

Integrated Risk Governance Under Global Changes

Peijun Shi¹, Roger Kasperson², Nario Okada³, Joanne Bayer⁴, Ning Li¹, Guoyi Han⁵

1. *Beijing Normal University*, 2. *Clark University*, 3. *Kyoto University*, 4. *IISAS*, 5. *Stockholm Environment Institute*.

SPJ@bnu.edu.cn

Global risk has increased due to global change (including global environmental change and globalization), which is mainly represented by the increased frequency of weather and climate extreme events: influencing the normal operation of some infrastructures in the world, increasing the production accident risks, and decreasing the service capacity of the global ecological system. Meanwhile, the world-wide dissemination of kinds of risks due to globalization is being strengthened by WTO or Regional cooperation organizations such as: “ASEAN Ten Countries”, “ASEAN Ten Countries +1” and “ASEAN Ten Countries + 3”, APEC, EU, Alliance of America, Canada and Mexico, etc. Hence, for the world’s sustainable development, it is required to accelerate the development of IRG science and technology. This paper puts forward the framework of integrated risk governance under global changes, that is integrated risk science system, integrated risk governance technology system and integrated risk management system. Based on this, the integrated risk governance science plan is suggested to setup under IHDP, and its main objects are: 1) How to measure the integrated risk problems on the premise of global environmental change: i.e., the improvement of theories and methodologies for integrated risk measurement; 2) How to probe the system design problem for IRG under the background of globalization: building of the legal system and administrative system for IRG; 3) Formation mechanism (dynamics) for integrated risks under the background of global change and the theory and technology for its model and analog: i.e., risk dynamics and its model and analog; 4) IRG model and its promotion and application for the high-risk regions under the background of globalization: i.e., selection, promotion and application of typical successful cases of IRG; 5) Construction of information-sharing platform for global, regional and local-dimension integrated risks under the multi-lingual and cultural environment and building of the integrated risk information and effective technical service system: i.e., integration of risk information and capacity building for public and commercialized services; 6) Global-dimension promotion of sustainable development and building of IRG model: i.e., build the demo regions integrated with sustainable development and IRG adapting the global environmental change.

Keywords: Integrated Risk Governance, Global Environmental Change, Globalization, IHDP-Science Plan

1. Introduction

IRG (**Integrated Risk Governance**) is an inter-discipline core scientific project with an aim to elevate the understanding of integrated disaster risks and capacity for transfer of disaster risks. The scientists of IRG Committee are striving to study the dynamic and non-dynamic mechanism of formation and change of global and regional disaster risks so as to provide the operational assessment tools for formulating policies of transferring disaster risks. IRG research has a wide range ([Figure 1](#)), including: 1) Formation mechanism, diffusion behavior and changing process of integrated disaster risks; 2) Global and regional integrated disaster risk model; 3) System,

mechanism and legal system for integrated disaster risk governance; 4) Insurance, reinsurance and financial model for catastrophe risk transfer; 5) Regional paradigm for integrated disaster risk governance; 6) Database of driving force for disaster risk and information platform for integrated disaster risks.

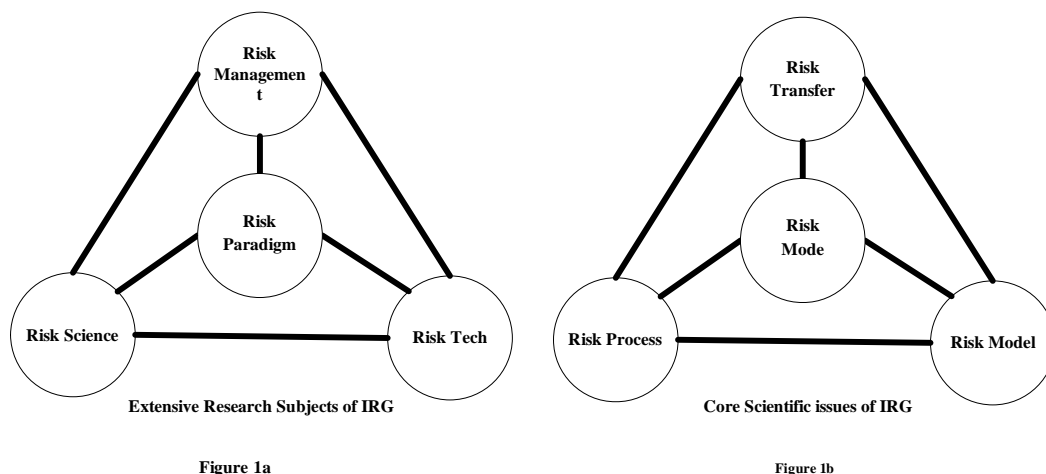


Figure 1: Core Scientific Issues and Research Subjects of IRG

2. Research Scope for IHDP—IRG Core Scientific Project

In view of the Core Scientific Project established by IHDP, with consideration of IHDP, WCRP and DIVERSITAS and the Core Scientific Projects of relevant researches established by ESSP (IHDP, 2007), in view of the striving target defined in UN-ISDR, with reference to some major scientific, technical and managerial issues concerned recently by the organizations related to the study of relevant risk problems and starting from the overall target of IHDP, the Core Scientific Project has planned such major targets as: IRG is an inter-discipline project with the aim to deepen the understanding of risk formation mechanism and diffusion behavior, which is devoted to develop some global and regional integrated disaster risk model so as to deepen the understanding of the dynamic and non-dynamic mechanism for formation and change of global and regional disaster risks under the motivation of global environmental change and globalization and provide operational assessment tools (Figure 2) for formulating policy of disaster risk transfer. Based on this, undertake the research on the following four key fields: formation and change of disaster risks, disaster risk modeling and simulation, regional disaster risk governance modeling and simulation, and approaches for catastrophe risk transfer.

2.1 IRG Focus I

In view of the multi-discipline integration analysis, deepen the understanding of risk formation and change of disaster risk under the background of global environmental change. The Core Scientific Project must take the multi-discipline integration analysis to deepen the understanding of risk formation mechanism under the background of global environmental change and diffusion behavior in the globalization system. (Figure 3)

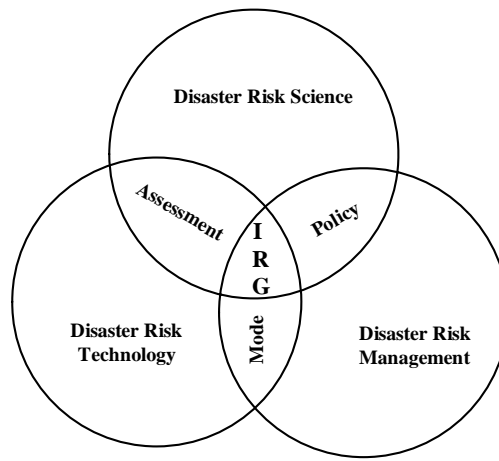


Figure 2: Major Targets for IRG Core Scientific Plan

In this regard, it is planned to undertake the profound studies in the following six aspects. (1) Interaction of mankind and nature and formation mechanism of disaster risks under the global opening system; (2) Development trend of the world's disaster risks and the changing trend of its tempo-spatial pattern under the background of global warming; (3) Predictability of global environmental change and tempo-spatial change of natural disaster risks ; (4) Predictability of global environmental change and tempo-spatial change of ecological disaster risks; (5) Globalization and global diffusion and diffusion mechanism of disaster risks; (6) Feedback mechanism for impacts of catastrophes on the regional and even global environment.

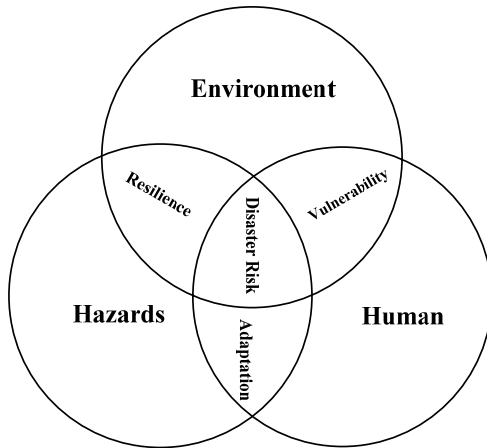


Figure 3: Change of Disaster Risk System

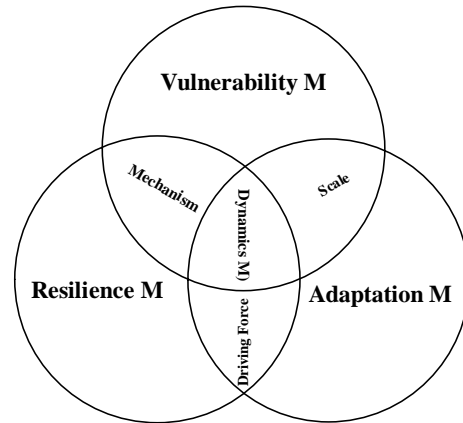


Figure 4: Modelling and Simulation of Disaster Risk

2.2 IRG Focus II

According to the completeness of samples (large samples, small samples and incomplete samples), select and develop a new generation assessment model for integrated disaster risk and establish the regional and global disaster risk simulation system under the different environmental changes. Measurement of disaster risk system has always been a key basic scientific issue for IRG research. Due to the influence of disaster vulnerability, resilience and adaptation, in the regional as well as global dimensions, the disaster risk assessment faces the examination of sample completeness ([Figure 4](#)).

In this regard, it is planned to start with an in-depth research on the following aspects: 1) Disaster risk assessment modelling system with consideration to the different tempo-spatial scales and different conditions of originating mechanism; 2) The downscaling and up-scaling of disaster risk modelling in different conditions of causing mechanism; 3) Disaster risk vulnerability, resilience assessment modelling with small samples and incomplete samples and improvement of the regional and global integrated disaster risk model; 4) Development of social vulnerability assessment model for regional and global integrated disaster risk; 5) Development of integrated risk simulation and modelling tools under different situations and conditions (different tempo-spatial dimensions, different originating mechanisms, prominent difference in vulnerability and resilience of objects bearing the disaster influence, different political and economic systems in the place of disaster risk); 6) Global and regional disaster risk modeling and simulation and division of high-risk zones

2.3 IRG Focus III

Building a mode for IDRG (integrated disaster risk governance) not only needs the aforementioned scientific research on the risk issues under the global environmental change and the technological development for risk governance and design of different systems, but also more importantly the way to put into practice the interaction mechanism of global environmental change and risks and technology and policy achievement for risk governance. IDRG Mode (Figure 5) for the regional sustainable development integrated with regional development and disaster risk reduction has also to some extent promoted energetically the integration and application of the available disaster risk governance policies and technologies: e.g., China's regional demo project for preventing and controlling the wind-sand disaster risks and China's demo project for preventing and controlling the landslide and mud-rock flow disaster risks. Countries like Japan and Turkey have established the building demo projects for preventing and controlling the earthquake disaster.

Therefore, it is intended to carry out in-depth studies in the following aspects: 1) Construction of information service platform for preventing the risks due to the global environmental change; 2) Standard system suitable for different countries and regions to prevent different risks; 3) Global-scale mode for sustainable development and IRG of regions with high disaster risks; 4) Regional and global large-scale disaster risk governance mode; 5) Collection, promotion and application of local experiences in traditional governance of disaster risk; 6) Aid mode for small island countries and other weak regions under global environmental change to govern the disaster risks.

2.4 IRG Focus IV

In view of the inter-discipline (natural sciences, social sciences and human sciences and technology), go deep in exploring approaches for transfer of catastrophe risks. Economic development is not only the source of different catastrophe risks, but also the fundamental force to improve and reduce the impact of risks. Adjustment of the economic structure and development speed and scale can, on the one hand, reduce the frequency of catastrophe risks as well as their influence and on the other hand can raise the capacity of adapting the catastrophe risks. Meanwhile, adoption of different financial means such insurance and re-insurance can also transfer catastrophe risks region-wide and worldwide. The total loss arising thereof is not reduced, but the pressure on

the influenced enterprises for recovery and rebuilding can be relaxed to a great extent. From the viewpoint of economics, it provides a new approach to undertake and operate the “catastrophe risks”. (Figure 6)

Therefore, the research can be deepened in the following dimensions: 1) Institutional design with risk adaptation under the global environmental change; 2) Technology of reducing risks with different tempo-spatial dimensions and different reasons for formation; 3) Safety building of enterprises and communities and integrated risk management system; 4) Mechanism and system for promoting the insurance and re-insurance against catastrophe risks; 5) Trans-national system design and technology development for improving the global-dimension catastrophe emergency and aid system; 6) Financial aid mechanism for improving the construction of IRG infrastructures for high-risk regions; 7) Organization mechanism for promoting and improving the volunteer system for catastrophe emergency response; 8) Mechanism for promoting and improving the public financial support system of risk education

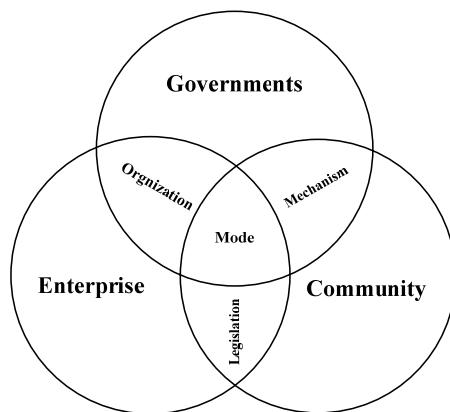


Figure 5: Regional IDRG Mode

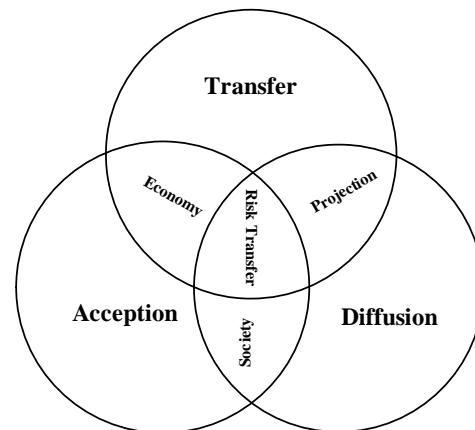


Figure 6: Approach for Disaster Risk Transfer

3. Summary and acknowledgement

In summary, we focus on following four scopes for the projects: 1) deepen the understanding of risk formation and change of disaster risk under the background of global environmental change; 2) select and develop a new generation assessment model for integrated disaster risk and establish the regional and global disaster risk simulation system under the different environmental changes; 3) improve as a whole the regional integrated disaster risk governance mode for alleviating the risk influence and promoting the world's sustainable development; 4) go deep in exploring approaches for transfer of catastrophe risks.

This work is a proposal aiming at setting up Integrated Risk Governance as Core Scientific Project of IHDP. It has been reviewed by International Workshop on Global Environmental Change and IRG, hold on June 5-7, Beijing. I really appreciate the suggestions and efforts every attendant made. And this work is supported by National Science & Technology Support Program of China (2006BAD20B00).

Reference

IHDP website, 2007: <http://www.ihdp.uni-bonn.de>

IGBP website, 2007:<http://www.igbp.kva.se>

DIVERSITAS website 2007: <http://www.diversitas.org>

ESSP website,2007:<http://www.essp.org>.