

## Chapter 4

# Conclusions and Recommendations

At present time of scientific and technological progress, new concepts, tools and methods of solving problems fulfil the principles of a democratic society, which dictate the obligation to provide a healthy environment for future generations.

Part of this challenge is timely assessment of the potential impacts of proposed activities on the environment and human health with acceptable environmental risk. It is necessary therefore to develop theory and apply appropriate methods for the systematic investigation, analysis and evaluation of the effects of projects, constructions, plant, equipment and other activities on the environment and population.

This book is informed by an effort to develop research with the aim of:

- Improving existing qualitative and quantitative methods for assessing the impacts of proposed activities on the environment;
- Achieving a better understanding of relations between probabilities and consequences in determining the risk of each of the considered alternatives;
- Developing methods to stimulate creative approaches in the search for alternatives to proposed activities (constructions) that are environmentally friendly;
- Developing methodologies for the application of assessment of impact of constructions on the environment based on risk analysis.

The book is designed to analyze the current state of the process of environmental impact assessment and to highlight the existing methods used in the assessment process. The work points out the possibility of improving existing methods of assessing the impacts of proposed activities by applying risk analysis in assessing the impact of hydraulic structures on the environment. The use of risk analysis methods for assessing the impact of activities on the environment and human health is undoubtedly an original and innovative proposal. The book has a clearly defined methodology and original concept of solution.

## 4.1 Theoretical and Practical Benefits

This book addresses current issues and comparison of alternatives for a proposed activity (construction) and the methods used in the environmental impact assessment of the proposed activity. In this context, it is necessary to develop new approaches based on the application of risk analysis (Zvijáková 2011).

The book will contribute to the strategic goals of sustainable development by proposing research activities that focus on the need to develop a knowledge base as well as developing advanced methods and tools necessary for the process of environmental assessment with the global aim of sustainable resource management, conservation and sustainable use of ecosystems, and ensuring the sustainability of natural and urbanized environments.

The main **theoretical benefits** of the study for environmental impact assessment are:

- The analysis of the current state of theory, practice and effectiveness of the impact assessment process in the world and at the same time pointing out the existing methods used in the EIA process;
- The summary of the EIA process in Slovakia in terms of practice of professionally qualified persons on the basis of a questionnaire survey, which also brought a new opinions on whether the current EIA is compliant, and what in terms of efficiency should be adapted in the current EIA process in the Slovak Republic;
- Analysis of the current state of risk analysis theory and review of risk analysis methods applicable in the EIA process;
- The proposal of the methodology for the EIA process: “*Methodology of the environmental impact assessment of flood protection objects*” using the method of multiparametric expression of risk, which may help to mitigate the negative impacts of proposed activities on the environment by choosing the optimal alternative of the activity.

The proposed methodology can be seen as an important scientific tool, which highlights the quality of the human environment for the further development of society. Other benefits of the work are listed below.

The proposed methodological procedure of environmental impact assessment of flood protection structures consists of:

- proposing indicators A–Z, which are related to the design of flood-protection structures;
- assigning a standardized weight to each of the indicators A–Z to determine their significance;
- calculating (based on the method of multiparametric expression of risk) an *average summation risk parameter ASRP<sub>j</sub>* and *average weighted summation risk parameter AWSRP<sub>j</sub>* assessed for each variant of the construction (flood protection structure), on the basis of which is determined the significance of the risk for the environment.

The proposed methodology assesses the magnitude of the impact on the environment of water structures and activities in the field of water management, according to the purposes of Slovakian Law no. 24/2006 Coll. (National Council of the Slovak Republic 2005) as amended, as well as the European Directive 2014/52/EU of the EIA (Official Journal of the European Union 2014). Similarly, they can be used to evaluate and prioritize risks in areas of the proposed activities.

The main **practical benefits** for EIA are the following. The output of the work—the methodology of impact assessment of water structures on human health and the environment—can be used by the staff of the *Ministry for the Environment* (Section of Environmental Assessment and Management, Department of Environmental Assessment); *District Environment Offices*, and also stakeholders involved in the EIA process. These are mainly *the professionally qualified persons* under the Ministry for the Environment who have professional competence for environmental impact assessment, then *the developers* and *the interested public*.

The application of the proposed methodological approach in terms of the study area along the stream Slatvinec in the village of Kružlov presents results of the assessment in a comparative way, based on graphical-analytical processing of the conclusions of the evaluation of impacts of different flood-protection structures on the environment.

The results of the work will contribute to increasing the effectiveness of the EIA process in practice, not only in Slovakia but also in Europe and worldwide.

## 4.2 Recommendations for Future Research

During the processing of this study, we have encountered many and various suggestions for further research and development in the area of EIA. This section identifies possible future research, continuing the work presented in this book.

To complete the functional purpose of the environmental impact assessment process, it is necessary to focus attention on the development, updating and publishing of different methodologies for assessing impacts of various proposed activities that would enable better and more objective evaluation of environmental impacts. It may be advisable therefore to investigate:

- Application of other methods of risk analysis in the EIA process and the creation of methodologies for different areas and different types of proposed activities;
- Preparation of a terminological dictionary of technical expressions for the purposes of risk-analysis application in environmental impact assessment;
- Development of new techniques and methodologies, such as:
  - proposal of a methodology of process management using a comprehensive modeling and evaluation tool and appropriate information technology to support the acceleration and automation of the process of environmental impact assessment;

- development of legislation for integrated environmental-health-safety assessment;
- development of a methodology for assessing impacts on Natura 2000 sites and methodologies for assessing impacts on habitats;
- proposal of a methodology for assessing the health risks of noise pollution in the environment;
- creation of a control mechanism for project monitoring;
- preparation of guidelines for the selection of suitable variants (optimal variant) in the process of environmental impact assessment of proposed activities in the form, e.g., “A catalogue of the variants of the proposed activities”.

In general, for the existing as well as for the proposed methodologies, some enhancements can be recommended that include:

- Using information technology and software: for complex modeling integrating different modeling standards (e.g., modeling at the level of strategy, objectives, risks, and processes); for statistical evaluation and subsequent prediction of the impacts of activities on the environment;
- Using geographic-information systems for predicting and evaluating the impacts of alternatives of proposed activities.

These proposals can contribute to objectification, standardization and improvement of efficiency of the EIA process. All these areas would contribute to the expansion of scientific approaches in environmental impact assessment.

## References

- National Council of the Slovak Republic (2005) Act of Law No. 24/2006 from December 14th 2005 on Environmental Impact Assessment and on amendments to certain acts
- Official Journal of the European Union (2014) Directive 2014/52/EU of the European Parliament and of the Council of 16 April 2014 amending Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment. Text with EEA relevance
- Zvijáková L (2011) Environmental impact assessment and risk analysis. In: Ph.D. seminar 2011 of Building and Environmental Institute: 3rd seminar: Proceeding of scientific works. 9–10 February 2011, TU, Košice