

# Risk Management in Ecology

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**Abstract-** During the 19th and 20th centuries, it was firmly believed that technical progress was a value that should not be specifically discussed, because its process was in accordance with a valid understanding of the position and relation of man and society to the nature contained in anthropocentrism: a man is in the center of the world, and Everything that is good for him is good for nature. The perniciousness of this relationship is increasingly manifested as an ecological crisis, the conditions of which are rising, and existing understandings can not offer a solution.

**Index Terms-** Tehnical,progress,ecological,rising,condition.

## I. INTRODUCTION

That is why new ecological ethics, ecocentrism, ethically opposed anthropocentrism, which basically puts an ecosystem and with which man equals with other forms of nature, only increases the responsibility for preserving life in general, even human species as well as inanimate nature. Responsibility stemmed from the fact that only a man is endowed with a highly developed consciousness and the ability to be the bearer of moral values.<sup>1</sup> Today's life of all people on the planet involves industrialization that allows for the improvement of the living standards of a large number of people on Earth, but on the other hand negatively affects the quality of the environment and the health of man.

Ecological ethics, now in the focus of ethical discussions, places nature, an eco-system, not a human and or a human society. A man will have to build his future on qualitatively new values in whose scale the dominant role is given to life in general, and then the life of the human species and the development of their consciousness (individual and social) in the function of preserving the life, survival and development of human society in accordance with other forms of life in nature, whereby its place must also have human responsibility and the knowledge that man as a conscious being is given to be the guardian of nature in all its manifest forms.

The greater the ecological crisis and its consequences, the more serious the need for people to change the situation. However, the market is not a universal and rational regulator in the sector of environmental protection and natural values, neither in a short or long term. It is about the relationship between the rational

behavior of entrepreneurs and the social costs that no one is bearing.

Modern economic science has developed a valid methodology of researching flows in economic life, based on a relationship: maximizing income - minimizing expenditures, but when the same methodology is applied to environmental problems, it is shown to be imperfect.<sup>2</sup> Nature and natural wealth can not be excluded from economic consideration and evaluation, but necessarily subject to state and institutional regulation, constraints and protection.

Ecological rationality must become an integral part of economic theory and economic practice. The classical perceptions of economic wealth are changing, changes in the expert thought array occur in the evaluation of natural resources and environmental factors. Ecological awareness, law, philosophy and culture are triggering a whole chain of activities, processes and practical behaviors that have a significant economic dimension.<sup>3</sup> Alternative development chances for a large part of mankind are cost-free technologies, eco-recycling, the development of the use of alternative raw materials, energy and mineral fuels, the installation and commercialization of eco-devices, green products and the like.

Ecological awareness is not achieved by birth, but is systematically produced by the system of overall education, science, culture and (ecological) education. Nations that are unaware of this have a special responsibility before the future and the planet. Each responsible nation must have a strategy of environmental protection and acceptable and sustainable development. These strategies must be based on an objective, well-defined state, economic principles and opportunities. The experiences of environmentally more experienced nations must be combined with competitive regional situations and motives. With the help of social marketing, it is necessary to conduct an active economic-ecological policy, acceptable measures and instruments, adapted to the economic system, the initial economic condition, as well as the culture and tradition of the nation.

## II. THE IMPORTANCE OF EDUCATION IN ECOLOGY

In 1975, the first "International Education and Training Program for Environmental Protection" (UNESCO and UNEP) was prepared, and after the Rio Conference, in 1993, it was

<sup>1</sup> Džozef R., Ekološka etika, Uvod u ekološku filozofiju,sl.glasnik, Beograd, 2006

<sup>2</sup> Nešković S., Ekološki menadžment, PEP, Beograd,2010

<sup>3</sup> J. Đorđević. „Nova ekološka etika i zaštita životne sredine“, Fakultet zaštite na radu, Niš, 2002.

promoted in order to reorient education and training of the global population in order to achieve sustainable (harmonized) development. This program defines the main goals of education<sup>4</sup>:

- enabling each individual to attain the awareness, knowledge, skills necessary to actively participate in the protection and improvement of the environment and the achievement of harmonious development,
- creating a new environment for preferable behavior and lifestyle,
- developing ecological ethics and ecological culture,
- strengthening education and education for the protection of the environment for all,
- improving quality of life<sup>5</sup>
- Education for the protection of the environment, that is, education for survival, or education for sustainable development, must include all levels of education, from pre-school, through basic and directed to university, post-diplomatic and that its implementation is permanent. It should be included in all forms of school education, in multiple activities outside the school and in the student organization. It must be continued in work organizations, through vocational training of workers for work in individual workplaces, in order to reduce the potential for environmental damage in work process.
- Education can not be reduced to training people for passive protection, but it should be directed to a positive attitude, to training citizens for the planned development of the environment with all its resources and human creatures. Knowledge and understanding of the environment must be exhibited in all teaching subjects where possible: in the subject of knowledge of nature and society, biology, chemistry, physics, geography, etc., and this education must in essence be multidisciplinary and intersectoral so that it allows integrative approach in the process of education and upbringing. Teaching content should cover the whole issue, emphasizing historical and developmental approach
- It is extremely important to understand human destructive powers, limitations of fuel, ore and soil, and to learn about the concrete consequences that a person causes in some of his activities in regional and planetary dimensions. In order to realize all these goals, it is necessary to prepare national strategies for harmonizing the educational process at all levels with the principles of sustainable (harmonized) development and a new philosophy of life and ecological ethics, which is an obligation of the signatory countries of the Rio documents.<sup>6</sup>

It is reasonable to assume that some people will live in the immediate future. Whatever your future people are, they will have certain living needs. In this sense, this duty towards the human offspring is correlate with the minimum of moral requirements that they will have when they exist. In other words, we are obliged not to bring their actions into a state in which they will have "scanty or significantly reduced life opportunities"<sup>7</sup>, which would jeopardize their elemental human needs and dignity.

Thus, the principle of sustainable development is an attempt to specify the obligations and rules that ensure that needs and desires of people today are not met at the expense of the vital interests of future generations. Therefore, moral requirements that imply the principle of sustainable development are the norms of fair treatment of people of the future. This formal principle also initiates a normative question of what are the values that make human life quality and meaningful, thus critically analyzing the very concept of sustainability.

### III. RISK ASSESSMENT FOR HUMAN HEALTH

Risk assessment, whether for human health or the environment, is characterized by a series of actions, such as:

1. Effect assessment, which includes:
  - identification of hazards,
  - identification of the negative effects that the pollutant susceptible can generally cause
  - determining the dose (the received concentration of the pollutant) and assessing the expected effects (response to intoxication) that includes the dose ratio that is in function of the exposure (exposure) and the occurrence, or severity, of the negative effects<sup>8</sup>
2. Exposure estimation, which includes:
  - determining the concentration / dose of the pollutant exposed to people (workers, residents, vulnerable categories in the human population) or which has reached some environmental media (water, air, soil).
3. Characterization of risk that includes:
  - determining the frequency of exposure and the severity of the negative effects that may occur in humans or between plants and animals, depending on the measured or estimated pollution size. This is usually associated with this
4. The risk quantification determines the extent and likelihood of occurrence of negative effects<sup>9</sup>.

The risk to human health is most often defined as the probability that describes the degree of endangerment of the health

<sup>4</sup> UNESCO - UNEP, "International environmental education program", Paris, 1993

<sup>5</sup> Ibid

<sup>6</sup> Risk Assessment Guidance for Superfund, Volume I- Human HealthEvaluation Manual, EPA/540/1-89/002, 1989 & EPA/540/R-92/003, 1991.

<sup>7</sup> Risk Assessment Guidance for Superfund, Volume I- Human HealthEvaluation Manual, EPA/540/1-89/002, 1989 & EPA/540/R-92/003, 1991.

<sup>8</sup> Technical Guidance Document on Risk Assessment, II edition, European Chemicals Bureau, EUROPEAN COMMISSION, EUR 20418 EN/1-4, 2003.

<sup>9</sup> Ibid

of an individual exposed to the action of a particular pollutant or group of pollutants.<sup>10</sup>

The amount of the harmful substance - the pollutant that enters the site of exposure - is called a dose.

Environmental risk assessment includes determining the nature of the effects and the probability of the occurrence of adverse effects among plants, animals, or in the environment, as a result of the action of a pollutant. The ecotoxicological risk assessment consists of two basic elements:

- determining exposure (exposure) that describes the interaction of the pollutant (s) and the receptor (e.g., plants or animals). The exposure measure can be described by the concentration of a pollutant in one of the environmental media, or by physical changes in the place of life (habitat, habitat)
- The effect of the analysis is evaluated by changes in nature, as well as the magnitude of this change caused by the exposure to the given pollutant (stressor).<sup>11</sup>

While risk assessment for a human is referring to a reference, millimeter-risk or tolerant dose, an ecological risk assessment can also be said about the so-called ecotoxicological threshold (ETP) - the concentration of a particular pollutant known to cause adverse effects in specific environmental receptors (specific representatives of flora or fauna).<sup>12</sup>

## 1. Risk management

Risk management includes respecting information and requirements in the following areas:

- engineering and technology,
- natural sciences such as physical chemistry or chemistry, or biology,
- economic sciences,
- sociology,
- biomedicine,
- legislation, politics and information<sup>13</sup>

Risk management is considered in achieving several of the following goals:

- identification, distribution and movement of pollutants,
- assess the impact of pollutants on humans, ie determining the risk to human health,
- assess the impact of pollutants on characteristic environmental receptors, i.e. determining ecological risk and ecotoxic thresholds,

- designing and implementing activities related to the renewal and purification of the polluted environment,
- assessing the negative impacts of certain pollutants on the environment and for different recovery processes,
- comparing the existing risk before and the expected risk after regeneration.<sup>14</sup>

Risk management requires teamwork. The following working groups are most often developed:

- physicochemical-mono-to-toxicological group,
- economic and legal group,
- risk assessment group and modeling of the protection system,
- engineering and technology group,
- communication and cooperation group<sup>15</sup>

### 1.1 Activities significant for risk management:

- preliminary testing of potentially polluted areas including monitoring,
- planning activities,
- additional testing and monitoring of the polluted area,
- basic risk assessment,
- setting priorities and finding the most hazardous pollutants,
- searching and designing an optimal procedure for regenerating the polluted area,
- studying the process of pollution: mobilization, transport and deposition of pollutants,
- comparative analysis of risk assessment results for different pollutants and alternative procedures
- identifying for the final plan of the renewal procedure and its application
- control of the results after the completion of the renewal procedure<sup>16</sup>

## 2. Ecological damage

The ecological damage caused by pollution and environmental degradation causes the negative social consequences. The consequences in society expressed as losses are above all medical-biological character, and then physico-chemical and social character. Today it is easy to prove positive correlation of pollution and various diseases of the population. The disease as the ultimate effect of environmental risk factors on human health is the possibility of recording the resulting physiological and histopathological changes.

<sup>10</sup> Risk Assessment Guidance for Superfund, Volume I- Human Health Evaluation Manual, EPA/540/1-89/002, 1989 & EPA/540/R-92/003, 1991.

<sup>11</sup> Risk Assessment Guidance for Superfund, Volume I- Human Health Evaluation Manual, EPA/540/1-89/002, 1989 & EPA/540/R-92/003, 1991.

<sup>12</sup> Ibid

<sup>13</sup> Technical Guidance Document on Risk Assessment, II edition, European Chemicals Bureau, EUROPEAN COMMISSION, EUR 20418 EN/1-4, 2003.

<sup>14</sup> Technical Guidance Document on Risk Assessment, II edition, European Chemicals Bureau, EUROPEAN COMMISSION, EUR 20418 EN/1-4, 2003

<sup>15</sup> Ibid

<sup>16</sup> Technical Guidance Document on Risk Assessment, II edition, European Chemicals Bureau, EUROPEAN COMMISSION, EUR 20418 EN/1-4, 2003.

A group of respiratory illnesses can be used to look at the harmful effects of exposure to air pollution: Pharyngitis acuta et tonsillitis acuta, Infectiones tractus respiratoria superioris multiplices acutae loci non specificatis, Bronchitis acuta and bronchiolitis aucta, Asthma bronchia, Tracheitis, emphysema and other obstructive lung diseases.

The problem of defining ecological damage to man and the environment is very pronounced due to the difficulty of measuring and still lacking exact indicators. Environmental damage from environmental pollution is caused by the reduction of the value of resources or their utilization. All forms of protection aimed at stopping ecological damage require certain financial investments, which would enable the conduct of research, control, planning, establishment of technical protection measures.

In this way, the improvement of the environment will not be missed, but also the volume and quality of production through the improvement of technical, economic and working conditions. In order to achieve the projected goals, it is necessary to apply elements of an economic-ecological account:

- costs caused by environmental pollution,
- the value of investments in environmental protection,
- effects of direct and indirect application of environmental protection.

Of particular importance is the effectiveness of protection, which is addressed through three aspects:

- the effectiveness of using environmental resources in the process of production and consumption -finalization;
- effectiveness of economic reserves use for environmental protection
- investment in environmental protection

Determining the source and degree of emission of pollutants, the duration and spatial interference, the display of changes in the middle are shown using a scale. Comparisons include pollution of water, air, plants, ecosystem functioning.

#### IV. CONCLUSION

People have only recently realized that the issue of further strategy survives a different attitude towards the environment. In essence, the ecological crisis is just an inseparable part of the great civilizational events. First of all, the deep crisis of one mode of production, model of consumption and economic growth, while simultaneously losing basic human values. Such a life has brought out a man from a balance with nature, of which he is only a part,

and it can be regained only by the fundamental sociocultural alternatives in the way of production and consumption.

We can say that it is worthwhile to harmonize production with borders in nature, but in that way not to devastate it, ie, Indeed, this means that the exploitation of natural resources, forests, minerals, water, ores must be limited in such a way that it does not prejudice the human future. The world, in order to recover from the great damage that causes major changes on earth, must first take into account its habits and then on the other. People can with their healthy consciousness preserve nature from further and greater disasters, which can lead to the global destruction of nature around us.

All countries have great responsibility and must capitalize on the potential they have, which will yield results not only with the preservation of energy but also in money, and ultimately the planet. An ecological crisis of great proportions has not yet occurred, if humankind still has the wills and ways to live with existing natural resources.

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