

Environmental Management

Ana Vizjak

Faculty of Tourism and Hospitality Management

anav@fthm.hr

Maja Vizjak

Faculty of Tourism and Hospitality Management

vizjakmaja1@gmail.com

Market activities do not generate a variety of desirable social or public goals, such as creation of a clean environment, and governments and their public environmental management also make many mistakes and failures in their activities. Every environmental management is a scientific approach directed towards the observation of nature and society, and it is essentially an open and integral multidimensional system that covers a wide time span while observing economic activities that take place within dynamic structures linking economic, natural and social systems.

The purpose of this paper is to examine the set hypotheses and determine the characteristics and importance of environmental management development in relation to public or private enterprises that has been, according to statistics, more and more abandoned because it impedes the development of the entire business sector.

Scientific methods used in this paper are methods of systematic analysis, dialectical and logical method, mostly combined with inductive-deductive and deductive-inductive method. Quantitative and qualitative methods were used with methods of comparison of spatial and temporal features.

Scientific contribution is manifested in the development of scientific thought about the importance of environmental management in business, but also type of resources, whether from renewable or non-renewable resources.

Conclusions of this paper are reflected through the issues of designing environmental management system oriented towards classification of natural processes into certain systems that operate according to the differentiation of a specific spatial and temporal sequence to which the systems are directed. According to the basis of interdependence of environmental processes, environmental management seeks to direct human actions to the environment and the world in general.

Key words: ecology, management, enterprises, government institutions, renewable and non-renewable resources

JEL classification: Q56.

1. Introduction

An important feature of environmental management is reflected in the use of systematic and holistic approach to the protection, management and restoration of the natural environment, and the ecosystem in general. Such an approach implies overall care for the environment, but also preservation of sustainability of a particular ecosystem. The activities should not be only oriented towards the achievement of manufacturing productivity or competitiveness through the use of natural resources, which was the previous mode of action in business practice. The main hypothesis is formation of a new attitude which will in future have a more significant impact on ecosystems. PH1: Research oriented only towards natural understanding of ecosystems cannot create a reliable basis for the operation of environmental management while a real need to understand the entire problem matter refers to an integrated understanding of ecosystems, individuals, and social systems and their relationships and obligations. PH2: Activities and knowledge of specific environmental management should demonstrate the ability of people to accept the views of the importance of ecosystems for human life, and such reflection should enable close co-operation of people and the ecosystems. PH3: The objective of environmental management should be to enable multiple environmental management through which it would ensure the fulfillment of human needs while preserving the natural environment. This can be achieved by developing various healthy, productive, and sustainable environmental measures. Moreover, every ecosystem should have clear objectives which should be harmonised with the established environmental policy, legislation and practice adapted to programmes of monitoring, and various studies oriented to understanding of environmental activities and related processes that sustain the structure, composition, and other features of ecosystems (Christensen 1996, 665-691). According to the previous mechanistic way of evaluating environmental problems, an important principle of what is now called the human factor within environmental management, is that individuals are also

considered a part of the natural world (Ecological Economics at www.fs.fed.us/eco/st2p1.htm?+harvest+scheduling).

2. Responsibility and Activities of Environmental Managers

In modern business, environmental management is a link between ecology and classic management. If human ecology is understood as the science of survival, and management as a skill of managing organisational systems according to the set objectives, and if we accept human survival as the ultimate goal of all human systems on the planet, we can define environmental management as the management with the purpose of survival by managing risks that endanger the survival (Mihajlović et al, 2011).

Every environmental manager should establish, predict and carry out an analysis of all possible environmental, social and economic impacts that their business entity or another organisation could have on the environment, which may significantly jeopardise their business operations or natural environment. Therefore, environmental management is directed towards mobilising and directing several scientific disciplines towards the same tasks with a team that needs to create appropriate financially acceptable systems that would act in accordance with economic, ecological, social, legal, ethical, and cultural requirements, which are essentially sustainable requirements. The expression „environmental management“ is now used in a much broader sense than before, and it is not focused only on the natural environment. Realistically, and according to some scientific findings, only five per cent of environmental control measures refers to „green issues“.

Environmental management activities are directed towards everything that is related to the natural environment, and this includes the places where people live and work, where there is production and other activities. Environmental management should develop a variety of skills for managing various groups of people with many information for this kind of action. This is an important skill that all environmental managers need to have in their work (Environmental Management and Specialized Skill at <http://www.envirolaw.co.za/Aldo-Leopold/Project-management.doc>).

Environmental management considers economics a part of a particular social system, because human beings are not only motivated by biological and physical needs, but also other characteristics that distinguish them from other species on the planet. Human beings seek a certain meaning, understanding, and judge everything around them. Thus, there is a problem, how to understand the issues related to ecosystems, loss of biodiversity, or increase in the danger for human health if there is lack of understanding of changes in the natural environment. Regarding these problems, all scientific activities should be harmonised in order to make a stronger impact on preservation of the environment and creation of social sustainability on the planet (Somerville, M. and Rapport, D. J., 2002).

Although there are different methods of environmental management in practice, a certain risk should still be accepted that may arise as a result of a wrong decision if it is made in accordance with a development strategy and environmental protection. Democratic and public method of environmental management is the most desirable in the modern world. In order to minimise environmental risks resulting from incorrect management decisions, it is necessary that environmental managers acquire certain knowledge and skills in natural, technical and economic sciences, and also to have communication skills and ethical principles of conduct. Instruments of environmental management can be divided into categories (downloaded from http://www.vus.hr/promet/NASTAVNI/stranice/POZN_ROBE.htm):

- Organisational and legal instruments – insitutional legal measures used to directly affect the impacts of pollutants of the environment by regulating production processes, prohibiting pollution discharges, including the creation of the so-called „environmental administration“.

- Administrative instruments are closely related to the ones mentioned above and refer to the establishment of eco-standards and norms for the emission of pollutants through agreement between local authorities and the business entity, including sanctions for violation of established norms.

- Voluntary instruments– these are agreements and conventions concluded between various entities on different levels (local, regional and international), through the mechanism of free will and persuasion.

- Economic instruments of environmental management cover a variety of duties, subsidies and refunds, and start from the principle „polluter pays“. They are classified in the following four groups:

- Pollution duties are taxes and similar payments imposed on polluters that vary with the quantity of pollutants released into the environment.
- Subsidies– forms of financial aid given to companies to reduce pollution, i.e. financing of eco-programmes for minimisation of pollution in the future
- Deposit and refund system – imposes a certain duty on polluters which they pay in advance; it is the so-called deposit for the potential ecological damage to the environment that is later refunded to polluters if they carry out a positive action.
- The licence exchange system – the latest economic instrument where the competent ministry i.e. environmental administration issues a fixed number of licenses, or „rights to pollution“, in a given area, and then allows development of the market on which polluters sell and buy the rights to pollution among themselves.

Numerous studies verify the fact that small and medium-sized enterprises have been abandoning the idea of environmental management as a promotional factor in their market performance. This usually happens because they expect that the state will regulate their actions on the market in order to make a better impact on environmental issues. Practice has shown that the state is incapable to take on this role, because there is not enough qualified staff, necessary information about the benefits, nor funding for reduction of pollution. A further obstacle to effective state action in environmental protection is political activity, perceiving ecological activities and sustainability issues as a supporting social need. It should be noted that the state in many cases acts to protect the interests of large companies, and does not devote enough attention to public interest and real protection of nature.

One of the reasons for non-acceptance of environmental management by the companies is the belief that neither business entity nor management have the time or the financial possibilities to accept and develop a certain environmental protection system (Čulahović 2001, 108).

It is evident that any action towards the creation of environmental protection requires time, financial resources, and professional and educated staff. Successful management of ecosystems creates certain benefits at national and international level, but also significantly reduces operating costs. Activities of environmental management should not be treated as coercive and unprofitable, but rather as a modern necessity without which further development is questionable, and cannot be included in the international division of labour. Specific experiences in the use of legislation related to environmental management should be harmonised with technical and economic knowledge. Without a scientific explanation and theoretical formation of the presented topic, there can be no scientific basis for problem-solving, and without it, there can be no active methods, nor coherent planning of solving the problems. Sustainable development therefore remains a political issue that cannot be realistically comprehended (Cifrić 1989, 345).

3. Activities of Environmental Management in State Institutions

Environmental management in the modern society has a major role in satisfaction of social needs and the public interest by encouraging sustainable development management (Deželjin 1997,7). Foundation of a certain level of the public sector that manages its own assets or financial resources, human resources, programmes, and often also public contents, the need arises for the creation of public environmental management. Activities of public environmental management should be co-ordinated by the state through administrative bodies, but also through state-owned companies. It should conduct legally prescribed activities under the control of state administration and be responsible for the preparation, adoption and implementation of various environmental regulations. Such state authorities or agencies already exist and operate in many countries and take care of environmental management, prepare the regulations, monitor the state of the environment, and report their findings and activities to state bodies or the public. In European countries, environmental stakeholders and various types of assistance are used to encourage co-operation and agreements, especially open environmental agreements between the government and industry, and market mechanisms are used to create the basis for development of management and protection of the environment (Goodstein 2003, 230). Just like the markets that do not achieve a variety of desirable social or public goals by their activities, namely the creation of a clean environment, the state itself and its public environmental management also have many flaws and make many mistakes in their operations. The most common barriers that impede the effective impact of the state and its environmental management in

management and control of the effects on the environment are:

- Inadequate environmental and economic information;
- Bad discretionary administrative legislation;
- Political influence on government institutions.

In reflecting on how and where sustainable development can be used successfully, and along the way develop other activities related to environmental protection and sustainable development, the conclusion was reached that a lot could be solved by creating environmental management at the regional and local level, because at these levels, important goals and realistic developmental needs can be determined effectively and in a socially responsible way, and environmental problems can be reduced (Forum on Sustainable Development 2004, 324). According to the above, there is a need for action in public environmental management at the local level, because at this level, the idea on real environmental management is developed, and this should be encouraged and promoted. This is a very responsible and professional task and it is often used under the term “urban management” which has great powers, but also responsibilities in the implementation of sustainable development and environmental protection in particular (Žugaj and Brčić 2003, 20).

Environmental management is also necessary in various non-profit organisations and companies for operating with the least expenditure of resources and achieving the best economic effects. Only a successful environmental management can encourage informing the public on all socially necessary activities, but also lobby at state and senior corporate levels in order to act towards sustainable development and environmental protection, because only environmental management can create an environment in which an individual can achieve multiple goals and tasks with a minimum of consumed resources and time. Accordingly, environmental management can only in this way become involved in the achievement of social objectives and activities and enable sustainable development.

4. Activities of Environmental Management in Companies

Activities of environmental management in an individual company are one of the recent modes of action of environmental management, and provide a comprehensive course of action whose important task is to set the goals of company activities towards environmental protection and reduce the negative impact of the state on the natural environment to a minimum, and also monitor and analyse environmental protection costs at the company level, and conduct various ecological research and compare them with development. The management recognises and offers four basic attitudes for companies to become more sensitive to environmental issues (Freema et al, 1995):

- Legal attitude implies that the company will voluntarily and without question implement all the laws, rules and regulations in the field of environment, and try to apply these regulations to their advantage by making the necessary changes and innovation in business activities;
- Market attitude is adopted by organisations that will base their business activities on fulfilling all the demands of their customers related to the environment;
- Attitude of all the stakeholders that extends beyond the one described in the above paragraph, by the fact that, except customers', it considers and respects the demands of all other stakeholders;
- Green attitude, as an attitude that promotes life that is in growing harmony with nature. At the current level of awareness and business activities, the application of this attitude is difficult.
- Companies' activities are closely related to their environment, and the environment affects the company in many ways. Companies should have a dynamic management structure that will enable development in an unstable environment. The management should accept and further develop the basic features of their environment that are closely connected with environmental factors, but also independently develop their environmental policy. By successful management which includes replacement of raw materials, clean technology and production of clean products and services, some additional value is inserted in the product; less natural resources are used and less waste materials created.
- In modern companies, organisations and institutions, management can no longer be the privilege of a few skilled managers; the issue of responsibility is dispersed to lower management levels. Management capacity is not a natural privilege of individuals and it should be acquired through education. Information and knowledge are especially important for organisational activities of environmental

management, with its readiness to take various types of risks. Management in modern business environments demands a high level of knowledge, activity and adaptation to new challenges. Such an environment requires from environmental managers creativity, the use of new modes of action, behaviour and thinking that should differ from the usual (Zekić 1997, 68).

- Production activities in companies usually border with economics and ecology and create room for problems, and to solve these problems, science is often used to encourage environmental activities in the company. Science should be developed for the benefit of all people, and driven towards meeting their needs (Zelenika 2004, 45). All this is evident through addressing economic and environmental issues at the global level and in individual companies in particular.

5. Effects of Environmental Management on Renewable Resources

Natural resources appear in nature as a part of overall natural resources, creating a basis for action, economic activities, and survival of the human species. Human survival is increasingly threatened by constant development of engineering and technology, and therefore, measures should be undertaken for rational use of the natural resources. For successful implementation of this idea, at the initiative of scientists, a new scientific discipline has been established and operational – economics of natural resources. It is a science that should create and point to certain rules of sustainable use of natural resources, the purpose of which is rational management of natural resources with the help of scientific knowledge, and the purpose of all these activities is to enable successful development of human society without endangering the ecosystem. Environmental management should perform continuous adaptation of companies' activities according to the situation on the market, as presented in Table 1.

To last, to grow and to benefit in the long run	Constantly adapting and anticipating in an uncertain environment
To become delocalised in the closest bordering regions	Take into account the effect of space and different levels of analysis such as the world, country, regions
To be the best in the supporting sector	Find markets, adapt to different cultures and stand up to competition,
Research	
Manipulation with people Technology with the highest achievements Innovation products	

Table 1. Adaptation of Companies to New Market Conditions

Source: Veselica, 2007, p. 34

In this process, the most important task is to manage the environment and determine and develop the most effective ways of managing natural resources which, at the same time, should meet economic needs and environmental criteria of sustainable development. In order to achieve such thinking, analyses are used containing elaboration of different possibilities of natural resource management, as well as the consequences of using these methods. These studies are used to define a particular way of future development of the social community and using natural resources which should encourage development. The way to manage natural resources is based on an appropriate approach and understanding of the long-term development, and with the co-operation of social, economic, and ecological system. During the environmental management, it is necessary to develop the need for sustainable management of resources in the environment.

To successfully operate in a business system, attention should be devoted to renewable resources which are part of the natural environment and can be renewed; these are forests, water, fish stocks, etc. These resources have characteristics of natural renewal or regeneration, which places them at the very top of human interest and use. In cases when their use does not exceed the level of their recovery, the use of these resources can be temporally unlimited. At the same time, growth of biological population such as fish stocks is not unlimited. The highest level of biological resources is determined and achievable by their carrying capacity, and the environment in which the biological species live (Cifrić, 1989, 46). For all mankind, increasing renewable resources is very important, because they can be permanently used in compliance with the prescribed norms. Irrational use of natural resources can lead to serious consequences

if the quantity of exploitation of the respective resource exceeds the level of its population growth. Reduction of individual resources can also happen due to pollution, which should be taken into account in the natural resources management. In the analysis of renewable resources, realistic study of individual resources should be considered, and used to influence the creation of ecological balance and interdependence of various biological species. The conclusion of all these analyses is that optimal use of certain resources is very complex, because for such an activity, many interdependent biological species and their interrelationship need to be analysed. A separate calculation can be used to calculate the level of resource use, but also yield on use of the respective resource. With more effort, more vessels, people and time, a better effect can be achieved, and the results of the achievement can be offered to mankind. In this way, the effort invested in the use of resources becomes an important factor of resource management. In the case where there is free access to the exploitation of a certain resource, and substantial profit can be earned in the process, many other stakeholders will enter this activity until profit is equalised with the marginal cost. Competition in the exploitation of resources will appear in the case when property rights do not apply, or when no one owns the particular resource.

Such economic activity has led to the need not to allow free access to renewable resources, because this destroys common property. Such activities have their roots in everyone's attempts to take as much as they can for themselves, regardless of the possibility of resource recovery, and the result of such action is that everyone loses. In order to achieve benefits, each participant tries to take as many resources as possible, which in reality leads to an increase in general exploitation of resources, but also to destruction of the respective resource and to the collapse of all the participants using the resources.

Privatisation is used in practice as a way to solve the problem of excessive use of each resource to which there is free access, and is common property. This is usually handled by giving concessions for the exploitation of particular resources while the government controls the use of the resource. On the other hand, using the privatisation system cannot be used with many other resources, because privatisation can bring many problems when the concessionaire forgets the external costs; thus, privatisation of renewable resources cannot be considered a successful solution of this social problem.

The use of state property could solve many problems that occur by using common ownership of natural resources, because excessive use of resources and external costs can be included in the costs of individual owners. In order for state property to operate successfully, the state should organise monitoring of resource use and set the appropriate rules of conduct.

Communal resource management is used in the case when the local community decides that it can best manage its resources in a sustainable manner. Although some problems appear also in this type of resource management, numerous studies have shown that this method of environmental management is in many cases satisfactory.

Regarding inadequate management of renewable resources, according to the results of previous research, it is estimated that annually about a thousand plant or animal species become extinct. This has become a serious problem, because many species bring people certain benefits and well-being. In case when a particular natural resource is used in a balanced way, open access to resources is in accordance with the conservation of flora and fauna. For the preservation of natural species, it is much better to use individual resource ownership. Open access to any resource contains the possibility of gradual destruction of this resource. Various problems in the use of renewable resources should not be considered in a static way, where the future costs and benefits are given less significance in relation to the current costs and benefits. The discount rate used in determining the exploitation rate of certain resources is high. Discount rate specified in this manner will be relevant as follows (Pearce and Turner 1990, 125):

Biological rate + new value of capital = discount rate

Why the discount rate is so important and how it affects the problem of preservation of resources is shown on the example when the high rate used by the owner of the resource needs to use the respective resource at the same time. In addition, high interest rate leads to excessive use of resources that gradually disappear. Renewable resources are endangered by excessive use which leads to extinction, all in the case when there is open access to this resource which is not under the control of property rights. Effective management of renewable resources requires the creation of a specific legal framework for management that should be based on rights, duties, privileges, and responsibilities. In realistic terms, private, but also state ownership of environmental resources is controversial in many cases, while communal resource

management is realistically the most effective way to use natural resources in a sustainable manner. Although many studies were carried out on this management method, practice has proven that this method of management of natural resources is the most effective and causes the least damage to the community.

6. Effects of Environmental Management on Non-Renewable Resources

Various minerals, metal ores, non-metals, coal, oil, and gas classify among non-renewable natural resources. All of these resources have their origin in the distant past and they were materialised in various natural ways. According to their structure and composition, they are non-renewable, and their creation took a long period of time. When considering these resources, it should be taken into account that they belong to a group of resources designated by the term “fixed reserves of exhaustible resources”, and attempts are made to find an optimal way of their use, or optimal exploitation rate. The most important feature of non-renewable resources is that their quantity is limited, and the concept of sustainable use, like in the case of renewable resources, cannot be applied. With these resources, it is important at which rate they are used, or they disappear like the total quantity of the respective resources in nature. Prediction of temporal availability of individual non-renewable resources as well as calculation of their temporal use is highly questionable and complex. In economic pricing of each of these resources, their rarity and supply costs are taken into account. In the calculation of current and future availability of each of these resources, interrelated methods of social and natural sciences should be used, and the synchronisation of potential stocks with the needs of humanity is associated with the growth of the human population, technological progress, and social and economic expectations. Issues related to the lack of resources will continue to be in the sphere of interest of society and the environment. Scientific views on the restriction of growth are closely associated to Malthus’s perspective which predicts and determines the absolute point at which lack of resources start emerging at a given time. This indicates the importance of using environmental restrictions in the exploitation of certain resources, which implies that large amounts of energy will be necessary for their preparation in order to use them in the future. At the same time, the quality of these resources will be reduced. Such effects will significantly increase the cost of these resources and destroy valuable natural environment and other capacities that satisfy people. English scientist Righardo indicates that the market and economic activities should enable full use of existing resources while finding new ones that will replace the old. Assessment of the shortage of certain resources can be conducted by connecting geological data and forecasting future demand for these resources.

Many authors divide non-renewable resources into natural resources and stocks, and the stocks are presented as layers which can be analysed geologically, and which are economically viable. All the other types of layers are displayed as resources because they have not yet been discovered, or because their use is presently irrelevant. The discount rate is especially important in the exploitation of non-renewable resources. While optimal use of renewable resources is important according to the formula presented above, for non-renewable resources, the following rule applies (Chape and Mulongoy 2004, 5):

Discount rate = increase in the value of capital

In this process, the claim should be taken into account that non-renewable resources should be used in such a way that the growth rate of use of non-renewable resources is equal to the discount rate. The above-rule is called the Simple Hotelling’s Rule (Hotelling’s scientific analysis from 1931), and the name has the attribute “simple” because it is only used in simple cases, when a company faces zero cost of using a particular resource.

7. Conclusion

Realistic assessment leads to the conclusion that current social and economic development do not show acceptance of sustainable development as a realistic option, which indicates that all present discussions on this topic are not realistically specified, because there is still no sustainable development.

Sustainable development is primarily a normative category, which means that it is something that has yet to be encouraged and further developed. The objective of this action is not a condition that needs to happen in the distant future; sustainable development is one of the characteristics of future development which should not proceed in the direction of environmental degradation and destruction of the natural material basis. This is not the usual environmental, economic or social category, but primarily one which

comprises all three options. Environmental management is present on all management levels: personal level, family (household) level, company level (and other economic entities), local, regional and global levels of the state administration, level of international, regional, and global institutions. In each of these cases, environmental management must be treated as a condition of survival and a development option (Rikalović, 1999). In no area of management is the dominance of the effectiveness principle over the efficiency principle, i.e. the inability to compensate lack of effectiveness (poorly selected goals, i.e. goals selected in an inhumane and non-ecological manner) with efficiency confirmed so powerfully and convincingly. In this respect, environmental management can become a kind of infrastructure management and a performance test of any management practice. In order to successfully implement environmental management, management should be created that would organise, direct, and lead sustainable development. This type of management has been developing, specifically from the moment when it became clear how badly human activities affect the natural processes, while at the same time, sustainable development exceeds the framework of scientific debates and increasingly acts as a political or social process of modern times. In this process, environmental economics should play its part and create a framework for unification and solving a variety of environmental, economic and social issues, and help in making correct solutions, decisions and answers. Common objectives should be set for proper economic development and establishment of realistic environmental protection policies. Therefore, environmental management is not just about the management of natural environment, but also the management of organised human activities in order to reduce their negative impact on the natural environment.

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