

Environmental crisis management through risk management

MARIANA CIOBANU, MIRELA MAZILU

Faculty of Engineering and Environmental Protection

University of Craiova

Calugareni 1, Drobeta Turnu Severin

ROMANIA

maryana_ciobanu@yahoo.com, mirelamazilu2004@yahoo.com

Abstract: - Under the conditions of modern society, whose rapidity, in unrolling of events and processes has become one of its characteristics, establishing and promoting measures for warning and administrating crisis represents a complex of measures which are necessary for finding solutions to extraordinary events.

Environmental management, as a process, implies planning and adoption of measures needed to bring the crisis situation under the control of those who administrate it and allow them through their action, to stop their future evolution.

In conclusion, crisis administration can be defined as a leadership process of human and social action for preventing and solving crisis situation, by adopting adequate measures and efficient use of necessary strategies and instruments.

Key-Words: - risk management, crisis management, environmental crisis

1 Introduction

The final decade of the 20th Century has brought back in forefront an old sociological concept – the crisis. A crisis is defined as a period in a system's dynamic during in which the conspicuous accumulation of difficulties and the conflictual outbreak of strains make difficult its normal run. There are some powerful pressures for change. Another concept developed in the last years is the crisis management - usually described as a reactive activity directed to the scaling problems. An efficient and comprehensive crisis management implies cooperation and dialogue relations between involved actors, especially in recognition the need for a strategic approach of the crisis situation.

The analysis of the current and future risks which can generate calamities and catastrophes, but also true crises of geopolitical and geostrategic dimensions, takes into account any kind of threats, but also the specific ones of the new millennium beginning.

New techniques of control and removal of risks and vulnerabilities are subject to the scientific debate, as well as an accurate management system, in close correlation with the main characterisation parameters and the description of disasters. From the analysed perspective, the training of the societies to cope with the extreme natural disasters is different, aspects like education, culture, tradition and customs, infrastructure, state organisation etc.

raise specific problems and varied complexities in the management of the various crises.

According to some experts, the increase of the vulnerability of the human society towards the natural catastrophes is due to not only the modification of the manifestation manner of the phenomena, but also to some anthrop causes, like the increase of the population, the social inequality, the militarization and the politicization of the economic help, the accumulation of economic capital in the areas affected by hazards, etc.

There are more factors which render regions and people vulnerable to the natural disasters. The increasing communities of people and infrastructure in vulnerable areas like the coast line, the floodable fields and the unstable slopes are reasons which lead to the affection of a large number of persons and economic activities. Although the poor countries are the most vulnerable, each country has categories of people and certain communities (especially the poor ones, the women and the ethnic communities) which have a lot to suffer during a catastrophe and after it. For the poor countries and the poor people, the damages caused by a disaster represent a disproportional percentage between incomes and resources. The errors in setting the development priorities and the burden of the large debts may increase the disaster and negatively influence the rehabilitation efforts, impeding even more the process of development.

At a world level, the two main social tendencies of the last decades made us more vulnerable to the natural dangers: the migration of the population towards the coast areas and the town and the fantastic expansion of the built surfaces.

A disproportional number of the poor all over the world lives in the areas which are more exposed to disasters. While the surface and the density of the urban population grow, the potential damages are also bigger.

In many of the developing countries, the urbanisation means dangers as well. Almost half of the population of the big cities from the developing countries lives in illegal colonies, because there are no building permits, located most of the times in vulnerable places: floodable fields, hills or even dumpsters. These poor communities do not usually benefit from public services like, for instance, the water supply, the sanitary systems and the networks of the economy, and can be pushed to the edge when the catastrophe strikes.

2 Problem Formulation

Three elements are common to most definitions of crisis:

- a threat to the environmental,
- the element of surprise, and
- a short decision time.

Venette argues that "crisis is a process of transformation where the old system can no longer be maintained." Therefore the fourth defining quality is the need for change. If change is not needed, the event could more accurately be described as a failure or incident.

Risk management is the identification, assessment, and prioritization of risks followed by coordinated and economical application of resources to minimize, monitor, and control the probability and/or impact of unfortunate events or to maximize the realization of opportunities.

In ideal risk management, a prioritization process is followed whereby the risks with the greatest loss and the greatest probability of occurring are handled first, and risks with lower probability of occurrence and lower loss are handled in descending order. In practice the process can be very difficult, and balancing between risks with a high probability of occurrence but lower loss versus a risk with high loss but lower probability of occurrence can often be mishandled.

Crisis management consists of:

- Methods used to respond to both the reality and perception of crises.
- Establishing metrics to define what scenarios constitute a crisis and should consequently trigger the necessary response mechanisms.
- Communication that occurs within the response phase of emergency management scenarios.

In contrast to risk management, which involves assessing potential threats and finding the best ways to avoid those threats, crisis management involves dealing with threats after they have occurred. It is a discipline within the broader context of management consisting of skills and techniques required to identify, assess, understand, and cope with a serious situation.

For the most part, these methods consist of the following elements, performed, more or less, in the following order.

- identify, characterize, and assess threats
- assess the vulnerability of critical assets to specific threats
- determine the risk (i.e. the expected consequences of specific types of attacks on specific assets)
- identify ways to reduce those risks
- prioritize risk reduction measures based on a strategy

The International Organization for Standardization (ISO) identifies the following principles of risk management:

Risk management should:

- create value
- be an integral part of organizational processes
- be part of decision making
- explicitly address uncertainty and assumptions
- be systematic and structured
- be based on the best available information
- be tailorable
- take into account human factors
- be transparent and inclusive
- be dynamic, iterative and responsive to change
- be capable of continual improvement and enhancement

Crisis is also a facet of risk management, although it is probably untrue to say that Crisis Management represents a failure of Risk Management since it will never be possible to

totally mitigate the chances of catastrophes occurring.

During the crisis management process, it is important to identify types of crises in that different crises necessitate the use of different crisis management strategies

Natural crises, typically natural disasters considered as 'acts of God,' are such environmental phenomena as earthquakes, volcanic eruptions, tornadoes and hurricanes, floods, landslides, tsunamis, storms, and droughts that threaten life, property, and the environment itself.

Example: 2011 Tsunami Japan

3 Problem Solution

Gonzalez-Herrero and Pratt found the different phases of Crisis Management.

There are 3 phases in any Crisis Management are as below

- The diagnosis of the impending trouble or the danger signals.
- Choosing appropriate Turnaround Strategy.
- Implementation of the change process and its monitoring.

According to the standard ISO 31000 "Risk management - Principles and guidelines on implementation," the process of risk management consists of several steps as follows:

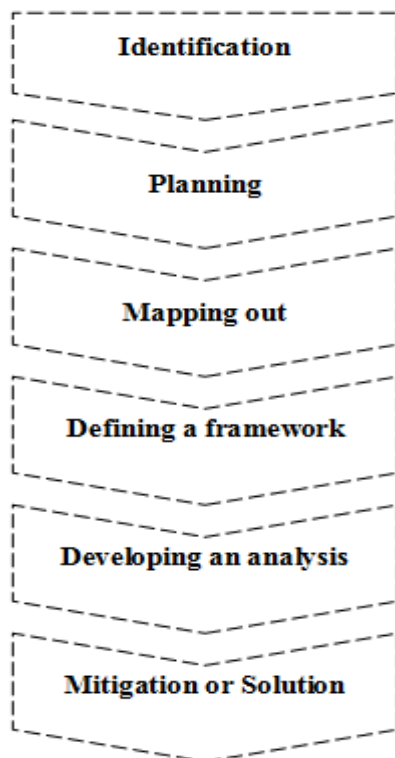


Fig 1. The process of risk management

Establishing the context involves:

- **Identification** of risk in a selected domain of interest
- **Planning** the remainder of the process.
- **Mapping out** the following:
 - the social scope of risk management
 - the identity and objectives of stakeholders
 - the basis upon which risks will be evaluated, constraints.
- **Defining a framework** for the activity and an agenda for identification.
- **Developing an analysis** of risks involved in the process.
- **Mitigation or Solution** of risks using available technological, human and organizational resources.

After establishing the context, the next step in the process of managing risk is to identify potential risks. Risks are about events that, when triggered, cause problems. Hence, risk identification can start with the source of problems, or with the problem itself.

Once risks have been identified, they must then be assessed as to their potential severity of impact (generally a negative impact, such as damage or loss) and to the probability of occurrence.

Thus, there have been several theories and attempts to quantify risks. Numerous different risk formulae exist, but perhaps the most widely accepted formula for risk quantification is:

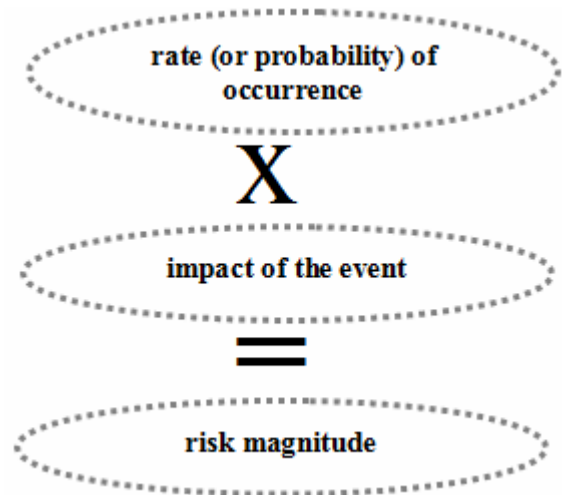


Fig.2 Formula for risk quantification

Rate (or probability) of occurrence x impact of the event = risk magnitude

The above formula can also be re-written in terms of a Composite Risk Index, as follows:

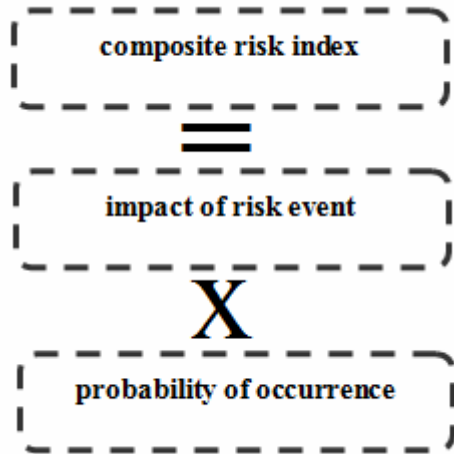


Fig 3. Composite Risk Index

Composite Risk Index = Impact of Risk event x Probability of Occurrence

The impact of the risk event is commonly assessed on a scale of 1 to 5, where 1 and 5 represent the minimum and maximum possible impact of an occurrence of a risk . However, the 1 to 5 scale can be arbitrary and need not be on a linear scale.

In figure 4 are presented the factors that influence risk management.

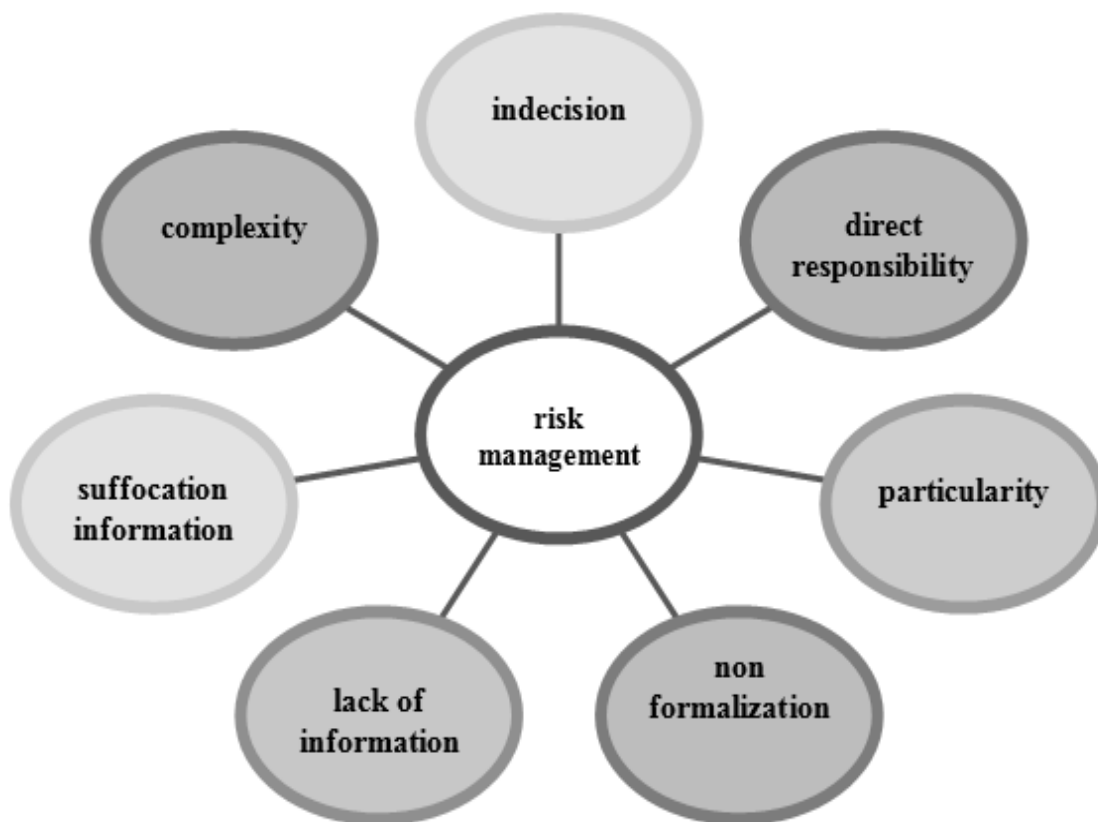


Fig 4. Factors affecting risk management

4 Conclusion

Hazard prevention refers to the prevention of risks in an emergency. The first and most effective stage of hazard prevention is the elimination of hazards. If this takes too long, is too costly, or is otherwise impractical, the second stage is mitigation.

The time has come to use the nature’s engineering tactics instead of counting on the constructions engineering, using the services

offered by the healthy and renewable ecosystems. The increase of the safety degree of the communities must not mean high technologies or costs. The active involvement of the members of a community is essential in the planning and the application of all kinds of measurements for the reduction of the impact of calamities and for the rehabilitation of the affected area.

References:

1. M. Ciobanu, M. Mazilu, S. Mitroi , M V.

- Ciobanu, “*The quality management in general and the environment management: a natural relationship*”, WSEAS International Conferences, Prague, Czech Republic, March 2008.
2. M. Mazilu, M. Ciobanu „*A new challenge in the current economic system: environment*”, WSEAS International Conferences, Prague, Czech Republic, March 2008.
 3. M. Ciobanu, M. Mazilu, S. Mitroi , M V. Ciobanu, “ *The Environment Management Versus The Quality Management* ”, INTERNATIONAL JOURNAL of ENERGY and ENVIRONMENT, ISSN: 1109-9577, 2008, <http://www.naun.org/journals/energyenvironment/>
 4. M. Mazilu, M. Ciobanu, „*Binomial Inseparable Environmental Economics*”, INTERNATIONAL JOURNAL of ENERGY and ENVIRONMENT, ISSN: 1109-9577, 2008, <http://www.naun.org/journals/energyenvironment/>
 5. Ciobanu M., Ciobanu M., Mazilu M., *Global warming, decisive factor of uniformity seasons*, published in vol. Abstract Book, Global Conference on Global Warming 2008, organised by The Scientific and Technological research Council of Turkey, 6th – 10th July 2008, Istanbul, Turkey, ISBN 978-605-89885-0-7, pg. 131 and in vol. Conference Proceedings, pg. 1073-1083, ISBN 978-605-89885-0-7, www.gcgw.org, www.gcgw.org/Abstract-book-GCGW08.pdf
 6. Ciobanu Mariana, Ciobanu V. Marius “*Ecologic crisis situation management*”, INCD ECOIND International Symposium “The Environment and Industry” – Simi 2007 – Bucharest, oct. 2007, ISBN: 1843-5831, P 391 – 395.
 7. Mazilu M., Ciobanu M., *The Impact of European Integration on the national environment on quality*, article published in Proceedings of XXI International Serbian Symposium on Mineral Mining, ISBN 978-86-80987-63-7, COBISS.SR-ID 152797196, pg.244-249, University of Belgrade, 2008.
 8. Alexandra SARCINSCHI, *Crizele și managementul crizei. Abordare geopolitică*, IMPACT STRATEGIC nr. 1-2/2003, pg. 65
 9. M. Mazilu, M. Ciobanu “*Deliberative Democracy Stablishment In Environmental Policies - Alternatives For The Environmental Conflict Resolution*”, Journal of Environmental Science and Engineering, ISSN 1934-8932, USA Apr. 2010, volum 4, no.4, serial no.29, p.77-84.
 10. M. Ciobanu, M.A. Diminescu, M. Mazilu , „*The Study Of The Environment Quality In The Mehedinti County – Heavy Metals, Sediments And Particulates*” The Seventh International Congress in Materials Science and Engineering, Iasi, ROMANIA, Mai 28—31, 2009, ISSN: 1453 – 1690
 11. Seeger, M. W.; Sellnow, T. L., & Ulmer, R. R. (1998). "Communication, organization and crisis". *Communication Yearbook* 21: 231–275.
 12. Venette, S. J. , *Risk communication in a High Reliability Organization: APHIS PPQ's inclusion of risk in decision making*. Ann Arbor, MI: UMI Proquest Information and Learning, 2003.
 13. http://en.wikipedia.org/wiki/Risk_Management
 14. http://en.wikipedia.org/wiki/Crisis_management