

Environmental Disaster Risks Identification in Arda River Basin, Bulgaria

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1. Introduction

The target area of research – Arda river basin, Bulgaria, is much affected by nature disaster risk events like heavy rainfalls, snow thawing, hail etc., as a consequence of which floods and soil erosion occur. Heavy metal pollution triggered by human activity and emission of harmful substances by wastewaters in nature environment comprises also a serious hazard with peril effects. Therefore, studying of these 3 phenomena and their effect on the society requires knowledge on the elements of social, eco and geosystem, their interdependencies and relations.

The implementation of methods for analyzing the structure and interactions between social, geo and ecosystem provides valuable information for better understanding the essence of disaster risk and its impact on the society. Such a tool is the ISM ? Interpretive Structuring Method that is to synthesize and exhibit the components of different systems and their relationships.

2. Implementation of ISM as a tool for studying disaster risk in Arda River Basin, Bulgaria

The proposed model constitutes a system consisting of 15 most important elements. Most of them represent economic sectors and infrastructure equipment several are related to eco and geosystem. Input elements are nature disaster risk, transport and communication and mineral resources, the output is the daily life of people, as it depends on the state of all these components.

ISM graph provides the following ordering of elements and relationships:

On the 1st level, nature disaster risk is the most important input element. On the 2nd level, transport and communication, mineral

resources and water utilization system are located. At the 3rd level stay industry, floods, mining and metallurgy. The 4th level consists fo deforestation, soil erosion and heavy metal pollution. Next, 5th level, depicts environmental disaster risk, flora and fauna. 6th level is formed by tourism and agriculture that secure most of the incomes of the local people and appear to have the strongest input on daily life. Thus, the output of the system appears to be daily life that determines the wealth, quality of life and problems of the people and potential conflicts that may evolve.

3 chains of mutually dependent elements are formed: the 1st starts from industry and shows its negative impact that finally affects the tourism; the 2nd starts from nature disaster risk and reveals its consequences over the agriculture; and the 3rd chain depicts the effect of mining and metallurgy also concentrated over agriculture. Application of this graph as a final product of ISM analysis not only visualizes the interactions of components and their behavior, but also provides valuable insight of how to approach and what method to apply when studying disaster risk in Arda River Basin, Bulgaria.

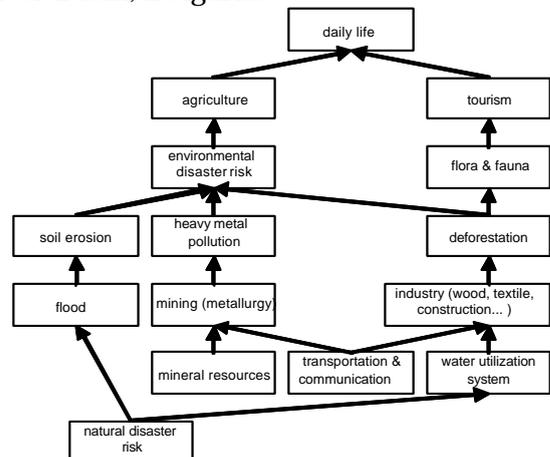


Fig. 1. ISM Analysis Graph