Disaster Risk Reduction for Sustainable Development

ISAP 2016

Key messages

- *The focus of disaster risk reduction has changed from response-based approaches to pre-disaster preparedness, mitigation and risk reduction approaches over the course of the last 25 years. However, the progress of this transition in focus has been slowed by a narrow perspective on risk reduction, which is yet to be fully mainstreamed into climate change policy.*
- *Climate-related disasters are increasingly impacting people's wellbeing and their livelihoods, which means that these disasters hinder sustainable development. Disaster risk reduction measures therefore need to be a central part of the sustainable development framework and vice versa.*
- *Our textual analysis of three international frameworks adopted in 2015 (Sustainable Development Goals (SDGs), Paris Agreement on Climate Change, and Sendai Framework for Disaster Risk Reduction) found that disaster risk reduction was emphasized in the SDGs framework, but did not receive the same amount of attention in the Paris Agreement.*
- *For effective use of resources, the three frameworks need to be implemented in an integrated manner, ensuring that any actions taken under either of the frameworks complements the objectives of the other frameworks. This coordination is especially important at local levels, where most of the decisions over development, adaptation and disaster risk reduction take place. All the three frameworks rightly recognize the importance of "local" level implementation for achieving their goals.*
- *In addition to building capacities and institutions and securing resources at local levels, there is a need to implement measures that complement disaster risk reduction, climate change adaptation and sustainable development, which is possible through mainstreaming these concepts into policies and plans, monitoring and evaluation and impact assessment guidelines.*

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1. Introduction

Sustainable development (SD) and disaster risk reduction (DRR) are closely interlinked. A single major natural disaster or "shock" incident (i.e. a rapid onset disaster like an earthquake, storm, tsunami or landslide) can undo hard-won development progress and set back development by years. A "stress" incident (i.e. a slow onset disaster like drought, sea level rise, and salinity intrusion into groundwater stocks) can also cause long-term socio-economic harm.

In recent decades, the Asia-Pacific region has experienced tremendous economic progress, with millions of people crossing over the poverty line. However, there have been serious costs to this progress, including degradation of the natural environment, which has increased the exposure of people

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to natural hazards. A case in point is the widespread clearance of mangroves on the coasts of South and Southeast Asia to make way for aquaculture. The protective functions of these mangroves were widely recognised after the devastating Indian Ocean Tsunami that struck the region on December 26, 2004. Areas where the mangroves had been removed experienced greater damage than areas with mangrove belts.

In addition to the loss of natural resources, vulnerability to climate change impacts is being exacerbated by a lack of urban development controls and land use planning. Development in the Asia-Pacific region is characterised by uncontrolled and rapid urbanization, with poor infrastructure planning, uncontrolled internal migration, weak land use regulations and insufficient economic planning. Uncontrolled rural to urban migration is increasing urban vulnerabilities, as the poorest migrants often settle in marginal and hazardous locations, either near the coast, or near rivers or on slopes that are exposed to natural hazards.

Climate change is superimposed on these human-induced vulnerabilities and acts as a threat multiplier. In recent years, an increase in the frequency and severity of extreme weather events (including storms, droughts, heat waves and cold "snaps") has been associated with climate change. Such events multiply the risks that people living in areas prone to natural hazards already face. For example, parts of Kyushu, Japan experienced unprecedented heavy rainfalls in June 2016, resulting in an unusually large number of landslides, which took the lives of several people.

The threat multiplying effect of climate change will be especially felt in cities located on coasts, river banks and floodplains and the edges of major water bodies in areas where the protective function of watersheds have been lost because of unplanned urban and industrial development. One such example is the city of Santa-Rosa, which is located in the bottom part of the Silang-Santa Rosa subwatershed on the edge of Lake Laguna, the largest lake in the

Image 1. Flooding in Santa Rosa city, the Philippines in 2013 (Photo credit: Santa Rosa City DRRM Office)

Philippines. The city already experiences flooding (Image 1), in part because the subwatershed has lost some of its protective functions through the conversion of natural land cover to concrete and other impermeable manmade materials. Climate change is expected to bring heavy rainfalls, which will increase the frequency and size of flood events.

2. The Evolution of Disaster Risk Reduction

Contemporary concepts and approaches to reduce the impacts of disasters have emerged over the past 25 years or so. While in the 1970s and 1980s, the focus was on rescue and response, the 1990s saw a drastic change from post disaster to pre-disaster preparedness. The United Nations resolution in 1985 that urged the launching of the first United Nations Decade of Natural Disaster Reduction (from 1990 to 1999) was behind this transformation. Under this initiative, lessons were drawn from various disasters around the world, from which a common understanding of the need to place the emphasis on pre-disaster preparedness emerged. The importance of preparations and responses at local levels was also acknowledged. For example, community-based approaches to disaster risk reduction were felt to be important after the Great Hanshin Awaji Earthquake of 1995, when local communities and neighbours rescued 98% of the affected people in the immediate aftermath of the earthquake.

The concept of risk reduction received a lot of attention in the latter part of the 1990s and the early 2000s. Disaster risk was now understood to be a function of hazard, vulnerability and capacity. Risk reduction thus became concerned with reducing vulnerability and enhancing capacity. Vulnerability was defined in various ways. It was associated with physical or infrastructure-related issues, socio-economic or human-related issues, knowledge

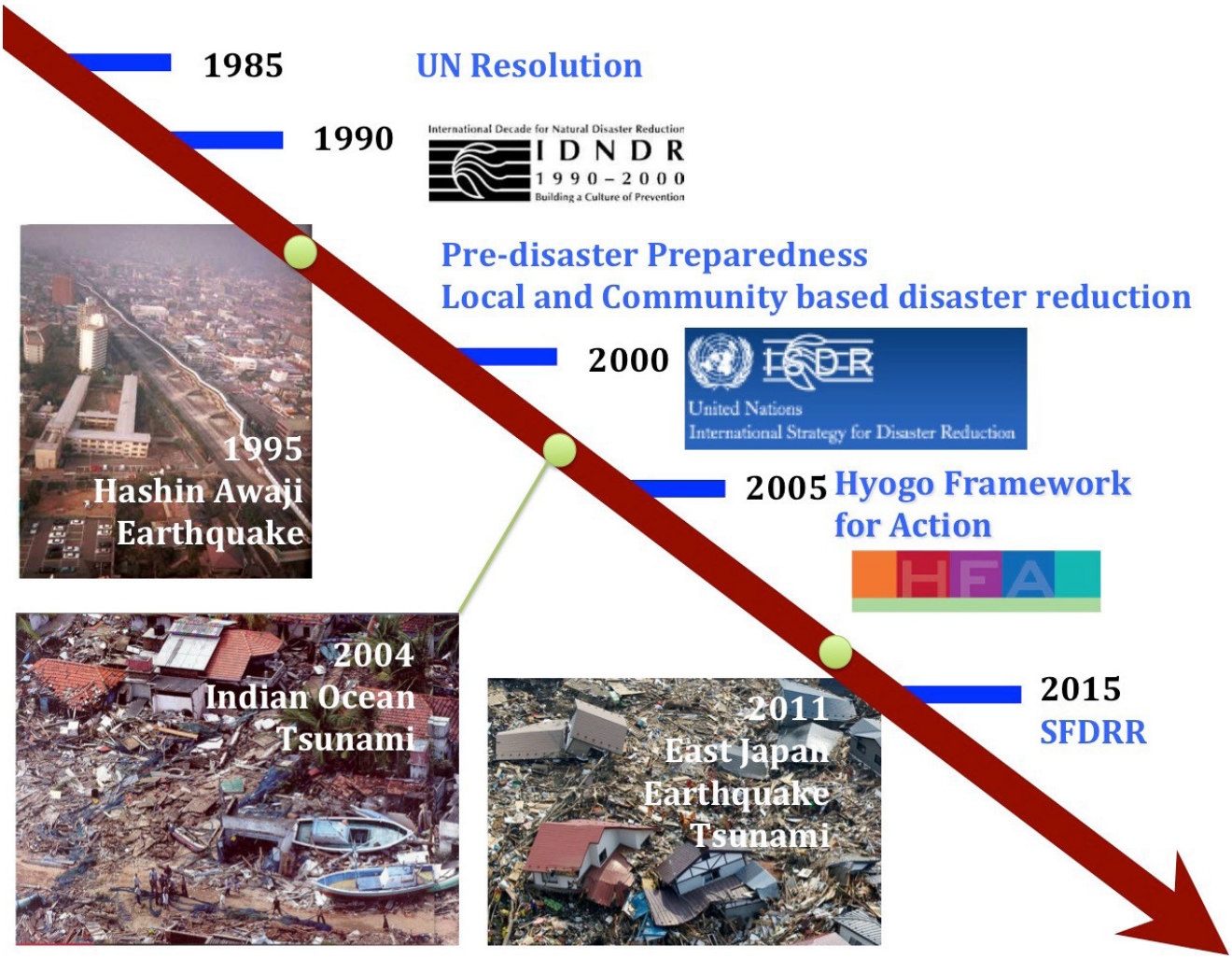

Figure 1. Evolution of disaster risk reduction field

gaps and education-related issues, and so on.

In 2004, the world experienced one of the deadliest disasters in recent times when the Indian Ocean Tsunami struck parts of South and Southeast Asia. In the following year, the United Nations member states adopted the first global framework of disaster risk reduction: the Hyogo Framework for Action (HFA). To align with the existing development framework, i.e. the Millennium Development Goals, the HFA was given the same time frame of 2005 to 2015. The temporal alignment of sustainable development and disaster risk reduction frameworks continues to the present, with the Sendai Framework for Disaster Risk Reduction and the Sustainable Development Goals having the same timeframe of 2015 to 2030.

In 2011, the world saw another devastating disaster in Japan, the East Japan Earthquake and Tsunami, which took the lives of over 10,000 people and resulted in economic losses close to 150 billion USD. The recovery process from this disaster emphasised the importance of the links between development investment and disaster risk reduction.

3. Disaster Risk Reduction for Sustainable Development

a. Through Global Actions: Three major global policy frameworks/agreements were reached in 2015. The year started with the adoption of a new DRR framework in March 2015 in Sendai, Japan, namely the Sendai Framework for Disaster Risk Reduction (SFDRR). In September, a new set of global development goals – the Sustainable Development Goals (SDGs) – were adopted by the UN General Assembly in New York. In December, the world's leaders forged a new climate change agreement – the Paris Agreement –, which needs to be ratified within a year from 22 April 2016.

The three documents set the stage for future global actions on DRR, sustainable development and climate change. They are important achievements, but do they acknowledge the close interlinkages between disaster risk reduction and sustainable development? To help answer this question, we conducted a textual analysis of how each of the agreements uses the terms "sustainable development", "disaster risk" and "climate change".

We found that the term sustainable development is well embedded in the SFDRR and Paris Agreement, and that the term disaster risk is incorporated in SDG document moderately, but less so in the Paris Agreement (Table 1) (Shaw et al., 2016). In contrast, the term climate change is well embedded in both the SDG and SFDRR documents.

Our analysis suggests that the importance of DRR to sustainable development, and the importance of sustainable development to DRR, are well recognized. The SDG and SFDRR documents thus provide a strong foundation for ensuring that initiatives on DRR and sustainable development pay sufficient attention to each other's objectives. In contrast, the Paris Agreement did not give so much attention to the issue of disaster risk.

b. Through local actions: Transforming knowledge generated through research into action is particularly important at local levels. It is at the levels of individuals, households, communities and local governments that many of the planning and decisions associated with climate change adaptation, sustainable development and DRR will take place. Based on this understanding, using the same method as explained above we assessed how much emphasis is given to local issues in the three global frameworks. The 35-page SDG document mentioned the term "local" 10 times. It uses the term local in connection with authorities, communities, culture, materials and planning. In particular, Goals 6 (clean water and san-

Table 1. Cross reference among the three global frameworks based on the frequency of use of selected terms

	SDG (UN 2015b)	SFDRR (UN 2015a)	Paris Agreement (UN 2015c)
Sustainable development		20	16
Disaster risk	12		1
Climate change	20	15	

itation), 8 (decent work and economic growth), 11 (sustainable cities and communities) and 13 (climate action) emphasise local issues. In the 32-page Paris Agreement, the term local is used 9 times in connection with communities as well as knowledge. This is mostly in relation to adaptation, rather than mitigation. In the 25-page SFDRR document, local is used 48 times in connection with government, community, knowledge, priorities, and DRR strategy, etc.

Our analysis indicates that all three global frameworks rightly encourage investments in building institutions and capacities at local levels. The challenge now is to generate and mobilise the necessary knowledge to ensure these investments are optimal in terms of reducing disaster risks as well as facilitating development and climate change adaptation.

4. Towards knowledge-action links in disaster risk reduction

The Institute for Global Environmental Strategies (IGES), which conducts strategic policy research on major environmental issues, particularly in Asia-Pacific developing countries, has strategically put risk reduction at the core of its research agenda through the environmental entry point. IGES has worked on risk reduction as part of a number of research projects related to climate change adaptation and land-use planning. Several of these projects are described below.

Guidance for adaptation projects

Donors and other supporters of projects that aim to build adaptive capacity want to know how effective these projects are. With investments in adaption projects increasing, IGES launched a project in the Gangetic Basin to develop adaptation effectiveness indicators to assist in the assessment of adaption

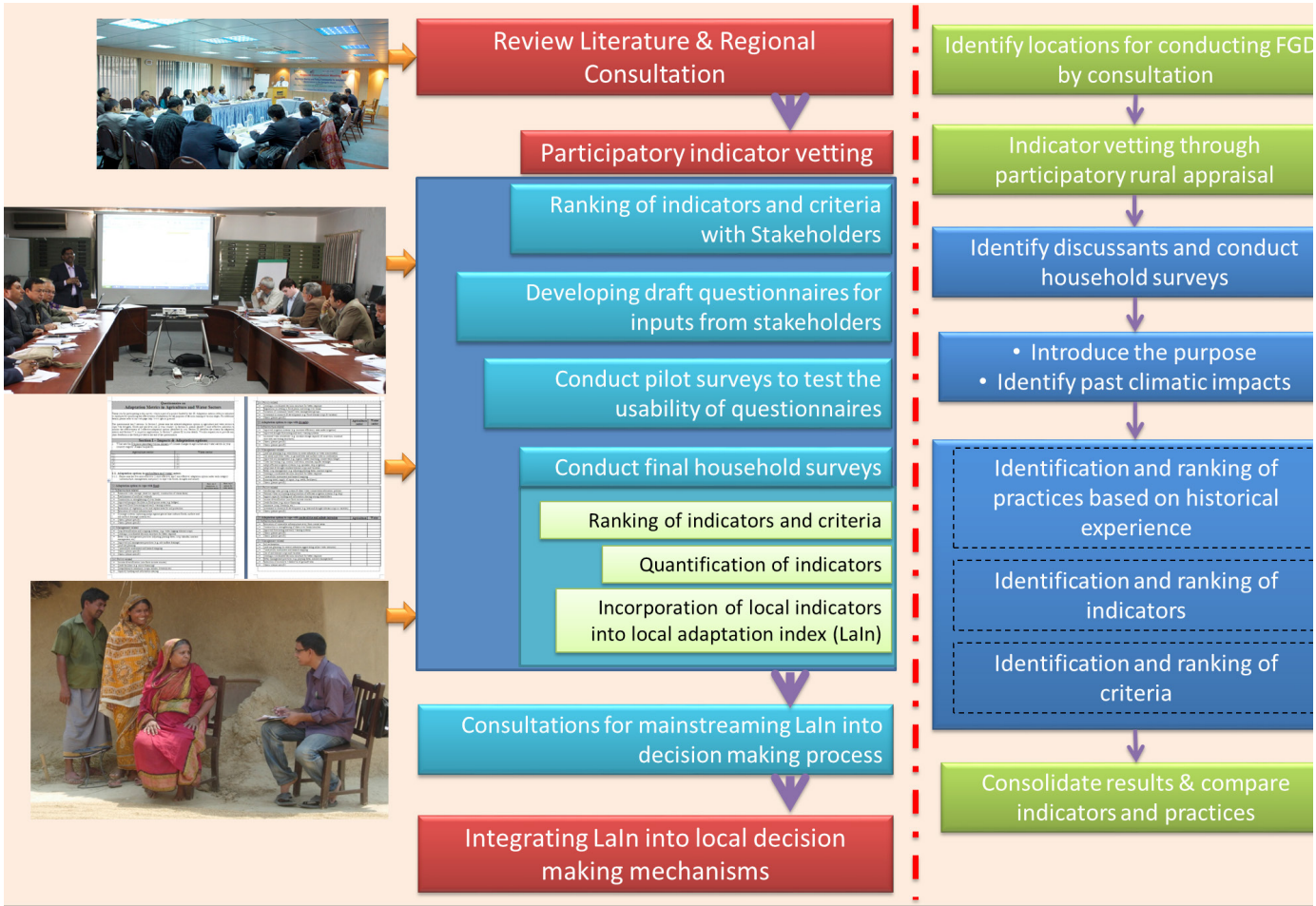

Figure 2. Developing Local Adaptation Effectiveness Index (LaIn) in a consultative manner in the Gangetic Basin

projects. The indicators were identified through participatory appraisal techniques (Figure 2). Adaptation practices were prioritised using multi-criteria decision making methodologies (Prabhakar et al., 2012; Prabhakar et al. 2014). IGES used the results of this research to develop the "Local Adaptation Index" (LaIn) and later collaborated with the National Bank for Agriculture and Rural Development (NABARD) in India to develop a vulnerability assessment methodology (Prabhakar, 2015a). The methodology employs a "Vulnerability and Capacity Assessment Index" (VCAI) that helps project implementers to identify projects with the greatest potential to reduce vulnerability and to monitor and evaluate project impacts on vulnerability.

In collaboration with national partners and regional networks such as the Asia-Pacific Adaptation Network, IGES developed training modules for the agriculture sector in several Asian countries to support the mainstreaming of climate change adaptation into the sector. Recognising that the agricultural sector will be exposed to greater external shocks and stresses as a result of climate change, IGES is advocating comprehensive evaluation of risk spreading tools such as insurance for maximising their adaptation, DRR and SD benefits, including assessing these approaches for their efficacy to address non-economic loss and damages (Prabhakar et al., 2015b). In an ongoing project in South and East Asia, IGES is evaluating the effectiveness of insurance in delivering adaptation, SD, and DRR benefits. These lessons will be helpful in preparing guidelines for insurance product designers.

Mainstreaming climate change action and DRR into urban planning in the Philippines

The growing risk of flooding driven by climate change and improper urban and industrial development in the Silang-Santa Rosa subwatershed (described above) is the focus of another IGES project. To address this problem, IGES launched a pilot project in cooperation with the University of the Philippines to assist local governments in the subwatershed to improve their land use by mainstreaming climate change and disaster risk reduction into urban planning (Endo et al., 2015). Using analytical tools such as participatory geographic information systems (GIS) and hydrological modeling, the project assessed flood hazards and helped the local governments create management actions to address flood risks (Figure 3). The research proposed a range of actions to reduce future flood risks, including the use of water-permeable pavement in urban and industrial areas, and the preservation of vegetation, both of which could reduce the rate and volume of run-off after heavy rainfall events. Findings and recommendations made by the project, including countermeasures, were used to improve comprehensive land use plans (CLUPs) and other municipal plans to guide future development in the study area.

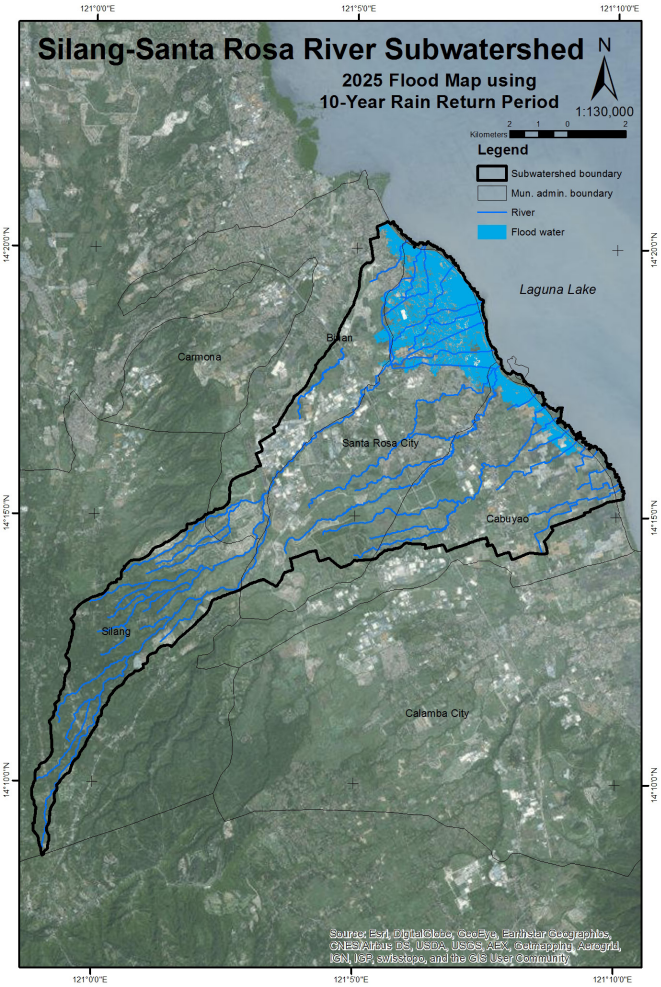

Figure 3. Flood-hazard map of the Silang-Sta. Rosa subwatershed projected for 2025

Note: Areas vulnerable to flooding indicated in light blue. (Source: IGES)

Climate-fragility risks

Climate change can potentially increase the fragility of countries in the face of threats associated with negative economic, social, demographic and political developments. Recognising how climate change acts as a risk multiplier to increase fragility, IGES along with its research partner, Adelphi, recently launched a new research project on climate fragility-risks in the Asia-Pacific region. The project was developed from the understanding that there are seven compound climate-fragility risks: local resource competition, livelihood insecurity and migration, extreme weather events and disasters, volatile food prices and provision, trans-boundary water management, sea-level rise and coastal degradation, and unintended effects of climate policies. The extent of climate-fragility risks differs between countries (Figure 4). At this early stage of the research, IGES is analysing the seven compound risks in Japan and the Asia-Pacific region as a whole through a series of consultations with stakeholders (government, civil society and academics) and in-depth questionnaire surveys. One objective of the project is to have the research results inform Japan's development policy and foreign policy.

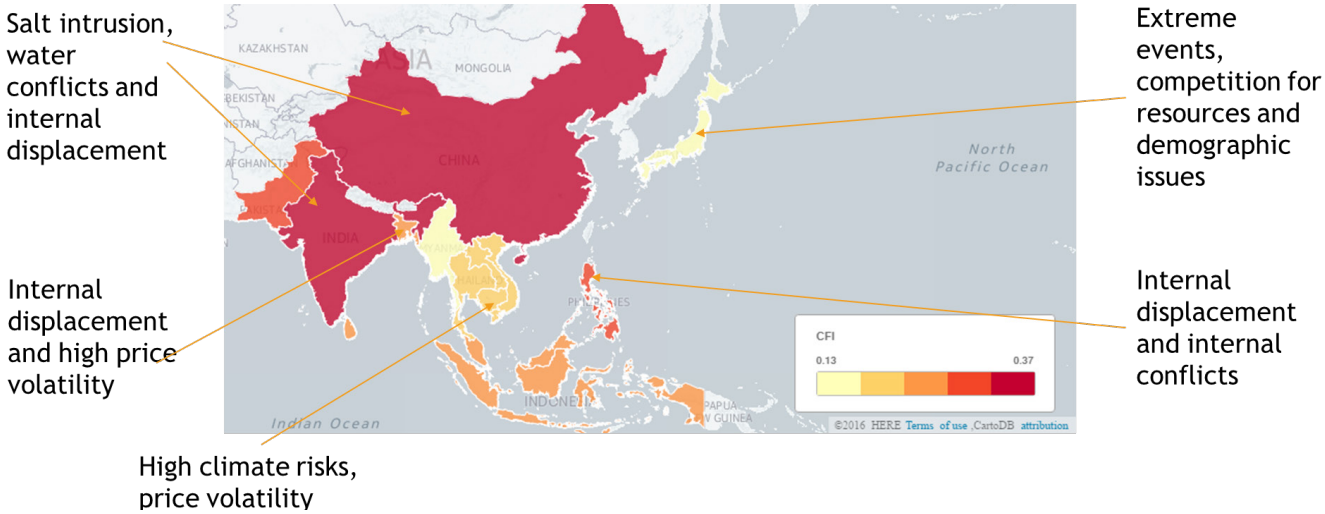

Figure 4. Countries in Asia at various levels of climate-fragility risks, as indicated by the Climate Fragility Index (IGES 2016)

5. Conclusion

Disaster risks are rising and becoming increasingly complex. They can only be comprehensively addressed by incorporating disaster risk reduction issues in the framework of sustainable development, and this requires policy interventions at the national level, as well as specific actions at local levels.

Research has an important role to play in generating knowledge that can guide policies, plans and interventions to address specific disaster risks in the context of sustainable development. IGES has found that the co-design of research projects and the co-production of knowledge through the involvement of diverse stakeholders and communities in research activities are likely to generate the most useful outputs with the greatest potential for uptake.

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This issue brief has been prepared for discussion at the International Forum for Sustainable Asia and the Pacific (ISAP2016).

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