

• **Developing disaster science as a means of reducing risks**

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Background

A disaster may be defined as the harmful realisation of a risk befalling a given territory. In order to attenuate such disasters, a solid understanding of existing risks is every bit as important as other factors such as governance, institutional capacities, inequalities, economic models etc. SDG 13 stipulates the introduction of measures to combat climate change and reduce the risk of natural disasters. Drafted under the aegis of the United Nations, the Sendai Framework was adopted in 2015. This framework attaches special importance to advancing knowledge. However, experience shows that the knowledge generated by research in earth sciences and social sciences is often ill-suited to the demands of risk management and minimisation. What we need now is a research strategy that is better aligned with the scope for and obstacles to action, a more interdisciplinary approach which remains open to non-academic stakeholders.

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Further reading

<https://lmi.igepn.edu.ec/>

Science and the constraints of management

Traditionally, scientific discussion of risk has focused on threats and vulnerabilities, two key terms which symbolically represent the division of labour between the physical sciences (the study of threats) and the social sciences (more concerned with vulnerabilities). In this dichotomous view, the evidence of extant threats (earthquakes, volcanic eruptions, floods and the like) often obscures the importance of the social and political dimensions involved in the construction of risk. And yet, rather than a simple succession of threats and vulnerabilities, the lessons of past disasters point to a complex interplay of physical events and social and political phenomena. As such, in order to produce knowledge of practical use for risk management, a change of approach is necessary: we need to focus not on what threatens us, but rather on what we want to protect, i.e. the key functions of our territories, given concrete form by the places and relations which enable these functions to exist: political power, the supply of energy and food, health, education etc. Analysing the vulnerability of these major priorities requires us to identify all of the risks which could potentially interrupt or disrupt their operational continuity.

This includes, but is not limited to, exposure to potential threats. It must also take into consideration other sources of weakness (technical, legal, economic, political...). By doing so, the concept of risk becomes more than just a combination of threats and vulnerabilities, resting

instead on two key pillars: major priorities, and their vulnerability. This approach to risk analysis allows us to focus on those places and objects belonging to the social sphere which allow our territories to function, priorities for which public authorities might be willing to establish vulnerability prevention and reduction policies. It offers a way of constructing research objects and questions which incorporate the influence of context, territorial specificities and the constraints of risk management.

Towards a disaster science which is sensitive to context

Disaster science is an umbrella term encompassing an array of research approaches aimed at better understanding and managing risks in their territorial contexts. Much of this research is conducted in an integrated manner, by means of: 1) interdisciplinary practices conducive to mutual reconceptualisation and reformulation, transcending the traditional boundaries between social sciences and physical sciences with regard to “risk” as an object of study; 2) transdisciplinary practices sensitive to existing constraints and cognisant of the conflicting interests of the many actors involved; 3) recognition of the nature of research work, and the conditions which inevitably have consequences for the type of knowledge produced. Exploring an alternative research agenda, disaster science foregrounds two key aspects: firstly, the diversity and complementarity of disciplinary contributions; secondly, contextual effects arising from the conditions

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in which research is conducted and the constraints and opportunities associated with its results. Disaster science is not limited to contributions focusing on the study of risk and its components. It requires both an opening up and a contextualisation of research, in order to arrive at a knowledge strategy which is better aligned with the specificities of the territories directly affected by risks and the challenges implicit in their management. The aim of such research is to prevent or mitigate the impact of disasters.

In Ecuador, a high standard of scientific research and the dilemmas of insufficient integration

In the fields of geosciences and the social sciences, three decades of cooperation have nurtured the emergence of a binational research community in Ecuador, united by a shared language and more than capable of debating research priorities. This community is now grappling with the relative failure of the knowledge it produces to bring about real change with regard to risk conditions. There appear to be a number of obstacles standing between knowledge and action. Some of them have to do with the ways in which scientific knowledge is produced. In the past, funding allocation has tended to prioritise high level research in the most cutting edge disciplines, leaving interdisciplinary and cross-disciplinary initiatives to the care of a few tenaciously motivated collectives. Others arise from the contexts (social, institutional, political) in which the knowledge they produce subsequently circulates. Obstacles to risk reduction are not simply a matter of insufficient knowledge.

Most vulnerability diagnoses are a matter of public record, as are the mechanisms in play and the cartographic profile of the principal threats. This apparent impotence of academic knowledge when it comes to actually reducing risks points the way for the work to be done by disaster science: to construct a research agenda which incorporates the social conditions of knowledge production and the various constraints (social, political, institutional) which influence the production and circulation of knowledge.

The challenge of doing research differently: developing disaster science in Quito

Coming up with an alternative strategy for our knowledge of risks is particularly relevant to one aspect of research work, that aspect directly concerned with the constraints and opportunities of fieldwork and the conditions of risk management. Research needs to be more integrated and more horizontal, working to complement other disciplines' readings of risk components. A good understanding of the threats at hand will define the relevant time frame and spatial reach. Understanding institutional response capacities will also determine the technical potential for action. In spite of the competition between different knowledge strategies (means, skills, time), disaster science should not be viewed as a rival to other disciplinary studies of risk components. This means acknowledging the need for more openness, inter- and transdisciplinarity, but we also need to construct the modes and methods which will allow disaster science to be more than a field pieced

together from practices and skills borrowed from elsewhere. To that end, we propose one prerequisite condition and three concrete proposals for making research practices more integrated, more reflexive and more contextually aligned with risks. Firstly, we must establish on a permanent basis opportunities for exchanges between researchers from different disciplines, and between researchers and non-academic stakeholders. Such opportunities are essential for building mutual understanding, so important to the task of interdisciplinary conceptualisation. Transdisciplinary exchanges can help us to keep in mind the conditions in which actions unfold, although this does not mean that research should simply be aligned with the demands of management. The goal is to identify the knowledge required to reduce and manage risks within specific contexts. There are three avenues to explore here:

- reappropriating existing knowledge with the help of more horizontal readings enriched by inter- and transdisciplinary exchanges. The goal is to integrate the contributions of all parties, based on concrete examples and translated into shared research subjects. Disciplinary skills are deployed on the basis of the contribution they can make to resolving jointly-defined problems;
- integrating disciplinary contributions with the help of general principles, such as systems dynamics and questions of scale. The use of models and scenarios can help to situate experience gained in the field, putting it into perspective in a manner conducive to effective action and more robust cross-disciplinary knowledge;
- structuring methods and the construction of research subjects in disaster science. Adopting a programmatic approach which seeks to build, on foundations provided by concrete cases and experience, the forms and content of a new and singular science.

KEY POINTS

When it comes to reducing the risk of disasters, scientific knowledge is at once essential and insufficient. Disaster science encompasses every aspect of risks, where they originate and how to study and manage them. Disaster science seeks to reconfigure the risk research community to achieve more overlap and more permeability between the research sphere and society at large. In this context, the key challenge attendant upon the creation of an entirely new research agenda consists of constructing methods of knowledge production which are sensitive to the constraints of the social world and the corresponding possibilities for action. In Quito, the close bonds of trust built up between research, cooperation and management actors gravitating around the IRD community for more than 40 years make this territory fertile ground for the development of such initiatives.

SUSTAINABILITY SCIENCE

UNDERSTAND, CO-CONSTRUCT, TRANSFORM

Volume 3

Collective thinking coordinated
by Olivier Dangles, Marie-Lise Sabrié and Claire Fréour

IRD Éditions

French National Research Institute for Sustainable Development
Marseille, 2024

Editorial coordinator: Corinne Lavagne
Editorial preparation: Jasmine Portal-Cabanel
Cover, design and layout: Charlotte Devanz

Cover photo: Rock painting, *Cueva de las Manos*, Argentina.
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ISBN PDF: 978-2-7099-3041-3