International Institute for Applied Systems Analysis (IIASA)

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Outline

The International Institute for Applied Systems Analysis (IIASA) is a non-governmental research organisation based in Laxenburg, Austria. Founded in 1972, IIASA is an international scientific institute that conducts policy-oriented research into problems that are too large or too complex to be solved by a single country or academic discipline. Problems like climate change that have a global reach and can be resolved only by international cooperative action. Or problems of common concern to many countries that need to be addressed at both the national and international level, such as energy security, population aging, and sustainable development. Funded by scientific institutions in the Americas, Europe, Asia, Oceania, and Africa, IIASA is independent and unconstrained by political or national self-interest. IIASA's mission is to provide insights and guidance to policymakers worldwide by finding solutions to global and universal problems through applied systems analysis in order to improve human and social wellbeing and protect the environment. Overall, IIASA is well-known for: land-use, energy, climate change, adaptation and mitigation, air pollution, technology, risk and vulnerability, and population, modelling.

Over the last 10 years, IIASA's program on Risk, Policy and Vulnerability (RPV) has focussed strongly on providing scientific insight for informing the disaster risk management debate. The aim of the RPV Program is to contribute to transforming the way societies manage risks associated with economic, ecological and social systems from stresses imposed by global change. By examining environmental and socio-economic risks and policy options across multiple spatial and temporal scales, we provide the analytical foundation for the improved management and governance of natural disasters, climate change, and technological and ecological transitions. RPV's specialty is in applying advanced methods for assessing and analysing risks and uncertainties to improve policy outcomes on global change issues, such as extreme events, economic development and environmental degradation. Over the last years, IIASA has focused strongly on risk analysis, economics of disaster risk management and climate adaptation, and has been involved in many international research and consultancy projects. RPV researchers have acted as IPCC lead authors for the recent special report on Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation (SREX), IPCC's 5th assessment report and UNISDR"s 2013 and 2015 Global Assessment Reports.

Research Achievements and Challenges

Figure 1: CATSIM Interface

Over the past decades, the International Institute for Applied Systems Analysis (IIASA) has engaged in providing policy-relevant analyses regarding disaster risk management in the public sector using Catastrophe Simulation (CATSIM model). The use of macroeconomic and fiscal risk assessment using CATSIM played a key role in the adoption of risk management policies by a number of developing countries, including the establishment the Caribbean Catastrophe Risk Insurance facility in 2006, and the first-ever government-issued catastrophe bond against natural disasters by Mexico in 2007. IIASA has also advised DRR policies using a broad range of economic appraisal tools such as probabilistic Cost-Benefit Analysis (CBA) and Multi-Criteria Decision Making (MCDM). IIASA has designed and implemented capacity building workshops for policy-makers on a number of topics related to the economic assessment of disaster risk including Turkey, Colombia, India, Mexico, Philippines (2004), Madagascar (2008, 2012, 2014), Caribbean (2007), and Cambodia (2014). In recent years, the use of fiscal risk assessment has also helped to shape global discussions on disaster risk management. In 2015, IIASA in collaboration with the United Nations Office for Disaster Risk Reduction (UNISDR), for example, has conducted risk assessment of 160 countries for the Global Risk Assessment (GAR 15).

Figure 2: Policy Workshop in Madagascar '15

Traditionally, the debates regarding public sector disaster risk management have focused primarily on the use of economic efficiency–oriented tools such as Cost-Benefit Analysis (CBA); however, recently the scope of the debates has broadened to include multiple objectives such as equity and distributional issues. At the same time, the need for further integration (or mainstreaming) of DRR into broader development agendas are also calling for a major paradigm shift in the areas of disaster risk assessment and policy.

One of the key challenges is incorporating these broader developmental agendas with that of disaster risk reduction. For this, the use of single 'efficiency' criterion is becoming increasingly obsolete, and more integrative decision-making frameworks that incorporate additional criteria such as 'co-benefits' 'robustness' and 'public acceptability' is increasingly needed.

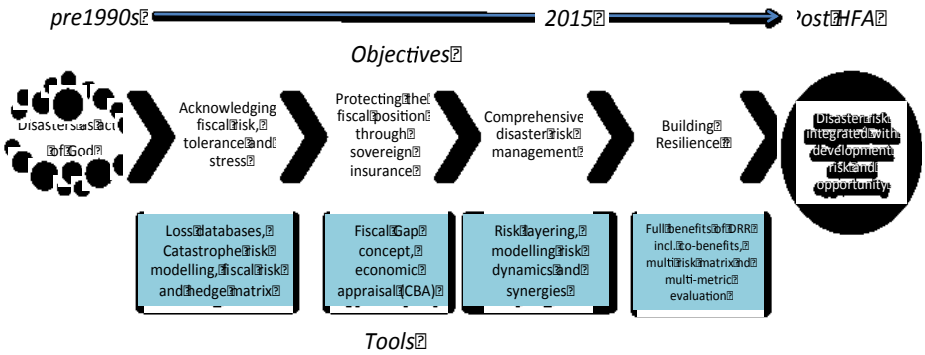

Figure 3: Evolution of DRR concepts and a way forward in Post HFA

Such broader framework may colloquially be understood as a shift from 'risk to resilience' thinking: Policy-makers, practitioners and researchers are increasingly called to look beyond 'direct risk' and to find critical linkages of development-risk nexus.

Suggestions for the Disaster Research Roadmap

Promoting a broader understanding of 'disaster resilience'

Given the importance of developmental drivers of disaster risk (such as poorly enforced land use planning and building codes leading to risk creation) and developmental implications of disasters (such as physical destruction of disasters eroding developmental gains made by household, communities and countries), disaster risk and its links with development processes must be understood more holistically within the post 2015 Hyogo-framework of action (HFA) agenda.

The notion of 'disaster resilience' has a potential to become such broad umbrella concept linking natural disaster, development and climate change adaptation agendas; however, the current conceptualization of disaster resilience as 'bouncing-back' is falling short of providing inclusive conceptual grounds for these different-yet-interlink fields to come together. Re-conceptualization of disaster resilience as that of 'bouncing-forward' –or a key to creating virtuous cycle of risk reduction, improved welfare and sustainability is increasingly needed. Disaster research roadmap beyond 2015 should be built on such broader understanding and reconceptualization of 'disaster resilience', which can successfully invite different disciplines to work together on common goals of DRR and sustainable development.

Building evidence-base beyond 'direct risk' toward improved understanding of development-risk interaction

Evidence-based decision making will increasingly become important in the Post HFA era. This is already seen in the proposed HFA measurement and monitoring framework that emphasizes the need to quantify and monitor changing risks facing member states. While the improved evidence of direct damage is certainly desirable (especially in those countries where evidence-base is currently limited), further research should be devoted to collecting evidence beyond 'direct risk or damage.' DRR field has yet to understand fully, what drives individual or collective decision-making that creates risks (and what can be done to successfully avoid risk creation); and how the direct damage of disasters (collapsing buildings, infrastructures, crops and the way we cope with such direct risks) ultimately define the longer-term trajectory of future risk and development.

The collection of evidence that focuses on the immediate impact of natural hazards cannot give us answers as to how direct risk can be avoided and developmental consequences be minimized. Further evidence base should therefore be collection on 'what had been happening before disasters?' as well as 'what has happened after disasters?' together any evidence that links the before and after of disasters in a more holistic way. The use of innovative tools and frameworks such as participatory 'citizen science' will be effective in engaging more probing analysis of natural disaster causes and consequences.

Improved science-policy interface for integrated DRR policy actions

Modeling and risk assessment are only useful so far as they are being used in the real world policy-making. 'Risk knowledge' is hence a process rather than a product—it is not knowing economic estimates, hazard maps or technological options, but being able to translate them into practical use. More participatory and engaging research is certainly needed in the Post-HFA era so that the state-of-the art scientific knowledge of DRR be translated and implemented on the ground. Wider stakeholder engagement of policy-makers, private sectors, community leaders and academics are needed and this is where IIASA is taking the leadership under the ongoing project such as the Zurich Flood Resilience Alliance. The new types of partnership, engagement and dialogues are needed to transform the traditional academic discipline to one that is 'action' oriented and impact-focused.