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## Preface

### 1. The governance of risk in a changing context

In recent centuries, the advances of science and technology have brought a degree of safety and comfort to masses of people, that would have seemed miraculous in earlier ages. For a time, it seemed that there were no limits to the achievements of science in these as in other spheres. In an era of progress and economic growth, scientific knowledge was claimed to be the basis of policy decisions on issues of technological and environmental risk.

However, such claim proves to be (at best) a prescriptive, rather than a descriptive one. Indeed science becomes more and more incapable to provide univocal interpretations and agreed upon practical recommendations when dealing with complex issues, which are characterised by uncertain facts, uncertain connections among occurring events and uncertain influences of human action on observed phenomena.

No doubt, most scientists and decision-makers themselves had never totally subscribed to the illusion of perfect knowledge and total certainty. Yet, while the dominant paradigm was one of unlimited scientific progress and continuing economic growth, the majority of them felt it legitimate to assume that science was the only source of acceptable knowledge for decision-making.

But in recent generations we have come to realise that the powers of science and science based technology can present new dangers of their own. At this beginning of the millennium, scientific expertise and representative democracy are both experiencing a credibility crisis, as the result of the new challenges posed by the technical, economic, and social processes of late-modernity [1]. Such credibility crisis does not merely impair the status of a few individual scientists and decision-makers; rather it concerns the whole organisation of the scientific endeavour, technological development and the overall structure of the policy decision process.

Citizens find it less and less satisfactory to delegate the assessment and the management of health and safety issues to restricted groups of experts, administrators and decision-makers. New forms of public participation are explored. Yet, at this stage, there are neither satisfactory models nor appropriate forums for the full realisation of an extended participatory democracy. Some minor adjustments in either or both the research system and the political institutions are deemed totally inadequate to meet the new challenges of the late-modernity. A substantial change in the style of governance is instead considered necessary and urgent.

The title of this special issue, “Risk and Governance”, puts together two terms that seem to belong to totally different fields of enquiry, apparently unrelated to one another. The former is the realm of scientists, technologists, regulators, experts in quantitative analyses, i.e. all those who are deemed competent to assess and manage risks. The latter is the sphere of

political science and sociology, dealing with different types of human aggregations and institutions, and the mechanisms of social stability and change. As defined by the Commission on Global Governance [2] “Governance is the sum of the many ways individuals and institutions, public and private, manage their common affairs. It is a continuing process through which conflicting or diverse interests may be accommodated and co-operative action may be taken. It includes formal institutions and regimes empowered to enforce compliance, as well as informal arrangements that people and institutions either have agreed to or perceive to be in their interest.”

Issues such as, for example, nuclear power, radioactive wastes, chemical accidents, toxic contamination, food safety, transgenic crops, natural hazards, and climate change show that the study of risks and their management cannot be separated from a reflection on governance. Because of the various sorts of uncertainty and value-commitments that enter into any decision and because of the socially unequal incidence of risks, the scientific side of the work must be complemented by other societal considerations.

In response to these challenges a willingness to incorporate societal concerns into the management of risks is emerging. Clearly, this is not enough. There is a need to take a step further and to recognise that the very analysis of risks is conditioned by social, historical, economic, institutional, and cultural contexts. Which risks are taken into account, how they are framed, what constitutes a solution are all matters which go beyond scientific enquiry [3].

## 2. The contents of this issue

In order to show how problems of risk and governance are strictly connected, I have invited a number of scholars and experts to address the subject, suggesting to include the following issues in the frame of their discussions. 1. How science (and what kind of science) can best contribute to the assessment and management of the different kinds of risks. 2. Which complementary expertise and skills are required. 3. Which new societal ‘arrangements’ are needed. 4. Which are the present trends in research and policy. 5. Which are possible future scenarios for risk assessment and management.

The result is a collection of thoughtful papers, which reflect upon different types of risks (ranging from earthquakes to nuclear power), addressed from different perspectives (disciplinary and geographic), offering new insights on the contextual aspects of risks and the instruments and skills necessary to manage them.

Jerry Ravetz opens this collection of essays with a broad theoretical reflection. He maintains that the present, widely recognised crisis in official scientific expertise, related to the increase of uncertainty and the loss of trust, results from structural features of the globalising knowledge economy, and the contradictory roles of governments. He substitutes ‘safety’ for ‘risk’ as the operative concept and uses paradox as an explanatory tool, to exhibit the contradictions in the situation. He suggests ways of resolving these, based on the perspective of ‘post-normal science’.

Paul Slovic develops the thesis that in the context of health, safety, and environmental decisions, the concept of risk involves value judgements that reflect much more than just the probability and consequences of the occurrence of an event. He conceptualizes the act of defining and assessing risk as a game, in which the rules must be socially negotiated within

the context of a specific problem. He maintains that the interested and affected parties should be allowed to define and play the game.

Paul Barnes points to the existence of contrasting risk perceptions between safety regulators and the public they serve. Dealing specifically with fire services, he shows how these are beginning to seek closer links with communities. In this attempt they are starting to delineate clear regulatory frameworks for conventional safety assessments and conceptual frameworks that allow a redefinition of their role towards establishing partnerships with communities to promote sustained safety.

Stephen Healy argues that the ways in which technical practices, knowledge and rationality have become structured into governance are counter-productive and now instrumental to the proliferation of risk and destabilisation of governance. He suggests the creation of processes integrating 'factual' technical and 'value-laden' societal concerns and explores avenues for their realisation. He calls for a democratisation of technical practices and elaborates on its political implications.

Andrew Stirling explores the contrasts between 'risk-based' and 'precautionary' approaches to the governance of risk, paying particular attention to the problems of intractable uncertainties and divergent values. He applies his analysis to the electricity sector and suggests approaches to the governance of energy risks that are at the same time scientifically rigorous and precautionary.

Martin O'Connor and Sybille van den Hove outline the potential for participative governance and risk management as applied to the nuclear sector. The unavoidable need to manage the inherited risks and uncertainties on large temporal and geographical scales is a novel feature of technology assessment and governance within the European Union. In their view, public consultation and deliberation improve the robustness of strategies dealing with high-stakes investment options and risk management challenges.

Taking the 1995 Kobe earthquake as a sample-case, Scira Menoni suggests that the simple conceptual pair 'hazardous event-damages' which is currently used in the analysis of disaster consequences, ought to be substituted by the idea of 'chain of losses and failures'. This should include physical parameters related to the built environment as well as organisational, social, and systemic factors, which are equally crucial for understanding disasters dynamics and planning for their mitigation.

Joseph Scanlon draws attention to the trans-national and international implications of environmental problems and discusses a possible role for the United Nations in sponsoring a police force for their prevention and management. To support his thesis he analyses four toxic accidents, and discusses the issue of acid rain. He argues that present unsatisfactory arrangements may lead some countries to act for a change. Not any country however, but those with economic and military power will have a possibility to succeed.

Carlos M. de Freitas and his colleagues discuss chemical safety in Brazil. By a series of case studies they illustrate how improvements in technical knowledge and expertise are only a partial response to the current situation, characterised by institutional vulnerability coupled with population vulnerability. The authors call for substantial societal changes favouring democracy, sustainability and equity as the basis for effective governance.

Juan Martinez Alier describes some historical and contemporary mining conflicts and discusses the international environmental liability of mining corporations. Comparisons are made with conflicts in the United States and in South Africa which fall under the rubric of

the Environmental Justice movement. Such conflicts are fought out in many languages, and the economic valuation of damages is only one of such possible languages.

In his paper, Howard Kunreuther proposes a strategy for the use of cost-effective risk mitigation measures coupled with insurance and/or new capital market instruments. The mix of these measures will depend on the governance structure and the institutional arrangements in a particular country. Two examples, one from the United States and the other from Honduras, illustrate differences between strategies that can be adopted.

Roger Strand deals with the issue of genetically modified organisms in agriculture as a highly complex and controversial one. He maintains that factual matters cannot be resolved by science alone. He suggests that traditional risk assessment is replaced by other forms of expert advice, including impact assessment and the evaluation of inherent forms of uncertainty and ignorance.

Luigi Pellizzoni addresses the same topic as Strand from a different perspective. He presents some results from sociological research in five European countries, using focus groups with lay people. He shows that public concerns are framed in the broad terms of the management and control of technological innovation and advocates a style of governance based on the principles of deliberative democracy.

Sylvie Faucheux and Christelle Hue discuss the renewed interest in Future studies, under the label of Foresight, with no claim to prediction, but as a strategic tool for improving interaction between key actors and for anticipatory policy making. They apply their analysis to environmental policy and sustainable development and show how foresight opens up the possibility of negotiating a more fruitful relationship between science and technology, on the one hand, and society on the other.

The last contribution is a brief account by Gilles Heriard Dubreuil of the conclusions of a European concerted action on risk governance. Based on the interdisciplinary analysis of eleven case studies, the project identifies the emergence of new co-operative processes of decision-making (mutual trust paradigm) in contexts where the traditional model of collective decision-making is meeting with difficulties. It is maintained that the adoption of co-operative decision-making requires profound changes in the mentality and the attitudes of all actors involved.

This collection of papers shows that there are a number of reasons why a debate on the relationship between science and governance is timely. The recent bovine spongiform encephalopathy (BSE) crisis in Europe has shown serious defects in the regulatory systems and remedies are being proposed, in order to protect people's health as well as restoring public trust. New modes of scientific advice, more open and transparent to public scrutiny, are being developed [4]. Also, public participation is sought for and encouraged in many risk-related areas, for both crisis prevention and management [5].

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Bruna De Marchi  
*Head, Mass Emergencies Programme (PEM)*  
*Institute of International Sociology of Gorizia (ISIG)*  
*Via Mazzini, 13, 34170 Gorizia*  
*Italy*