

Chapter 2

Characteristics of Risks in the Modern World

2.1 New Challenges to Risk Governance

A number of driving forces have been identified that are shaping our modern world and have a strong influence on the risks we face (cf. OECD 2003a:10 ff.): The *demographic development*, including the increase of the world population, the growing population density and visible trends towards urbanisation accompanied by significant changes in the age structure of most industrial populations have lead to more vulnerabilities and interactions among natural, technological and habitual hazards. Demographic changes are also partially responsible for the strong interventions of human beings into the natural environment. Human activities, first of all the emission of greenhouse gases, may cause global warming and, as a consequence, place growing stress on ecosystems and human settlements. In addition, the likelihood of extreme weather events increases with the rise of average world temperatures. Furthermore, these trends towards ubiquitous transformation of natural habitats for human purposes are linked to the effects of economic and cultural *globalization*: The exponential increase in international transport and trade, the emergence of world-wide production systems, the dependence on global competitiveness and the opportunities for universal information exchange testify to these changes and challenges. In terms of risks, these trends create a close web of interdependencies and coupled systems by which small perturbations have the potential to proliferate through all the more or less tightly coupled systems and cause significant damage.

The development of globalization is closely linked to *technological change*. The technological development of the last decades has led to a reduction of individual risk, i.e. the probability to be negatively affected by a disaster or a health threat, yet increased the vulnerability of many societies or groups in society. Among the characteristics of this technological development are the tight coupling of technologies with critical infrastructure, the speed of change and the pervasiveness of technological interventions into the life-world of human beings, all aspects that

have been described as potential sources of catastrophic disasters (cf. Perrow 1992; von Gleich et al. 2004).

In addition to the technological changes, *socioeconomic structures* have experienced basic transitions as well. In the last two decades efforts to deregulate the economy, privatise public services and reform regulatory systems have changed the government's role in relation to the private sector which had major repercussions on the procedures and institutional arrangements for risk assessment and risk management. Attitudes and policies are increasingly influenced by international bodies with conflicting interests and increasingly by the mass media.

These basic developments have induced a number of consequences:

- An increase of catastrophic potential and a decrease of individual risk, associated with an increased vulnerability of large groups of the world population with respect to technological, social and natural risks
- An increase in (cognitive) uncertainty due to the growing interconnectedness and the fast global changes
- An increased uncertainty about a change in frequency and intensity of natural hazards due to global change
- Strong links between physical, social and economic risks due to the interconnectedness of these systems
- An exponential increase in payments by insurances for compensating victims of natural catastrophes
- The emergence of “new” social risks (terrorism, disenchantment, mobbing, stress, isolation, depression)
- An increased importance of symbolic connotations of risks, and thus a high potential for social amplification and attenuation of risks. Social amplification of risk describes an amplification of the seriousness of a risk event caused by public concern about the risk or an activity contributing to the risk (Jaeger et al. 2001:171)

2.2 The Emergence of Systemic Risks

These recent trends and consequences of risks to society have led to the creation of a new risk concept – the concept of *emerging systemic risks*. These are risks “that affect the systems on which the society depends – health, transport, environment, telecommunications, etc.” (OECD 2003a:9). Systemic risk denotes the embeddedness of risks to human health and the environment in a larger context of social, financial and economic risks and opportunities. Systemic risks are at the crossroads between natural events (partially altered and amplified by human action such as the emission of greenhouse gases), economic, social and technological developments and policy driven actions, both at the domestic and the international level. These new interrelated risk fields also require a new form of risk analysis, in which data from different risk sources are either geographically or functionally integrated into

one analytical perspective. Investigating systemic risks goes beyond the usual agent-consequence analysis and focuses on interdependencies and spill-overs between risk clusters.

Systemic risks also face specific problems with respect to public perception and risk governance structures. Risk management and governance processes dealing with systemic risks suffer from a loss of credibility and trust; they are often driven by crisis and immediate often non-reflected management actions determined by public opinion. One major reason for this is that decision-making on risk often fails to successfully combine scientific expertise with careful consideration of the socio-cultural aspects of risk issues. Policy makers are often not aware or not willing to accept that risk relates to both the physically measurable outcomes (“facts”) and the socio-cultural attributions (“values”). Neither the solution that assumes that scientific knowledge determines political decisions, nor the opposite view that “all knowledge is created equal” provides a promising and reliable basis for prudent risk management.

Systemic risks have evolved from the increased vulnerabilities and interconnections between geographic areas as well as functional dependencies between the various sectors of society such as the physical world, the economy, the social relationships and the political cultures. The potential for systemic risks is likely to become augmented because of:

- Increase of population and population density
- Increase of population exposed to natural hazards and technological risks (dramatic increase in losses due to natural disasters over the last four decades, during the last decade natural hazard disasters have resulted annually in some 79,000 fatalities, with 200 million people affected) (OECD 2003a:14)
- Increased use of hazard-prone land for productive purposes (for example 40 of the 50 fastest growing urban centres in the world are located in earthquake-endangered areas) (Randall et al. 1996)
- Increased interdependencies between technical, social, and cultural hazards
- Expected increase of hazard intensity due to climate change and other human interventions into geo-chemical cycles (IPCC 2001)
- Changes in the social definition of what is being regarded as detrimental or hazardous (Renn and Rohrmann 2000)
- Growing diversity with respect to lifestyles and subcultures within societies (Beck 1992a)

At a time, when the disaster potential increases, the coping mechanisms of many societies appear to become less effective. Vulnerability is likely to increase due to:

- Speed of urbanization (probably two thirds of the world population will live in cities after 2020) (Jones and Kandel 1992)
- Insufficient speed in building infrastructure to cope with it (OECD 2003a:44)
- Coupling of independent risk sources
- Interaction of natural disasters with chemical, technological, lifestyle, and social risks (Perrow 1984; Renn 1997b)

- Increase of mobility and cultural de-rooting
- Loss of traditional management capabilities (WBGU 2000)
- Increase of social pressure and conflicts
- Lack of capacity for mitigation and contingency management, etc. (IFRC 2000)

Given these new challenges the world needs a concerted effort to deal with systemic risks. In particular new methodological as well as institutional solutions involving the different levels of risk governance at the local, national, international and global level are required as a means to provide adequate tools for limiting and managing those risks. Another more down to earth reason for such an integrated approach is the confusion of the public, because, on the one hand, the methodical approach for risk assessment is different for different technologies and, on the other hand, because the risks of the same technology are evaluated differently in different countries, by different interest groups and by different experts; even terms are used differently. A similar confusion exists with respect to the risk management processes themselves and for the policy styles, the regulation principles and the target values applied.

As a result of the emergence of systemic risks, new challenges for risk management, and risk governance have come up. Among the most pressing are:

- Finding more accurate and effective ways to characterize uncertainties in complex systems.
- Developing methods and approaches to investigate and manage the synergistic effects between natural, technological, and behavioural hazards.
- Integrating the natural and social science concepts of risks to deal with both physical hazards and social risk perceptions.
- Expanding risk management efforts to include global and transboundary consequences of events and human actions.

In Chap. 4 we will develop a framework that promises some solutions of how to deal with these challenges.



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