In: Morel, B. and Linkov, I. eds. (2006) "Environmental Security and Environmental Management: The Role of Risk Assessment", Springer.

COOPERATIVE NETWORKS FOR ENVIRONMENTAL RISK ANALYSIS STUDIES: THE CASE OF THE MIDDLE EAST REGION

MOHAMMED K. ZAIDI
Radiological and Environmental Sciences Laboratory (RESL)
US Department of Energy, Idaho Operations Office
1955 Fremont Avenue, Idaho Falls, Idaho, USA.

JACQUES GANOULIS
UNESCO Chair for Water,
Laboratory of Hydraulics, Department of Civil Engineering,
Aristotle University of Thessaloniki, 54124 Thessaloniki, Greece

Abstract

The role of regional networks for applying Environmental Risk Analysis (ERA) in order to promote environmental and human security is analysed in this paper. These networks should be based on national and regional approaches, multidisciplinary view, financing strategy, training policy for specialists and technicians according to the specific need and social policy for information, prevention and sensitization of citizens. The case of a specific network to be developed in the Middle East is further discussed.
Keywords: risk assessment, environmental security, pollution and emergency preparedness.

1. Introduction

In public health, Risk Assessment (RA) is a process aiming to analyse different hazards that may induce risks to human health following exposure to a particular substance [1]. RA of health effects depends on the purpose and scope of available information (data) used in assessing the situation. Some assessments conducted are to look at the impact after an accident has happened and some done before to identify hazards, estimating exposure and potential health dangers and characterize or describing the risk. A more general definition for RA: may be applied not only to health effects but also to environmental, ecological and technical risk problems based on a trans-disciplinary approach [2,3,4]. According to this definition, RA is a complex scientific domain involving different disciplines (e.g. physics, chemistry, toxicology, engineering, law, economy, sociology and political sciences) and inter-disciplines (e.g. ecology and environmental sciences) and addresses difficult technical, economic, environmental and social problems.

In: Morel, B. and Linkov, I. eds. (2006) "Environmental Security and Environmental Management: The Role of Risk Assessment", Springer.

In order to effectively apply ERA methods and tools for resolving complex regional and national problems in ERA regional networks of institutions and specialists may play a major role. A strategy for developing sustainable cooperative networks should include: a multidisciplinary view for environmental protection, financing, training policy for specialists and technicians, preventive action for protection and sensitization of the public, starting at the primary education level, according to the specific needs and social conventions for information dissemination. As the methodologies to evaluate and manage environmental and health issues should be adapted to particular regional problems, it is suggested to start by setting up an open information and network to develop and sustain cooperation in the region. Modern Information and Communication Technologies (ICTs) and the Internet should be intensively used in order to increase effectiveness and save available resources [5]. There is also the necessity to include a scale of measuring the usefulness of such a network. Selected topics of interest as well as the tools and methods to be used are further discussed in this paper.

It is important for the region that such a network should develop, maintain and share an objective information database. Given the regional character of the network it could be easier to ask and secure scientific and financial support from international organizations, such as UNESCO, UNEP, GEF, the World Bank, IWLEARN, EU, USAID, NATO etc. Methods and tools for developing such a network, selected topics of interest and the way to plan future action are further discussed below.

2. Methodology

On the issues of environmental security in the Middle East, it may pointed out that there is a large surplus water in certain places in the region such as Syria and Turkey while there is a great shortage of it at other locations such as Jordan and the Palestinian Occupied Territories [6,7]. It is brought to the attention of all that there will be a great stress on water supplies, independent of climate change, by the year 2025 [8].

To face this situation, it was suggested [9] to address the challenges of water resource management quantity and quality by considering not only technical and economic objectives (Fig. 1) but also environmental and social (Fig.2). Sustainable management of water resources may be achieved by applying Dublin principles [10], i.e. the:

- *Ecological Principle* is based upon river basin management, multi-sectoral management of agricultural, industry, and households, and the idea that land and water must be managed together.
- *Institutional Principle* encompasses all stakeholders, state, private sector and civil society, and requires that they must be involved in the management using the principle of subsidiarity or action at the lowest level.
- *Instrument Principle* uses economic mechanisms to improve allocation, enhance quality and adopt pricing policies.

In: Morel, B. and Linkov, I. eds. (2006) "Environmental Security and Environmental Management: The Role of Risk Assessment", Springer.

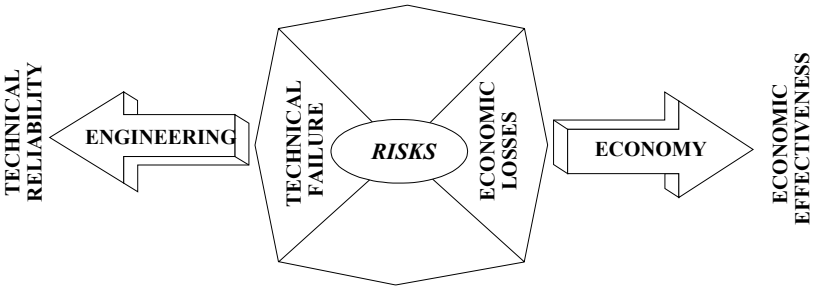

Figure 1: Technical and economic objectives.

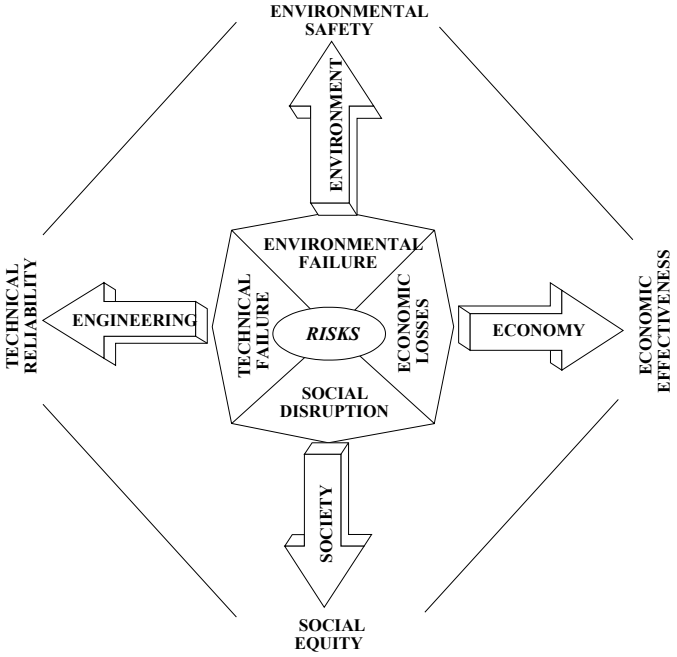

Figure 2: Technical, economic, environmental and social objectives.

Irregardless of the approaches agreed upon, public opinion needs to be managed and the age old stereotypes of "us against them" must be overcome with the realization that there will be pros and cons from both sides of the issues. It was stated that most of the time the public does not share or agrees upon common goals, nor do they collectively have the goodwill and spirit to get such a job done [11]. Therefore politicians, elected representatives and policy makers, must come forth in a leadership role to take credit for a policy to allow professionals to conduct research and provide background knowledge, technical data and pertinent information to administrators in order to provide solutions to create a lasting outcome for the recipient public.

The Mediterranean Region will be the local region – the Middle-East (ME), Inter-regional Middle-East and North Africa (MENA), South Eastern Europe (SEE) and Balkans. The countries involves will be Cypress, Egypt, Israel, Jordan, Lebanon, Palestine, Syria and Turkey. As it is a multi-national group, so different languages, customs and way of life play an important part in decision-making. The consequences of wars have created a sense of mistrust, worthiness and a potential conflict in the use of international waters. The existing institutional structure is also very weak and depends or dominated by external international politics and pressure put on participating countries on decision-making.

While considering water management and environmental protection – we discussed the water supply alternatives, demand, sharing international waters, water recycling and use, waste water treatment and disposal, desalination, coastal waters, ecology, water quality. This area is ecologically very sensitive, semi-arid and arid region of the World. Rapid changes in the demand of water and food may occur in this region and may be among the first victims of global climate change [12]

Air pollution from industry and transporting of soil contaminants is a major cause to deter water quality and may be a cause risk to public health [13]. As an example, the risk assessment was conducted of the remains of the destroyed reactor (Chornobyl April 1986 accident) and its surrounding shelters, radioactive waste storage and disposal sites, and environmental contamination in the region. They also discussed other risks posed – such as collapse of the shelter, radionuclides migration from storage and disposal facilities, transfer from soil to vegetation and its potential regional impact [14].

It is suggested to develop a sustainable cooperative network for application of ERA in the Middle East. The core group to manage this website will be the ARW scientists and made available to local Non-government Organizations (NGO), administrators, end users, research institutions, public representative, law makers and ministers. It will have three major components:

1. *Information Network* (IN): will be mapping existing information/data, analysis of data reliability, monitoring networks, guidelines/standards, sharing data, internet e-networking, education, training, capacity building, exchange publications, paper, reports etc., etc. The needed information will be collected (IC) here in the IN,

2. *Knowledge Network* (KN): will formulate the problem, prepare the model, analyze case studies using past experience, develop tool boxes, conduct workshops,

seminars, exchange experience, and learn from traditional techniques, identify gaps in knowledge, do comparative analysis and apply best practices,

3. *Practice Network*: will need to find out financing and look for sponsors, involve the decision makers, address public opinion, communicate knowledge/information to the media, public through publications, handouts and brochures etc.

3. Conclusion

Any national Risk Assessment related policy should be based on national and regional approaches. This may increase transboundary cooperation at the local level. As proposed, effective institutional arrangements and networking for environmental management, may create sustainable use of water resources, encourage development of local economies, promote stability and peace, harmonize legislation, guidelines, and methodologies, and attract international support and funding. The technical, economic, environmental and social objectives of region will be meet.

Acknowledgement: This work was developed at the NATO-ARW – "The role of risk assessment in environmental security and emergency preparedness in the Mediterranean Region" held in Eilat, Israel during April 15-18, 2004. The authors wish to thank the organizing committee for the financial support provided to attain the meeting

4. References

1. U.S. Environmental Protection Agency (USEPA) (1984) Risk Assessment and Management: Framework for Decision Making, EPA 600/9-85-002, Washington, DC: U.S. December 1984.
2. U.S. Environmental Protection Agency (USEPA) (1998) Guidelines for Ecological Risk Assessment. Federal Register 63: 26846-26924, 14 May 1998.
3. Duckstein, L. and E.Plate (eds.) (1987) Engineering Reliability and Risk in Water Resources, E.M. Nijhoff, Dordrecht, The Netherlands, 565 pp.
4. Ganoulis, J. (1994) Engineering Risk Analysis of Water Pollution: Probabilities and Fuzzy Sets. WILEY-VCH, Weinheim, Oxford, NY, 306 pp.
5. Ganoulis, J., I. L. Murphy and M. Brilly (eds.) (2000) Transboundary Water Resources in the Balkans: Initiating a Sustainable Co-operative Network**,** NATO ASI SERIES, Partnership Sub-Series 2: Environmental Security, Vol. 47, Kluwer Academic, Dodrecht, Boston, London, 254 pp**.**
6. Amery H.A, Wolf A.T. (2000). Water in Middle East: geography of peace, Austin, TX.
7. Bellissari A. (1994). Public health and water crisis in occupied Palestinian Territories. J.Palestinian Studies 23 (2). 52-63

8. Robert T. Watson RT. (1996). Implications of Climate Variability and Human-Induced Climate Change for Water Resource Management, ESSD, World Bank. Inter-governmental Panel on Climate Change.
9. Ganoulis, J. (2004) Integrated Risk Analysis for Sustainable Water Resources Management In: Comparative Risk Assessment and Environmental Decision Making, 275-285, NATO Science Series, Kluwer Academic, The Netherlands.
10. Water Engineering and Research in a Learning Society. (2003). Proceeding - 30th Biennial World Congress of the IAHR, Thessaloniki, Greece.
11. Homer-Dixon HF. (1991). On the threshold: environmental changes as causes of acute conflict. Int. Security 16 (2). 76-116.
12. Tal A, Linkov I. (2004). The role of comparative risk assessment in addressing environmental security in the Middle East. *Risk Analysis,* In Press
13. Israel Ministry of Environment. (2003). Risk assessment for air pollution in Tel Aviv – Ashdod area, 1995-99, Jerusalem
14. Vargo GJ. (2000). The Chornobyl Accident: A comprehensive risk assessment. 2004 Books from Battelle.