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Review

THE NEED FOR INTEGRATED APPROACH TO ENVIRONMENTAL PROTECTION IN THE REPUBLIC OF CROATIA

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It is a well-known fact that healthy environment is a basic prerequisite for preserving people's health and quality of life. Various symptoms of environmental crisis, perceptible worldwide in their various forms, are giving a clear warning that current civilization development patterns, unless significant changes and reversals occur, are unsustainable. The paper gives an overview of actual national state of the environment. It is pointed out that institutions whose competence involves the management of particular segments of the environment are insufficiently interconnected, and thus against insufficiently developed environmental awareness and the prevailing adverse economic conditions, render difficult any positive development with regard to restoring to measures for recovery and improvement aimed at preserving good quality of the environment. It is furthermore pointed out that rational and in the long-term efficient environmental protection at national level may be achieved and maintained only if considering the state of environment in its integrity, and by taking the measures and implementing the solutions based on an interdisciplinary expert approach accompanied by holistic management. In order to increase the efficiency of environmental protection, it is certainly indispensable to achieve inter-institutional integration and action while considering and contemplating individual environmental components as an integral corpus - indivisible ecosystem.
Key words: ecosystem, holistic management, multidisciplinarity, environment, Republic of Croatia.

Potreba za integriranim pristupom zaštiti okoliša u Republici Hrvatskoj. Poznata je činjenica da je zdrav okoliš temeljna pretpostavka za očuvanje zdravlja ljudi i kvalitete življenja. Brojni simptomi krize okoliša, koji su primjetni u različitim oblicima širom svijeta, jasno upozoravaju da je trenutni razvoj civilizacije, ukoliko ne uslijede značajne promjene i zaokreti, neodrživ. U radu se daje osvrt na aktualno stanje okoliša na nacionalnom nivou. Ukazuje se na činjenicu da su institucije, koje pod svojom nadležnosti imaju upravljanje pojedinim sastavnicama okoliša, međusobno nedostatno povezane, što uz nedovoljno razvijenu ekološku svijest i nezahvalne gospodarske okolnosti otežava konstruktivne pomake, glede poduzimanja sanacijskih i razvojnih mjera s ciljem očuvanja kakvoće okoliša. Nadalje se ukazuje na činjenicu da se svrsishodna i dugoročno učinkovita zaštita okoliša na nacionalnom nivou može postići i održavati samo sagledavanjem stanja cjelovitog okoliša, te poduzimanjem mjera i implementacijom rješenja utemeljenih na multidisciplinarnom strukovnom pristupu popraćenim holističkim menadžmentom. Za intenziviranje učinkovitosti zaštite okoliša potrebno je zasigurno intenzivnije međuinstitucionalno povezivanje i djelovanje, te sve sastavnice okoliša uvažiti i sagledavati kao cjelovito tijelo – nerazdvojivog ekosustava.
Ključne riječi: ekosustav, holistički menadžment, multidisciplinarnost, okoliš, Republika Hrvatska.

INTRODUCTION

Judging by current environmental state reports, it follows that negative impact on the environment in the Republic of Croatia, resulting from human activities, is not exceeding the critical threshold. It is assumed that critical degree of negative environmental impact will not be attained if the development of economic and other activities is going to be brought in line with environmental requirements, planned and implemented in compliance with the concept of generally accepted sustainable development principles which involve coordinated, comprehensive and permanent concern for the environment.

Interdisciplinarity of technological solutions in environmental issues is imposed as an indispensable and relevant prerequisite for successfully achieving the most cost - effective solutions, the efficiency would result in attaining the sole objective which justifies invested resources – that being reached in the most efficient possible manner the harmony between quantity of pollutants emitted in the environment as a result of human activities and the self-purifying capacity of the environment.

It is presumable that the prerequisite for successful and thorough environment-friendly economic development is provided in solid cohesion of relevant institutions and scientized comprehension of whatever is by interaction of a human being and the environment occurring in a water molecule, in a bit of soil and air particle, and in the attempt to assist those, recovery – wise or prevention - wise, to preserve their original quality status.

ANALYSIS OF THE STATE OF SECTORAL LOADS ON THE ENVIRONMENT

For a country characterized by exceptional geographical and biological diversity, with rich natural resources and available potential, of particular importance is thorough monitoring of the state of environment and managing the sectorial loads on environment, in a manner ensuring a long-term and integral environmental protection, economic and social progress, while at the same time fulfilling the requirements for implementing the globally accepted sustainable development concept.

Urbanisation

Urbanisation load is on the rise in communities and along the seacoast. Population is concentrated in big cities, along the roadways and the coast. Major changes involve boosting of man-made surfaces recording an increase of 1,8 km/100 km^2 compared to the previous period, that being evidenced in rising density of road network.

Some advances in physical planning and safeguarding of coastal region against inappropriate construction are evidenced from 2004, as a consequence of adoption and implementation of new regulations governing the construction in said area and also of concrete measures undertaken with regard to removal of illegally constructed buildings [1].

Industry

Environmental requirements in industrial sector became particularly prominent after 2005, when the process of transposing the EU Acquis into national legislation started, following which new legislation was adopted with regard to environmental pollution. Significant reduction of negative industrial impact on the environment was the result of diminished post-war production output, and higher reliance on imports.

On the other hand, introducing few hundred clean manufacturing projects led to higher environmental efficiency of production processes. As a consequence of market promotion activities, there is an ever increasing number of companies being certified as ISO 14 001 „Environmental Management System" compliant.

Introducing the socially responsible business system in industry as from 2007 substantially contributed to promoting the environmental management system. The risk management policy in industry is redirected from acting in case of an accident to preventive action, thus involving the organization of production, control, supervision and procurement of appropriate production technology equipment [2, 3].

Agriculture

In spite of the fact that the number of farms in Croatia is substantially reduced, agriculture constitutes a significant source of environmental load within the meaning of potential pollution of soil and water, as well as contribution to global warming owing to greenhouse gas emissions. The consumption of agrochemicals per unit of area fluctuates substantially, and according to available data on mineral fertilizers consumption, Croatia ranks as top consumer compared to Member States of the European Union.

Owing to incomplete records on imported quantities, it is not possible to ascertain precise quantity of consumed plant protecting agents. The state of quality of agricultural soils is deteriorating permanently as a result of inappropriate plant growing measures as well as soil fertilization and cultivation interventions. Genetic diversity of agricultural system in Croatia, which is significant owing to long tradition and diversity as regards agricultural production types, is expanding – whereby precaution is needed, as new species could possibly replace the old ones, thereby ultimately reducing genetic diversity of the agricultural system. Qualification structure of farmers is unfavourable, that being the reason why ecological production is only practiced on 0.75% of the area of overall cultivable agricultural land [4, 5].

Transport

Burdening effect of transport on the environment is manifested through increased emissions of pollutants and quantities of waste associated with transport, as well as through potential emissions of hazardous substances into the environment as a result of contingencies. Noise and vibrations originating from transport additionally load the environment and affect people's health and quality of life, particularly in urban areas where up to 80% of noise is associated precisely with the transport. Total area of transport infrastructure, particularly roads, underwent substantial increase.

Intense road construction obviously facilitated better regional links, but those

very transport undertakings resulted in a reduction and cutting off, and sometimes complete destruction of natural habitats for flora and fauna, of some human communities, while in some cases significant degradation of natural landscape occurred. National environmental action plan points out to the need of enhancing the variety of modes for passenger and goods transport as a reasonable development solution, which would unballast road transport and reduce load on the environment, however that is not being implemented according to planned time schedule [6].

Tourism

Load on the environment originating from tourism industry is targeted toward all the environmental components of coastal and in shore area, and occurs in a very short time period throughout summer tourist season. At that are particularly affected the utility services of water supply, sewage and waste management, whose throughput capacities are overloaded.

Projekt Jadran (Project Adriatic) has to substantial extent, but far from completely, resolved the problem of sewage and municipal wastewater treatment in littoral region, while the number of blue flags awarded to Croatian beaches and marinas is steadily increasing. The attendance rate in national parks is on the rise, and with the scope of preserving the ecosystems in such areas, it is necessary to provide for control of the number of visitors, and to implement promotional measures in order to achieve more balanced attendance distribution in less-favoured national parks as well [7, 8].

Waste

In the field of waste management, a number of activities were initiated, and moderate results were achieved in the following areas: legislation, improvement of the so-called unauthorised dumping sites and closure of official landfills, building of waste management centres, as well as building the capacities of bodies responsible for waste management. Precise evaluation of the current state of waste issues is significantly aggravated due to unavailability of data concerning the type and quantity of waste. However, it is notorious that the quantity of municipal waste is growing constantly, and almost the entire quantity collected, with the exception of packaging waste, is dumped on the landfills. Landfilling of such material without its prior selection by quality constitutes accumulated waste material that decomposes slowly and requires huge areas for landfilling [9].

The facilities for treatment and recovery of waste are mainly those designated for treatment of special categories of waste, while for particular waste types such as hazardous waste there is still no recovery and disposal facility available in Croatia, resulting in the growing export of waste. Requisite reduction of quality of biodegradable municipal waste dumped on landfills is not yet being achieved [8].

OVERVIEW OF THE STATE OF ENVIRONMENTAL COMPONENTS

Sound monitoring for assessing the environmental impact is of enormous significance, that being the sole method for performing realistic assessment of the impact of interaction of human activity and the environment, as well as the degree of viability of good quality of the environment. Monitoring is presently undertaken by numerous operators independently and separately, with steady factor being that of shortage of funds for monitoring that would to a sufficient degree quantitatively and qualitatively, tackle each environmental component.

Achieving harmonized methodology of collecting and processing the data, followed by implementation of national standards that would be aligned with currently valid standards constitutes one of the activities of crucial importance for ensuring facilitated environmental state monitoring and implementing the efficient recovery and preventive environmental policy at national level.

Air

The emissions of principal air pollutants are generally declining as a result of implementing more stringent provisions on maximum concentrations, the development of public transport, reduction of permissible lead content in gasoline, gasification and connecting to heating grid, the use of low-sulphur coal, fitting the desulphurization plant as well as enforcement of other similar activities. Air quality throughout the territory of the Republic of Croatia is mainly of category one, while major pollution problem in populated areas for the time being is pollution by dust, or suspended particles.

Exceeding maximum air quality thresholds in populated areas is most often the result of proximity of local sources of pollution, transport and furnaces. The quality of precipitation is lowest in eastern part of Croatia, that being associated with emission of ammonia from agricultural sector. Croatia is in disadvantageous position due to acidification problem, eutrophication and ground-level ozone, as only a portion of overall sedimentation and ground-level ozone originates from domestic sources, while major part of the load is brought by air currents from neighbouring countries.

Currently under way is upgrading and improving the emissions and air quality monitoring system, concrete contribution thereto being the purchase of measuring equipment for twelve regional stations for background air quality monitoring, as well as outfitting of the chemical and calibration laboratory [10,11].

Soil

Soil is an exceptionally complex medium and important resource playing a series of essential functions for sustaining overall life on Earth. In Croatia, activities have been launched in connection with soil monitoring programme and creating the database on potentially polluted sites. It has been established that soil acidification process is under way in Croatia as well as organic matter degradation, particularly on agricultural land. There is a trend of expansion of the areas with saltified soils in Neretva watershed as well as the increase of saltification level. On the territory of

Slavonia and Baranja, the zones of alkaline soils are gradually expanding.

Integral protection policy for soil is not yet instituted. In forthcoming years, concrete advances are expected in stipulating limit values that would define precisely the level of soil pollution as well as in establishing the mechanisms for collecting, processing and accessing the data [12].

Water

Drinking water provision from public water supply systems at national level reaches the rate of about 80%. Monitoring the quality and sanitary quality of drinking water is regulated and implemented in compliance with the Ordinance on sanitary quality of drinking water setting out the number of water samples taken from public water supply systems and other public water supply facilities, the sampling frequency, and sampling sites.

Laboratory testing of water samples with the purpose of assessing sanitary quality within the framework of sanitary control is undertaken by Public health institutes of the counties, Croatian Public Health Institute and other institutions authorized from the part of the Ministry of Health and by the laboratories in water utilities. Substantial progress in sanitary quality control of water in recent years has been achieved by introducing HRN EN ISO/IEC 17025 norms and HACCP system in laboratories of water utilities. Small waterworks which prevail in isolated rural regions, on the islands and peripheral urban communities pose a significant problem and health risk in Croatian water supply. They are not integrated in the system of public water utilities, it is unknown who controls them and who provides maintenance thereof, and they are also not subject to qualitative supervision by authorized supervisory bodies.

At the moment 65% of Croatian population has a regulated sewage system, and 44% a connection to wastewater treatment systems. Current analyses reveal the need for 759 wastewater treatment systems in Croatia. Construction of wastewater treatment plants in coastal areas is implemented through Projekt Jadran (I and II), and in continental part through the Inland Waters Project. Environmental state of transitional, coastal and open waters is, considering the currently valid criteria regarding the composition and variety of water flora and fauna, deemed satisfactory. However, for implementing comprehensive and final evaluation of water quality status, it is still necessary to adopt national provision that will define the criteria and monitoring programme more precisely [6, 13].

BIODIVERSITY

Aggregate knowledge of biodiversity in Croatia is characterized by uneven geographic distribution. There is lot of information on certain areas, as opposed to none on others. Lately a significant progress is noted in systematizing and collecting the data on biodiversity at national level. By analysing current state, as well as the origins of threat and the problems of protecting the biological and landscape diversity in Croatia, along with progress currently achieved, it has been established that within the context of Western and Central Europe, Croatia possesses enormous wealth and diversity, as well as high value and conservation level of biological and landscape diversity. A

network of ecologically important areas for conservation of habitat types and endangered species in Croatia has been established.

Substantial progress was made in the domain of protected areas management. Comparing the current state of nature protection sector with other European countries, it may be ascertained that we manage to pursue European legislation and practice, but anyhow additional efforts are required, targeted toward implementation of action plans through strengthening the institutional framework and earmarking sizable funds for nature protection in state and county budgets [14, 15].

IMPACT OF THE ENVIRONMENT ON PUBLIC HEALTH

It is a common place that healthy environment constitutes basic prerequisite for preservation of health of people and quality of life, while on the other hand major current challenges for public health are the following: polluted air, water and soil, improper dumping of municipal and hazardous waste, pesticides, radiological contamination, UV radiation, noise, global climate change, etc.

In spite of all that, there is as yet no legal obligation in Croatia regarding systematic and comprehensive monitoring of correlation between environmental factors and public health. There are neither standardized indicators for monitoring the state, nor funds available for launching purposeful programmes supporting thereof.

Data available at national level suggest that for the time being there is no significant impact of environmental factors on public health – that not being applicable to the working environment which is categorized and considered separately [16].

FINANCIAL INVESTMENTS IN ENVIRONMENTAL PROTECTION AND THE INTERNATIONAL STATUS

Available statistical data evidence significant increase in the investments made in environmental protection [17]. Average value of the investments made in environmental protection according to protection type in a 2005-2010 period, as shown in Fig. 1, indicates that major investments involved the waste management sector.

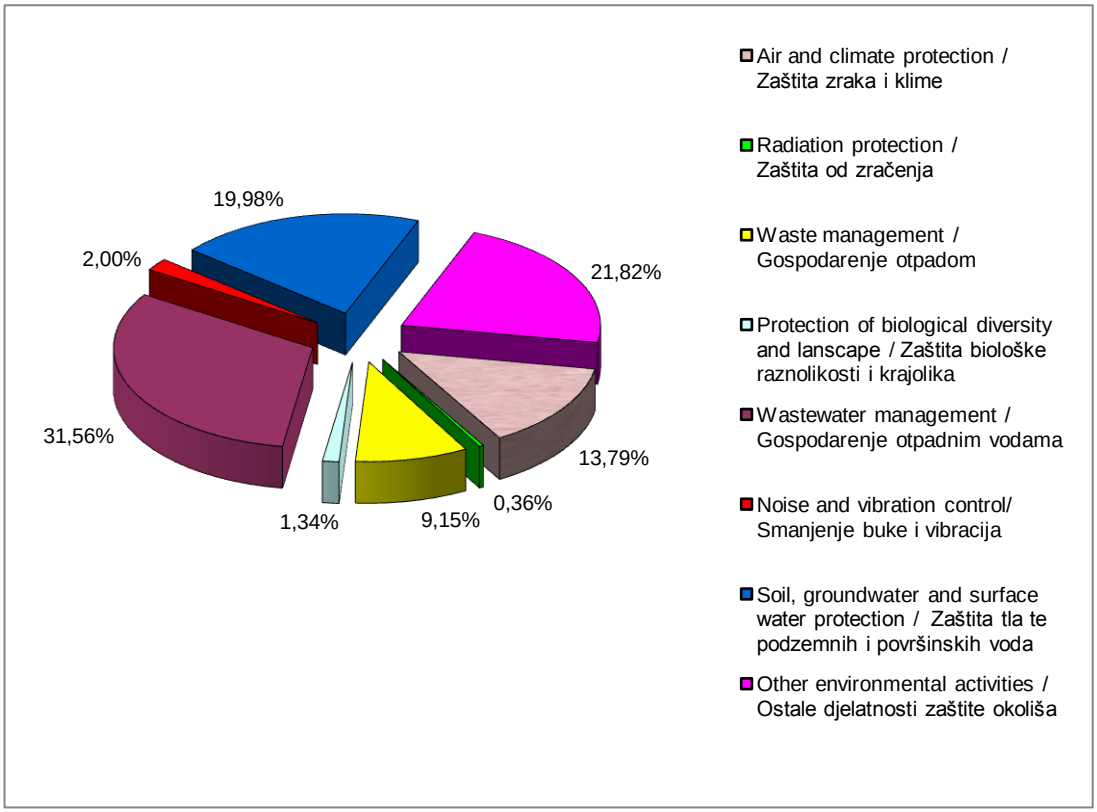

Figure 1. Investments made in environmental protection according to type of protection (average for 2005-2010 period).
Slika 1. Ostvarene investicije u zaštiti okoliša prema vrsti zaštite (prosjek za razdoblje 2005.-2010.).

Public interest in environmental issues, as well as associating of individuals and/or interest groups in environmental non-governmental organizations is on the increase (Table 1) and comparable to trends in other countries [17].

Table 1. Increase of the number of environmental protection organisations in 2005-2010 period.
Tablica 1. Porast broja udruga za zaštitu okoliša u razdoblju 2005.-2010.

Associations engaged in environmental protection / Udruge koje se bave zaštitom okoliša	2005.	2006.	2007.	2008.	2009.	2010.
Nature protection organizations / Udruge za zaštitu prirode	278	310	336	363	391	399
Associations pursuing other environmental protection activities / Udruge za ostale djelatnosti u zaštiti okoliša	140	168	195	220	255	267
Total / Ukupno	418	478	531	583	646	666

In the field of environmental protection the Republic of Croatia is involved in co-operation on several levels: multilateral, regional, sub-regional and bilateral. This co-operation is based on a number of international legal instruments (conventions, agreements, treaties, etc.) and programmes, with the Republic of Croatia being either a party thereto or a participant therein.

With regard to majority of international environmental documents signed and majority of programmes implemented the Republic of Croatia needs to undertake legislative adjustments, provide the resources for their implementation (since they often concern the restriction of emissions in specific production processes, adjustment to new technologies and most often adaptation of production systems to modern and demanding production methods), and to initiate administrative and institutional changes in the existing system of environmental protection on a regular basis so as to facilitate the fulfillment of obligations [18, 19, 20].

BEFORE CONCLUDING

Numerous symptoms of crisis of the environment which are perceptible in various forms worldwide clearly warn that current development of civilization is not sustainable, unless significant changes and turnarounds set in. Such generally negative trend of societal impact on the environment ensues from the following:

- growth of the Earth population which in recent years experienced multifold increase and continues at such a trend;
- "consumeristic" civilisation, which under the influence of marketing and the overall economic system, experiences and covets the standard and quality of life primarily in the form of possession and ever more intense consumption of new material assets;
- the use of technologies which do not minimise sufficiently the negative impact of manufacturing process on the environment, all that resulting from endeavour that product price be formed so as to make uncompetitive on the market, and thus economically unsustainable, those manufacturing methods which are sufficiently environment-friendly.

One of the positive outcomes of escalation of mentioned crisis is the fact that it is all the more difficult to ignore various symptoms of negative human impact on the environment.

Consequently, more and more people are becoming aware that healthy environment is not something that is granted regardless of their activities, and are prepared to change the environment-unfriendly habits, to invest the effort and support the activities for conservation and sustainable use of the environment.

Undeferrable is the requirement of contemporary times that a human being, as reasonable actor in nature, should find the paths for conciliation, the paths of wellbeing for himself and his immediate environment as a part of global ecosystem [21].

As long as he uses the environment, human being is compelled to recognize the fact that the environment is not and may not be the object of his arbitrariness. It depends on a human being whether project interventions of environmental protection will be implemented formally or functionally – at personal satisfaction and for well-being of the community which he ultimately acts on behalf of as an ecologist [22].

CONCLUSION

Croatia has to date made significant progress in environmental protection, but much is still left to be done in near future. With the purpose of bringing about its proper „sustainable tomorrow“, it should assume a number of further commitments, properly figured-out in terms of strategy. For intensifying environmental efficiency what is beyond question necessary is a more intense inter-institutional integration and action, as well as considering and contemplating all the environmental components as an ensemble.

On the basis of existing data regarding all the environmental components it would be desirable to make a breakthrough by undertaking interdisciplinary review thereof and consequently do the following: consolidate whatever is critical, prevent the contingencies, as well as plan and implement the most environment-friendly projects, while endeavouring simultaneously and in a persistent manner to achieve higher level of environmental awareness of the society in general and of the expert community.

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