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## ECOLOGY AND ENVIRONMENTAL SECURITY - PROSPECTS, CHALLENGES

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**Abstract:** This paper presents ecology and ecological security - concept, subject, perspectives and challenges. It points to the branches of ecology, ecological disturbances, ecological factors and their significance, ecological threats to security, challenges and perspectives.

The causes that led to the ecological crisis can be found in the disturbed balance between the natural life-support systems and industrial, demographic and technological needs of humanity. More dominant and more accepted thought in the contemporary world is that the ecological crisis and environmental disasters can lead to the destruction of humanity. Under the ecological security we mean "very complex process of confronting threats from any source, any type and any natural system component, including human society, whereby some degree of protection against threats to livelihoods, needs and interests is achieved."

As a significant problem of modern civilization, ecological security is discussed starting from its conceptual determination up to pointing out the most important problems of its implementation.

**Keywords:** *ecology, environment, ecological crisis, ecological security, ecological crime, ecological police.*

### INTRODUCTION

Environmental protection is a basic condition for the survival of human society in a contemporary setting. There are various definitions of ecology and environment, almost as much as the authors that are involved in reviewing this area of life. Ecology is the science that deals with the relationships of living things and their environment, as well as the mutual relations of organisms in nature. Or, more simply put, it is the science that studies the mechanisms of survival of living beings, or the doctrine of the survival of life.<sup>2</sup> It is a stage of evolution, or the "science of the household of nature."<sup>3</sup>

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<sup>2</sup> M. Pantelić & others, Ecology and Environmental protection, Technical Faculty, Čačak, 2007

<sup>3</sup>M. Pantelić & others, Ecology and Environmental protection, Technical Faculty, Čačak, 2007

For the environment it can be said that it is the set of natural and man-made values whose complex interrelationships make the environment, better said the space and living conditions. It is natural - artificial "life frame" in which all beings (humans, animals, plants) live and work, linked by multiple mutual influences.<sup>4</sup>

Ecology and environment are certainly complex fields for every man, wherever he lived on planet earth. Ecology is the study of environment, a scientific discipline that studies the scheduling and distribution of living organisms and biological interactions between organisms and their environments. The term ecology was first used in 1866 by the German biologist Ernst Heinrich Haeckel and comes from the Greek word *oikos*, meaning house (residence, home) and *logos* meaning science. As ecological issues become more publicly accompanied, ecology has become quite general word in spite of its original character.

The subject of ecology is the study of the relationships between plants and animals, with their physical and biological environment.

Therefore ecology occupies a central place in biology, is strongly linked with biological disciplines and by the object of its research can be divided into several ecological branches:

- Phytocology - studying plant population, plant species and plant communities and their relationship with the environment,
- Zoocology - studying animal populations, species and animal communities and their relationship with the environment,
- Microecology - studying ecology of microorganisms (bacteria ecology, ecology of algae, fungi ecology, ecology of protozoa)
- Human Ecology - studying the ecology of man populations, his complex tangle of interrelationships with the environment, which is of particular importance to preventive medicine.

As we see ecology developed as a separate field of biology. The goal of ecology is not only the study of a variety of living organisms, but also the environment in which organisms live, from which it is clearly evident that this is a complex discipline. Unfortunately, this discipline has not been paid enough attention. Ecology is something that ends up in second place - right behind the economy and the human need for money and power. Ecology is a word that has never been taken seriously, because a lot of people still think that ecologists just scare people when they talk about growing ecological problems. But the reality is quite different, because now, at the beginning of the 21st century we have to contend with more environmental problems than ever before in human history. Only fifty years ago, the ecological crisis as a phenomenon was not even in sight on the historical horizon, yet today it is a major worldwide problem. The only thing that is debatable is whether we already stepped from the ecological crisis right into a catastrophe, which is certainly connected to certain subsystems of the entire ecosystem. The twentieth century, as if it passed entirely in crisis: moral, political, economic,

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<sup>4</sup> D. Gaćeša, Basic problems of ecological crime suppression, Collection of works; University for Business Studies, Banja Luka, 2012

and ecological. But back to some other definitions of terms and definitions, what ecology actually is? Ecology is a biological discipline that studies the relationships, the structure and functioning of the economy as a whole, including the man or mankind as a specific component of biological systems on Earth.

It deals with the relationships of living things and their environment, as well as the mutual relations of organisms in nature. The modern definition of ecology emphasizes that it is the science that studies the solutions that living beings implemented in different ways, in relation to the problems that the external environment imposed and that had to be resolved through its evolution to be able to survive in these particular areas.

Simply put, ecology can be determined as the science that studies the mechanisms of survival of living beings.<sup>5</sup>

According to some ecological theorists, the term ecology was introduced by Charles Darwin in 1856 in his book "The Origin of Species".

Ecology is the natural and interdisciplinary science, which built its foundations in biology, geography, physics, chemistry and mathematics. Lately, information technology plays a major role in the synthesis and collection of environmental data. Ecology is trying to find the solution of many environmental problems<sup>6</sup> that are increasingly surrounding us. Unfortunately, many of the problems today are of human origin. Transportation, power plants and combustion of fossil fuels for various purposes are responsible for more than 50% of the air pollution; water and soil contain increasing amounts of radioactive waste, whose handling and disposal demand very precise measurements and standards. Such problems are just a few examples to help us realize that ecology is facing serious and complex problems in the environment and that the answers to many questions that arise are not always recorded nor easy to solve.

The term ecology was first used by the German biologist Haeckel in 1866. At the beginning of the 20th century, scientists from various disciplines are gradually confronted with problems that require synthesis of two or even three different sciences to respond to them. Before, chemists were engaged exclusively in chemistry, biologists in biology and physicists in physics. In the early 1960s, the famous American biologist, Rachel Carson, wrote a groundbreaking book, *A Silent Spring* (1962). The central theme of this book was fierce criticism of pesticide DDT, which caused mutations in a large variety of flora and fauna. This book has recorded high sales and consequently

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<sup>5</sup> Encyclopedia; Group of Authors; Environment and Sustainable Development, Eco Libri Publishers, Belgrade & Institute for Textbooks and Teaching Aids, Srpsko Sarajevo, 2003, page 9

<sup>6</sup> Veljko N. Đukić; Environment Protection Basics; Apeiron – Pan European University, B. Luka, 2008, p.8, with the term environment we differ:

1. Environment – natural environment (planet space as a whole)
2. Livingenvironment - (part where the man lives)
3. Workingenvironment - (part of the environment – working place, close or open space)

"awakened" ecological awareness. In short, ecology was born in the 20th century, although it can be said that the ecologists or the ecological approach to the problems existed long before that.

In the lay public, the term ecology is often used as a synonym for the term environmental protection, which is not correct because the environment is only one of the areas addressed by the ecology. In fact, ecology is a scientific discipline that studies the biological interactions between organisms and their environments. Environment of the organisms includes their physical characteristics, which summarized can be described as "Abiotic factors" such as climate and geological conditions (geology), but also include other organisms that share with it its ecosystem or habitat.

Ecology is a broad field that encompasses many sub-disciplines. The usual, broad classification, which ranges from the lowest level of complexity, where complexity is defined as the number of members (entities) and processes within the system studied is as follows:

- Behavioral ecology studies the adjustment of animals to their ecological habitats (environment).
- Population ecology (auto-ecology) studies the dynamics of certain type's populations and their connection with the factors of the environment.
- Biocenology (synecology) focuses on the interaction between the species within a biocenosis (community life).
- Ecology ecosystems, study material and energy flow through biotic and abiotic components of ecosystems.
- Ecology of landscapes, examines the interrelationships in less visible parts of the landscape.
- Evolutionary ecology, studying the ecology in a way that explicitly focuses on the evolutionary history of species and their interactions.
- General ecology, which deals with the macro ecological level.

Division of ecology may be based on the target group studies: animal ecology, plant ecology, insect ecology...

Another common method is to divide the studied biome (EKOTOP): arctic (polar) ecology, tropical ecology, desert ecology, etc. The primary technique used for the study is often used to divide the discipline into groups, such as chemical ecology, genetic ecology, statistical ecology, theoretical ecology and others.

## **ECOLOGICAL DISTURBANCES**

Generally speaking, the ecological problem starts when the environment starts to act negatively on the survival of the species or specific populations. This happened even when environmental factors began to lose its quality in comparison with the needs of the species and after the change of abiotic environmental factors (e.g., temperature increase or decrease of the amount of rain). It can also happen when the environment starts to act negatively on the survival of the species (population) due to the increased activity of predators (e.g., overfishing). After all, that's what happens when

environmental factors begin to act negatively on the quality of life of the species (population) due to an increase in the number of individuals (overpopulation).

Ecological disturbances can be larger or smaller (and vary from several months to several million years). They can be caused by natural or human factors. They can also affect one type or a small number of them, and can hit a large number of them. Finally, ecological disturbance can be local (as in oil spill) or global (sea level rise associated with global warming).

In accordance with the aforementioned limitations degrees, local disorder can have significant or less significant consequences ranging from speculations of a number of individuals up to the total destruction of the species. Whatever the cause, the disappearance of one or more of the species regularly causes a disruption in the food chain with far-reaching consequences for the survival of other species.

In the case of global disturbances, consequences can be far more expressive in some cases of disappearances; more than 90% of the species that lived in a certain time were extinct. Of course, it must be noted that the disappearance of certain species (such as dinosaurs) led to the liberation of a certain habitat enabling the emergence and diversification of mammals. Here an ecological disturbance, paradoxically, boost the bio diversification.

Sometimes the ecological disturbance is of limited scope and without major consequences for the ecosystem. But usually these effects last much longer. In fact, most often it is a connected series of events with the one final event. At this point is not possible to return to the previous stable state.

In the end, as it can cause the disappearance of species, ecological disorder can reduce the quality of life of the remaining individuals. Thus, although it is believed that the diversity of the human species is endangered, some believe that the disappearance of the human race is very close. Anyway, epidemics, food contamination, negative impact of air pollution on health, lack of food, lack of living space, accumulation of toxic and difficult degradable waste and endangering the survival of key species (great apes, panda bears and whales) are also factors that affect human well-being .

In the past few decades the increasing human influence on the ecological disturbance can be observed. Thanks to technological advances and rapid population growth, human work has a much greater impact on their environment than any other factor of the ecosystem. Some of the most frequently cited examples of ecological disturbances are:

- Permian-Triassic extinction 250 million years ago,
- Cretaceous-Tertiary extinction 65 million years ago
- Global warming is associated with the effect of "greenhouse gases". Heating may cause flooding of the Asian river deltas, more frequent extreme weather disturbances and qualitative and quantitative changes in food production.
- The emergence of the hole in the ozone layer.

- Deforestation and increasing desertification, with disappearance of many species.
- Nuclear meltdown at Chernobyl in 1986 caused the death of many people and animals and caused numerous mutations in humans and animals. Area around the nuclear power plant was abandoned because of the large quantities released from melting core.

### **ECOLOGICAL FACTORS AND THEIR SIGNIFICANCE**

All the impacts that exist and that determine the environment and allow the life of a certain organism in it are designated as a life or ecological factors. As they come from the surrounding environment, they are also referred to as environmental factors or simply by external factors. Ecological factors that may cause dynamic changes in the population or within a particular species in a particular ecological environment are usually divided into two types: abiotic and biotic.

The abiotic factors include geological, geographical and climatological parameters. The biotope is a region with similar characteristics of the environment in which a separate set of abiotic ecological factors exist. These factors are:

- The water, which is also a fundamental element of the living world and his milieu.
- Air, which provides oxygen, nitrogen and carbon dioxide for all living species and the production and release of pollen and spores.
- Fertile land, which is at the same time the food and the physical support.
- Fertile soil pH, salinity, nitrogen and phosphorus have the property of retaining water, wherein the concentration of these elements is very important.
- Temperature, which should not reach extreme values even in the case when some of the living species may survive a high temperature.
- Light, that provides the energy for the ecosystem, through photosynthesis.
- Natural disasters can also be considered as abiotic factors.

For certain living being, given ecological factors are essential living conditions, which for some other organism, may not be necessary, or may have little relevance or even may be without significance. In any case, in every place, conditions and environmental resources, through their mutual interaction, are acting as a single complex environmental factor. Due to the variability of the characteristic of each ecological factor, their complex effect is characterized by high dynamism in time and space. In this way, very heterogeneous conditions are created permitting the occurrence of so many different organic species. Biocenosis, or a community, is a group of animal or plant units or microorganisms. Each population is the result of an act of reproduction within individuals of the same species and cohabitation in a certain place at a certain time. When in a given population there is an

insufficient number of individuals then this population is faced with extinction; extinction of species can begin the moment and when the number of biocenosis (community) consisting of representatives of certain species begins to decline. In small populations, breeding between close relatives can lead to a reduction in genetic diversity which can disable the community itself. Biotic ecological factors also influence the resistance of the community; these factors may operate within certain species and between more species. Relationships within the species differ between individuals of the same species which, in the end, constitute the population. These are relations of cooperation and competition with the division of the territory and, at times, the hierarchical organization of the community.

Relationships between species: interactions between different species are numerous and are mostly described with regard to their positive, negative, or neutral influence on the community.

The most important relationship is predatory (eat other or be eaten), which brings us to the food chain, the basic concepts in ecology (e.g., herbivores eat grass, carnivores eat herbivores and carnivores eat a larger carnivores). Too many predators in relation to prey abundance negatively affects the community of predators and community of the prey, so that reduced amount of food and high mortality in young animals (which have not yet reached full maturity breeding) can reduce (or prevent growth) populations of both. Selective harvesting of certain types by man is the active example in which there are a number of predators in relation to a single prey. Other factors within the same species include parasitism, infectious diseases and the constant struggle for limited resources in the case where two types share the same ecological habitat.

Constant interaction between different living beings takes place simultaneously with continuous mixing of minerals and organic matter that organisms use for their growth, and reproduction of life, to serve later as a fertilizer. This continuous circulation of elements (especially carbon, oxygen and nitrogen) and water is collectively called biogeochemical cycle. These cycles allow for long-term stability of the biosphere (if we ignore for a moment, still poorly studied impact of human factors, extreme weather or geological phenomena). This self-regulation, which is controlled by feedback, ensures longevity of the ecosystem and is called homeostasis. The ecosystem also tends to evolve to a state of perfect equilibrium that is reached after a succession of events or the climax (e.g. a pond can become a peat bog).

### **ECOLOGICAL SECURITY-SECURITY OF ENVIRONMENT (ENVIRONMENTAL PROTECTION)**

Some definitions of ecological security, from thirty years ago are now obsolete and outdated, although given by eminent authors and institutions, which in itself tells us how difficult it is to define security. It is known that there are several types of security such as: national security, public security, health security, economic security, traffic safety, private security and others.

In recent years, the ecological security is mentioned more and more, which at this level of development of society becomes increasingly dominant type of security, and how could it not be the case when the condition of the security depends on the survival of humanity. Therefore, we can conclude that the ecological security, new - modern form of security, emerged as the need to prevent damaging the environment. It protects the basic components of the environment, without which there is no survival of living beings. Likewise, if one type of security can be considered a global security, then this certainly is ecological security. The facts indicate that due to the poor conditions in the field of ecology, the planet Earth itself can be compromised (e.g., uncontrolled spending of the ozone layer, increased harmful greenhouse gas emissions, production and abuse of genetically modified microorganisms, excessive radioactivity, excessive use of pesticides, etc.), which can lead to a complete destruction of biodiversity.

Due to the lack of effective ecological security, ecological crime shows properties of dynamism and expansion in all areas, gaining a global characteristic; because no administrative measures or national boundaries can stop the pollution or the endangerment of the basic components of the environment (air, water, soil).

Ecological crime group includes crimes which pollute or threaten the basic components of the environment (water, air, land, and artificially built environment, i.e., the biosphere in general), that threatens the survival of living beings on earth.

Already in the early eighties of the last century, Richard Ullman was one of the first scientists who demanded that ecological factors are incorporated into the concept of security.

Termination of the Cold War not only brings mitigation of competition between superpowers but also enable the international community pre-occupied by the threat of nuclear war, to examine the growing threat of global ecological problems such as ozone layer depletion, the mid-eighties Chernobyl nuclear accident (1986) or global warming at the end of eighties of the last century. Although the environmental security is accepted as a normative concept, its meaning remains more or less questionable and very complex.

Some scientists as Ullman 1983, Mathews 1989 and Myers 1989, 1994 put ecological matters in the US national security agenda. While national security has a state as the main reference object, human security as reference objects has human beings or human species.

The problem probably lies in defining what exactly constitutes an ecological security and environmental protection.

Experience tells us that scientists often "attack" the study of ecological security and environmental protection; because they believe that it



is not a legitimate area of research or they criticize the elasticity concept of security, considering that it exceeds the limits of traditional military field.<sup>7</sup>

Ecological security or the security of environment is a term used for problems linking environmental situation with the interests of national security. This is a topic that is gaining its importance, though a high degree of consensus still does not exist on how to define ecological security, which are the threats to its stability and what are the responsibilities for the actions taken. Ecological security is a factor of human security. Ecological security includes consideration of problems related to insufficient quantities of natural resources, environmental degradation and biological hazards, which can lead to conflict or threat to human security. Although sustainable development and ecological security are concepts that complement each other, they are not one and the same. Sustainable development refers to the ecologically sensible socio-economic development and ecological security focuses on preventing conflicts related to the environment, the additional need for the armed forces to protect themselves from ecological hazards and the remediation of environmental damage. Big threats that security environment has to face are ozone depletion and climate change, all of which are caused by emissions of greenhouse gases (change in intensity of rainfall), which leads to global warming. We are witnessing the growing impact of climate change on ecological security in the world. Environmental degradation and lack of resources at the local level and regionally, (exacerbated by population growth, uneven distribution of resources and global changes in environmental areas) are important factors that can create and reinforce a threat to national security in terms of political instability and violent conflict, or contribute to it. Population migrations caused by the apparent degradation of the environment is increasingly emerging as a new problem, and it can be expected that they will reinforce the already existing tensions. The quality of ambient air in the Republic of Srpska and in Bosnia and Herzegovina is linked to the emissions of SO<sub>2</sub>, NO<sub>x</sub>, SO, soot, particulate matters and other substances originating from thermal energy facilities and industrial plants. A lot of air pollution originates from traffic due to the use of leaded fuel. Water has long been a key illustration of ecological security.

Since 1950, the global supply of drinking water per capita has fallen to 60% while the world's population has grown by over 150%, and consumption has increased by 180%. In the next two decades, it is expected that the consumption will increase by additional 40%. In the past 50 years there were more than 450 conflicts related to water, and in 37 cases there was an armed conflict between countries. The Republic of Srpska and Bosnia and Herzegovina have sufficient quantities of water to meet their needs, but only if they use it rationally due to a complex and specific flora-geographical position. Because of all of this Republic of Srpska and Bosnia and Herzegovina are a

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<sup>7</sup> Deudney case 1990; Levy 1993

rich source of indigenous plant and animal resources. Forests and forest land consists of 100,000 ha or 44% of the total area of the Republic of Srpska.

The exploitation of mineral resources, especially in open pits leads to a gradual degradation of the land. Unlike agriculture, forestry and water resources, most of the non-renewable mineral resources are exhausted in the process of their exploitation. Mines in the Republic of Srpska and in Bosnia and Herzegovina are characterized by many years of massive exploitation. Intensive exploitation of minerals, apart from depleting non-renewable natural resources and pollution of water and air, has led to a significant degradation of the land. Environmental sustainability is an essential element of security for the entire region of South-Eastern Europe. The existence of hot spots or places of potential environmental accidents (e.g. nuclear power plant in Slovenia), with the risk of severe and uncontrolled pollution at the local, especially cross-border level, represents a threat that must be minimized or eliminated. Everybody should be engaged in this job, from those who are directly affected, to international institutions whose business is the provision of pre-conditions for security and cooperation. Accidents involving hazardous materials in production, use, storage, transportation and disposal are sources of environmental pollution and risk to a human health. As a result, they have the release of hazardous substances, such as fuels, lubricants, cleaners, solvents, RSV, etc. in the environment. Such accident occurred in October 2006 when near Prahovo a greater amount of crude oil, leaked into the Danube, which at the end reached the Danube in Bulgaria. State authorities of Bulgaria, sought compensation from the Republic of Serbia for the damages they had. Minimization of the risk by accidental pollution and the establishment of effective warning systems are the most important means of preventing the environmental impact of pollution. Floods continue to be common natural disasters all around the world. The Republic of Srpska and Bosnia and Herzegovina are not an exception, a large percentage of their territory is vulnerable to flooding, and the most recent examples were in 2011 and 2014 when major flooding struck Semberija, Drina valley, Posavina, Mačva, especially the towns of Republic of Srpska: Dobož, Bijeljina, Šamac, Prijedor, and some others in the Republic of Serbia: Obrenovac, Šabac, Negotin and others. Due to the listed threats and accidents, it is necessary to improve the existing policy instruments that could be adapted and effective in cases of ecological threats to regional stability. It would be good to focus particular attention on international protocols, conventions and treaties that define ambiguous international relations, not only in the field of environmental protection, but delve deeply into economic relationships and the development of the countries on more than one plan (Kyoto Protocol and the Aarhus Convention .... ). It is also important to consider regulations that harmonize standards of production, trade, transport and education, and which contain elements of sustainable development, so that this principle could be used as an additional support to the transitional processes. From the aspect of ecological security, local communities have a special place and role. Numerous dangers and risks (natural disasters, technological, environmental and other

contemporary security risks) that the local community is faced with such specificity and sensitivity, and the consequences that they cause (health, financial, social, environmental), require that the protection and safety becomes a priority and interest of all potential civil society sectors. Civil planning through the segment of civil protection emphasizes the importance of perception assessment planning and resolving of the crisis situations at the local level, where the functioning of all subjects is achieved in continuity with their regular activities. How much a security project will be successfully implemented in the area of the local community, in addition to the continuous influence of each individual entity, it is influenced by quality of their relationships and the interactions. Therefore, for the successful implementation and design of the desired level of security it is important to know and to respect the possibilities of individual subjects as well as to respect the specificity of each of them in terms of the content of activities, methods and resources. The local community must take into account the wider social framework, to realize their personal capabilities and to have insight into the needs of citizens in the security sphere, together with the majority of its institutions, in order to better contribute to safety and security of its citizens.

Ecological security, and within it the safety of the environment is faced with the following problems in the near future:

- Population growth,
- Damage to the ozone layer,
- Climate change due to emissions of greenhouse gases (Changes in rainfall intensity) and global warming,
- Poor management of radioactive waste (the issue of nuclear safety)
- Natural disasters, floods, landslides, earthquakes,
- Pollution by oil,
- Lack and water pollution, including pollution of groundwater,
- Increased use of international rivers,
- Erosion of land,
- The disappearance of forests,
- Loss of biodiversity,
- Industrial development, air pollution from industry,
- Disposal of hazardous waste,
- Food safety,
- "Ecological Refugees"
- Poverty: increasing gap between rich and poor.

Some of these threats are perceived and regulated by existing international conventions that Bosnia and Herzegovina and the Republic of Srpska accepted and ratified. Ecological security means the security of the citizens of:

- Irresponsible pollution of air, water, soil, flora and fauna;
  - Irresponsible use of natural resources (water, fish, mineral resources);
  - Inefficient law enforcement institutions;
- Environmental security is established by:

- Recognition of the fact that environmental security is an important part of the regional cooperation and global foreign policy relations;
- Strengthening the environmental sector and sustainable use of natural resources;
- Consideration of the need to establish a system for natural and disaster response early warning systems in the event of chemical accidents;
- Consideration of the need to introduce cleaner technologies and production through mechanisms for combating further climate change;
- Implementation of the strategic assessment of environmental impact in all planning processes;
- Solving the problem of perennial negative environmental heritage (primarily in areas of waste and waste water).

### **ECOLOGICAL THREATS TO SECURITY**

According to Jar de Vilden ecological security threats can be divided into three groups<sup>8</sup>. In the first group; we include threats that are not caused by human activities. Those are the examples of volcanic eruptions, earthquakes, typhoons, meteor hits, etc. However, except in the case of the latter, the claim that man's activities are not directly linked or lead to these threats can also be called into question.

Statistics show that in the period from 1987 to 1998, the average number of hydro-meteorological disasters was 195, while in 2000-2006 the number has increased by 187% to an average 365. As for geological disasters, in the period from 1987 to 1998, average number was 28, while in the period from 2000 to 2006 that number had risen to 38, which means an increase of 136%.<sup>9</sup> If it is true that human activity is the main cause of current climate changes, then it follows that these threats are part and indirectly caused by human activities.

The second group includes threats caused by man, but that does not threaten the survival of civilization. These are for example the pollution of rivers or the exhaustion of certain resources that are vital for survival, such as certain minerals. Yet here, it is difficult to draw the line where and when pollution or depletion of resources began to threaten civilization itself.

In the third group are the threats caused by man and that threaten civilization, such as global warming, sea level rise, the hole in the ozone layer or depletion of renewable resources vital for survival (e.g., drinking water).

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<sup>8</sup> An example of the person that denies global warming as his personal belief is the case of physicist and mathematician Freeman Dayson. He thinks that global warming is exaggerated and that it draws attention and resources from much bigger issues like poverty, diseases and education.

<sup>9</sup> About the successes of denial of climate changes see: Clive Hamilton, *Requirem for a Species*.

Ecological threats have several attributes.

First, although they are often treated as threats without enemies that unite the world and pointing to cooperation, in reality it is not always so.<sup>10</sup>

While climate change is affecting basically the whole world they do not affect it in the same way. Maldives, Ethiopia and Zimbabwe have been particularly affected by drought; Bangladesh, China, India by floods; island states, Vietnam, Egypt and Tunisia by sea level rise; Sudan, Senegal and Zimbabwe by soil desertification; and the Philippines, Madagascar and Moldova by storms.

Also, those who contribute most to climate change are the least vulnerable to them. Both the US and Europe who have contributed most to global warming in the past hundred years, over the next hundred years will probably be the least affected because of their geographical position and because of the level of technological, economic and political development.

Even though the West drastically reduces emissions of harmful gases into the atmosphere, large developing countries such as India and China will continue to do so. In short, ecological security is part of the policy in which the question of "who gets what, when and how" loses its significance in no way.

Another characteristic of ecological security threats is that they are gradual threats.

Terrorist act in time can take hundreds or even thousands of lives as demonstrated by the attacks on New York, London, Madrid, or Bali. Military occupation or economic collapse could happen in a few weeks. With ecological threats, threats materialize gradually.

The fact is that tsunamis like the one that struck the Indian Ocean in 2004 for a few minutes can take over 220 000 people.

However, global warming, melting of the glaciers, raising of sea levels, desertification, the hole in the ozone layer, weakening of the Gulf Stream, just to name a few, are all threats that come gradually and that it are therefore difficult to detect in security terms.

Third, unlike military threats which are sufficient to invoke the memories of the last war, social ones where it is enough to walk through the suburbs of European cities or economic ones where it is enough to recall the stock market crash in 1929, some ecological threats like the raising of sea levels, for example, have no historical precedent.

Corruption and organized crime as a social forms of endangering safety by its contents and forms may be restricted or tracked by segments and take legislative and other measures to ensure that in a society their influences are alleviated. Endangering the stability of the environmental security in the ecological sphere and hazards that can occur in it can be devastating for a large number of living beings.

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<sup>10</sup> Prins Gwyn (Ed) Threats Without Enemies. Facing Environmental Insecurity, London : Earthscan 1993

The threats and challenges that the security systems of many countries will have to face in the near future include: population growth, depletion of the ozone layer; climate change due to greenhouse gas emissions and greenhouse gases (change in intensity of rainfall) and global warming; Inadequate management of radioactive waste (the issue of nuclear safety); natural disasters; floods, landslides, earthquakes; oil pollution and leaking; shortage and pollution of surface and groundwater; increased use of international rivers; soil erosion; deforestation; loss of biodiversity; environmental pollution by industrial development; disposal of hazardous waste; food security; "Ecological Migration and Refugees", the expansion of poverty and increasing disparities and the gap between rich and poor. As a consequence, in the contemporary security studies a new research focus - security of the environment, is singled out. Under this term we mean "The ability of a nation or society to withstand all scarcity of environmental and unwanted risks that result from changes in it, all the way to possible tensions and conflicts." From this definition it is clear that the links between environment and security are multiple and complex. As Mladen Bajagić claims "Firstly environment gives negative influences to security, even leads to conflict by reducing the amount and quality of renewable and non-renewable resources. Secondly, the lack of security has a negative impact on the environment and must be subject to serious dialogue at all levels and between all actors. These are the reasons why the subject of the security debates today must be resources and the environment in the context of national policies, international organizations, scientific researches, and specific actions of governmental and non-governmental sectors at local and global levels."<sup>11</sup>

There is no doubt, however, that the technical and technological development and progress of mankind cannot be stopped and that they must have some negative impacts on the development and improvement of the environment. However, the technical progress of society loses its effect if, in a greater extent, threatens the life and health of people and the environment in which people live. Seemingly, the culprit may be found in the bestiality of corporate demands anywhere in the world, but the basis for the up regulation of possibilities towards human environment lies in economic relations, better said in the adopted method of production, and in countries where there is no balance between economic development and protection of environment.

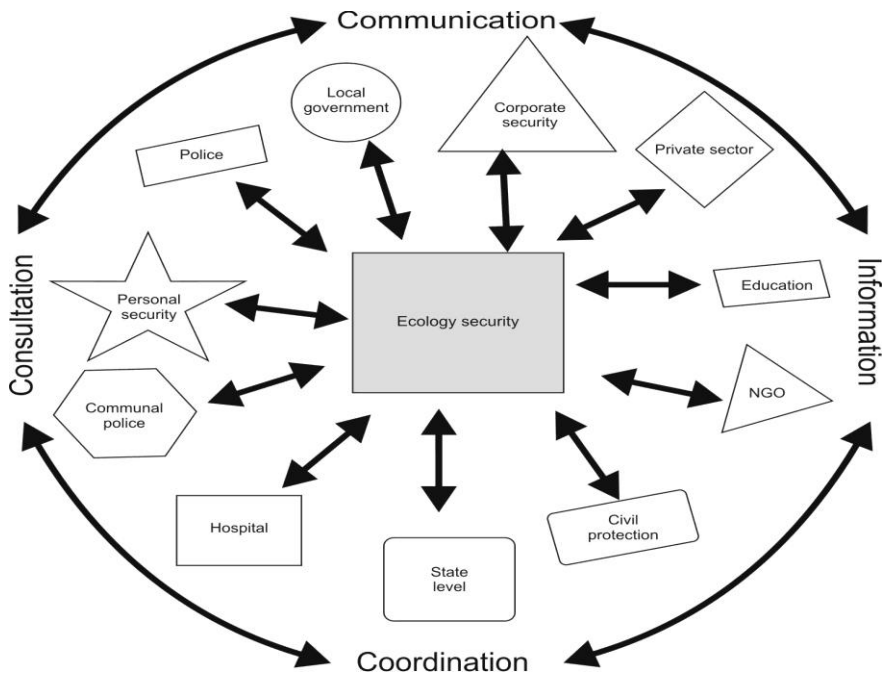
The impact on the environment can be intentional or unintentional, although, in fact, in both cases, the consequences can be devastating. The intentional effect of assumed threats can be contained in: within interests during the war; the current political and economic relations; the need of industrialized countries to house radioactive and other hazardous materials<sup>12</sup>,

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<sup>11</sup> For more see: M. Bajagić, Environmental security-New focus of the security research studies, S. Mijalković & others, Proceedings „Confronting contemporary organized crime and terrorism“, Crime-Police Academy, Belgrade, 2011.

<sup>12</sup> M. Bošković, Research and resolve of the economic crime, Higher School of Internal Affaires, Zemun, 2001, p 60.

processes of individuals or groups and their impact on the environment on the basis of which the construction of factories in the natural habitats of animals and plants lead to the destruction of reserves; indirect impact on increasing pollution of water or air, and the like. Unintended impacts can be achieved by individuals or groups who craft factories in natural habitats, ecologically sound settlements, etc., while at the same they lack the vision of ecological aspects and occurrences in the future.



Scheme no. 1: Simplified display of interaction of the ecological security with elements of an integrated security model<sup>13</sup>

In this contextual level, if the system "security-society-nature" indicates the connection between ecological and social security policy on a planetary scale, then it needs to be protected from that general position towards lower systems with critical thinking and evaluation of socio - political organizing forms.

Data chart indicates how many interdependent entities ecological security has towards the socio - economic systems that influence her, directly or indirectly. It is evident that all the elements cannot be enumerated, but it is clear that as the problems in the field of ecology are becoming more complex, the inter-dependent elements in the system increase. It is expected that in the coming period, many institutions, events and activities will be focused on joint resolve of the problems of ecological security.

<sup>13</sup> D. Vejnović & S. Simić, Ecological security and Social ecology, EDC, Banja Luka, 2014

## PROSPECTS AND CHALLENGES

Environmental problems are coming into the limelight of public opinion every time in the world occurs some greater catastrophe with ecological consequences. Thus, the atomic accidents at Chernobyl (Ukraine) or satellite images of the disappearance of the ozone layer above the northern hemisphere were the latest causes to publicly "open file", and all the other events that threaten the environment. Ecological problems usually occur as individual and local, but their negative effects are manifested on a global scale. Hence the motto of supporters of social movements for the protection and preservation of the natural environment "think globally, act locally".

One of the main problems when it comes to protection of the environment and combating ecological crime, is the common object of protection (air, water, land, built environment, i.e., the biosphere in general), so people have no interest to report crimes (" I do not care for the ozone layer, it is not mine "), were the frequent answers of some irresponsible individuals. As the proverb says: "What belongs to everyone belongs to no one". All this contributes to the fact that the environmental offenses are "dark figure" i.e. executed and not reported crimes because no one knows about them. To forestall or eliminate this problem, it is necessary to continuously work on strengthening the ecological awareness of citizens.

Following of the problems and challenges in this field is inadequate organization of security entities that are responsible for combating environmental crime, and lack of skilled personnel and technical equipment. When it comes to the existing organization of entities for ecological security and combating ecological crime, their jurisdiction is quite jagged.

Accordingly it is one of the most important tasks of the Ministry of Interior to prevent and detect criminal offenses, which means that it is also the body responsible for the prevention and detection of ecological crime. However, in practice, the problem is that for them, the ecological crime is still on the margins, since the police are primarily aimed at the prevention and detection of general crime, and economical crime.

The second example shows that the Directorate for Inspection consists of ecological inspection, which operates within the urban-construction and surveying inspection, which shows that the situation there is similar to the one in the Ministry of Interior and that the margin is reduced to issuing ecological permits. Communal police primarily follows the by-laws of their local communities (municipalities), which is still insufficient for combating serious forms of ecological crime. Unfortunately, there is still no authority or body to coordinate the work of all those involved in the protection of the environment and combating of ecological crime.

From what is said previously, and this is confirmed by numerous studies, the organization of security subjects we described do not meet numerous principles: the internal organizational structure, cohesion and coordination, the hierarchy, the enforceability of control, division of labor and



others. In order to overcome these problems, it would be desirable to establish an environmental police (according to the utility, which justified its existence) as soon as possible. Ecological police would deal with combating ecological crime and the protection of the biosphere (air, water, soil) as essential components of the environment.<sup>14</sup>

Bearing in mind the consequences of ecological offenses (destruction of or damage to the health of humans, animals and plants to a greater extent) it is obvious that the amount of sanctions does not match the gravity of the offences. This undoubtedly confirms that neither citizens nor the state pay enough attention to the protection of the environment, which makes it necessary to tighten the penal policy in this area.

### CONCLUSIONS:

The causes that led to the ecological crisis can be found in the disturbed balance between the natural life-support systems and industrial, demographic and technological needs of humanity. The ecological crisis is manifested in the depletion of natural resources and environmental pollution.

In the contemporary world, the more dominant and more and more accepted knowledge is that the ecological crisis and ecological disasters can lead to the destruction of humanity. And precisely because environmental problems have become global problems that significantly mark and characterize modern society, they slowly transcend political differences that exist between countries in order to find solutions to already accumulated ecological problems.

The main thing that would help the solution of ecological problems is the preservation of the environment in order to preserve mankind, and this can be achieved through joint activities, as well as the increase of food production, prevention of the diseases and by maintaining a healthy environment.

Because of the importance given to the environment, both in the security discourse and in practice it is discussed about the ecological security sector. In this sector, the key relationships are the relationships between man and nature.

Ecological problems arise as individual and local, but their negative effects are manifested on a global scale. Therefore, the basic motto of supporters of social movements for the protection and the preservation of the natural environment is: "think globally, act locally".

Essentially, ecological security presents different set of procedures and measures that maintain the biological balance, without compromising the stable security environment.

All countries, including ours, should take all necessary measures to mitigate all root causes and forms of threats towards the environment to the

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<sup>14</sup> For more see: Dragan Gaćeša, PhD, Basic Problems in suppression of ecological crime, p 961 & 962, Proceedings of University for business studies, Banja Luka, 2012

lowest possible level. In this direction, following the example of other countries we have to form an ecological security police as a special segment with a sole purpose to protect the environment. We should permanently strengthen the ecological awareness of our citizens.

## EKOLOGIJA I EKOLOŠKA BEZBEDNOST PERSPEKTIVE I IZAZOVI

Dr Dragan Radišić

**Apstrakt:** U radu se sagledavaju ekologija i ekološka predmet, perspektive i izazovi. Ukazuje se na grane ekologije, ekološke poremećaje, ekološke faktore i njihov značaj, ekološke pretnje bezbednosti, te perspektive i izazovi.

Uzroci koji su doveli do ekološke krize nalaze se u poremećenoj ravnoteži između prirodnih sistema za održavanje života i industrijskih, demografskih i tehnoloških potreba čovečanstva. U savremenom svetu sve je dominantnije i sve je više prihvaćeno saznanje da ekološke krize i ekološke katastrofe mogu dovesti do uništenja čovečanstva. Pod ekološkom bezbednošću se podrazumeva "veoma složen proces suprotstavljanja ugrožavanju iz bilo kog izvora, bilo koje vrste i bilo koje komponente prirodne celine, uključujući i ljudsko društvo, pri čemu se ostvaruje neki stepen zaštićenosti od opasnosti po egzistenciju, potrebe i interese".

Kao značajan problem savremene civilizacije, ekološka bezbednost razmatra se počev od njenog pojmovnog određenja do ukazivanja na najznačajnije probleme njenog ostvarivanja.

**Ključne reči:** ekologija, životna sredina, ekološka kriza, ekološka bezbednost, ekološki kriminalitet, ekološka policija.

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