

Annex 2

Risk Management and Vulnerability framework of analysis: a shared glossary

Water risk management can be defined as the systematic process of using administrative decisions, organization, operational skills and capacities to implement policies, strategies and coping capacities of the society and communities, in order to lessen the impacts of natural hazards and related environmental and technological disasters. Such an approach encompasses a multi-phases cycle of a wide array of systematic actions, including structural and non-structural measures to avoid (prevention) or to limit (mitigation and preparedness) adverse effects of hazards.

The delicate and actual “crossroad” between environmental risk and public management can be better defined with the support on the socioeconomic vulnerability framework of analysis on which we will be focusing in this section. Socioeconomic vulnerability assessment is a conceptual framework of analysis aiming at determining through an ex ante perspective the susceptibility of a unit of analysis towards a specific phenomenon (e.g. poverty, environmental disaster etc.). It helps in understanding that even whether shocks and risky events can be seen as ‘exogenous’ variables, not directly under the control of people, vulnerability is the endogenous part to the story and can be reduced by means of strategies and activities which can be taken locally to manage or reduce ex-ante risks. Analysing deeply the exogenous side of the framework a conceptual underpinning of the variables of *hazard* and *shock* is now required.

- **Hazard** is “*the threat of a potentially damaging physical event, phenomenon or human activity that may cause the loss of life or injury, property damage, social and economic disruption or environmental degradation¹*”. The concept of *hazard* include latent conditions that may represent future threats and can have different origins: natural (geological, hydrometeorological and biological) or induced by human processes (environmental degradation and technological hazards). Hazards can be single, sequential or combined in their origin and effects. Each hazard is characterised by its location, intensity, frequency and probability.
- The negative impact – the **disaster** or shock– is “a serious disruption of the functioning of a community or a society causing widespread human, material, economic or environmental losses which exceed the ability of the affected community or society to cope using its own resources²”, depending on the characteristics, probability and intensity of the hazard, as well as on the susceptibility of the exposed elements based on physical, social, economic and environmental conditions.

¹UNISDR (2004). **Terminology of disaster reduction Section**. <http://www.unisdr.org/isdrindex.htm>

² *ibidem*

- As seen above, however the recognition of vulnerability as a key element in the risk notation has also been accompanied by a growing interest for **endogenous variables**, such as the positive capacities of people to cope with the impact of hazards. In this sense the analytical tool of "**resilience**" of the unit of analysis has been introduced, referring to "*the capacity of a system, community or society potentially exposed to hazards to adapt, by resisting or changing in order to reach and maintain an acceptable level of functioning and structure*".³ Resilience is determined by the degree to which the social system is capable of organizing itself to increase its capacity for learning from past disasters for better future protection and to improve risk reduction measures".
- Strictly connected to the analytical tool of resilience is the assessment of **coping capacities** of the unit of analysis. By coping we intend all those measures "by which people or organizations use available resources and abilities to face adverse consequences that could lead to a disaster". *In general, this involves managing resources, both in normal times as well as during crises or adverse conditions. The strengthening of coping capacities usually builds resilience to withstand the effects of natural and human-induced hazards.*

Reconducting this theoretical framework to the more specific case of vulnerability to environmental disasters, key aspects include the extent of natural resource depletion and the state of resource degradation. In the same vein, a lack of resilience within ecological systems and exposure to toxic and hazardous pollutants are important elements that shape environmental vulnerability. A reduced access to clean air, safe water and sanitation and inappropriate forms of waste water management, especially in densely populated and urban environments can deepen levels of socio-economic vulnerability. Increasingly vulnerable environmental conditions such as growing water scarcity can easily threaten food security for people dependent on the products of the land, forests, pastures, and marine environments for their livelihoods. A polluted environment also increases people's exposure to health risks. As natural resources become more scarce the range of options available to communities becomes more limited, reducing the availability of coping solutions and decreasing local resilience to hazards or recovery following a disaster. Over a period of time environmental factors can increase vulnerability further by creating new and undesirable patterns of social discord, economic destitution and eventually forced migration of entire communities.

Incorporating endogenous and exogenous variables, a disaster can be defined as an event whose consequences in terms of damage exceed the effective resilience and coping capacity of the socio-economic system as a whole, intended as the means by which people or organizations use available resources and abilities to face adverse consequences of a shock. *In general, this involves managing resources, both in normal times as well as during crises or*

³ibidem

adverse conditions. The strengthening of coping capacities usually builds resilience to withstand the effects of natural and human-induced hazards, which brings to the logical that the magnitude of a disaster is strictly related to the specificity of the hurted society.

More in detail the ex ante measures of risk management can be divided into two broad categories of Prevention and **Preparedness**.

- **Prevention refers to all those activities concurring** in avoiding adverse impact of hazards and to all those means which can contribute to minimizing related environmental, technological and biological disasters. Prevention is a delicate field of action of risk management, requiring *careful cost/benefit considerations and punctual investments whose implementation can be justified according to the magnitude of risk and hazards and the frequency of disasters. Prevention however also affects the context of public awareness and education, with great potentialities in changing attitudes and behaviour for a more diffused "culture of prevention".*
- **Preparedness**, slightly differently from prevention, refers to activities and measures taken in advance to ensure ex ante effective responses ex post to the impact of disasters, including the issuance of timely and effective early warnings and the temporary evacuation of people and property from threatened locations.

Concrete field of actions of vulnerability reduction (preparation + preparedness) in the risk management cycle are⁴ :

- *Risk awareness and assessment including hazard analysis and vulnerability/capacity analysis;*
- *Knowledge development including education, training, research and information in order to strengthen endogenous resilience;*
- *Public commitment and institutional frameworks, including organisational, policy, legislation and community action;*
- *Application of measures including environmental management, land-use and urban planning, protection of critical facilities, application of science and technology, partnership and networking, and financial instruments;*

Early warning systems including forecasting, dissemination of warnings, preparedness measures and reaction capacities.

⁴ ISDR (2002.) *Living with Risk: a global review of disaster reduction initiatives*"