends to evolve, creates an urgent need to build up a widely and freely accessible world information network. This network could serve to provide monitoring, forecasting and early warning with regard to elements capable of triggering a global change and thus help to implement the principles of sustainable development.

Such a network would be vital in bringing us closer to a globalization process and its numerous phenomena ranging from the management of human settlements, world eco-systems, population movements up to other crucial elements of global transformation. (….).

which four-fifths took place after 1950 (Brundtland, 1987), These data were confirmed: *The pace of change is reaching an extraordinary rate, driven in part by technological innovation.(…) To illustrate, growth in the world economy during the year 2000 exceeded that during the entire nineteenth century. (…) The sevenfold growth in global output of goods and services since 1950 dwarfs anything in history.(Brown, 2001).*

As a result of such big pace of change, as well as big growth of inertia of developed world society (and economy), existing forms of life (politics, technology, value systems, economics, production and consumption as well as individual reserves creation patterns, and so on) – that were fitted to previous (slowly changed) life-conditions – rapidly are getting obsolete, morally aged.

When the changes in state of social and natural environment are going so rapidly, we must change the methods of development policy. We, the humankind, need as much as possible knowledge - not only about the past, but also about the future. But we ought to understand our limits in access to full knowledge. Therefore we should be also very flexible and create reserves of life-resources which help us to overcome dangers that were not predicted in proper time.

In the state of change and risk it is not proper to act only on *post factum* (simple feed back) principle. To live in this state we must build in socioeconomic relations (with help of System Dynamics) quite new, additional feed back system – FEED FORWARD: anticipative, *ante factum*[9] (Wiener 1971, Ogawa 1989, p.44).

The model of shaping policy (also science-technology policy) adequate to the state of change and risk – see fig. 1 (Sage, 1977).

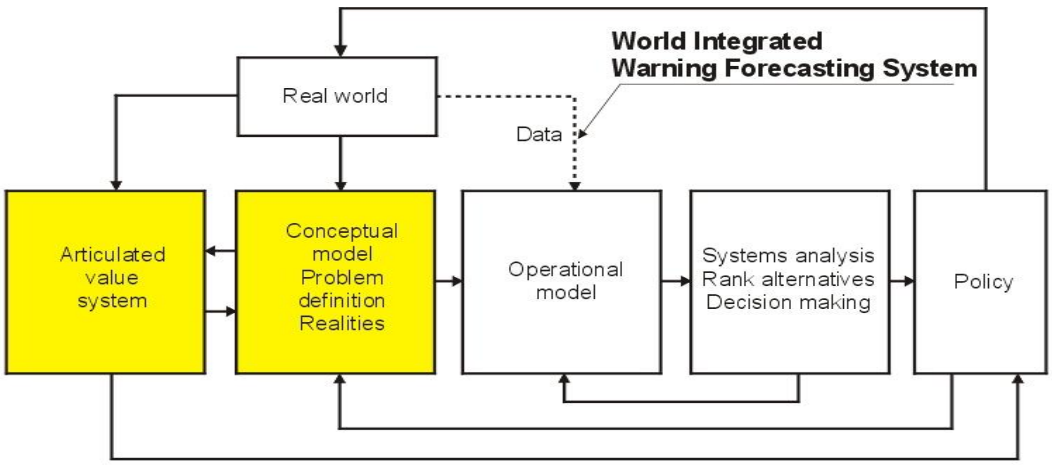

Figure 1 Systems engineering-based policy formulation process (Sage, 1977)

I have enlarged above Sage's proposal by introducing into it notion: World Integrated (and distributed) Warning Forecasting System. In the state of change and risk we need - for proper developmental policy - not only our own monitoring results and forecasts, but also such ones created in our social environment.

Therefore I propose some sort of integrated system for using System Dynamics to regularly provide updated information on future conditions.

Centralized forecasting system is not adequate for state of change and risk, because of difficulties in access to information and loss of information, as a result of *inter alia* delays in communicating them. These days, the proper policy should be

[9] On such anticipatory principle is built antimissile defense system.

based on adequate political philosophy, systems thinking, computer simulation of their future effects, easy access to the information reflecting (past and future) rapidly changed real world and value system adequate to actual state of system and environment changed as a result of policy.

The information reflecting real world – that we need for proper shaping policy - consists of:

- statistical data;
- science, philosophical and empirical knowledge, including conceptual model of real world;
- predictions of effects of policy of other subjects of socioeconomic life and other changes in state of environment.

To introduce into the practice aforementioned model - (fig. 1), indispensable for shaping SD-policy - we especially need a conceptual model of the real world – for understanding life-processes, its constraints, and the essence of systems we interfere them with our policy (Ashby 1956, Laszlo 1972)..

3. *System of Life* model as a aid for SD-policy

For SD-policy we need at least two conceptual models:

- a general (homomorphic[10]) conceptual model, and
- a specific conceptual model.

The general conceptual model should include universal (system-philosophical) science concerning the real world changed as a result of governance, together with a general systems theory, general cybernetics (including general information theory and theory of life-process), and other adequate general and/or philosophical knowledge. The general conceptual model is especially essential to determine the main, currently existing, constraints of changes as well as a proper – for decisions making - value system.

With the help of general conceptual model we can shape policy on the "top – down" principle. It allows to avoid false emotional impacts on looking for qualitative new ways of development (Forrester 1961). It helps to predict indispensable changes in dominating value system and to build in advance the conditions for such changes.

I have undertaken the task of building such a general conceptual model and I called it: *System of Life* (Michnowski, 1989, 1995, 2002a, 2002b, 2002c).

System of Life model is not mathematical or computer model. It is rather philosophical conceptual model. But this model ought to be useful in system dynamics modeling especially of large-scale ecosocial systems.

I create this model by means of axiomatic method (Forrester 1961, Bochenski)[11]. *System of Life* model reflects common properties and structural features of different life-systems, including the systems: man – technology - environment (social and/or natural – SMT-Env), their sub-systems (especially systems: man–technology - SMT) and over-systems. It also reflects the process of life of such systems and general life-system's feedbacks.

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[10] Homomorfic model – such one, that reflects common properties of quite structurally different objects, for example: individual organism, family, nation, global ecosystem, and so on.

[11] Some proposal of axiomatic method of forecasting based on philosophical knowledge, see (Sajdal-Michnowska, Michnowski 2001b)

*System of L*ife model includes static as well as dynamic properties and structural features of these systems. It also reflects the logic of process of life of systems of this kind, its phases and stages. *System of Life* model contains the knowledge about the logic of limits to growth and means for crossing them in developmental way.

System of Life model shows us qualitative changes in SMT:

- infrastructure,
- control (governance, homeostat)-subsystem, and
- value system,

which are necessary to support the development of different forms of such life-systems. *System of Life* model shows us also the changes in human needs arising with socio-economic development.

System of Life model can help us to understand the essence of global crisis and to find methods to overcome it.

Below I will present only some fragments of *System of Life* model, which allow to justify the main conclusions of this paper. It is impossible to present in this paper this model in all and logical ways of getting its outcomes.

The basic axioms of *System of Life* model are:

I. $$i = B(n,q)1/s$$

where:

i - is the level of information (Wiener, 1971) – conceptual measure of level of development (and organization, as well as quality) of life-system;

s - is the level of entropy as well as the level of development- reserves of life-system;

n - is the number of its elements;

q - is quality of elements of life system, and

B(n,q) - some function connected with quantity and quality of system elements.

II The life-span of life-system depends on the level of its information.

III The life of life-system depends on life, high quality and proper form of environment, treated as life-system too.

IV All elements of set/system: life-system - environment are mutually feed back interlinked.

System of Life model treats the system: man – technology – environment (SMTEnv), as a life-system. In the same way it treats the system: man – technology (SMT) and the (socio-economic) environment (Env) of the SMT. The life of every life-system (individual, social, ecological, ecosocial) depends on the life of the environment, its high quality and relevant form[12]. Life-system consists of energy in larger sense ($E=mc^2$)[13]. Differences between life-systems depends on their structures.

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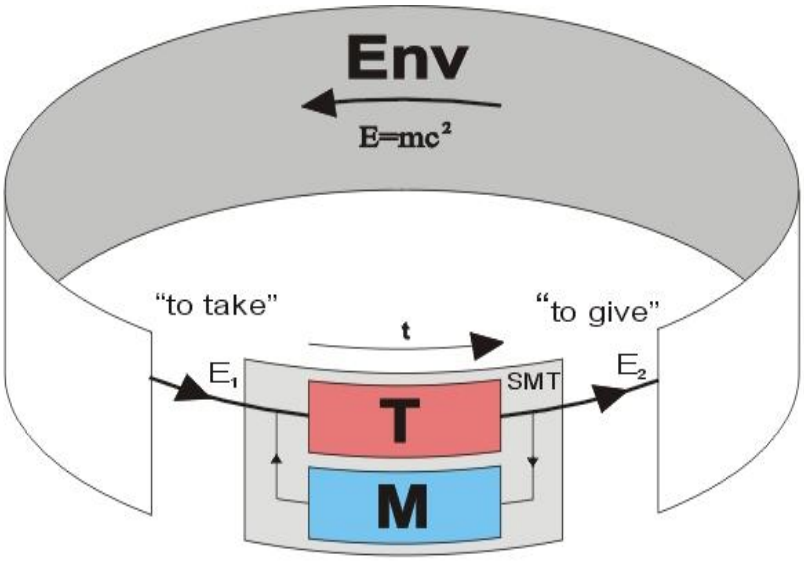
[12] It is quite different approach to the environment. Not import negetrophy from environment and export entrophy (Prigogine, Steners 1984), but changing – based on wisdom - exported entropy into negetropy for suport life of environment.

[13] In accordance with Wlodzimierz Sedlak, biological organisms consist of photons (Sedlak 1985).

The life-system is open (and general) (Bertalanffy, 1952, 1968, fig. 2), autonomous (Mazur, 1999), self-organizing, anticipative, developing information (Michnowski, 1989), and dynamic (Forrester, 1961) system.

Therefore it has a possibility of homeostasis (Bertalanffy, 1968).



Denotations:
SMT system: man-technology
Env social and/or natural environment
T technology
M man, control-subsystem of SMT
t time
E1 input energy (in larger sense), **the form depends on our aproach to enviroment**
E2 output energy (constructive and destructive impacts), **the form depends on our consciousness and technology.**

Figure 2 System: man-technology as the life-system and open system

Life-system is capable of supporting life – producing negentropy and minimizing entropy - for itself and the environment[14].

In the view of *System of Life* model, ecosocial entropy is isomorphic to physical entropy according to:

$$s - k \ln W,$$

where

W – number of different dynamic structures, (i.e. time-space configurations of elements) of life-system (or a group of life=systems), that allow to get the same level of its (their) development.

It is important, that entropy is a conceptual measure not only for the level of disorganization, but also for the development-reserves. By introducing organization into

[14] In accordance with Wladyslaw Kunicki-Goldfinger, evolution depends on increasing information (Kunicki-Goldfinger 1976).

life-system – i.e. proper changes in its dynamic structure - it is possible to change these reserves into active factors of its life.

The life-system also has a possibility of defending its life and, what is of general value, cooperating for the support of its own life and the life of the environment. The quality of life-system is measured, in conceptual way, by its level of information.

The process of life depends on creation of information and/or lowering the range of entropy growth in the set/system: life-system - environment.

Creating information means to put in new order (by means of new feed backs) already existing elements of life-system and/or of set/system: life-system - environment.

The process of development depends on proper changes in the dynamic structure of over-system, that supports life of life-system and life of environment of life-system. The development of the life-system depends on proper changing time-space configurations of the elements of the set/system: life-system - environment, in that getting maturity of existing system's elements and integrated them into its new subsystems relevant to life-needs of the system (and/or its environment).

The life-span of the life-system is finite, but not determined. The higher level of information, the lower level of consumption of life-resources and/or higher level of efficiency of life-system creativity is. The higher level of information, the higher life-potential level of life-system, including potentials of life-defense and creative cooperation is.

The main goal of life-system is to support life in the set/system: life-system – environment, by maximizing the level of information in above set. It is conditional upon proper organizational changes, developmental growth and crossing in developmental way limits to growth of life-system. .

Therefore not equilibrium or steady state, but wisdom based growth and sustainable development can be the future of humankind[15].

(Wisdom: human intellect, knowledge (including knowledge about the future) and AI (artificial intelligence). Intellect: reasoning, intuitive cognition, conscience [as skill of proper – for common good – evaluation of acts or tendencies]). There are a lot of human brains and cosmic energy. We need the knowledge and political will to organize these SD components into means for overcoming limits to growth.

It is a main conclusion based on above mentioned Wiener information/entropy and Einstein equations.

During development-process such new feedbacks are added to existing feedbacks, that allow to put up informational efficiency of life-system and access to the new (already existing, inner and/or outer) sources of intellectual-material life-resources.

The future of life process is only partly established by its past (chaos theory).

The process of life is irreversible. Reversible changes result in growth of entropy.

Every act of life-system is followed by two quite different results for system and environment: positive (negentropy effect), and negative (entropy effect). When the production of life-system negentropy exceeds the production of its entropy, the life-system is inner-constructive and develops.

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[15] Wisdom: human intellect, knowledge (including knowledge about the future) and AI (artificial intelligence). Intellect: reasoning, intuitive cognition, conscience (as skill of proper – for common good – evaluation of acts or tendencies).
"We have a lot of knowledge, but we have not enough wisdom" - see (King, Schneider 1992).

The stream of energy (in a wider sense) which leaves the life-system (as an open system) is - from the view point of the leaving-system - degraded, but the same energy can be life factor of another outer life-system. It is conditional by proper – fitted to life-needs (and structure) of environment - form of structure of this output-energy.

Therefore by proper differentiation of subsystems (elements) of over-system and synergetic integrating them it is possible not only to decrease the range of growth of the life-system entropy, but even to get a synergetic effect of (symbiosis form) cooperation. Proper diversity of life-system elements is thus the source of its synergetic development.

Every life-system is different from another life-system. Putting life-system to death means lowering the diversity of its over-system (the set/system: life-system - environment).

There are two different kinds of entropy and negentropy processes: parametric and structural ones. Parametric entropy process (physical destruction) is a kind of life-system destruction which needs - for elimination of its negative consequences - simply rebuilding of the old, physically destroyed forms (structure) of the life-system.

The structural entropy process (not physical, but moral destruction, outdatedness, ageing, getting obsolete) is a destruction of life-system, which needs - for the elimination its negative consequences - the construction of quite new structure (and life-form) of life-system adequate to the new life-conditions. Extending technological progress results in a greater moral destruction of the environment[16].

The structure of life-system consists of its microstructure and macrostructure. The microstructure is the structure of life-system elements. The macrostructure is the set of relations that join the elements of life–system into system - live whole.

The structure of SMT consists of:

- software;
- hardware;
- orgware (macrostructure), and
- control (governance, homeostat)-subsystem.

The main element of this control-subsystem is an elite of SMT.

The proper orgware plays active role in accelerating development.

The process of life of SMT (and the other type life-systems) consists of its two qualitatively different forms: normal, i.e. a development (fig. 3 and 4), or pathological, i.e. a crisis (fig. 4).

[16] For example traditional typewriter was morally destroyed as a result of inventing personal computer.

No Limits to WISDOM Based GROWTH

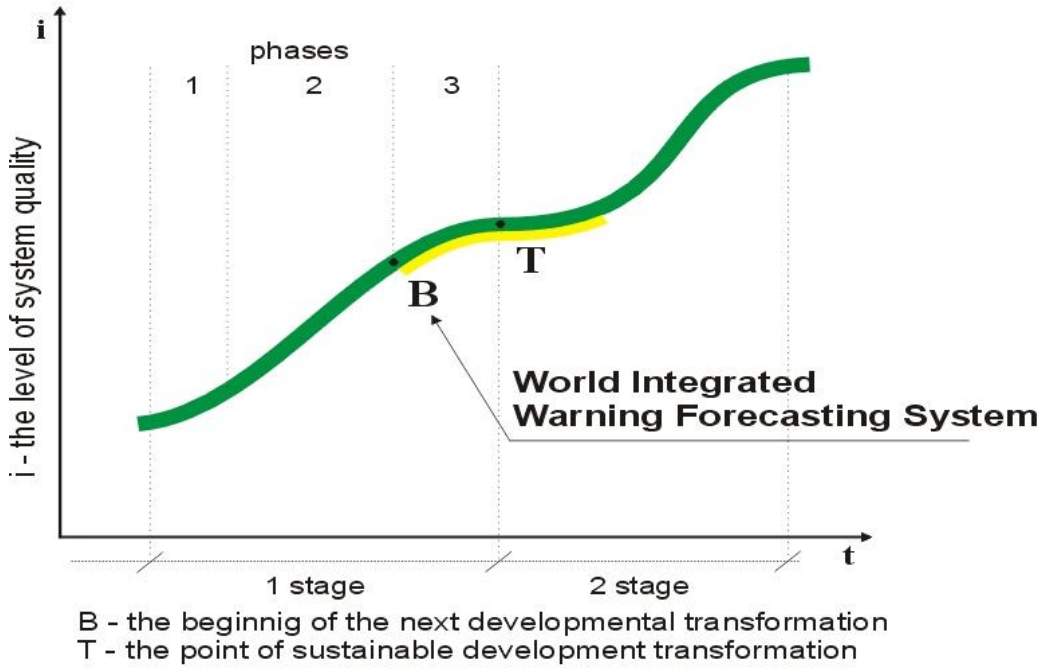

Figure 3 Sustainable development

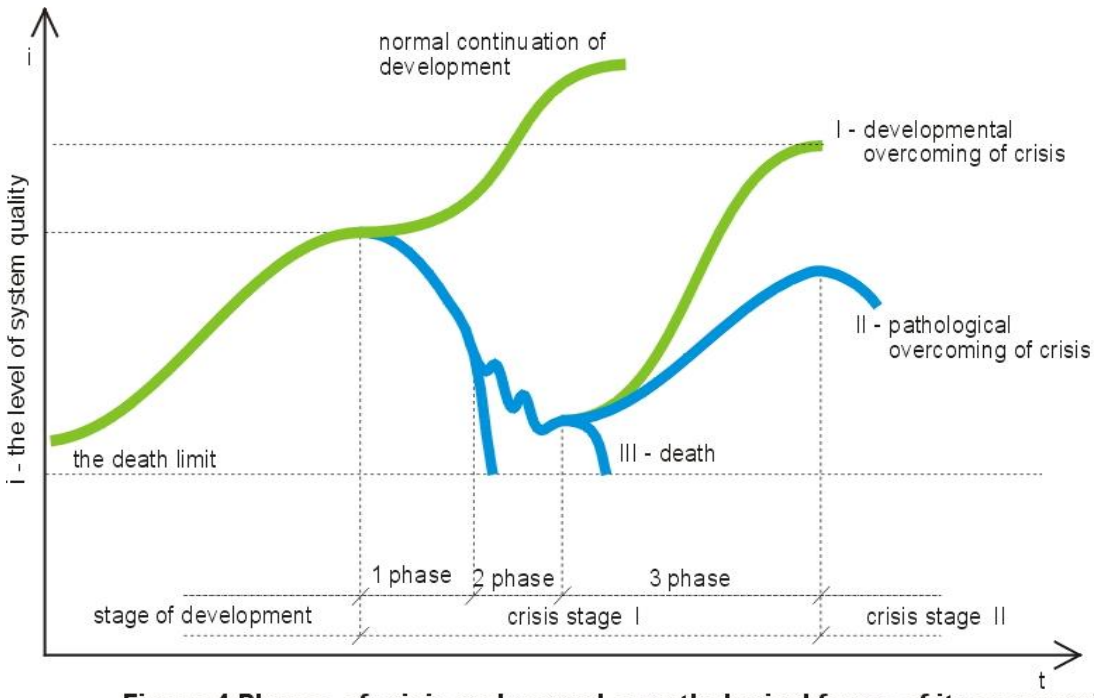

Figure 4 Phases of crisis and normal or pathological forms of its overcoming

The process of life goes through various phases and stages.

There are two kinds of development process of life-system: “at the cost of the environment” and “together with the environment”. Young life-system – with small life-potential - normally develops “at the cost - and with help - of the environment”. Matured one develops “together with the environment” (Michnowski, 1994).

SMT develops only then if develops also its environment.

To avoid global catastrophe we especially ought to know the features of - and how behave in state of change and risk - life-systems SMT type (world society, high developed civilization, and so on).

During the process of SMT life, software and hardware are changing practically continuously, but the orgware is changing discreetly, periodically – from time to time.

During development the consecutive quantitative and qualitative changes in SMT structure include:

1. – changes of software;
2. – changes of hardware, and (as a result of above changes, as well as of environment);
3. – changes of orgware (system transformations).

As a result of quantitative and qualitative changes in life-system microstructure grow its inertia and rate of changes in the environment. To adopt the life-system to such new life-condition it is necessary to rebuild life-system macrostructure (SMT – orgware), that allows to acting more far-sighted, flexibly, reserves creatively and less destructively to environment..

A proper change of orgware means that SMT has crossed the limits to growth in developmental way and entered the new stage of development.

When the SMT is developing:

- the amounts of its elements and its inertia grow;
- its structure differentiates;
- its flexibility grows;
- the quality of life of its subsystems grows;
- its inner reserves of life-resources grows;
- its life-span (durability) grows;
- its level of information rises.

When SMT is in crisis, its level of entropy rises and it approaches a death boundary.

The growth of life quality of SMT subsystems is described by the growth of their biological and internal as well as external creative life-span. The internal and external creative period of life is, when life-system “gives” more than “takes” from itself and environment, It means that system develops and helps the environment to develop.

The amount (quantity) of life-system inertia is described by delay between the change in life-conditions and adaptation of its life-forms to these new life-conditions.

The more developed is SMT the bigger is rate of environment changes, as an effect of the life of such life-system.

The main cause of SMT crisis is its development and over-inertia (as a result of developmental growth and growing rate of environmental changes) without proper transformation of orgware. The crisis mainly results from decreasing, with the old orgware (or improper transformation), the possibility of developmental (i.e. without of damaging environment) access to external life-resources. The crisis means, that the

system reached limits to growth, especially connected with its old orgware and overcame them in a pathological way.

As a result of the crisis the life-system can

- be destroyed, or
- enter a pathological life-state, or
- enter again a normal life-state and restore development.

The first phase (of every stage) of development (fig. 3) depends mainly on proper finishing of creation of a new orgware fitted to the new inner (software, hardware) and outer (environment, including the rate of its changes) life-conditions. The second phase – accelerated by proper orgware - is a rapid development of SMT software and hardware. The third phase, slows down the pace of development - as a result of moral ageing of the existing orgware that is now less fitted to the new hardware, software and/or state of SMT environment. In the third phase, new elements are created (or should be created) which help transform the old structure of SMT and its orgware, into a new one, fitted to the new inner and outer conditions of life and support SMT development. When the old – morally aged - orgware stops developing, the stage of development is finished. After that SMT enters, with its proper transformation a new stage of development or – without such transformation – crisis.

The essence of SMT crisis depends therefore on the lack of ability to access outer life resources combined with the lack of skill to support the life of the environment. SMT in crisis depletes its own, inner reserves of life-resources and/or takes them from environment also in pathological way. It leads SMT to death.

The more developed (and inert) SMT is, the more long-sighted, flexible, and resource creative - anticipative it should be to live in a rapidly changed environment. The main cause of the crisis is the underdevelopment of its control (homeostat)-subsystem.

There are two kinds of crisis: local and global. Local crisis of SMT occurs when its environment is in the state of development. Global crisis occurs when its environment is also in crisis.

The first phase of the crisis is quiet, invisible. The level of information of the SMT at the beginning decreases slowly, in a not too visible form. Such regressive stability of this phase results from the pathological stabilizing activity of stronger part of the system, which is materially interested in life determined by the old orgware. If not interrupted, this phase brings SMT to a death boundary.

The second phase of crisis features instability of SMT, what is a result of the defensive activity of a part of the system, being either mostly menaced by the influence of old orgware or understands (at least part of elite) the deathly consequences of life without building a new, proper form of the orgware. During this phase the system pathologically increases its quality - periodically and for only a short time. This is a result of partial destruction of the old orgware combined with access to resources that were, till then, inaccessible.

The longer the crisis persists, the more inner and/or outer life-resources are depleted. Therefore, in the second phase of crisis the system also approaches a death baundary.

In the second phase of crisis, it can be easier overcome. In this phase it is possible to combine wisdom and defensive activity of the elite with spontaneous defensive activity of non-elite of SMT. If, in the second phase of the crisis, SMT does

not find a proper way to transformation of the old form of orgware to a new proper one, it will enter the third phase

The third phase of crisis is again stable. It results from pathological governance. In this phase a new, but pathological, orgware is built. The elite of SMT is weakened. The power is shifted into hands of pseudo-elite. This new orgware allows the conservation of SMT life by destroying life of the social or natural environment, or by limiting access to deficit resources for the weaker part of own SMT. For some time SMT upgrades its quality, pathologically put down its inertia, but this is short-term tendency. If the crisis is not overcome by the end of the third phase, the system will enter a new stage of crisis or reach death boundary.

Development of life-system is especially depended upon developmental changes of its control (homeostat)-subsystem, which allows its higher long-sightedness, flexibility and more efficient creation of life-reserves. When the inertia of the life-system reaches some maximum level, the control (homeostat)-subsystem must be changed. A new form of the control (homeostat)-subsystem should therefore extend the strategic horizons of the life-system and increase flexibility of SMT inter alia by dividing (on the subsidiarity principle) the process of execution its life supporting policy (decision-making) among a larger number of decision-makers. This enlargement is connected with making the access to information base and other information technologies available. The increasing of active intellectual potential and informational efficiency of SMT therefore is needed too.

Every SMT has its relative limits to growth. After approaching these limits its further development is therefore conditioned by proper change of its orgware, including the control (homeostat)-subsystem, value system and/or its synergetic integration with another system or systems.

For sustainable development we ought to know the logic of limits to growth and proper transformations (of orgware) indispensable for supporting development.

For developing SMT it is necessary – together with reaching the limits to its growth – to go successively through the next main transformations:

I - to add feed forward into socio-economy relations and increase flexibility of SMT (and get proper long-sightedness);

II – to change value system into egoaltruistic-ecohumanistic one, and build SD-economy (and not to allow to damage its environment);

III – to put environment under its ecohumanistic control (not allowing environment to damage SMT);

IV – to integrate own control (homeostat)-subsystem with homeostats of environment life-systems (and reach symbiosis in set/system: SMT – environment).

All these sustainable development transformations feature the following characteristics: active intellectual potential of SMT and its information efficiency are growing up. Along with these transformations the SMT value system is changed from egoistic to egoaltruistic. The main feature of these transformations is strengthening of the SMT homeostat and supporting the development of environment.

These transformations are indispensable when (as a result of the previous development stage):

- the system is excessively inert, and/or
- there arises a threat of destruction at least of SMT elite, and/or

- there arises a threat of destruction of the SMT environment.

These transformations depend on the change in the SMT structure by creation of an additional feedback set that make it possible to enlarge the creative and defensive potential of the system and/or developmental integrating of SMT with another SMT (or SMTs).

As a result of successful such transformations, SMT becomes more information efficient, long-sighted, flexible, reserve-creative, environment friendly, and gets access to new life-resources.

When proper transformation is not made the system enters a crisis, builds up a pathological life-state and damages outer or inner life-resources. .

The behavior of SMT especially depends on its access to life-resources and differences in the creative-life potential.

If two SMTs, one of them stronger and another one weaker, exist in the situation of accessibility to life-resources, the stronger one uses the weaker as technology.

If two SMT exist deprived of their life-resources, the stronger one causes the weaker one to die and takes over its resources.

If two SMTs of the same creative- and defensive- life potential exist deprived of their life-resources, they start to cooperate to get – with the synergetic effect of cooperation – an access to new resources.

The above mentioned cooperation is also possible between strong and weak SMT, if the destruction of the weaker one leads to the death of the stronger one - but only when the stronger has the knowledge of such a danger. (In order to create such a possibility nowadays it is necessary to build world warning forecasting system).

This is *System of Life* model basis on which we can more precisely define the notions of global crisis and sustainable development (fig. 3 and 4).

Sustainable development is a kind of development which is not interrupted by periodically occurring crises – heavily destroying life-resources. In the era of globalization a global crisis can easily evolve into global catastrophe. Sustainable development depends on properly, in anticipatory way made transformations of the orgware of world society, aided by relevant development of software and hardware. In order to overcame the global crisis and avoid global catastrophe we need multiplication of active intellectual cognitive and innovative potential of humankind.

Presently for sustainable development we then need not only environmental protection, we need also social and economic development, as well as a possibility to shape the changes in environment in proper and anticipatory way.

It means that the present-day concept of sustainable development (UN “three pillars”) is not only ideal for proper governance, but also lays down an essential condition for survival of the humankind. In the view of *System of Life* model - sustainable development is not oxymoron[17].

[17] See: Wolpert A., *A SDsustain Listserv discussion that begins with talk about sustainable development and ends up clarifying the concept of SERIOUS system dynamics* - http://world.std.com/~awolpert/gtr345.html .

4. How to overcome the global crisis?

Al the next conclusions and proposals are logical implications of *System of Life* model.

In accordance with mentioned above fragments of conceptual model *System of Life*, the world society is in global crisis, because presently in the crisis is also the natural environment.

We are polluting natural environment faster than the environment can regenerate itself to reach the level suitable for human needs. The natural environment has not nowadays sufficient life-potential, which is necessary to rebuild itself - without the help of world society - in the form proper to support life of natural environment and human beings.

We are also exploiting our natural resources of minerals and fuels faster than we are gaining access to alternative sources.

Depreciation (devaluation) - moral degradation - of the existing life-forms is going on faster than new forms, consistent with new life-conditions for humans and for the nature, are being introduced. This situation is complicated also due to demographic expansion, especially in those parts of the human family that are lagging in their development.

Presently we are probably just before a third phase of crisis (fig. 4). We are in turning point. Before us there are either sustainable development, global catastrophe or new high science and technology pathological new world order.

We are living now in the state of change and risk. This state is a result of big science and technology progress. The main cause of global crisis is over-inertia of world society and its economy. It causes rapidly pacing moral destruction (getting obsolete) of existing forms of life not fitted to new, rapidly changed, with technology and environment, life-conditions. Negative effects of this destruction are not eliminated by innovative activity. Present economy system does not stimulate such creative activity. The physical destruction of global ecosystem (Earth, i.e. system: world society – natural environment), goes rapidly, as a result of short-sighted, egoistic economy and big, resources thoughtlessly damaging, hedonistic and prestige consumption[18]. This economy system is particularly unfitted to genetic engineering.

Our developmental policy is short-term. We have no governance and value system adequate to the state of change and risk. The short-sightedness and egoistic value system result mainly from underdevelopment of information subsystem of the world society. Our economy is also not adequate to state of change and risk. This economy does not include externalities into accounting. This economy does not take into account the complex and long-range effects of socioeconomic activity – together with external (socio-nature) profits and costs.. This economy does not stimulate intellectual (cognitive and innovative) creative activity for common good. This economy allows getting money by matured subjects at the cost of social and natural environment – without sustainable development-creative, especially innovative, activity.

[18] Willard R. Fey and Ann C. W. Lam, propose - to avoid global catastrophe - to put down the range of world consumption. In my opinion there exist three kinds of consumption: hedonistic-, prestige- and efficiency-consumption. We ought to put down the hedonistic- and prestige-consumption. We ought to use efficiency-consumption as drive for SD creative activity (Fey. Lam, 2001).

The world society (and its economy) is short-sighted and not enough flexible. We have not created any possibility to lead sustainable development policy according to Sage's model – fig. 1. We have not enough knowledge for such policy. We have not information foundation for wisdom based policy.

We do not understand correctly the essence - for our life and proper environmental conditions - of mutual, symbiotic life supporting. We do not know yet – in polical practice – an irreversible law of life. We do not know complex and long-term effects of our socioeconomic activity. Very often we introduce new technologies into practice in a blind way. We have no possibility to predict and evaluate in measurable way the effects of policy, work and other changes in life-conditions. We have no possibility to eliminate forecasted dangers in anticipatory way. We have no possibility to create in precautionary way the reserves of intellectual-material resources, which might be necessary to avoid catastrophes that were not predicted. We destroy thoughtlessly socio-, bio- and geo-diversity – the synergetic base of development and life-reserves for Unknown.

But we have yet high science and technology, that are necessary to overcome this crisis and to achieve the sustainable development. For this end we have to lower a range of physical destruction of global ecosystem (i.e. human and nature) and to get skill of efficient overcoming the negative effects of moral destruction of existing forms of life, which are not fitted to the new and rapidly changing life-conditions. For eliminating negative effects of presently so rapidly pacing moral degradation of existing forms of life (technology, economics, value systems and so on) we have to maximize intellectual, especially innovative creativity. For this end we ought to extend the efficiency consumption (but not – hedonistic and prestige consumption)..

For better understanding above tasks we might remind the fig. 2. The world society is represented here by the system: man (control-subsystem) – technology (labor-subsystem) (SMT). When the level of science-technology development was low, the external destructiveness of world socioeconomic activity was less than external constructiveness of developing natural environment. Therefore the natural environment could then rebuild itself into form convenient for the world society. It was a result of natural homeostasis. In that time the input energy (in wider sense - natural resources, "natural fruits, clean air and water", and so on), from environment, was generally unchanged.

Under such conditions the development of the world society could depend on natural form of evolution: by a process of "trial and error". When the environment could not be destroyed by young, weak SMT, it was unnecessary to account external costs of socioeconomic activity. We had not to conserve our environment, to take care about it. We could then live and get matured "at the cost of the environment".

The first task in social development was to create strong and wise elite – the important factor of global homeostasis and future development of the world society. As well as - high science and technology. It was possible then to treat the weaker parts of human family as simple working force – mainly technology for execution of this main developmental task.

Presently, we are living in quite different situation. The natural environment, permanently destabilized, is in the state of regression. As a result of it the shape (form) of input energy (fig. 2) is also changing permanently. Our future life depends than on getting ability of:

- more efficient using of presently accessible resources;
- access to new sources of resources in adequate time;
- support life of our socio-natural environment;
- getting under control process of life of environment, and
- maximizing intellectual creative activity – cognitive and innovative - for common good.

Therefore we should get a skill to adapt ib properly way our life-forms, especially our orgware, to such new and permanently changed external life conditions - to the state of change and risk. We cannot do this adaptation by means of "trial and error". We must base this adaptation on the knowledge about complex effects of developmental policy and the other future life-conditions.

Because the results of such acts of adaptation are inevitably - even considerably - delayed, then we must introduce the changes, particularly in orgware, in anticipatory way. If the change of orgware is not enough to adapt us to new life-condition we ought to prepare also proper software and hardware that will be necessary to life in changed life-conditions, as well as proper integration.

Therefore we have to predict long-term changes in state of environment (including access to deficit resources and other dangers) and change our life-forms before new impacts of environment cause socio-economic damages, even big catastrophes.

It is only the first (linked to the left side of fig. 2 – input-energy) part of adaptation to living in the state of change and risk. The second part is linked with our out-put energy: from SMT to environment.

In *System of Life* model approach, the environment is also the life-system. Our life depends then on the life, high quality and proper form of environment. This environment is a self-organizing system, with the skill to defend its life and cooperate for common good. Therefore we ought to change our impacts on the environment – from destructive to constructive one. We must create such forms (patterns) of production and consumption, which shall allow supporting our life as well as life of the environment. We must build symbiosis forms of mutual relations inside of the humanity and between humanity and natural environment. All our properly formed wastes should be used as means supporting life of social and nature environment. It is not all for permanent socio-economic life and development in state of change and risk. Our environment is changing. Thus we should know the future needs of our environment life. To live in the state of change and risk we have to know not only changes in input impacts of environment, but also - its future life-needs. On such basis of prediction we ought to change - permanently and in anticipatory way – our life-forms to fit them to future, permanently changing life-conditions and life-needs of environment..

Execution of these tasks is depended upon the substitution the intellectual evolution for – presently dominating in socioeconomic life – natural evolution patterns (social-Darwinism). Intellectual evolution means the initial selection of new life-forms done (by means of popularly used computer simulation) in "virtual reality" instead of in practice.

It means not only the necessity of developing world sustainable development-information and education subsystem that allowing such prediction and simulation. It means also the necessity of changing our value system into ecohumanistic one.

Without such qualitatively new - ecohumanistic, symbiosis - social and socio-natural relations, it is impossible to avoid global catastrophe we are going to. Execution

of above mentioned tasks means to carry out at once a least two sustainable developmental transformations:

I – to add feed forward and flexibility (inter alia subsidiarity) into socio-economic relations;

II – to change the value system into egoaltruistic-ecohumanistic one, and build SD (sustainable development)-economy;

It means the lifting-up a lot of weaker part of world society on the level of their intellectual creativity. It also means not to slow the pace of world consumption, but to change its patterns into creativity helping and stimulating, efficiency consumption.

It is a big challenge to world society, world power elite, science-technology people – to transform our socioeconomic relations into one fitted to the state of change and risk. Without such ecohumanistic transformation, introducing the sustainable development (fig. 3) will be impossible. Instead of sustainable development we will reach very dangerous - for all people - regressive growth and global catastrophe – especially as a result of defensive activity of being eliminated part of world society.

For getting sustainable development we then ought to:

1 - build information basis for SD-policy, ecohumanistic consciousness and SD-economy;

2 - change consciousness of world power-elite into ecohumanistic;

3 - change our short-sighted and egoistic economy into SD-economy.

The SD-economy it the economy based on:

- the accounting of complex and long-term profits and costs of socioeconomic activity including social and nature environmental elements of it, and
- ecohumanistic (common good) value system.

SD-economy should be based on ecosocial justice principle. It means join access to wealth for mature socioeconomic subjects with their ecosocial usefulness, i.e. the creative, especially innovative, and for common good activity. It should allow to use natural lust for putting up the range of consumption as a drive for intellectual, innovative, for common good creative activity.

SD-economy should direct socio-economic activity to support the social development, economy development and environmental protection, i.e. putting up durability and quality of life of human beings and environment.

In relation to yet existing techniques SD-economy should direct innovative activity to put down the complex unit cost of using technique (CUCUT).

CUCUT is the unit cost, which takes into account all costs connected with production, exploitation, annihilation and rebuilding of socio-natural environment destroyed with it. This cost includes the cost of getting access to new sources of resources depleted with using of given technique.

SD-economy should also support creation of reserves of intellectual-material resources that can be indispensable to avoid catastrophes not predicted.

The first step in ecohumanistic transformation should be building the information basis of SD-policy (Sage, fig. 1).

If we are in the global crisis and above mentioned conceptual model *System of Life* is adequate to real world then we have two possibilities:

- dropping into third phase of global crisis, i.e. regressive growth, and into new totalitarian, information inefficient, system (Lebensraum policy, Orwell information society, “clash of civilizations”, and “20-80% society” (Martin,

Schumann 1999), false "development" and rapid destroying of world developmental reserves (including socio-diversity), or

- overcoming – on the ecohumanistic partnership cooperation base - this crisis and achieving sustainable development.

To start this ecohumanistic transformation we must know that it is impossible to overcome global crisis by still putting up the range of social and/or nature environmental destruction.

We do not know where presently is the boundary of death (fig. 4).

5. The world SD-information system

To overcome global crisis and achieving the sustainable development (SD) we must, as a first step, introduce - additionally into world socioeconomic infrastructure quite new (*ante factum*) feed back – FEED FORWARD. We must predict new life-conditions and in anticipatory way shape new forms of life indispensable to overcome dangers connected with these new life-conditions. For this end we need world information system - integrated and distributed. It is not possible – when changes in environment are pacing so rapidly – to base developmental activity on strongly centralized (for example, only in one state localized) information system.

For this end we ought to build commonly accessible World (integrated and distributed) SD-Information System for Comprehensive Monitoring, Prediction and Measurable Evaluation - of effects of policy, work and other changes in life-conditions of human- and other beings (World SD-Information System).

It should be a result of a large-scale international (even global) scientific-technological operation (such kind as Apollo-operation) directed on creation of information basis of sustainable development[19].

As a first stage of this operation we ought to build World Warning Forecasting System.

As a first steps in building of World Warning Forecasting System I propose to:

- arrange Meadows's (System Dynamics) type world warning forecasts (and comprehensive monitoring of Earth) year by year (Meadows et al, 1993),
- transform national statistical offices into national offices for statistic and warning forecasting (including comprehensive monitoring),
- build international system of mutual access to forecasting methods, dates, knowledge, and prognoses that are necessary for global and local warning forecasting.

The methods of comprehensive monitoring and warning forecasting should be continuously developed.

As a second stage, we ought to build World Computer Simulation System - for designing and assessment of technological, organizational and environmental changes.

The last (and more difficult) stage of this operation it would be building of the Information Basis of SD-economy.

The main task of above operation would be getting common access to computer simulation methods for particular SD-policy (including organizational and technological progress) and information needed for SD-economy and stimulation of creative

[19] In accordance with Michio Kaku, it will be possible – from science–technology point of view – to build such large-scale information system (Kaku 1997).

intellectual activity by means of ecosocial justice. It allow to really change patterns of production and consumption - into one based on symbiosis principle.

Than, as an effect of creation of World SD-Information System, it would be possibly to lead proper developmental policy - based on systems engineering principle (fig. 1).

World SD-Information System allows - together with the intellectual evolution - for substitution of intellectual, especially innovative creativity for present excessive biological creativity. It allow – it is very important conclusion from *System of Life* model - to stop in humanitarian way the over-population of Earth.

These big tasks cannot be done without changing the dominating value system into ecohumanistic one. But it is interlinked. It is impossible to change really the human consciousness without building of above mentioned SD-information basis.

Without building above proposed information basis for intellectual evolution (the real ground of sustainable development) it will not be possible to introduce SD-economy and symbiosis ecosocial relations, as well as to avoid global catastrophe and achieve the sustainable development.

World Warning Forecasting System – the first step in building of World SD-Information System - allow world power elite to get believe that sustainable development and SD-economy are really possible as a real alternative to global catastrophe. Consequently, with the help of creative forces of a social and natural environment, we get enough time which is essential for indispensable ecohumanistic transformation[20]. Ecohumanistic consciousness of world power elite allow for undertaking of the above two next stages of building the World SD-Information System.

When we overcome the global crisis and restore development , World SD-Information System helps us to (fig. 4):

- support the second phase development by proper science-technological progress of software and hardware - in the way fitted to changing and future life-conditions and life needs of world family and environment,
- recognize (as a result of complex monitoring) when the pace of development starts to slow down (figure 3, point B), and when we should start to design new form of orgware. .

In accordance to *System of Life* model (fig. 3), in the moment B (and as a result of comprehensive monitoring) we should start the new transformation. In this moment (B) we ought to predict and start to build new form of orgware, that is essential for support development. During this prediction we ought to get knowledge about new software and hardware (including science and technology) that we should get to introduce this new form of orgware. The new form of orgware means not only simple change in socio-economic infrastructure, but also eventual introducing quite new form of governance (homeostat) and value system.

6. Subsidiarity global governance

The global crisis is mainly the result of lack of proper - adequate to state of change and risk – control–subsystem (homeostat) of the world society. World socioeconomic system is over inert for controlling them in the primitive way of self-organization and “a posteriori” feed back principle (in such a way acts so called “free market”) as well as on the over-centralized principle.

[20] See: (Meadows 1993, p. 236).

The global partnership cooperation for common good is presently essential. It is impossible to get such cooperation without very efficient multilevel (including global) governance – based on subsidiarity principle.

The subsidiarity principle depends on:

- resolving the problems on the principle "one for everybody" that are not to be resolved by lower levels of organization, or the resolving of them would be over expensive;
- controlling society in the indirect way, mainly by mutual supervising them (global village) and formulation of common goals, building proper orgware and getting access to information;
- putting to order controlled system, if independence of some lower levels leads to dangerous situation of controlled whole.

The higher is level of such control the larger must be its range and far-sightedness.

For sustainable development and proper flexibility we need subsidiarity multilevel governance: global, international and national, and of other local levels, as well as civil society participation.. But proper governance and such participation is impossible without proper access to information, especially about future results of its policy and results of warning forecasting.

Without global governance it is impossible to build information basis of sustainable development.

As important element of global governance I propose to create – for example, by UN Security Council – a professional World Center for Strategy of Sustainable Development (Michnowski, 1997)[21]. This World Center should be supported by important its part: United Nations Sustainable Development Information Center (inter alia for creation and popularization of computer simulation methods needed for sustainable development)..

The main task of World Center would be creation of mentioned above SD-information basis. The next task it would be creation of SD-economy[22]. Another important task would be computer simulation supervision of socio-economic and environmental Earth life-conditions and stimulation of defense actions for overcoming forecasted dangers, supporting sustainable development and building reserves of

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[21] This proposal was supported in 1997 by above mentioned *(Polish Initiative …)* 165 very important persons from Poland:
http://www.psl.org.pl/kte/Polinicj.htm , http://www.psl.org.pl/kte/Lista.htm .

[22] In accordance with Lester R. Brown: *Transforming our environmentally destructive economy into one that can sustain progress depends on a Copernican shift in our economic mindset, a recognition that the economy is part of the earth's ecosystem and can sustain progress only if it is restructured so that it is compatible with it. The preeminent challenge for our generation is to design an eco-economy, one that respects the principles of ecology. (…) Unfortunately, present-day economics does not provide the conceptual framework needed to build such an economy. (…) The question is not how much will it cost to make this transformation but how much it will cost if we fail to do it.*(Brown, 2001*).*

In accordance to Club of Rome Report: *Maximum sustainable levels of use of critical resources and of pollution must be limited in global economic systems. "Externality" costs must be internalised.* See: (CoR Report 2002).

Without of building proposed information basis for sustainable development it will be impossible to change present-day economy into SD-economy.

resources needed for Unknown. World integrated system of flexible automation ought to be build also as a next step of adaptation of world society to state of change and risk[23].

Execution of above proposal would allow to change the role of UN Security Council from "feed back - fire department" into FEED FORWARD SD and PEACE-CREATOR – indispensable factor of "preemptive development".

7. Far-sighted science-technology policy as a basic factor of sustainable development

Present science-technology policy is based on "*post factum*" (feed back) principle. It allows to get the new technology as an answer on past accidents or dangers. We do not know all interlinked good and bad effects of new technology. We do not know new approaching life-conditions and dangers connected with using of existing and new technology under such quite new conditions. In the state of change and risk such method of science–technological eco-development is very expensive, inefficient and even very often obsolete – morally aged.

By means of execution of above proposed world information system it will be possible to achieve quite new level of SD science-technology policy.

When we start world and/or local (integrated) warning forecasting we get information about the lack of knowledge that is necessary to do such prognoses. It allows to control the development of science and collection of statistical data in form most convenient for such prediction activity. It allows also to cooperate in getting access to new science achievements that are necessary for making forecasts.

As a result of warning forecasting we get information about approaching to different dangers. It allows to control the development of science and technology in the way that is necessary to avoid these dangers.

All above it allow not only to avoid the global catastrophe, but also to accelerate achieving the sustainable development of the world society.

8. Conclusions

Presently we – humankind, developed societies - are living in quite new life-state – in the state of change and risk. That results from big science-technology progress. We are not adapted to live and develop under such new life-conditions. We are not far-sighted, flexible, and reserve creating enough.

The main cause of the global crisis is rapidly pacing moral degradation (process of obsolete) of existing life- forms not fitted to the new, rapidly changed conditions of of human and nature life. To eliminate the negative consequences of that, we need a huge intellectual, informational and ethical potential.

In order to avoid the global catastrophe and to achieve sustainable development it is necessary to substitute the intellectual evolution for "trial and error" development method. Computer - System Dynamics - simulation should be therefore presently a basic method of selectioning developmental undertakings – in "virtual reality", instead of in practice. Continuation nowadays of old patterns of development through very expensive "trial and error" - leads us in era of globalization to global catastrophe.

To avoid the global catastrophe we ought to change the patterns of development. We ought to achieve ethical maturity and symbiotical skill to develop "together with

[23] See: (Michnowski 1985).

environment (social and/or natural)". For this end we should incorporate into our socio-economic infrastructure quite new developmental mechanisms – FEED FORWARD and ECOHUMANISTIC value system[24]. We should also change the patterns of consumption. Consumption of developed parts of world society should be used as a drive of their intellectual, especially innovative creative activity for common good. Consumption of weaker parts of world society should allow them to reach intellectual and ethical maturity - education and possibility of their intellectual creative partnership cooperation in sustainable development activity.

Presently, the approaching dangers must be eliminated in anticipatory – preemptive development - way. Without partnership cooperation for common good, aided by new technology, it is impossible to get access to adequate knowledge and generate big intellectual - cognitive and innovative - creativeness that is indispensable for anticipatory elimination of negative effects of rapidly pacing moral destruction of existing forms of life.

To live in state of change and risk we need the Wisdom Based Global Information Society.

Therefore we need also information efficient, subsidiarity, multilevel and global, governance. This governance must be based on the World SD-Information System - for aiding SD-policy.

For sustainable development we especially have to:

1 - create the possibility of comprehensive monitoring, long-term prediction and measurable valuation of effects of policy, work, and other changes in life-conditions of human beings and nature,

2 - join access to wealth and deficit resources with ecosocial usefulness of intellectual creative - especially innovative - activity.

Consequently we could reach an opportunity to create new economy – SD-economy - based on common good (egoaltruistic, ecohumanistic) value system and complex, long-term calculations of benefits and costs (including social and environmental components).

Therefore I propose to recommend to World Summit on the Information Society (Tunis 2005) undertaking large-scale international scientific-technological operation of building information basis for sustainable development[25].

The creation of commonly accessible World (integrated and distributed) SD-Information System for Comprehensive Monitoring, Long-term Prediction and Measurable Evaluation - of effects of socio-economic activity and/or other environmental changes is essential to avoid the global catastrophe and to achieve sustainable development, through partnership for common good cooperation of world society based on multilevel (and global) governance, SD-economy and Inclusive Globalization (CIA, 2000).

Sustainable development without adequate political philosophy, as well as still developed and commonly used System Dynamics can be only oxymoron.

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[24] Ecohumanism is a partnership-based co-operation for the common good of all people (rich and poor, from countries highly developed and underdeveloped), their descendants, and natural environment - commonly supported by science and high technology.

[25] Previously I addressed such proposal to World Summit on the Sustainable Development, Johannesburg 2002 (Michnowski 2002a, 2002b, 2002c). See also: http://www.psl.org.pl/kte/eco.htm ,

To avoid the global catastrophe and overcome limits to growth we urgently need large development and wide spreading of the System Dynamics.

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