

*Chapter*

## **SUSTAINABLE DEVELOPEMENT CONCEPT – FIASCO OR THE ONLY HOPE TO SURVIVE.**

***Orce Popovski, PhD\*, Ljupcho Shosholovski, MD***

Military Academy “General Mihailo Apostolski”- Skopje, University  
“Goce Delchev” Stip, an associated member, Skopje, Republic of North  
Macedonia

### **ABSTRACT**

Before the beginning of the industrial revolution, the climate changes were regarded solely as a natural phenomenon. From then onwards, anthropogenic activities present an enormous influence over the climate changes. Numerous studies which were conducted at the beginning of the ‘80s of the last century, indicate link between environment and security. Studies primarily are related to the research of the implications of environmental changes on security. Knowledge about the global impact of environmental changes, such as the reduction of the ozone layer, increased pollution of all environmental media, the disproportion in population growth and food production, demographic imbalance, the increased influx of immigrants in developed countries, all show their implications on security. As a result, the relevant authorities were motivated to make a re-evaluation of the security dimension, incorporating environmental concerns.

Sustainable Development is one of the most important environmental issues, since it was launched during the 1992nd Rio de Janeiro’s World Summit. Together with formulation of Agenda 21, Declaration on environment and development, concern on forests, climate changes, bio-diversity, and desertification, a Commission on Sustainable Development was established as well [1].

**Keywords:** climate change, environmental changes, security, Sustainable development

---

\* Corresponding Author Email: [popovskiorce@gmail.com](mailto:popovskiorce@gmail.com)

## INTRODUCTION

Everything started when in 1987 the UN World Commission in its Report Our Common Future [2], faced the terrifying fact that global demand of natural resources doubled in 45 years! This was mainly due to population growth and increased individual consumption in the years after World War 2. As a result, the Commission concluded where the development is favorable - but it must be also sustainable. Sustainable Development continued to be in the center of worldwide interest on summits that followed. So, at the Kyoto Summit a far reaching Protocol was adopted aimed at controlling the Global climate by strict intension that all countries would converge toward equal per capita emissions of CO<sub>2</sub> from fossil fuel combustion [3]. Starting with the situation in 1990s when the most developed countries were emitting CO<sub>2</sub> 10 or more times than the rest of the world, the Kyoto Protocol was advocating the idea that by the year 2020 all countries should converge to CO<sub>2</sub> emission equivalent to 1 ton carbon per year and capita. This noble idea was not accepted by the most relevant countries, the ones that were supposed to make extreme efforts in reducing the CO<sub>2</sub> emissions. Countries as, e.g. USA, Canada, Australia, ... opposed to sign the Protocol expressing fear that this will limit their economic growth. In the case of USA the reduction of CO<sub>2</sub> emissions was 7 times. This really represents a drastic measure and explains why the most developed countries kept such an attitude. Never the less, Kyoto Protocol is still an actual document and has achieved important goals. The need for global acceptance and action of all of Earths population, raised doubt in the feasibility of the Sustainable Development concept, due to beginning of searching for its sucesor [4, 5].

Finally, all eyes were pointed on the United Nations Summit held in Copenhagen in 2009. From the Summit was expected, governments of 192 countries to reach a new agreement on climate change. Mankind hoped that political leaders will be visionaries for the future because of them depended on whether there will be "Copenhagen" after Copenhagen. Successful, even partially agreement in Copenhagen will be given the chance, for example, the islands of Maldives to survive [6].

Whatever the mankind's hope and expectations are, even before the start, analysts were not optimistic about the results of the Copenhagen summit, because reducing carbon dioxide emissions, in fact, means reducing industry, reallocation of market cake and of course – the power. Thus, it became clear that the rich countries are not willing to pay such a high price for the sustainable development.

Although the 15th International Conference on Climate Change's supposed to be the most important chapter in the story called "climate change", 35 years old, it

went as predicted - followed by protests, riots, comments and... without a final agreement. Unfortunately, more or less all of the later conferences failed to adopt a Program for implementing harmonized conclusions.

Unlike the Kyoto Protocol, which was mandatory for industrialized countries, the "Copenhagen agreement" is legally optional, contains no specific figures for reducing greenhouse gas emissions, either order, the emission of carbon dioxide by 50% by the year of 2050. Unlike the Kyoto Protocol, which was mandatory for industrialized countries, the "Copenhagen agreement" is legally optional, contains no specific figures for reducing greenhouse gas emissions, either order, the emission of carbon dioxide by 50% by the year of 2050.

## **SUSTAINABLE DEVELOPEMENT CONCEPT AND MILITARY OPERATIONS**

Unfortunately, this is also the case with the norms and principles of environmental protection when conducting military operations, although it is known that damage to the environment has always been present in military conflicts [7]. In fact, it is quite clear that the daily tasks and activities performed by military members are directly related to the environment, because they use a variety of means contributing to the pollution of air, water, soil, vegetation, animal life, etc. Of the past, certain means and methods of warfare leading to harmful effects on the environment, and sometimes amounted catastrophic proportions. While in the past environmental damage was compared to the result of the use of certain types of weapons and/or instruments of warfare, today such damage is often the result of conscious intent of the deliberate sides.

Although environmental damages are inevitable consequence of conducting military operations, the problem of environmental protection is actualized only in the last decades of the 20th century in the International Humanitarian Law. Until the Vietnam War, International Humanitarian Law contained no specific rules for the preservation of the environment, but the rules for the protection of property served as the sole legal basis for environmental protection. However, since the Vietnam War which destroyed large forest expanses and other flora, comes to a reversal of that plan, so several international agreements containing provisions on environmental protection in armed conflicts have been adopted.

Provisions in a more direct way related to the protection of the environment are contained in several agreements of the International Humanitarian Law: Additional Protocol I on the protection of victims of international armed conflicts since 1977,

the Convention on the prohibition of the use of military or any other hostile technique that causes changes in the environment since 1976 (ENMOD Convention) and the Convention on conventional weapons (Protocol III to prohibit and restrict the use of flammable weapons).

However, it seems that the explicit norms that contained prohibitions and environmental restrictions are general and imprecise, and the conditions for their application set are at a very high level. The Protocol I contains only two provisions of a more direct way protect the environment. The first of them (Article 35, paragraph 3) is in the third part, devoted to the means and methods of warfare, while the second (art. 55), which is located in the fourth section, refers to the protection of the civilian population [8].

Paragraph 3 of Article 35 says that "...it is prohibited to employ methods or means of warfare which are intended, or may be expected, to cause widespread, long-term and severe damage to the natural environment". This provision prohibits not only the means but also any method used with intent to cause damage to nature on a grand scale, but those whose use feeds to predictable collateral damage of such magnitude. Accordingly, there is a violation of Protocol I when against legitimate military target acted and permitted means, but is caused unintended (collateral) damage to the natural environment, which has a widespread, long-lasting and serious character.

Paragraph 1 of Article 55 reads as follows: "...care shall be taken in warfare to protect the natural environment against widespread, long-term and severe damage. This protection includes a prohibition of the use of methods or means of warfare which are intended or may be expected to cause such damage to the natural environment and thereby to prejudice the health or survival of the population".

The formulation used, implies that both Articles only apply to environmental damage that cumulatively qualifies widespread, duration and severity (the so-called triple cumulative standard). With this requirement, the threshold of their application is elevated to a very high level. For example, if there is serious damage to the environment, which is manifested by decades, decreases to a breach of these Articles, if the adverse effects are not manifested in the wide area.

The second obvious example of this are the provisions of the ENMOD Convention, which under Article says: "States Parties undertake, in the military, and any other hostile use, not to engage in techniques that alter the environment and that have widespread, long-lasting and serious consequences when used as a means of destruction, damage or injury to the opposite side". The Convention, therefore, prohibits the use of so-called "Environmental modification techniques" as a military tool. However, the Article 2 of this Convention defined "environmental modification techniques" as referring to any technique for changing—through the

deliberate manipulation of natural processes—the dynamics, composition or structure of the earth, including its biota, lithosphere, hydrosphere and atmosphere or of outer space”. From this definition follows that the ENMOD Convention is limited to manipulation of nature with many advanced technologies that leave far-reaching consequences. As examples suggest techniques that cause earthquakes, tsunamis, rainfalls, droughts, disruptions in the ecological balance in a given region, climate change, changes in the ionosphere, etc.

In addition, a particularly large problem in some norms in the International Humanitarian Law, represents the application of the principle of military necessity and limits collateral damage caused by attacks on military facilities.

It is obvious that the International Humanitarian Law cannot fully prevent or exclude environmental damage during armed conflicts, but it can contribute them to be reduced to the lowest possible level. The best way to promote environmental protection in armed conflicts is certainly the adoption of a new international agreement that will unify, systematize and expand existing norms in the International Humanitarian Law, but will introduce new balanced primarily with the sustainable development concept.

## **CONTEMPORARY CHALLENGES OF THE CONCEPT OF SUSTAINABLE DEVELOPMENT**

While the daily unfolding debates about saving the planet, the facts show that humanity increasingly enjoy material affluence and luxury. Report by the World Wildlife Fund from 2006 is clear: “We spend the resources faster than what nature creates”.

If the relationship consumed: updated in 2003 was 1.25 : 1, the predictions of this Fund that relationship in 2050 will be 2: 1. Therefore, the Fund recommends: a) to change the way of life; b) to reduce energy consumption, food, wood, etc.; c) to reduce the speed of turning resources into waste; d) ... This new philosophy means life takes place exclusively in harmony with nature: Recycle – Reduce – Recover – Reuse [9].

Since time, immemorial various forecasts and dark scenarios about the survival of mankind existed. The most characteristic between them, it seems, is Malthus' embarrassment. Namely, at the end of the 18th century, he predicted because of the disharmony in population growth (geometric progression) and the increasing in food production (arithmetic progression), humanity is doomed to suffering from massive disease, poverty, if no action is taken to limit the population growth.

Instead, ever since the population is tripled, the life is extended, and people are healthier than ever before. So what was wrong in Malthusian theory? Apparently, he belittled the possibilities of science and technology. Malthus could not foresee the ingenious technological solution proposed by Haber and Bosh for getting fertilizer from atmospheric nitrogen (inexhaustible resource), and thus food production skyrocket. Therefore, the eternal dilemma is: restriction or expansion in spending resources?

The expansionists' philosophy is unlimited spending on raw materials, as long as it requires economic growth and the fear of their exhaustion is unsuspected because technology creates new resources. Maybe this solution, which includes the development, promotion and improvement of existing and the discovery of new materials is the alternative concept of sustainable development. The basis for such optimistic forecasts lies in the possibilities of chemistry, which in this area has not yet given its final word. In fact, if you look through history, clearly notes that before the 20th century, mankind was limited on consumption of natural materials and metals, the 20th century marks the consumption of polymers, ceramics, composites, ... (man-made materials), while the 21st is likely to be century of new composites (fullerenes, carbon nanotubes, graphenes, etc.) [10, 11].

The advantage of these materials is that the resources for obtaining them are inexhaustible, unlimited, renewable, and their features are superior to the previous materials.

Let's go back in the history to retrospect technological revolutions (Fig. 1). Any technological revolution causes remarkable change of lifestyle followed by new materials, products and services, providing new life comfort quality [12, 13]. On the other side, every technological revolution is connected to certain source of energy, i.e. certain kind of fossil fuel. Beginning of the industrial revolution (steam machine appearance), on the other side, means beginning of mass consumption of coal as a convenient energy source. Further, electricity revolution is based on usage of coal which appears as the main energy source, too. Appearance of oil, causes automotive revolution, while this revolution causes oil to be the main energy source. Correlation between information revolution and natural gas is not cause-consequence based, but only temporal. And finally, we are coming at the point that was discussed in the introductory note, i.e. exhaustion of fossil fuels and harmful consequences of their long-term exploitation. Thus, the humanity is faced to energy crisis and all efforts are focused on invention of new sustainable energy sources. Intensive research and pilot projects few decades, foreshadow new energy revolution.

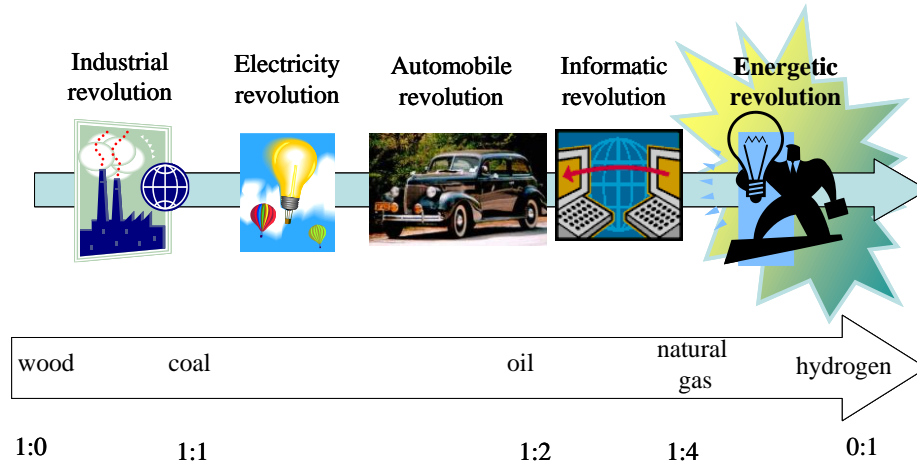


Figure 1. History of technological revolutions and fossil fuels

Therefore, hydrogen economy including economic electrochemical production of hydrogen using renewable sources of energy (solar, wind, hydro-potential, gravity etc.), transportation to hydrogen stations, to consumers or to fuel cell stations for further conversion of electricity, invention of new cheaper but efficient electrode material for hydrogen evolution/oxidation, new hydrogen electrolyzers/fuel cells etc., is in the focus of the energy revolution [14, 15].

Hence, we can say that the future is in our hands or ingenuity of future generations, but not in repeating the mistakes of the past. No matter how it is obvious, it takes time to realise that the sustainability was not at all a new phenomenon in the mankind's behavior. It was present ever since, starting with the earliest days of human civilization. Having in mind such a long Sustainable Development history, it is normal to ask ourselves: - What was new in the Sustainable Development concepts accepted and continuously improved at Earth Summits in past 20 years? The answer is simple – new was the size of Society that was in crisis and that looked to resolve the crisis at a lower possible price. In fact, the whole Planet was endangered with unreasonable behavior of human in past Century: the non-renewable resources (fossil fuels, minerals/ores, etc.), including fresh water, are seriously depleted; the waste skyrocketed both in quantity and potential hazard; a special type of waste – waste heat no matter how naive it looks, contributes to the continuous rise of the global surface temperature and indirectly to sea-level rise, extreme climatic events etc. The solution was recognized in the

concept of Sustainable Development, but aimed at the highest Global level: to keep the high standards of modern living, but to think to future generations, as well.

## CONCLUSION

While the Sustainable Development concepts in past were based on taking advance of empirical skill, the top-level concept is sophisticatedly formulated ('development that meets the needs of the present, without compromising ability of future generations to meet their own needs') and indicate scientific approach. Despite of it, a dose of contradiction between goals is visible. It is not easy to make clear distinction and to establish the border line between the (greedy) present and imaginary and somehow emotive future, but it does not mean that we should give up of the Rio's Sustainable Development idea. The authors of the concept were not naive; they were aware of how difficult it is achieving its goals, but never mind – they keep on that concept. Their philosophy was (probably) that it is better to start solving the Global environmental crisis; no mater how uncertain is its finalization, than to give up in advance. By the way, the very idea was accordingly formulated: in presenting the measure of worldwide unique per capita emission of CO<sub>2</sub>, the authors skillfully employed the expression to converge to ..., and not to achieve ..., meaning that Sustainable Development at Global level is an idea to be followed, and not a commandment that must be obeyed. As time goes on, it could rise to a level of command, but probably then there will be no more places for hope.

## REFERENCES

- [1] Earth summit '92: The United Nations Conference on Environment and Development: *Rio de Janeiro* 1992.
- [2] Drexhage, J. & Murphy, D. 2012. "Sustainable development: from Brundtland to Rio 2012." *International Institute for Sustainable Development (IISD)* for UN, New York: UN.
- [3] Klarin, T. 2018. "The Concept of Sustainable Development: From its Beginning to the Contemporary Issues." *International Review of Economics & Business*, Zagreb Vol. 21, No. 1:67-94.
- [4] Hadzi Jordanov S. 2002. "Sustainability expires – a search for its successor begins." *Plenary Lecture given at the International Conference on Transboundary Pollution*, Belgrade.



- 
- [5] Popovski O., Paunovic P., Hadzi Jordanov S. 2011. “Sustainable Development – 20 years later.” *1st International Conference on Accomplishments in Sustainable Development*, Banja Luka.
- [6] Clarke W. C. 1977. “The Structure of Permanence: The Relevance of Self-Subsistence Communities for World Ecosystem Management, in Subsistence and Survival: Rural Ecology in the Pacific.” *Bayliss-Smith T. and Feachem R. (eds), London: Academic Press:363-384.*
- [7] Protecting the environment during armed conflict, an inventory and analysis of international law, United Nations Environment Programme, 2009;
- [8] Melzer N. 2016. “International humanitarian law a comprehensive introduction.” *International Committee of the Red Cross.*
- [9] Janke D. and Savov L. 1997. ”Circulation of Materials, Erstes Freiburger Europa Seminar: Resources for Tomorrow - Materials Recycling.” *TU Bergakademie (December):1-12.*
- [10]Cassedy E. S. and Grossman P. Z. 2008. “Introduction to energy: Resources, technology & Society, Chapter 2: Energy Resources.” *Cambridge University Press, Cambridge:30.*
- [11]Hadzi Jordanov S., Paunovic P., Dimitrov A. and Slavkov D. 2008. “Chemistry – a vital pillar to hold the building named: Supplies for tomorrow”. *9th ECRICE Conference, Istanbul: 160.*
- [12]Bockris J. O’M. 1972. “A Hydrogen economy.” *Science, 176:1323.*
- [13]Gregory D. P. 1973. “The Hydrogen Economy.” *Sci. Amer., 228:13-21.*
- [14]Neophytides S. G., Zaferiatos S. H. and Jakšić M. M. 2003. “Novel Trends in Electrocatalysis: Extended Hypo-Hyper-d-Interionic Bonding Theory and Selective Interactive Grafting of Composite Bifunctional Electrocatalysts for Simultaneous Anodic Hydrogen and CO Oxidation.” *Chem. Ind., 57 (9) 368-392.*
- [15]Paunović P., Popovski O., Hadži Jordanov S., Dimitrov A. and Slavkov D. 2006. “Modification for improvement of catalysts materials for hydrogen evolution.” *J. Serb. Chem. Soc., 71 (2) 149-165.*