Monitoring disaster risk reduction targets: the example of INFORM

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1. *Monitoring progress in disaster risk reduction*

Disaster risk consists of three elements: hazard, exposure and vulnerability. Risk can be reduced by controlling the frequency and intensity of hazards (e.g. flood protection, slope stabilization), reducing or limiting exposure (e.g. urban planning, urbanization policy, room for rivers to flood in unexposed areas) and reducing vulnerability (e.g. early warning, seismic building codes, contingency and response plans, evacuation). Further, to avoid disasters, society must build resilience to recover quickly after a hazard, mainly through effective response, reduced poverty, risk financing (public or private) and other coping mechanisms.

Accurate measurement of a complex phenomenon as risk is a non-trivial task. Because of its many dimensions, different stakeholders can perceive risk differently. One person's loss can be another ones gain. Some communities express risk in terms of loss of life and others in financial numbers. Besides this conceptual uncertainty, the various components are not easy to quantify and involve scientific disciplines ranging from natural sciences to social sciences. Due to their nature, some risks can't be compared on the same scale (e.g. earthquake risk versus droughts).

Nevertheless, there is a need to create multi-hazard risk metrics based on scientific evidence to inform disaster risk reduction policy. One tool that has been used to integrate information from different disciplines and communities is a composite indicator.

This note discusses the opportunities, challenges and strengths of composite indicators to measure progress in disaster risk reduction, and in particular the experience of a recently developed Index for Risk Management – INFORM.

2. *INFORM – Index for Risk Management*

INFORM is a way to understand and measure the risk of humanitarian crises and disasters and how the conditions that lead to them affect sustainable development. Such crises and disasters affect tens of millions of people every year all over the world.

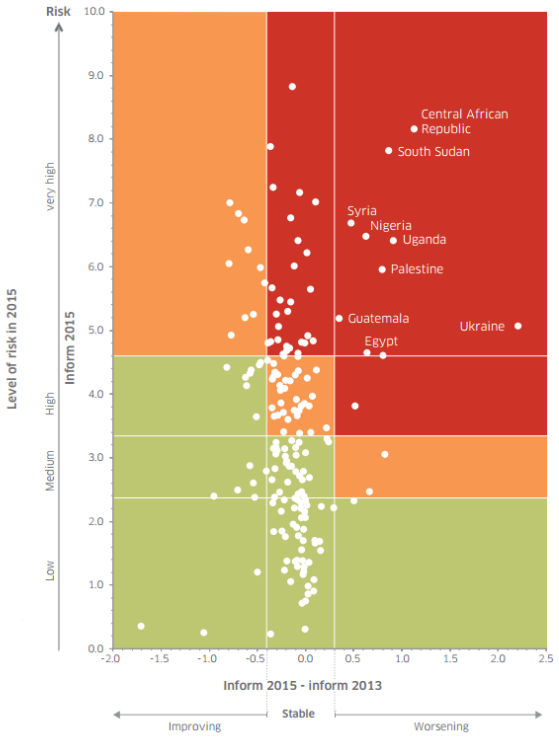

Figure 1. INFORM tracks risk level and changes in risk level

2.1. Collaborative risk assessment

INFORM was developed in response to recommendations by numerous organisations (e.g. the World Bank, OCHA) to improve shared evidence for risk analysis, as well as the real demands of INFORM partner organisations. INFORM is a collaboration of the Inter-Agency Standing Committee Task Team for Preparedness and Resilience and the European Commission.

The strength of INFORM is that all partners have a direct contribution to its development. Expertise from specialized agencies was used as a basis to collect, interpret and use data in a

consistent and appropriate way for risk assessment. At the same time, the scientific partners in INFORM ensure that state of the art scientific developments are included and statistical soundness is audited by the Joint Research Centre (Michela Nardo, 2005).

The inclusive process of INFORM created ownership by all partners and encouraged organisations to use INFORM results in their internal risk management processes. Even in the pilot period, organisations like the UN Office for Coordination of Humanitarian Affairs, the European Commission Directorate General for Humanitarian Affairs and Civil Protection, UNICEF, the UK Department for International Development, the World Food Program and World Vision have changed their internal procedures to incorporate INFORM results.

2.2. Methodology

INFORM simplifies information about risk (De Groeve, Poljansek, & Vernaccini, Index for Risk Management - InfoRM: Concept and Methodology, 2014). It uses 50 different indicators to measure hazards and peoples' exposure, vulnerability, and coping capacity. As the focus of INFORM is on response by international agencies and donors, coping capacity is separated from vulnerability. Hazard and exposure are considered within probabilistic risk assessments (which consider typically hazard and physical vulnerability, but not social vulnerability). The INFORM model thus has three dimensions:

- **Hazards & Exposure**: hazardous events that could occur and the people or assets potentially affected by them. It is made up of two categories – natural hazards and human hazards. Historical losses, deterministic and probabilistic risk assessments, conflict risk assessments, and global exposure datasets are key components.
- **Social vulnerability**: the susceptibility of people to potential hazards. It is made up of two categories – socio-economic vulnerability and vulnerable groups. Data from participating agencies is critical for this dimension.
- **Lack of Coping Capacity**: the lack of resources available that can help people cope with hazardous events. It is made up of two categories – institutions and infrastructure. Self-assessments reported by countries under the Hyogo Framework for Action for disaster risk reduction are a key component (UNISDR, 2015).

2.3. Heterogeneous open source data

For each dimension, the best available data sources were selected based on predefined criteria: open source, quantitative, reliable, global coverage and 5-year time series. INFORM works directly with source organizations to ensure quality and of the source data in INFORM, as well as to build in sustainability. However, model components were defined in such a way that future data sources can seamlessly replace older ones, to accommodate the abundance of newly available data.

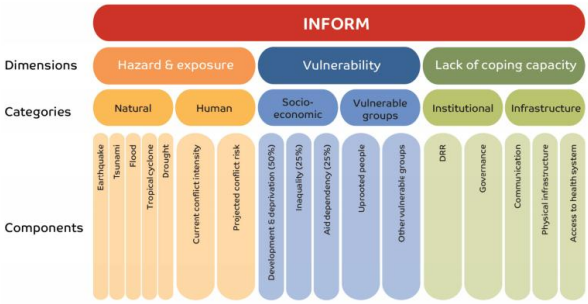

Figure 2. Conceptual outline of the INFORM model

For example, INFORM is working to integrate the Global Human Settlement Layer (GHSL) in its assessments (Pesaresi, et al., 2013). GHSL is the first global multi-temporal remote sensing derived datasets of built-up areas, providing novel quantitative data on exposure to hazards. The Joint Research Centre, in collaboration with many partners including UNHABITAT and the World Bank, are deriving urbanization statistics and exposure statistics at local, provincial and national level, which will feed in INFORM.

A second example is the Hyogo Framework for Action Monitor Data, collected by all countries to track progress in disaster risk

reduction policy, strategy and implementation. To date, the data is provided on voluntary basis and is generally considered subjective. However, it is expected that the HFA Monitor will be improved significantly to address its shortcomings under the Post-2015 Framework for Disaster Risk Reduction. INFORM counts on these data being available in the coming years to replace the current HFA Monitor data, thereby greatly improving the Lack of Coping Capacity component.

2.4. A flexible methodological framework

Novel scientific work, such as new conflict risk models (De Groeve, Vernaccini, & Hachemer, The Global Conflict Risk Index (GCRI): A Quantitative Model. Concept and methodology, 2014), the Global Risk Assessment 2015 (to be published), mid and long term weather forecasts (e.g. considering El Nino effects) can progressively be integrated in INFORM.

The flexibility, openness and transparency of INFORM also allows organisations to develop INFORM-based indexes for specific purposes. INFORM supports these activities by providing methodological overview and technical support. Current projects include national regional pilots in Sahel and East Africa, national pilots in Lebanon, thematic pilots on Ebola, Old Age and Disaster Risk Reduction (DRR).

3. Lessons from INFORM for DRR

The experience of INFORM can be used in the effort to develop metrics for DRR. Even in its current state, INFORM is informative and its coping capacity component is frequently used as a proxy for DRR. Dedicated work to transform and exploit INFORM for DRR monitoring will start to deliver concrete results in 2015.

The value of indicator data was demonstrated by the INFORM projects, and all partners of INFORM are supporting the call to UN Member States to collect better data in the post-2015 framework for disaster risk reduction. The exact outcome of the process cannot be foreseen, but there is consensus to replace the subjective and qualitative indicators by objective and quantitative indicators.

JRC is participating in an expert working group preparing the post-2015 HFA Monitor. The post-2015 framework for disaster risk reduction in widely seen as a golden opportunity to collect new primary data to finally get a grasp of national and local coping capacity.

4. Issues for consideration

INFORM is only one project aiming at capturing risk levels and risk reduction. Others include the Disaster Risk Index (Peduzzi, 2009) and the World Risk Index (UNU-EHS and Alliance Development Works, 2014). Increasingly, such projects are conducted with participation of many stakeholders, creating trust in scientific evidence, and adoption of results in internal procedures.

Composite indicators are useful to integrate multi-disciplinary and multi-stakeholder data, but they are a crude tool to describe a process as complex as risk because mostly available at national level only. Subnational models would address many issues related to scale, but would still suffer from lack of good data. Using probabilistic models providing average annual loss values and probable maximum loss values can increase accuracy for some peril types, but not so easily for others (e.g. conflict, technological hazards, or pandemics).

Nevertheless, data availability is increasing rapidly and scientific modelling capacity follows suit. More importantly, in recent years, partnerships between scientific organisations and practitioners and policy makers dramatically changed the uptake of evidence in policy and operations. Setting and monitoring disaster risk reduction targets is increasingly based on scientific evidence.

5. References

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