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Index for Risk Management - INFORM

INFORM
INDEX FOR RISK MANAGEMENT

Concept and Methodology

Version 2015

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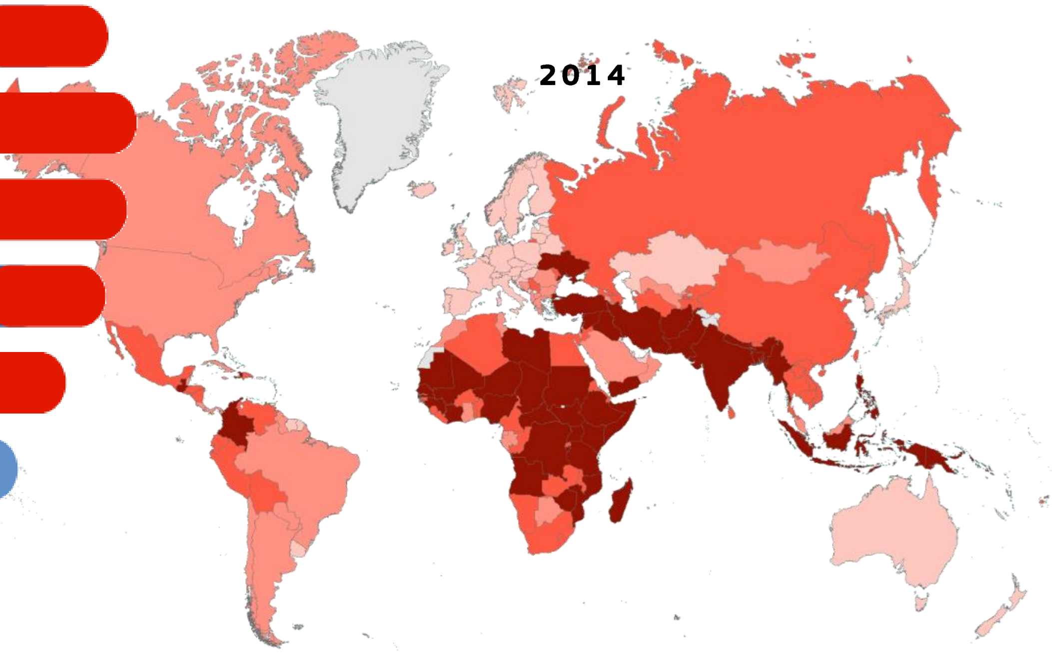

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V0.1	15/12/2013	Draft version for core INFORM partners
V1.0	20/01/2014	First version of INFORM methodology (2014)
V2.0	17/11/2014	Updated methodology and data (2015); Revised text to reflect progress of 2014

ABSTRACT

This report describes the concept and methodology of the composite Index For Risk Management (INFORM). The INFORM initiative began in 2012 as a convergence of interests of UN agencies, donors, NGOs and research institutions to establish a common evidence-base for global humanitarian risk analysis. An initial version (version 2014) was completed and a first report published in January 2014, and was used in a 10 month process of peer review, user consultation and methodological improvements. The current report is an updated version (version 2015), reflecting the outcome of that process.

INFORM identifies the countries at a high risk of humanitarian crisis that are more likely to require international assistance. The INFORM model is based on risk concepts published in scientific literature and envisages three dimensions of risk: Hazards & Exposure, Vulnerability and Lack of Coping Capacity. The INFORM model is split into different levels to provide a quick overview of the underlying factors leading to humanitarian risk.

The INFORM index supports a proactive crisis and disaster management framework. It will be helpful for an objective allocation of resources for disaster management as well as for coordinated actions focused on anticipating, mitigating, and preparing for humanitarian emergencies.

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CONTENT

GLOSSARY OF ABBREVIATIONS

ACAPS	Assessment Capacities Project
ASI	Agricultural Stress Index
CRED	Centre for Research on the Epidemiology of Disasters
DFID	United Kingdom government - Department for International Development
DRR	Disaster Risk Reduction
ECHO	European Commission - Humanitarian Aid and Civil Protection
FAO	Food and Agriculture Organization of the United Nations
FCI	Forgotten Crisis Index
GDP	Gross Domestic Product
GFM	Global Focus Model
GNA	Global Needs Assessment
GNI	Gross National Income
HDI	Human Development Index
HFA	Hyogo Framework for Action
HIIK	Heidelberg Institute for International Conflict Research
IDMC	Internal Displacement Monitoring Centre
IDP	Internally Displaced Persons
IOM	International Organization for Migration
IQR	Interquartile range
MDG	Millennium Development Goals
MMI	Modified Mercalli Intensity Scale (I-XII)
MPI	Multidimensional Poverty Index
Natech	Natural Hazard Triggering Technological Disasters
NOAA	National Oceanic and Atmospheric Administration, The United States
OCHA	Office for the Coordination of Humanitarian Affairs
ODA	Official Development Assistance
OECD	Organisation for Economic Co-operation and Development
PAGER	Prompt Assessment of Global Earthquakes for Response
PPP	Purchasing Power Parity
SS	Saffir-Simpson Hurricane Scale (Category 1-5)

UNHCR	United Nations refugee agency
UNODC	United Nations Office on Drugs and Crime
UNEP	United Nations Environment Programme
UNICEF	United Nations Children's Fund
UNISDR	United Nations Office for Disaster Risk Reduction
UXO	Unexploded ordnance (i.e. explosive weapons, e.g., bombs, bullets, shells, grenades, land mines, naval mines, etc.).
WFP	United Nations World Food Programme
WHO	World Health Organization
WRI	World Risk Index

1. INTRODUCTION

Around the globe, hundreds of millions of people are exposed to natural and man-made hazards. According to the Centre for Research on the Epidemiology of Disasters (CRED), at least 96 million people in 115 countries were affected by natural disasters in 2013. While the economic costs of these disasters are concentrated in the industrialized world, the impact on people is predominantly felt in developing countries, including the vast majority of those killed, injured and made homeless. 2013 also saw over 200 violent conflicts underway around the world, according to the Heidelberg Institute for International Conflict Research (HIIK). These and previous emergencies, both natural and man-made, have created over 16 million refugees and more than 41 million internally displaced people (IDPs).

While the lead role in disaster management lies with communities and national governments, the international community plays an important supporting role both in responding to emergencies, as well as working with communities, national governments and civil societies on prevention, mitigation, and preparedness.

Humanitarian and development stakeholders increasingly recognise the need to transition from a reactive humanitarian crisis response model to a proactive crisis and disaster management framework. Such a framework must be built on a sound understanding of the drivers of humanitarian risk so that actors can work from a common understanding of priorities in order to target their resources in a coordinated and effective manner.

Since 2012, a group of UN agencies, donors, NGOs and research institutions have explored how to address this gap.

The group is proposing a comprehensive and flexible, widely-accepted, open and continuously updated, transparent and evidence-based multi-hazard humanitarian risk index with global coverage and regional/subnational scale and seasonal variation. The group is engaged in incorporating the risk index in internal decision making processes and to demonstrate the added value of doing so to other interested organisations.

The humanitarian risk index will be helpful:

- for reaching a common understanding of humanitarian needs,
- for an objective allocation of resources for disaster management,
- for coordinated actions focused on anticipating, mitigating, and preparing for humanitarian emergencies,
- as a tool to plan ahead.

Started in a workshop in October 2012 organised at the Joint Research Centre of the European Commission (JRC), the process leading to INFORM followed a series of technical discussions among the partners. The first workshop explored the synergies between a process around improving the European Commission Global Vulnerability and Crisis Assessment and a similar process in the Inter Agency Standing Committee (largely focused on expanding the OCHA Global Focus Model). The Joint Research Centre of the European Commission is the main scientific partner in the INFORM process, and has lead the bottom-up process of building a consensus-based new methodology, taking into account the requirements of participating institutions as well as limitations of data availability.

In 2013 and 2014, the process has matured and the common risk assessment of INFORM has been widely discussed, both at international level, regional level and national level. Six organisations have conducted a study on how INFORM is and will change their business, including prioritization of humanitarian funding, sizing regional or national presence, or triggering preparedness actions. At regional level, in the Sahel, a similar multi-stakeholder group was set up to develop a regional version of INFORM adapted to the local situation. The lessons learnt of this exercise will allow turning INFORM into a methodology that can be applied at regional or national level, keeping the core elements identical, but adapting indicators to specific local conditions. Finally, INFORM has also inspired other communities to develop composite risk indices on resilience, disaster risk reduction and climate change.

The scope of this publication is to describe the methodology of the global INFORM index in detail. It can be considered as the second version of the methodology, greatly improved by feedback of real use by participating organisations, suggestions of new partners, and availability of new science and data. INFORM will keep evolving when new science and data becomes available, but the main concepts, dimensions and indicators are expected to remain stable to allow for comparability over the years and trends analysis.

For more information and updated versions of this document, please refer to the INFORM website: http://www.inform-index.org.

2. HUMANITARIAN RISK: THE PHENOMENA PORTRAYED BY INFORM

INFORM stands for the Index for Risk Management supporting informed decision making. It refers to the effectiveness of disaster risk management in preventing humanitarian crisis, i.e. to save lives as a core goal and indirectly to diminish disaster losses. The main users of INFORM are humanitarian organizations (FAO, ISDR, OCHA, UNHCR, UNICEF, WFP, WHO, ECHO, DFID) as well as donors, countries and other actors including development partners with a resilience agenda. The human component is essential and prioritized over economic loss though the two are related. If one can measure and monitor risk at the country level, one can better prioritize resources and advocate for resilience, preparedness and humanitarian actions. If also computed at a subnational scale, humanitarian and development actors, as well as national governments can use INFORM as a tool to monitor internal progress and to support evidence-based dialogue among actors.

The INFORM index is designed to convey the following information:

1. Which countries are at risk for a need of humanitarian assistance in response to humanitarian crises?

2. Which countries are prone to humanitarian crisis?
3. Which are the underlying factors that may lead to humanitarian crisis requiring humanitarian assistance?
4. How does the country's risk change with time?

The primary role of the index is formulated in the first question. It serves for the ranking of countries according to the likelihood for a need of international assistance in the near future. The composite index is aggregated from many categories, each reflecting a different dimension of the phenomena, and their values give the answers to the other three questions. If the continuity of the index is sustained, the time series obtained will show trends as well. The core indicators have been carefully chosen to respond to subtle changes in the society, governance or environment that can change the country's risk in either direction. Thus the index can be used to evaluate the effectiveness of policy intervention not only in the long term but also in the medium term.

Humanitarian assistance consists of material and logistical assistance provided for humanitarian purposes, typically in response to humanitarian crises. The primary objective of humanitarian assistance is to save lives, alleviate suffering, and maintain human dignity. It may therefore be distinguished from development aid, which seeks to address the underlying socioeconomic and governance factors which may have led to a crisis or emergency. A humanitarian crisis is defined as a singular event or a series of events that are threatening in terms of the health, safety or well-being of a community or large group of people. It may be an internal or external event and usually occurs throughout a large land area. Humanitarian crises can have natural or man-made causes or a combination of both. In such cases, complex emergencies occur as a result of several factors or events that prevent a large group of people from accessing their fundamental needs, such as food, clean water or safe shelter, and healthcare system.

Humanitarian assistance vs. Development aid: Humanitarian assistance refers to immediate needs in on-going emergencies while development aid ensures preparedness for future events. However, they are related. If a country manifests a high risk of needing humanitarian assistance whenever extreme natural or man-made events happen, then this country should be of high priority when allocating development resources.

Box 1: The mission statements of the humanitarian organizations involved

The humanitarian and development organizations involved in the INFORM project are the main users as well as data providers of the composite index. The INFORM framework is designed to help their missions. The official mission statements of the organization involved may be very long and comprehensive, and are precisely articulated on their webpages. Herein we deliver very concise versions:

ACAPS (The Assessment Capacities Project) - is an initiative of a consortium of three NGOs (HelpAge International, Merlin and Norwegian Refugee Council) created in December 2009, with the aim of supporting the coordinated assessment of humanitarian needs in complex emergencies and crises.

DFID (Department for International Development) is a United Kingdom government department with a Cabinet Minister in charge. The goal of the department is to promote sustainable development and eliminate world poverty. Its main programme areas of work are Education, Health, Social Services, Water Supply and Sanitation, Government and Civil Society, Economic Sector (including Infrastructure, Production Sectors and Developing Planning), Environment Protection, Research, and Humanitarian Assistance.

ECHO (Humanitarian Aid and Civil Protection department of the European Commission) - is the European Commission's department for overseas humanitarian aid and civil protection

FAO (Food and Agriculture Organization of United Nations) – leads international effort to defeat hunger, malnutrition and food security, serving both developed and developing countries

IASC (The Inter-Agency Standing Committee) is the primary mechanism for inter-agency coordination of humanitarian assistance. It is a unique forum involving the key UN and non-UN humanitarian partners.

IOM (International Organization for Migration) - is dedicated to promoting humane and orderly migration for the benefit of all. It does so by providing services and advice to governments and migrants.

OCHA (United Nations Office for the Coordination of Humanitarian Affairs) – strengthens the UN’s response to complex emergencies and natural disasters including the coordination of humanitarian response, policy development and humanitarian advocacy.

UNEP (United Nations Environment Programme) - is the voice for the environment within the United Nations system. UNEP acts as a catalyst, advocate, educator and facilitator to promote the wise use and sustainable development of the global environment. UNEP/GRID-Geneva developed the PREVIEW Global Risk Data Platform. GRID-Geneva developed several models of hazards, exposure, vulnerability and mortality risk. It is one of the main research centre supporting the Global Risk Analysis for the UNISDR GAR report.

UNHCR (United Nations High Commissioner for Refugees) – protects and supports refugees at the request of a government or the UN itself and assist in their voluntary repatriation, local integration or resettlement to a third country.

UNICEF (United Nation’s Children Fund) – provides long-term humanitarian and development assistance to children and mothers in developing countries.

UNISDR (The United Nations Office for Disaster Risk Reduction) – ensures the implementation of the international strategy for disaster risk reduction

WFP (World Food Programme) – is the food assistance branch of the United Nations. It is the world's largest humanitarian organization fighting hunger and helps people who are unable to produce or obtain enough food for themselves and their families.

WHO (World Health Organization) – is the directing and coordinating authority on international health within the United Nations' system. It is responsible for providing leadership on global health matters, shaping the health research agenda, setting norms and standards, articulating evidence-based policy options. It provides guidance and support to countries to build strong national public health systems that can maintain active surveillance of diseases and public health events as well as identify and respond to public health risks of international concern under the International Health Regulations.

The quick overview (Box 1) shows that the partners are focused on pressing issues typical for developing countries. The majority of them are specialized departments, agencies or assistant branches of United Nations, intergovernmental organizations with global coverage. Summarized in the keyword format, core issues include: poverty, development, livelihood, education, health, hunger, malnutrition, food security, vulnerable groups (children, refugees), disaster risk reduction, emergency situation, natural disasters, civil protection, and humanitarian assistance.

Referring back to the definition of INFORM we try to **identify the countries at a high risk of humanitarian crises that are more likely to require international assistance**. INFORM's interest is not primarily in countries with high exposure alone, but in those countries with high exposure and that are likely to experience such a shock to the human environment that this will hinder recovery from the crisis situation because residual capacity is too low.

We must identify the root causes for such conditions to happen to be able to rank the countries in terms of risk. However, one approach does not fit all. In developed countries, human settlements have generally developed in ways that provide a substantial protection to the local hazards through such means as a protective infrastructure, warning systems, emergency services, insurance plans, and mutual aid agreements. For extreme infrequent events such measures may not be sufficient to avoid harm but adequate for a quick recovery.

In developing countries the level of economic and social development may not provide such conditions. In many cases the root cause is reduced to poverty. This masks recognition that societies with significant economic challenges are not passive in the face of risk, but instead use the range of strategies to increase their defence mechanisms against hazard. We should look for such factors to make a distinction and enable ranking. Underlying factors could include social organization and networks, knowledge transfer and communication capabilities and basic livelihood situation. Further, we might consider potentially vulnerable social units which have limited access to social institutions (e.g., schools, hospitals, religious places and markets), be it due to physical disconnection (e.g., rural/urban), dependency on help of the others (e.g., elderly, children), or an underprivileged position (e.g., minorities, refugees, women).

3. THE ORIGINS OF INFORM

The origins of the humanitarian risk composite index INFORM lay with the European Commission's Global Needs Assessment with Forgotten Crisis Index [9] published from 2005 to 2013 and OCHA's Global Focus Model [34] published from 2007 to 2013.

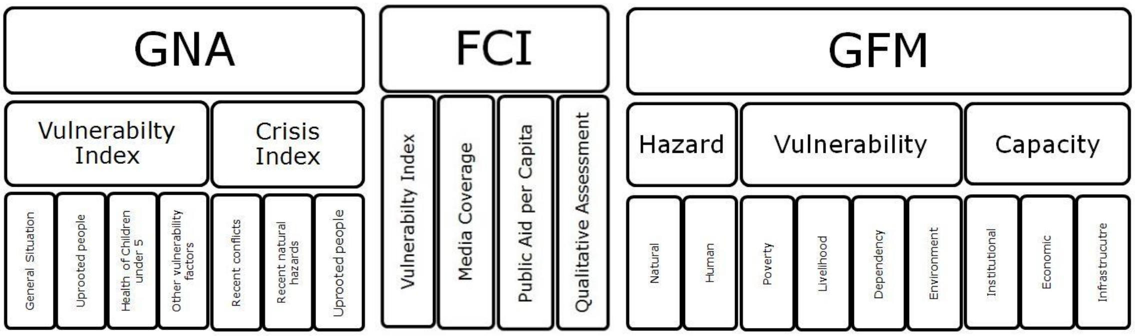

Figure 1: Global Needs Assessment Model (left), Forgotten Crisis index (middle) and Global Focus Model (right)

GNA is a combination of Vulnerability and Crisis Index. It has been renamed to Global Vulnerability & Crisis Index (GVCA) since 2013. The Vulnerability Index identifies those countries whose population is likely to suffer more than the others in the event of a humanitarian disaster while the Crisis Index identifies countries actually in a humanitarian crisis situation. The Forgotten Crisis Index detects severe, protracted humanitarian crisis situations where affected populations are receiving no or insufficient international aid and where there is no political commitment to solve the crises. GFM covers three dimensions summed into the risk value. The hazard, vulnerability and capacity dimension reflect with the disaster risk community approach although the three dimensions are added instead of multiplied like in traditional risk formulas. The GFM methodology is not openly published making it non-transparent methodology.

In a participative process (in a series of workshops) the commonalities, strengths and weaknesses of the existing indexes were identified and the lessons learned were integrated into the INFORM index.

4. CONCEPTUAL FRAMEWORK: THE PHENOMENA'S DIMENSIONS

4.1. Existing concepts

What happens to a country when exposed to a hazard event is clearly of a multifaceted nature. In scientific literature there are many different views of how to systematise disaster risk, reflected in various analytical concepts and models [2]. Given the complexity of the phenomena and interactions among different dimensions a unique optimal solution does not exist. INFORM's objective is to present disaster risk in a quantitative manner. The challenge was to construct a relatively simple framework that ascribes an appropriate level of complexity to the concept of humanitarian risk.

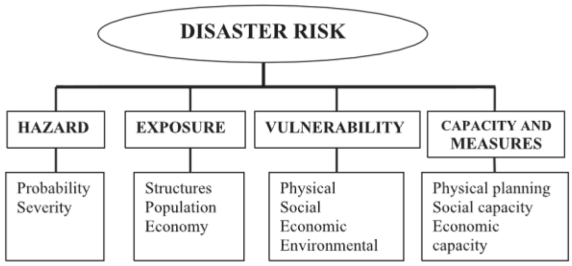

Figure 2: Conceptual framework of disaster risk community to identify disaster risk ([3],[8])

The disaster risk community ([3],[8]) conceptualizes risk as the interaction of hazard, exposure, vulnerability and capacity measures (Figure 2). However carefully the dimensions are defined, the innumerable interactions and overlappings that exist among the dimensions makes it possible to argue both positive or negative effects on the calculated risk. This framework does not portray the interactions among the dimension. This allows for a simple and transparent calculation. A hazard event represents a load that the country will have to handle characterized by severity and frequency. But no matter how severe the hazard is without exposed assets, population, buildings, infrastructure, or economy there is no risk. Vulnerability describes how easily and how severely exposed assets can be affected. Thus everything that is exposed must have an associated vulnerability which may be or may not be hazard dependent. Capacity encompasses physical planning, social capacity, economic capacity and management. It is closely related to coping capacity which refers to formal, organized activities and efforts of the country's government that are performed either after or before a hazard event.

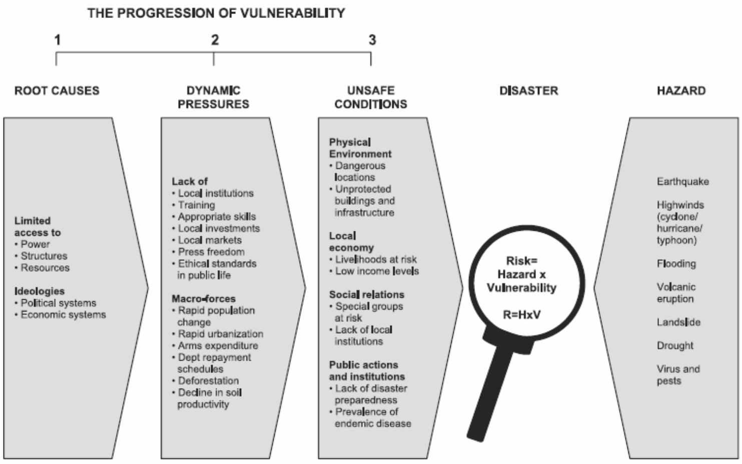

Figure 3: PAR model [41]

The pressure and release model (PAR model) views a disaster as the interaction of two major forces: on one side the hazard event while on the other side those processes generating vulnerability [41]. In this context vulnerability is defined within three progressive levels: root causes, dynamic pressures and unsafe conditions. Thus the model avoids direct identification of vulnerability and refers to underlying causes of why the population is vulnerable. The approach underlines the fact that efforts to reduce vulnerability and risk involves changing political and economic systems that in turn help to change local capacity. Again, in multi-causal situations and dynamic environments it is hard to differentiate between the causal links of different dynamic pressures on unsafe conditions and the impact of root causes on dynamic pressures.

The best known approach that emphasizes the social-ecology perspective of risk is published by Turner et al. [33]. Vulnerability is viewed in the context of a coupled human-environment system. It stresses the transformative qualities of society with regard to nature and also the changes in the environment on social and economic systems. Vulnerability encompasses three strongly interconnected aspects: exposure, sensitivity and resilience. However, complex interdependencies introduced in the model hinder its practical application.

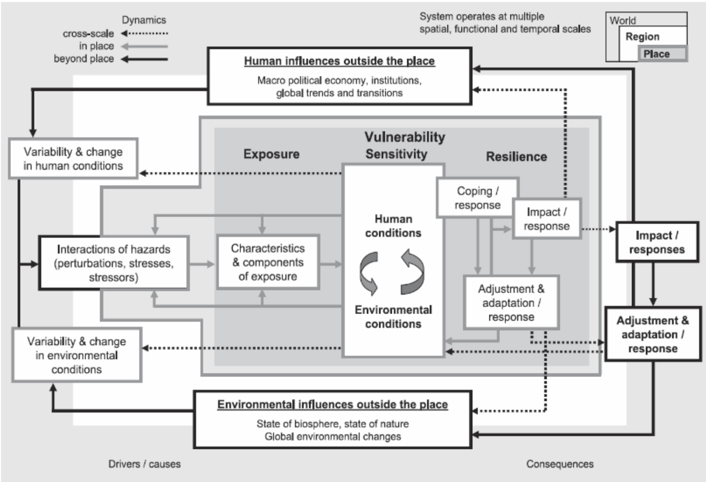

Figure 4: Coupled human-environment system [33]

The conceptual framework for a holistic approach to evaluating disaster risk was based on the work of Cardona [6]. For Cardona, vulnerability consists of exposed elements on several aspects:

- Physical exposure and physical vulnerability, which is viewed as hard risk and being hazard dependent
- Fragility of the socio-economic system, which is viewed as soft risk and being hazard independent
- Lack of resilience to cope and recover, which is also defined as soft risk being hazard independent

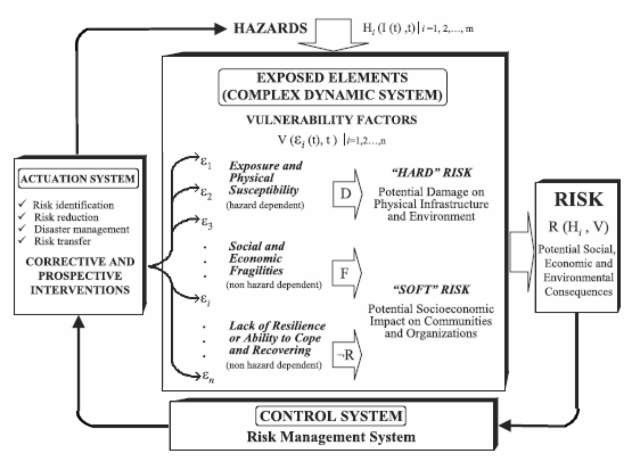

Figure 5: Holistic approach [6].

Box 2: Adopted definitions

As already observed different concepts provide different views on what vulnerability, exposure, resilience and coping capacity are. As there is no common definition in the field of disaster risk reduction the UNISDR terminology is used in the document [38]:

Disaster: A serious disruption of the functioning of a community or a society involving widespread human, material, economic or environmental losses and impacts, which exceeds the ability of the affected community or society to cope using its own resources.

Risk: The combination of the probability of an event and its negative consequences.

Hazard: A dangerous phenomenon, substance, human activity or condition that may cause loss of life, injury or other health impacts, property damage, loss of livelihoods and services, social and economic disruption, or environmental damage.

Comment: The hazards of concern to disaster risk reduction as stated in footnote 3 of the Hyogo Framework [39] are "… hazards of natural origin and related environmental and technological hazards and risks." Such hazards arise from a variety of geological, meteorological, hydrological, oceanic, biological, and technological sources, sometimes acting in combination. In technical settings, hazards are described quantitatively by the likely frequency of occurrence of different intensities for different areas, as determined from historical data or scientific analysis.

Exposure: People, property, systems, or other elements present in hazard zones that are thereby subject to potential losses.
Comment: Measures of exposure can include the number of people or types of assets in an area. These can be combined with the specific vulnerability of the exposed elements to any particular hazard to estimate the quantitative risks associated with that hazard in the area of interest.

Vulnerability: The characteristics and circumstances of a community, system or asset that make it susceptible to the damaging effects of a hazard.

Coping capacity: The ability of people, organizations and systems, using available skills and resources, to face and manage adverse conditions, emergencies or disasters.

Comment: The capacity to cope requires continuing awareness, resources and good management, both in normal times as well as during crises or adverse conditions. Coping capacities contribute to the reduction of disaster risks.

Resilience: The ability of a system, community or society exposed to hazards to resist, absorb, accommodate to and recover from the effects of a hazard in a timely and efficient manner, including through the preservation and restoration of its essential basic structures and functions.

4.2. Concept of the INFORM model

The INFORM model adopts some features of the models described above and envisages three dimensions of risk: hazards & exposure, vulnerability and lack of coping capacity dimensions. They are conceptualized in a counterbalancing relationship: the risk of what, i.e., natural and human hazard, and the risk to what, i.e., population.

The INFORM model adopts all three aspects of Cardona's vulnerability (Chapter 4.1), which also reflects the UNISDR definition of vulnerability, and splits them in three dimensions. The aspects of physical exposure and physical vulnerability are integrated in the Hazard & Exposure dimension, the aspect of fragility of the socio-economic system becomes INFORM's Vulnerability dimension while lack of resilience to cope and recover is treated under the Lack of Coping Capacity dimension. The final result is similar to the disaster risk community concept. For tracking the results of disaster reduction strategies this split of vulnerability aspects is useful. Disaster risk reduction activities are often localized and address particular community-level vulnerabilities and capacities.

Figure 6: Counterbalancing relationship

Furthermore we would like to keep the interaction of two major forces exposed in the PAR model: the counterbalancing effect of the Hazard & Exposure dimension on one side, and the vulnerability and the lack of coping capacity dimensions on the other side. Therefore hazard dependent factors are treated in the Hazard & Exposure dimension, while other hazard independent factors are divided into two dimensions: the Vulnerability dimension that considers the strength of the individuals and households relative to a crisis situation, and the Lack of Coping Capacity dimension that considers factors of institutional strength.

High vulnerability and low coping capacity, coupled with a high probability of physical exposure to hazard events contributes to a high risk of a country needing humanitarian assistance in a crisis situation.

Each **dimension** encompasses different **categories**. Categories cannot be fully captured by any individual indicator, but serve to meet the needs of humanitarian and resilience actors. We can say that the selection of categories is user-driven (for example, UNISDR may follow the

Institutional category index in the Lack of Coping Capacity dimension while UNICEF and WFP may be more interested in the category of Vulnerable Groups in the Vulnerability dimension). Underlying factors that contribute to the ranking results can be sought down through the levels depending on how narrowly the users intend to target their interventions. Each category can be broken down into **components** that capture the topic and are presented with a carefully chosen set of **indicators**.

Table 1: INFORM model

Ranking level	INFORM																
Concept level (Dimensions)	Hazard & Exposure							Vulnerability					Lack of Coping Capacity				
Functional level (Categories)	Natural					Human		Socio-Economic			Vulnerable Groups		Institutional		Infrastructure		
Component level	Earthquake	Tsunami	Flood	Tropical cyclone	Drought	Current Conflict Intensity	Projected Conflict Risk	Development & Deprivation (50%)	Inequality (25%)	Aid Dependency (25%)	Uprooted People	Other Vulnerable Groups	DRR	Governance	Communication	Physical Infrastructure	Access to Health System

The model of INFORM (Table 1) can be split into different levels to provide a quick overview of the issues in need of targeted actions:

- ranking level,
- concept level – dimensions,
- functional level – categories,
- component level - sets of indicators that capture concept of each category.

5. CALCULATING RISK

One of the underlying principles of the disaster risk reduction is to consider a disaster as a serious disruption of a community, which fits the definition of the vulnerability [38]. Taken from this standpoint a risk can be defined as a combination of the probability of an event (Hazard variable) and its negative consequences (vulnerability variable) on an exposed element (exposure variable):

$$Risk = Hazard \times Exposure \times Vulnerability$$ **Equation 1**

The UNISDR and most of the literature [41] express risk by Equation 1. In order to accommodate the INFORM methodology, where the vulnerability variable is split among three dimensions, Equation 1 is updated into:

$$Risk = Hazard\&Exposure \times \frac{Vulnerability}{Coping\ capacity}$$ **Equation 2**

Physical vulnerability (only in terms of the physical exposure) is considered under the Hazard & Exposure dimension. The higher the physical exposure, the higher is the risk. Furthermore, the vulnerability dimension covers only fragility of the socio-economic system. The higher the fragility of the socio-economic system, the higher is the risk. Institutional and infrastructure resources are allocated under coping capacity. Conceptually, better disaster management means higher coping capacity. The higher is the capacity of the institutional and infrastructure resources, the lower is the risk. The same formula for risk is suggested in [18]. For the sake of more straightforward communication, higher indicator values in INFORM refer to worse conditions. Therefor a coping capacity dimension is transformed into a lack of coping capacity. Higher lack of coping capacity means higher risk. Thus Equation 2 is transformed into:

$$Risk = Hazard\&Exposure \times Vulnerability \times Lack of\ Coping\ Capacity$$ **Equation 3**

In order to reflect the counterbalancing relationship of Hazard & Exposure against Vulnerability and Lack of Coping Capacity dimension the aggregation follows weighting in Figure 7 (left). High values in both dimensions, Vulnerability and Lack of Coping Capacity, lead to worse outcomes in the presence of high values of the Hazard & Exposure dimension. In practice INFORM results are calculated as a geometric average of the three dimensions with equal weights as in Figure 7 (right):

- Hazard & Exposure 33.3%,
- Vulnerability 33.3% and
- Lack of Coping Capacity 33.3%.

The risk calculated by Equation 4 equals zero if one of the three dimensions above is zero. Theoretically, in case of tropical cyclones there is no risk if there is no likelihood of a tropical cyclone to occur or/and the hazard zone is not populated or/and if the population is not vulnerable (e.g., all people have high level of education and live in high level of health and livelihood condition as well as they can afford houses built to a high level of wind security) or/and if the resilience of the country to cope and recover is ideal.

$$Risk = Hazard\&Exposure^{\frac{1}{3}} \times Vulnerability^{\frac{1}{3}} \times Lack of\, coping\ capacity^{\frac{1}{3}}$$ **Equation 4**

In this form the composite index is more sensitive to the Vulnerability and the Lack of Coping Capacity dimensions. We do not want to suggest that these are more important in the phenomena described. These are only the indicators that can be influenced the most with DRR activities. This approach allows slight variations in the Vulnerability and the Lack of Coping Capacity index amongst countries with similar exposure to manifest themselves in a more distinct ranking.

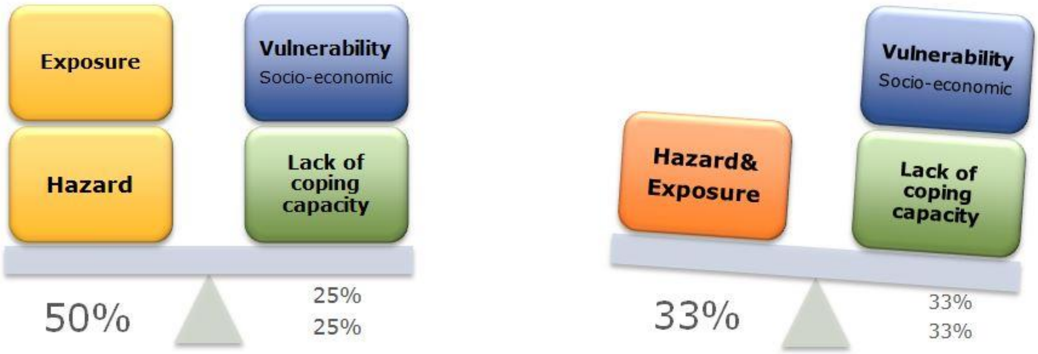

Figure 7: Weighting of the main dimensions

6. SCOPE (COVERAGE) AND SCALE (GRANULARITY) - SPATIAL AND TEMPORAL

The scope and the scale of the composite index determine the requirements for data. While the spatial scope of INFORM is global, the scale is national, at least initially; core indicators should be available, ideally, for all the countries of the world on continuous annual basis. The unit (i.e., scale) of analysis varies, from an individual to continental, from daily updates to annual measures. For example, at the individual or the household level, issues of livelihood are taken into account, yet at the national scale government efficiency parameters are applied. From a hazard perspective the impacts may be very localized or continental depending on the event.

6.1. Spatial scale

The possibility of geographical disaggregation to subnational level depends on the core indicators and the phenomena they capture. If the unit of analysis is fixed to national scale (e.g. Domestic food price index) then the subnational scale is not possible. If the unit of analysis of indicator can be disaggregated to higher scale then there are two options:

- the indicator can be determined on subnational scale because data are available or
- the indicator can be developed at subnational scale if the data becomes available in the future.

Whenever the unit of analysis allows and data are available the goal is to reach a subnational scale. Such sub-national analysis will provide greater granularity, identifying high-risk regions within otherwise lower-risk countries.

The INFORM methodology has been designed with in mind the disaggregation to subnational level. Based on preliminary work by JRC on disaggregating the Global Needs Assessment (internal report, 2013), a method was developed that is independent of the basket of spatial units. The main requirement of such a methodology is to develop normalisation functions and outlier detection functions that are independent of the statistical population. This is the case for INFORM, making the methodology applicable to data of arbitrary spatial units.

Currently, not all indicators are available at subnational level (the main ones are the Multidimensional Poverty Index, Human Development Index, Child Mortality and Children underweight). Some indicator can be spatially disaggregated (including Conflicts and natural disasters, Refugees and internally displaced people). For indicator available at national level, the following approach was followed: if the value is a ratio or fraction of population, the national value was applied to the subnational units (for instance the inequality scores and disease prevalence), if the value is an absolute value, it was weighted by the area or population of the administrative unit compared to the total country (for instance the number of refugees).

6.2. Temporal scale

For several applications of INFORM a finer temporal scale (e.g., from yearly to monthly releases) is desired, that is:

- seasonality of the risk, i.e., a monthly variation of the risk according to weather and agriculture patterns,
- forecasting of the risk, i.e., a variation of the risk according to long weather forecast.

This is particularly applicable to the Hazard & Exposure dimension but also Vulnerability may have seasonal components. The default temporal unit is set to one year, but it can be shorter. For example by applying WFP's Seasonal and Hazards Calendar[1] indicating the months where major seasonal hazards like floods, droughts, cyclones and heavy rains are active, temporal units can be reduced to the monthly scale.

Through time series INFORM will contribute to disaster risk management by providing Information about how the risk changes with time. It is not expected that the INFORM index and index of underlying dimensions will fluctuate in a quick way. For example a risk is highly connected to the development of infrastructure and has thus a significant inertia. Therefore it may take years,

[1] http://www.hewsweb.org/hazcal/

even under the best governance, to change the risk profile of the country. But indicators with proper sensitivity can reveal trends.

6.3. Update frequency

Natural hazards are relatively constant, apart from slow-changing influences of climate change and population growth. Indicators considered in the hazard dimension (the natural hazard category in particular) are based on databases that define the frequency and severity of past events over time and are thus little affected by single recent events. However, these recent events change the vulnerability of the country to the next hazard event significantly in the short term, i.e., during the recovery phase. The sensitivity of the INFORM index to on-going or recently resolved conflicts and recent natural disasters was modelled with the number of uprooted people and the number people affected by recent shocks, the two components under the Vulnerable Group category. These numbers are updated as soon as data are available. UNHCR provides global updates for the refugees data once per year but it is foreseen to increase the update frequency to 6 months, while in the case of crises situations updates come on daily bases. IDMC (Internal Displacement Monitoring Centre) for IDPs data updates the numbers on regular basis. The source for the number of affected people by recent events is EM-DAT, which provides new data every 3 months. Alternative sources are ACAPS (Assessment Capacities Project) [2] and IOM.

If data are continuous and the composite index is issued on monthly basis it does not imply that it is up to date. For instance, some indicators are designed to reflect real-time situation but they are still issued with some months of delays, e.g., GCRI conflict intensity, Relative Number of Affected Population by Natural Disasters, Number of Refugees. Despite best efforts, this time constraint must be kept in mind when using the composite index as a tool.

The INFORM will be published with two release frequencies:

- validated release: yearly release of the composite index which will be calculated with validated data,
- life release: daily/monthly releases will be available but validated later on.

[2] http://www.acaps.org/

7. COMPONENT AND CORE INDICATOR SELECTION

7.1. Introduction

The theoretical framework provides the basis for component selection, which is the next crucial step in the design of the composite index. The components should be:

- relevant: justification based on scientific literature,
- representative and robust: focused on the component to be described, proportionally responsive to the changes, they should avoid broad measures (e.g., GDP per capita),
- transparent and conceptually clear.

Furthermore, strengths and weaknesses of the composite index also derive from the core indicators, i.e. data sets describing the chosen component. These should be:

- reliable and open-source,
- continuous, consistent, global coverage,
- potentially scalable from national to subnational, from yearly to seasonal (monthly) scale .

A composite index is typically a compromise between a data driven and a user driven model. There are always some components which existing data cannot describe, especially if the demands for quality of data are very high.

When selecting the indicators the possible scalability in geographical and temporal scale is always considered as an important property for the future development of the INFORM index.

The following chapters present the component selection for each dimension and explain the aggregation rules within different levels of the INFORM model.

Box 3: Aggregation methods

Different aggregation rules are possible and each technique implies different assumptions and has specific consequences [21]. For ranking purposes aggregation is a tool to compensate a deficit in one dimension by surplus in another. The most popular aggregation methods are the arithmetic and geometric average. With arithmetic average, compensation is constant while with geometric average compensation is lower and rewards more the indicators with worse score. For a country with high and low scores, an equal improvement for low scores will have a much greater effect on the aggregation score than an equal improvement in the high score. So, the country should focus in those sectors with the lowest score if it wants to improve its position in ranking in case of the geometric aggregation. Multiple aggregation formulas may be used within a composite index. It depends how the components, sub-components and the core indicators are constructed into the framework to portray the real world phenomena. For example, we have two sub-components that are of equal importance for the performance of one component and the values are set with the notion the higher the worse. If at least one of them should score high, i.e. one OR the other, to reach the high score of the component than geometric average is the correct approach. If both of them should score high, i.e., one AND the other, to reach high score of the component than arithmetic average may be more appropriate (Chapter 10).

7.2. Dimension: Hazard & Exposure

7.2.1. Overview

The Hazard & Exposure dimension reflects the probability of physical exposure associated with specific hazards. There is no risk if there is no physical exposure, no matter how severe the hazard event is. Therefore, the hazard and exposure dimensions are merged into Hazard & Exposure dimension. As such it represents the load that the community has to deal with when exposed to a hazard event. The dimension comprises two categories: Natural Hazards and Human Hazards, aggregated with the geometric mean, where both indexes carry equal weight within the dimension.

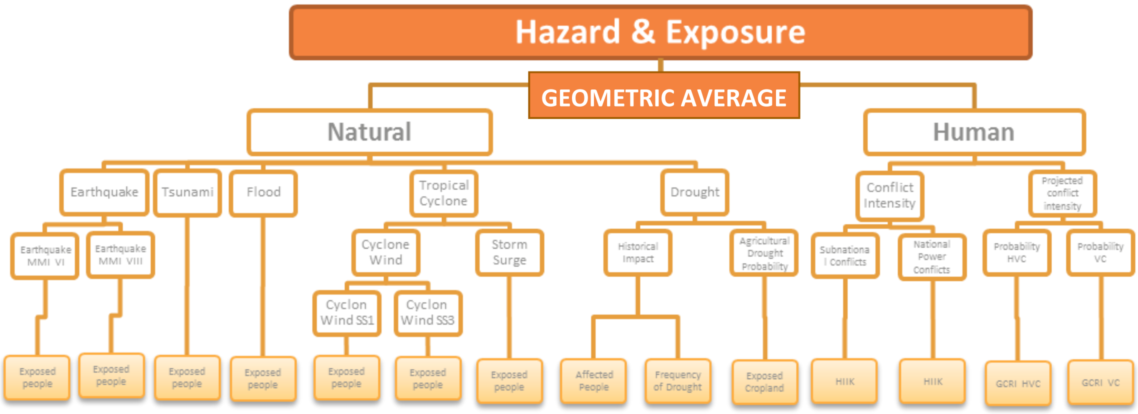

Figure 8: Graphical presentation of the Hazard & Exposure dimension

7.2.2. Category: Natural Hazard

The Natural Hazard category includes five components aggregated with a geometric average:

- Earthquake
- Tsunami
- Flood
- Tropical cyclone (Cyclone wind & Storm surge)
- Drought (Historical Impact & Agricultural Drought Probability)

According to the CRED EM-DAT database [41] the death toll of natural hazards during 1900-1999 is caused in the 86.9% cases due to famines, 12.9% due to floods, earthquakes and storms, and less than 0.2% due to volcanic eruptions, landslides and wildfires. On the other hand the rapid on-set hazards with a more limited geographic extent, sometimes labelled as extensive disasters, seldom exceed entry criteria[3] of the EM-DAT database. From that point of view their presence in the database is incomplete and the cumulative death toll is higher, while a single event rarely causes a humanitarian crises.

Rapid-onset hazards, i.e., earthquakes, tsunamis, tropical cyclones and floods, are dealt with differently than slow-onset hazard, i.e., droughts. Indicators for each component of rapid-onset hazards are based on the physical exposure to the hazard. By definition [38] the physical exposure encompasses the people and other assets that are present in the hazard zone. In the INFORM index only people are considered. Therefore the **physical exposure** is an expected number of people exposed in the hazard zone in one year calculated for each type of the hazard. It is estimated by multiplying the average annual frequency of hazard of given intensity by the population living in the hazard zone for each type of the hazard (Equation 5).

$$Physical\ Exposure = \mathrm{f} \times Pop \qquad \text{Equation 5}$$

f - *average frequency of given hazard event per year*
Pop - *total population living in the hazard zone*

Hazard zones encompass areas prone to the occurrence of an event of at least a minimum intensity level that can trigger significant damage causing a disaster. Hazard zones are obtained from hazard-specific maps converted into intensity levels or frequency of hazard intensities maps estimated from historical events. Hazard zones are overlaid with a model of a population distribution in order to derive the total population living in the hazard zone.

The aim is to find equivalent levels of intensities[4] for different types of natural hazards (Table 2). Equivalent levels should refer to the similar level of the number of people affected in terms of people needing assistance. This raises the question of how many exposed people are affected. Affected people[5] are people requiring immediate assistance during the period of emergency. Among them there are also injured, evacuated and homeless. In reality affected people are a subset of the exposed people but their share depends on their vulnerability and the strengths of the event as well as the type of the event. The approach used presumes that chosen intensity levels chosen refer to events with similar damage level and indirectly consider vulnerabilities of exposed assets.

[3] Hazard events have to fulfil at least one of the following criteria, in order to be included in the database (http://www.emdat.be/criteria-and-definition):

- 10 or more people reported killed
- 100 people reported affected
- Declaration of a state of emergency
- Call for international assistance

[4] Intensity scales are the measure of the effect of a hazard event and indirectly inherit the physical vulnerability as well as a high level of uncertainty. Correlations between physical measures for the strength of the hazard event and intensity levels are purely empirical [40]. They are usually based only on the few events and loss surveys existing in specific region. The lack of such research studies necessitates generalizing the existing correlations worldwide even though building practices vary. For example, conversion between peak ground acceleration and Modified Mercalli Intensity Scale for earthquakes is the result of survey based on eight significant California earthquakes.

[5] http://www.emdat.be/criteria-and-definition

Table 2: Intensity levels used for different type of hazards and data source [6]

Hazard type	Intensity levels	Source
Earthquake	Modified Mercalli Intensity scale VI and VIII	GSHAP Seismic hazard map (475-return period, 10% probability of exceedance in 50-year of exposure)
Tsunami	Wave height 2m	Map of annual physical exposure based on historical events for the period 1970 - 2011 (GAR 2011)
Flood	Inundated area	Map of annual physical exposure based on historical events for the period 1999 - 2007 (GAR 2009)
Cyclone wind	Saffir-Simpson category 1 and 3	Map of annual physical exposure based on historical events for the period 1969 - 2009 (GAR 2011)
Storm surge	Inundated area	Map of annual physical exposure based on historical events for the period 1975-2007 (GAR 2009)
Drought	Impact (affected people) and frequency of drought disasters	EM-DAT database for the period 1990 - now
	Agricultural drought: 30% of cropland in stress for more than 10 days	Map of annual agricultural drought based on remote sensing (ASI, FAO 2014)

Table 3: Intensity scale levels vs. damage level

Hazard type	Intensity levels	Damage level	Reference
Earthquake	Modified Mercalli scale VI	Perceived shaking: **strong** Resistant structures: **light damage** Vulnerable structures: **moderate damage**	PAGER[7]
	Modified Mercalli scale VIII	Perceived shaking: **severe** Resistant structures: **moderate/heavy damage** Vulnerable structures: **heavy damage**	PAGER
Cyclone Wind	Saffir-Simpson category 1	Wind speed: 119-153 km/h **Very dangerous winds will produce some damage**: Well-constructed frame homes could have damage to roof, shingles, vinyl siding and gutters. Large branches of trees will snap and shallowly rooted trees may be toppled. Extensive damage to power lines and poles likely will result in power outages that could last a few to several days.	NOAA[8]
	Saffir-Simpson category 3	Wind speed: 178-208 km/h **Devastating damage will occur**: Well-built framed homes may incur major damage or removal of roof decking and gable ends. Many trees will be snapped or uprooted, blocking numerous roads. Electricity and water will be unavailable for several days to weeks after the storm passes	NOAA

[6] http://preview.grid.unep.ch/index.php?preview=data&lang=eng
[7] http://pubs.usgs.gov/fs/2010/3036/pdf/FS10-3036.pdf
[8] http://www.nhc.noaa.gov/aboutsshws.php

In case of earthquake and cyclone wind the final component indicator is a geometric average of the normalized physical exposure based on two levels of intensities, i.e., low as well as extreme one. The hazard zones of low intensities inherit also the hazard zones with high intensities but their more detrimental impact is not visible with a simple overlay of the population map. So the presence of high intensities inside the hazard zones of low intensities was considered with a parallel indicator, which pushes up the countries exposed to extreme events, i.e., the events that more likely cause humanitarian crises. A high sub-component indicator is the result of high values in both levels of intensities, while low values of the indicator for high intensities will decrease high values of the indicator for low intensities and indirectly suggest that despite the high number of people exposed the share of affected people is expected to be comparatively smaller. The damage levels chosen are moderate potential damage and heavy potential damage (Table 3).

Furthermore the Tropical Cyclone component is an aggregation with arithmetic average of physical exposure for cyclone wind and cyclone surge, two possible consequences of the same hazard event.

Scalability: This approach enables geographical and temporal scalability of physical exposure. Hazard zones and population distribution maps allow extraction of subnational indicators as well as adaptation to mid-term and long-term variability when applying El-Niño scenarios or observed trends in climate changes, and incorporating seasonality of weather related hazard events.

Box 4: Literature overview of physical exposure definition

The physical exposure as used in the INFORM index exploits the current data availability and methodological limitation. Existing composite indices tackle the problem of identifying the physical exposure in different ways.

In the World Risk Index [4] and Global Focus Model [34]exposure is related to the potential average number of individuals who are exposed each year to earthquakes, storms, floods, and droughts and sea level rising.

Within the Disaster Risk Index [25] physical exposure is measured as the number of people located in areas where hazardous events occur, combined with the frequency of the hazard event in question. The Disaster Risk Index (DRI) was calibrated using past losses as recorded by EM-DAT in order to identify the contextual parameters which are best linked with mortality once associated with exposure to the hazard types. The best models identified through the multiple statistical regressions provide the weight for the different variables (exposure and socio-economic parameters). Each hazard has its own model. The analysis is based on an average value computed over a 21 year period. This is a limitation as the intensity of the event (e.g. wind for tropical cyclones, or magnitude for earthquakes...) cannot be taken into account.

The Mortality Risk Index [24][26] overcomes the limitations of the Disaster Risk Index using an event per event approach. Several thousands of past hazardous events were modelled to generate a footprint of the event, including its intensity (winds, rainfalls or magnitude depending on the hazard type). The footprint is used to extract the number of people exposed by the different levels of intensity and the outcome (death toll, economic damages) are linked with the event. This allows running a multiple regression analysis to identify the contextual parameters which are exacerbated risk. The models are different for each hazard types and also for each level of intensity. These models were reapplied over newly generated hazard models. The Mortality Risk Index shows that vulnerability plays a bigger role in low intensity events, while exposure plays a more predominant role in high intensity events.

The Disaster Deficit Index [6] measures the economic loss that a particular country could suffer when a catastrophic event takes place as well as the country's financial ability to cope with a situation. It applies probabilistic loss estimation methods that take into account all the exposed assets and their physical vulnerabilities and probability of occurrence of hazard event. A similar approach has been realized on a global scope in GAR 2013 where probabilistic loss exceedance curves were provided for earthquakes and cyclone wind using the CAPRA (Comprehensive Approach to Probabilistic Risk Assessment) methodology. The HAZUS - Natural Hazard Loss Estimation Methodology [13] is a similar methodology for probabilistic loss estimation but covers only the United States.

Drought is a complex process to model because of the inherent spatial and temporal uncertainty. In general terms, a drought can be understood as a deficiency in precipitation that severely affects a certain region, environment, industry, or people. According to the FAO, droughts are 'the world's most destructive natural hazard' with 'devastating impacts on food security and food production'. The frequency as well as intensity of droughts has increased in the past 20 years due to climate change and it is expected that this trend will intensify in the future.

Box 5: GAR 2009 approach for drought

In GAR 2009, annual physical exposure to drought is based on a Standardized Precipitation Index. However, precipitation deficits may not always result in crop failure; important variables include types of soil, vegetation and agriculture practices as well as irrigation systems. Even more, crop failure may not always lead to widespread scarcity. Modern famines are less the result of insufficient food stocks than an inability of social units to access food often due to poor governance and human conflicts. Affected people are not struck so much by physical drought as by food insecurity which is the result of the natural hazard and human causes.

In our model, the impact of drought is measured by a combination of two factors: (1) the risk for drought, calculated as the probability for an agricultural drought (which may or may not result in a drought disaster through reduced food production) and (2) the number of people affected by droughts in recent years (materialized risk).

For the first factor, we define an agricultural drought as a dry period in a certain region in which at least 30% of the crop area was in stress for more than 10 days. This is measured using the Agriculture Stress Index (ASI)[9], which is an index based on the integration of the Vegetation Health Index (VHI) in two dimensions that are critical in the assessment of a drought event in agriculture: temporal and spatial. The first step of the ASI calculation is a temporal averaging of the VHI, assessing the intensity and duration of dry periods occurring during the crop cycle at pixel level. The second step determines the spatial extent of drought events by calculating the percentage of pixels in arable areas with a VHI value below 35%.

We consider a country in drought in a particular year if the ASI index indicates drought in one or more crop seasons. We then consider the drought probability based on the country's frequency of droughts within the last 30 years.

[9] It is developed by FAO's Global Information and Early Warning System (GIEWS) and the Climate, Energy and Tenure Division.

The second factor, historical drought impact, considers the number of affected people per year (both absolute and relative to the country's population size) based on historical events in EM-DAT database for the period from 1990 up to 2013, which is the period when reporting is assumed to be consistent. To emphasize drought-prone countries with frequent and extensive drought (as well as to compensate for uncertainty associated with unique, intensive droughts), we combine the average annual drought affected people with the frequency of drought events in an arithmetic average.

The calculation of drought risk has several limitations which have to be taken into account. First of all, our model does not consider the impact of drought on pastoralism. Second, due to the coarse resolution of ASI, countries smaller than 1,000 km^2 are not considered. Lastly, the applicability of historical impact data is limited, as people "affected" by drought are not consistently defined over events (in EM-DAT).

Note that Food Insecurity is a component under Vulnerability dimension and the Vulnerable Group category (Chapter 7.3.3). Different than a drought hazard, recent Food Insecurity increases the population's vulnerability to new shocks.

Scalability: A useful feature of the ASI index is the geographical and temporal scalability, i.e., calculation of subnational indexes with seasonal component based on the historical archive of remote sensing data.

Absolute vs. relative physical exposure - correction in favour of small countries: There are two ways to consider population exposed to natural hazards. The absolute value of people exposed will favour more populated countries while the value of population exposed relative to the total population will reverse the problem and favour less populated hazard-prone countries, especially small islands where the entire population may be affected by a single cyclone. To enable a proper comparison between countries, in INFORM the subcomponent indicator is calculated both ways and then aggregated using an arithmetic average.

At the level of core indicators (Table 4) the datasets are rescaled into a range of 0 to 10 in combination with a min-max normalization. Since distribution of the absolute value of exposed people is extremely skewed, the log transformation is applied (Chapter 9).

Table 4: Aggregation of the Natural Hazards category

Functional level (Category)	Natural Hazard																	
	GEOMETRIC AVERAGE																	
Component level	Earthquake				Tsunami		Flood		Tropical Cyclone						Drought			
Aggregation	GEOMETRIC AVERAGE				ARITHMETIC AVERAGE		ARITHMETIC AVERAGE		ARITHMETIC AVERAGE						ARITHMETIC AVERAGE			
	EQ MMI VI		EQ MMI VIII						Cyclone Wind				Storm Surge		Drought impact			
									GEOMETRIC AVERAGE				ARITHMETIC AVERAGE		ARITHMETIC AVERAGE			
									CW SS1		CW SS3				Historical Impact			
	ARITHMETIC AVERAGE		ARITHMETIC AVERAGE						ARITHMETIC AVERAGE		ARITHMETIC AVERAGE				ARITH. AVG			
Core indicators	Log(absolute)	Relative	Log(absolute)	Relative	Log(absolute)	Relative	Log(absolute)	Relative	Log(absolute)	Relative	Log(absolute)	Log(absolute)	Log(absolute)	Relative	Log(absolute)	Relative	Frequency	Probability of agricultural drought

absolute - absolute value of physical exposure

relative - relative value of physical exposure

7.2.3. Category: Human Hazard[10]

Human made hazards are either technological (e.g., industrial accidents with environmental impact) or sociological in nature. The latter encompass such divergent phenomena as civil wars, high-intensity crime, civil unrest as well as terrorism. Especially armed internal conflict yields catastrophic results for populations and economies and is almost always accompanied by humanitarian risk on a larger scale, caused by the breakdown of supply lines, absent harvests, refugee flows as well as an overall deterioration of health services.

Compared to the pre-release version of the INFORM model, we excluded the variables Regime Stability and Extrajudicial and Unlawful Killings, previously used to proxy the conflict risk and low-intensity conflicts respectively in a country if there was no ongoing violent conflict. INFORM now includes two quantitative variables on man-made disaster that complement the Hazard/Exposure section with the dimension of violent conflict and the consequences generated by it, such as large refugee flows and overall destruction of infrastructure:

- Conflict Intensity
    - National Power Conflicts (source: Conflict Barometer, HIIK)
    - Subnational Power Conflicts (source: Conflict Barometer, HIIK)

[10] In contrast to earlier versions of INFORM, this updated chapter includes different variables: We discarded the variables Intentional Homicide and Regime Type, which we used to proxy conflict intensity, with the results of the JRC's Global Conflict Risk Index.

- Projected risk of conflict
  - Probability for Violent Conflict (source: Global Conflict Risk Index, JRC)
  - Probability for Highly Violent Conflict (source: Global Conflict Risk Index, JRC)

We take into account the current intensity of conflict in a country or – in case that there is currently no conflict – an estimate of future conflict probability. To determine the **Current Intensity** of a conflict, we use data by the annual *Conflict Barometer* of the Heidelberg Institute for International Conflict Research (HIIK).[11] The HIIK defines conflict as a dynamic process made up of a sequence of interlocking conflict episodes. Conflict intensity is determined by two criteria: Instruments on the use of force (use of weapons and use of personnel) and the consequences of the use of force (casualties, refugees, and demolition). Its values range from 1 (dispute) to 5 (war).

Table 5: Adaption of conflict intensity

Type of conflict	HIIK intensity	INFORM conflict intensity
Non-violent conflict	1 (dispute) 2 (non-violent crisis)	0-5
Violent conflict	3 (violent crisis)	5-8
Highly violent conflict	4 (limited war) 5 (war)	9/10

For our purpose, we cluster the conflicts observed by the HIIK into three different dimensions: Conflicts over national power in a country (National Power), over intrastate items apart from national power such as secession (Subnational), and interstate conflicts.[12] We clearly distinguish conflicts over national power from those over subnational items, as they have different causes and drivers that attributes to onset, duration, and escalation of violence.

Table 6: Conflict dimensions, items, and intensity

HIIK Conflict Item	Dimension INFORM	HIIK intensity level	INFORM conflict intensity
National power	National Power	5 (war)	10
		4 (limited war)	8
Secession Autonomy Subnational Predominance	Subnational	5 (war)	9
		4 (limited war)	7
Any	Violent conflict with lower intensity	3 (violent crisis)	Not considered
International Power Territory	Interstate	-	Not considered

[11] The HIIK approach distinguishes a total of five intensity levels, subdivided in non-violent conflicts (*Disputes* and *Non-violent Crises*) and violent conflicts (*Violent Crises*, *Limited Wars*, and *Wars*). The overall intensity is determined by the number of casualties and refugees caused by conflict, as well as by the number of personnel involved, the weapons that were used, and the destruction that was caused. The basic data is provided by the HIIK's annual Conflict Barometer which includes information about more than 400 political conflicts in the world (see http://hiik.de/en/konfliktbarometer/index.html).

[12] In our model, we only take into consideration the two intrastate dimensions of conflict. This has several reasons: First of all, scientific evidence shows that interstate conflict has become a rather rare phenomenon since the end of the Cold War. Besides, if military confrontations between states occur, they are mostly restricted to remote border regions and tend not to last longer than several weeks or even days, whereby they do not affect the civilian population as much as intrastate conflicts.

We consider conflicts over National Power to have a graver impact on population, supplies, and long-term development than those over subnational items. First of all, they constrain the overall national production and supply lines and are mostly fought with heavier weapons and more personnel and turns more people into refugees than conflicts over e.g. secession. Second, wars over government usually affect large parts of national territory and oftentimes have the tendency of involving foreign powers. Subnational conflicts are mostly restricted to certain regions of a country and only affect regional production and security. We therefore transfer the HIIK data on conflict intensity into a modified intensity scale: Conflicts with HIIK intensity 5 receive an INFORM intensity of 10 if the object is National Power, and 9 if the object is Subnational. Analogous, conflicts with HIIK intensity 4 (limited wars) are attributed values of 8 (National Power) and 7 (Subnational).

If a country does not experience violent conflict in the year of observation, we estimate instead the **Projected Risk of Conflict** using the Global Conflict Risk Index (GCRI). The GCRI is a quantitative model developed by the JRC that uses structural indicators to determine a given country's risk for conflict. It uses 22 quantitative variables including, among others, a country's regime type, its conflict history as well as other socio-economic, political, geographic and security variables that attribute to the outbreak of civil war.[13] Intensity levels as used in the GCRI are thereby also provided by the HIIK. We use the GCRI assessment of the risk for violent conflict within the next four years. The risk for either Violent Conflict (VC) or Highly Violent Conflict (HVC) is calculated using the geometric average of the probability for either type of conflict, with a log transformation of the HVC. A probability of 95% is thereby equivalent to a risk level of 7, countries with a risk score lower than 5 are considered to have no risk of conflict.

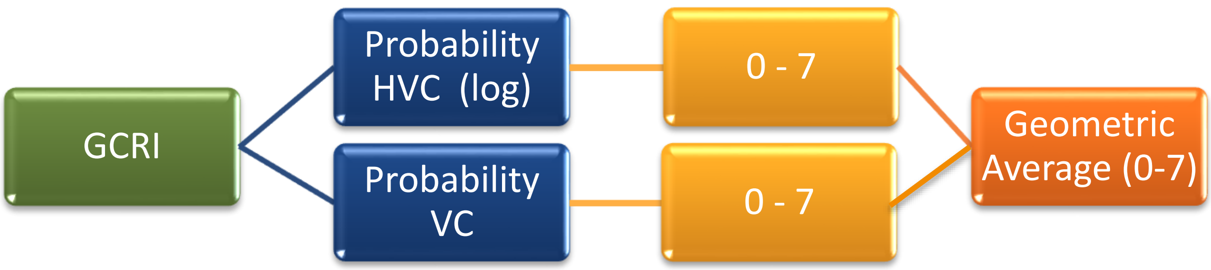

Figure 9: Transformation of GCRI Probability of conflicts to INFORM score

The total risk score for the Human Hazard category is then calculated by using the maximum score of either the actual conflict intensity or the projected intensity. As the GCRI as well as the HIIK are purely data-driven and composed of broadly accepted quantitative factors that add up to a comprehensive reflection of risk for and consequences of armed conflict, it allows us to complement our risk assessment with a man-made variable and contributes adequately to the overall predictive abilities of the model.

[13] The complete methodology of the GCRI is available via http://conflictrisk.inform-index.org/

Scalability: Subnational and monthly updates could be supported by the Conflict Barometer but they are not yet available. Data exist, at the moment, only for scientific purposes. The GCRI is planned to be updated in semi-annual intervals.

Table 5: Aggregation of Human Hazard category

Functional level (Category)	Human Hazard			
	MAXIMUM			
Component level	Current Conflict Intensity		Projected Conflict Intensity	
Aggregation	MAXIMUM		GEOMETRIC AVERAGE	
Core indicator	Conflict Barometer (Subnational)	Conflict Barometer (National Power)	Global Conflict Risk Index (Probability for Highly Violent Conflict, log)	Global Conflict Risk Index (Probability for Violent Conflict)

7.3. Dimension: Vulnerability

7.3.1. Overview

The main focus of humanitarian organizations is people, which is the element at risk contemplated in the INFORM composite index. The impact of disasters on people in terms of number of people killed, injured, and made homeless is predominantly felt in developing countries while the economic costs of disasters are concentrated in the industrialized world. The Vulnerability dimension addresses the intrinsic predispositions of an exposed population to be affected, or to be susceptible to the damaging effects of a hazard, even though the assessment is made through hazard independent indicators. So, the Vulnerability dimension represents economic, political and social characteristics of the community that can be destabilized in case of a hazard event. Physical vulnerability, which is a hazard dependent characteristic, is dealt with separately in the Hazard & Exposure dimension.

There are two categories aggregated through the geometric average: Socio-Economic Vulnerability and Vulnerable Groups. The indicators used in each category are different in time variability and the social groups considered in each category are the target of different humanitarian organizations. If the Socio-Economic Vulnerability category refers more to the demography of a country in general, the Vulnerable Group category captures social groups with limited access to social and health care systems.

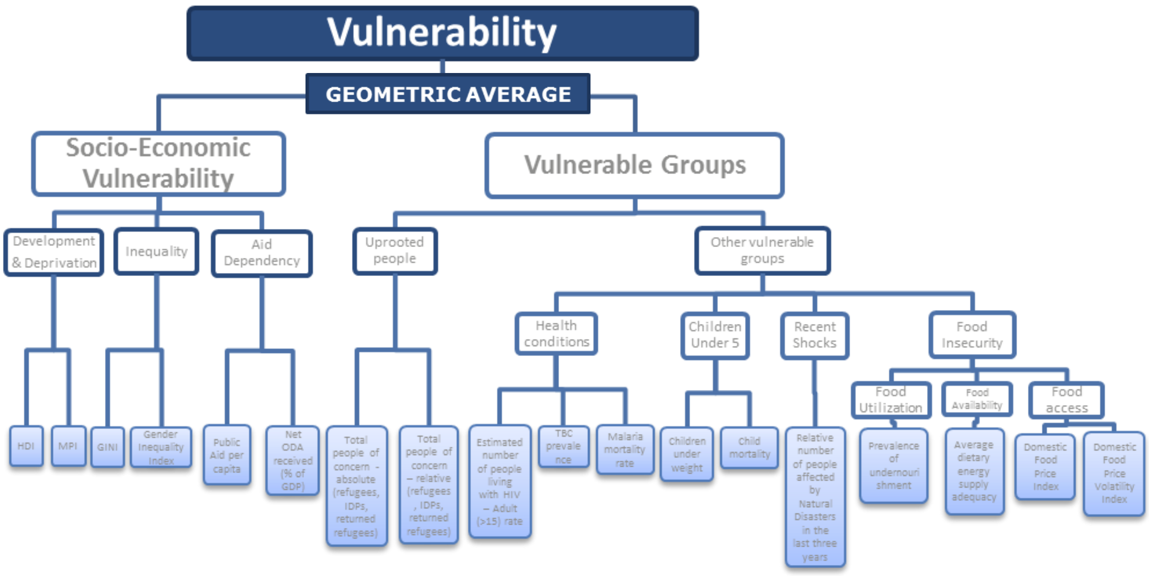

Figure 10: Graphical presentation of the Vulnerability dimension

7.3.2. Category: Socio-Economic Vulnerability

The question is what makes a population vulnerable when faced by a hazard event. In most cases vulnerability has a negative relationship with the provision of basic needs. In such cases vulnerability is closely related to the level of self-protection mechanisms. Therefore the Socio-Economic Vulnerability category tries to measure the (in)ability of individuals or households to afford safe and resilient livelihood conditions and well-being. These in turn dictate whether people can live in safe houses and locations as well as maintain an adequate health in terms of nutrition and preventive medicine to be resistant to increased health risk and reduced food intake in the case of disasters. Socio-Economic Vulnerability depends only in part on adequate income. Other deficiencies can be corrected with adequate development level that strengthens those cultural processes which raise level of awareness and knowledge. INFORM describes population performance with the weighted arithmetic average of three components:

- Development & Deprivation (50%):
    - Human Development Index (source: UNDP),
    - Multidimensional Poverty Index (source: UNDP).
- Inequality (25%):
    - GINI index (source: World Bank),
    - Gender Inequality Distribution (source: UNDP).
- Aid Dependency (25%):
    - Public Aid per Capita:
        - Total ODA in the last two years per capita published by OECD,
        - Global Humanitarian Funding per capita published by UN OCHA,
    - Net ODA Received in percentage of GDP (source: World Bank).

The **development & deprivation** component describes how a population is doing on average. It comprises two well recognized composite indices by UNDP: the Human Development Index (HDI) and the Multidimensional Poverty Index (MPI). The Human Development Index covers both social and economic development and combines factors of life expectancy, educational attainment, and income. While the Multidimensional Poverty Index identifies overlapping deprivations at the household level across the same three dimensions as the Human Development Index (living standards, health, and education), it also includes the average number of poor people and deprivations with which poor households contend. Even though dealing with similar dimensions, there is no double counting. If HDI measures capabilities in the corresponding dimension, MPI reflects the prevalence of multidimensional deprivation and its intensity in terms of how many deprivations people experience at the same time. However both indexes have a transparent methodology [16] with a justified choice of indicators and should be considered as a whole. This component is weighted 50% to fairly convey the contribution of both aspects, development as well as deprivation.

The **Inequality** component introduces the dispersion of conditions within population presented in Development & Deprivation component with two proxy measures: the Gini index by the World Bank and Gender Inequality Index by UNDP. The Gini index (named after Italian statistician and sociologist Corrado Gini) measures how evenly distributed resident's income is among a country's population while the Gender Inequality Index exposes differences in the distribution of achievements between men and women. Income inequalities are linked to and can reinforce other inequalities such as education and health inequality [37]. There is a relationship between high inequality and weak growth in developing countries, where a large part of population is trapped in poverty. Furthermore the data show [16] that countries with unequal distribution of human development within the nation also experience high inequality between women and men. So, the Inequality and Development & Deprivation components together help point out how the average person is doing and overcome the assumption that if the whole is growing, everyone must be doing better.

With the **Aid Dependency** component the methodology points out the countries that lack sustainability in development growth due to economic instability and humanitarian crisis. It is comprised of two indicators: Public Aid per capita and Net Official Development Assistance (ODA) Received in percentage of Gross National Income (GNI) by the World Bank.

Public Aid per capita is obtained as a sum of total Official Development Assistance in the last two years per capita published by OECD and Global Humanitarian Funding per capita published by UN OCHA.

Table 7: Socio-Economic Vulnerability category

<table>
<tr><th>Functional level (Category)</th><th colspan="7">Socio-Economic Vulnerability</th></tr>
<tr><td rowspan="2">Aggregation</td><td colspan="7">ARITHMETIC AVERAGE 50/25/25</td></tr>
<tr><td colspan="2">50%</td><td colspan="2">25%</td><td colspan="3">25%</td></tr>
<tr><td>Component level</td><td colspan="2">Development & Deprivation</td><td colspan="2">Inequality</td><td colspan="3">Aid Dependency</td></tr>
<tr><td rowspan="4">Core Indicators</td><td colspan="2">ARITHMETIC AVERAGE</td><td colspan="2">ARITHMETIC AVERAGE</td><td colspan="3">ARITHMETIC AVERAGE</td></tr>
<tr><td rowspan="3">Human Development Index</td><td rowspan="3">Multidimensional Poverty Index</td><td rowspan="3">GINI index</td><td rowspan="3">Gender Inequality Distribution</td><td colspan="2">Public Aid per capita</td><td rowspan="3">Net ODA Received (% of GNI)</td></tr>
<tr><td colspan="2">SUM</td></tr>
<tr><td>Total ODA in the last 2years per capita</td><td>Total Humanitarian Funding in the last 2year per capita</td></tr>
</table>

Official development assistance[14] has the promotion of economic development and welfare as its main objective. The effects of the economic instability are the main source of growth regression [24] because it decreases the ability of governments to predict budget revenue and thus expenditure, but also has an impact on income in dependent households. And once progress on human development is reversed, the damage can have multiplier effects and be lasting. For instance, deteriorating health and education today can lead to higher mortality rates tomorrow. Lower investments can hamper future progress in sanitation and water supply. The presence of fewer children in school can lead to lower completion rates in later years. And household incomes that fall far below the poverty line can delay escapes from poverty.

In a very simplistic view, the poorest regions on the world receive the highest volume of development aid relative to other regions [24]. These are the countries of sub-Saharan Africa and other least developed countries based on HDI ranking. So, development aid flows can cause developing countries to maintain government spending.

Parallel to the Aid Dependency component other aspects of economic dependency were considered as well, such as export dependency (the ratio of the international trade to GDP), export concentration (a degree to which a country's export is concentrated on a small number of products or a small number of trading partners) and personal remittances received (in % of GDP). They would address economic vulnerability in a country as a risk to have its development hampered by financial shocks triggered by different events on the foreign markets. Finally they were not adopted due to a weak causal link with the humanitarian risk.

Scalability: All core indicators of Socio-Economic Vulnerability are published annually. The data for indicators of Development & Deprivation and Inequality component are available on subnational level, while the unit of analysis for the indicators of the Aid Dependency component is country.

7.3.3. Category: Vulnerable Groups

The Vulnerable Group category refers to the population within a country that has specific characteristics that make it at a higher risk of needing humanitarian assistance than others or being excluded from financial and social services. In a crisis situation such groups would need extra assistance which appeals for additional measures, i.e., extra capacity, as a part of the emergency phase of disaster management.

Why are certain groups of people more vulnerable than others? At a conceptual level two fundamental reasons of increased vulnerability can be identified:

- Intrinsic due to internal qualities of individual themselves:
    - Special disabilities,
    - Disease and
    - Limitations imposed by stages of human life.

[14] http://www.oecd.org/dac/stats/officialdevelopmentassistancedefinitionandcoverage.htm

- Extrinsic as a result of external circumstances:
  - Social: ethnic, religious minorities, indigenous peoples,
  - Political: people affected by conflicts; refugees and IDPs,
  - Environmental: people recently exposed to frequent natural hazard events or living in areas difficult to access, like mountainous regions or extremely rural areas.

It is often the case that a particular vulnerable group is prone to several weaknesses as one characteristic of increased vulnerability develops circumstances for another one to take place. Those specific characteristics bear also a higher risk than others for a need of humanitarian assistance in the crisis situation.

For example, a study of rural communities in North Eastern India [28] shows that frequent exposure to floods is associated with long-term malnutrition of children under five. The underlying cause is the adverse impacts of flooding on crop productivity. Crop yield variation is one of the leading mechanisms to limited access to food. In such situation children are the first to suffer because of their greater sensitivity to certain exposure and dependence on care givers.

The vulnerable groups are a weak part of the society also in highly-developed countries. The Kobe earthquake of M 7.2 in 1997 revealed [41] a particularly vulnerable minority of Korean-Japanese workers and foreign illegal and legal workers. They were subjected to official neglect and economic deprivation. Within the most severely affected wards of Kobe City there were 130,000 foreign and migrant workers. Most were paid low wages in small businesses that were damaged or destroyed by the earthquake, which made their recovery even more difficult. However they failed to surface in official reporting by government as well as in most NGO reports.

Furthermore children, elderly and women in general are more vulnerable part of the society. Their presence is a demographic characteristic of the country (and in case of gender not even country specific), which is why we do not consider them as a special vulnerable group. The aim is to address special issues related to them. Children Underweight extract the group of children that are in a weak health condition, while together with Child Mortality it reflects also efficiency of the country's health system and food access problems. Gender inequality is taken into account under the Inequality component in the Socio-Economic Vulnerability. Regarding older people, they are also affected by inadequate health service and lack of protection, issues common to older ages. Declining health as well as social (e.g. isolation) and economic marginalization makes them even more vulnerable in disasters and conflicts [17]. Physical or mental impairment impede the ability to evacuate or specific health problems need adequate health care and medicines or isolation due to forgotten responsibilities of relatives and community results in poor nutritional status and poor livelihood conditions in general. Globally, the proportion of older people is increasing faster than any other group but the number of old people alone or old-age dependency ratio alone is not reflecting their weaknesses. Namely, old-age dependency ratio is higher in higher income countries but there basic insurance providing basic health care and old age pension makes their situation better. Altogether it is the matter of the Lack of Coping Capacity dimension, partially related with the quality of the social and health system, but mainly it is about strategies to protect older people during emergencies which are not momentarily directly covered by any available indicators.

However, effective monitoring and related indicators exist only for some of the identified vulnerable groups. The Vulnerable Group category is split in two: **Uprooted People** and **Other Vulnerable Groups**. Uprooted People are effectively weighted more because they are not a part of the society as well as the social system, only partially supported by the community and often trigger the humanitarian intervention:

- Uprooted People:
    - Number of refugees (source: UNHCR),
    - Number of returned refugees (source: UNHCR),
    - Number of Internally Displaced Persons (source: IDMC).
- Other Vulnerable Groups:
    - Health Conditions:
        - Prevalence of HIV-AIDS above 15 years (source: WHO),
        - Tuberculosis prevalence (source: WHO),
        - Malaria Mortality Rate (source: WHO).
    - Children under-5:
        - Children Underweight (source: WHO),
        - Child Mortality (source: WHO).
    - Recent Shocks:
        - Relative number of affected population by natural disasters in the last three years (source: EM-DAT), with decreasing weight.
    - Food Security:[15]
        - Food Access:
            - Domestic Food Price Level Index (80%): a measure of the monthly change in international prices of a basket of food commodities (source: FAO).
            - Domestic Food Price Volatility Index (20%): standard deviation of Domestic Food Price Index in the last five years (source: FAO).
        - Food Availability:
            - Average Dietary Energy Supply Adequacy: average dietary energy supply as a percentage of the average dietary energy requirement (source: FAO).
        - Food Utilization:
            - Prevalence of Undernourishment: the percentage of the population whose food intake is insufficient to meet dietary energy requirements continuously (source: FAO).

[15] Share of household expenditure is foreseen to be a third component of the Food insecurity to pinpoint the part of population living in poverty. At the moment the data coverage of Share of household expenditure is still inadequate.

Table 8: Transformation criteria for the relative value of uprooted people

% of total population	Level of Vulnerability	Index of uprooted people (relative)
> 10%	high	10.0
> 3% AND < 10%		8.3
> 1% AND < 3%	medium	6.7
> 0.5% AND < 1%		5.0
> 0.1% AND < 0.5%	low	3.3
> 0.005% AND < 0.1%		1.7
< 0.005%	no vulnerability	0.0

The total number of uprooted people is the sum of the highest figures from the selected sources (ANNEX B) for each uprooted group. The **Uprooted People** index is the arithmetic average of the absolute and relative value of uprooted people. The absolute value is presented using the log transformation while the uprooted people relative to the total population are transformed into indicator using the GNA criteria and then normalized into range from 0 to 10 (Table 8).

A **Health Condition** index refers to people in a weak health conditions. It is calculated as the arithmetic average of the indicators for three deadly infectious diseases, AIDS, tuberculosis and malaria, which are considered as pandemics of low- and middle-income countries. The combat to these three diseases is one of the 2015 Millennium Development Goals[16]. Similarly, the Global Fund[17] is an international financing institution that fights AIDS, tuberculosis and malaria.

A **Children under-5** index captures the health condition of children. It is referred to with two indicators, malnutrition and mortality of children under-5. Children Underweight extracts the group of children that are in a weak health condition mainly due to hunger. The Child Mortality shows general health condition of the children and is closely linked to maternal health since more than one third of children deaths occur within the first month of life and to how well the country tackles major childhood diseases (e.g. proper nutrition, vaccinations, monitoring system, family care practice, health system access, sanitation and water resources). Therefore decrease of underweight children and the child deaths are one of the MDG by 2015 as well.

Recent Shocks index accounts for increased vulnerability during the recovery period after a disaster and considers people affected by natural disasters in the past 3 years. The affected people from the most recent year are considered fully while affected people from the previous years are scaled down with the factor 0.5 and 0.25 for the second and third year, respectively, assuming that recovery decreases vulnerability progressively. This way the smoothness of the INFORM index in time series is assured.

[16] http://www.undp.org/content/undp/en/home/mdgoverview/
[17] http://www.theglobalfund.org/en/about/diseases/

Table 9: Vulnerable groups category

Functional level (Category)	**Vulnerable Groups**												
Component level	GEOMETRIC AVERAGE												
	Uprooted People			**Other Vulnerable Groups**									
Aggregation	ARITHMETIC AVERAGE			GEOMETRIC AVERAGE									
	Log(absolute)	Relative		**Health Conditions**			**Children under-5**		**Recent Shocks**	**Food Security**			
				ARITHMETIC AVERAGE			ARITHMETIC AVERAGE			ARITHMETIC AVERAGE			
										Utilization	**Availability**	**Access**	
										ARITHMETIC AVERAGE	ARITHMETIC AVERAGE	ARITHMETIC AVERAGE 80/20	
	SUM											80%	20%
Core Indicators	Number of refugees	Number of returned refugees	Number of IDPs	Prevalence of HIV-AIDS (>15years)	Tuberculosis Prevalence	Malaria Mortality Rate	Children Underweight	Child Mortality	Relative number of affected population by natural disasters in the last three years	Prevalence of Undernourishment	Average Dietary Energy Supply Adequacy	Domestic Food Price Index	Domestic Food Price Volatility Index

absolute - absolute value of uprooted people
relative - uprooted people relative to total population

The FAO definition of **food security** is: "A situation that exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life."[18] For our model, we therefore suggest three components for the Food Security index: Food Access, Food Availability, and Food Utilization. These concepts serve as proxy measures for the number of people lacking secure

[18] http://www.fao.org/3/a-i4030e.pdf, p.50. The complementary definition for Food Insecurity is: "A situation that exists when people lack secure access to sufficient amounts of safe and nutritious food for normal growth and development and an active and healthy life. It may be caused by the unavailability of food, insufficient purchasing power, inappropriate distribution or inadequate use of food at the household level. Food insecurity, poor conditions of health and sanitation and inappropriate care and feeding practices are the major causes of poor nutritional status. Food insecurity may be chronic, seasonal or transitory" (ibid.).

access to food. Leaning on definitions provided by the Integrated Phased Food Security Classification (IPC), we determine **Food Availability** on the fact if food is actually or potentially physically present regarding production, wild foods, food reserves, markets, and transportation. **Food Access** assesses whether or not households have sufficient access to that food, taking into account physical (distance, infrastructure), financial (purchasing power) and social (ethnicity, religion, political affiliation, etc.) aspects. Finally, **Food Utilization** covers the question whether or not households are sufficiently utilizing food in terms of food preferences, preparation, feeding practices, storage and access to improved water sources.

The combination of lack of food, lack of means to actually make it available, and lacking quality of food may lead to famine and hunger for poor populations. Therefore, the three components are aggregated with an arithmetic average. All components are the arithmetic average of the raw indicators. In the Food Access component more weight is given to the price index (absolute) versus price volatility, 80% versus 20%, respectively. For example, there are some situations of countries with high but stable prices that seem better off than countries with average prices and average volatility.

Scalability: The indicators for the Uprooted People component are foreseen to be updated as soon as data are available (Chapter 6.3) on subnational scale. The indicators of the Health Conditions and the Children under 5 sub-component are updated annually and could be potentially provided sub-nationally if the data would exist. The data for the Recent Shock sub-component are limited to national scale and provided every three months. In case of Food Insecurity indicators the data are available annually on national scale but other options considered in Box 6 , not available at the moment on global scope, would allow geographical and temporal disaggregation.

Box 6: Other options for food insecurity sub-component

For the Food Security sub-component some other options were considered, which seem more adequate but their coverage was too sparse:

- The IPC (Integrated Food Security Phase Classification) classifies the severity of food security and humanitarian situations into five phases based on a widely accepted set of indicators. The phase classification describes the current situation for a given area, while also communicating the likelihood and severity of further deterioration of the situation.
- The FEWSNet[19] methodology used by a famine early warning systems network. It uses scenarios to forecast the most likely outcomes based on continuous monitoring of weather, climate, agriculture, production, prices, trade, and other factors, considered together with an understanding of local livelihoods.
- FAO is developing a Food Security dedicated composite index named Food and Nutrition Security Index (FaNSI). The FaNSI is based on large set of base indicators describing the Food Security FAO framework. FaNSI is foreseen to be published in the following months.

These options may be integrated in the INFORM methodology in the future, when data coverage increases.

[19] http://www.fews.net

The Vulnerable Groups category should be always fed with the most recent data available (e.g., uprooted people, people affected by recent shocks,…) and plays a similar role as the Crisis Index developed within the Global Needs Assessment Index [9].

7.4. Dimension: Lack of Coping Capacity

7.4.1. Overview

For the Lack of Coping Capacity dimension, the question is which issues the government has addressed to increase the resilience of the society and how successful their implementation is. The Lack of Coping Capacity dimension measures the ability of a country to cope with disasters in terms of formal, organized activities and the effort of the country's government as well as the existing infrastructure which contribute to the reduction of disaster risk. It is aggregated by a geometric mean of two categories: Institutional and Infrastructure. The difference between the categories is in the stages of the disaster management cycle that they are focusing on. If the Institutional category covers the existence of DRR programmes which address mostly mitigation and preparedness/early warning phase, then the Infrastructure category measures the capacity for emergency response and recovery.

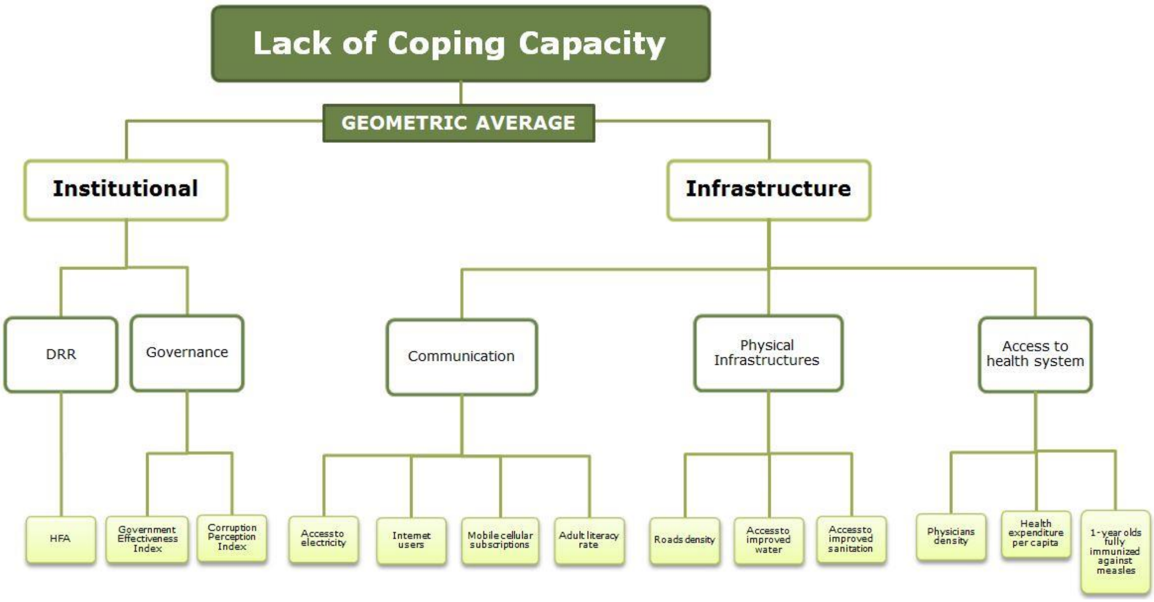

Figure 11: Graphical presentation of the Lack of Coping Capacity dimension

7.4.2. Category: Institutional

The Institutional category quantifies the government's priorities and institutional basis for the implementation of DRR activities. It is calculated as an arithmetic average of two components (Disaster Risk Reduction and Governance) in order to incorporate the effectiveness of the governments' effort for building resilience across all sectors of society.

- Disaster Risk Reduction:
  - Hyogo Framework for Action self-assessment reports (source: UNISDR).
- Governance:
  - Government Effectiveness (source: World Bank),
  - Corruption Perception Index (source: Transparency International).

The indicator for the **Disaster Risk Reduction** activity in the country comes from the score of Hyogo Framework for Action self-assessment reports of the countries. The Hyogo Framework for Action [39] covers the following topics:

1. Ensure that disaster risk reduction is a national and a local priority with a strong institutional basis for implementation.
2. Identify, assess and monitor disaster risks and enhance early warning.
3. Use knowledge, innovation and education to build a culture of safety and resilience at all levels.
4. Reduce the underlying risk factors.
5. Strengthen disaster preparedness for effective response at all levels.

Self-evaluation has a risk of being perceived as a process of presenting inflated grades and being unreliable. The subjectivity of HFA Scores is counterweighted by arithmetical average with external indicators of **Governance component**, i.e., the Government Effectiveness and Corruption Perception Index.

The Government Effectiveness captures perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies[20] while the Corruption Perception Index adds another perspective, that is the level of misuse of political power for private benefit , which is not directly considered in the construction of the Government Effectiveness even though interrelated.

Scalability: For all indicators of the Institutional category only annual updates on national scale are possible.

[20] http://info.worldbank.org/governance/wgi/index.aspx#doc

Table 10: Institutional category

Functional level (Category)	Institutional		
	ARITHMETIC AVERAGE		
Component level	Disaster Risk Reduction	Governance	
		ARITHMETIC AVERAGE	
Core Indicators	Hyogo Framework for Action Scores	Government Effectiveness	Corruption Perception Index

7.4.3. Category: Infrastructure

Communication networks, physical infrastructure and accessible health systems are treated as essential parts of the infrastructure needed during emergency response, focusing on the early warning phase, and carrying through response and recovery. Since all parts of the infrastructure should be operational to a certain level, the aggregation process uses the arithmetic average.

The Communication component aims at measuring the efficiency of dissemination of early warnings through a communication network as well as coordination of preparedness and emergency activities. It is dependent on the dispersion of the communication infrastructure as well as the literacy and education level of the recipients. In the case of Physical Infrastructure and Accessibility to Health System components the arithmetic averages of different proxy measures are used. We mainly try to assess the accessibility as well as the redundancy of the systems which are two crucial characteristics in a crisis situation.

Table 11: Infrastructure category

Functional level (Category)	Infrastructure									
	ARITHMETIC AVERAGE									
Component level	Communication				Physical infrastructure			Access to health system		
	ARITHMETIC AVERAGE				ARITHMETIC AVERAGE			ARITHMETIC AVERAGE		
Core Indicators	Access to Electricity	Internet Users	Mobile Cellular Subscriptions	Adult Literacy Rate	Roads Density	Access to Improved Water Source	Access to Improved Sanitation Facilities	Physicians Density	Health Expenditure per capita	Measles Immunization Coverage

- Communication:
  - — Access to Electricity (source: World Bank),
  - — Internet Users (source: World Bank),
  - — Mobile Cellular Subscriptions (source: World Bank),
  - — Adult Literacy Rate (source: UNESCO).
- Physical infrastructure:
  - — Roads Density (source: World Bank),
  - — Access to Improved Water Source (source: World Bank),
  - — Access to Improved Sanitation Facilities (source: World Bank).
- Access to health system:
  - — Physicians Density (source: WHO),
  - — Health Expenditure per capita (source: WHO),
  - — Measles Immunization Coverage (source: WHO).

Scalability: Health Expenditure per capita has a unit of analysis locked to country while all the other indicators could be potentially developed on subnational scale if the data would exist. Regarding the temporal scalability only annual updates are expected.

8. LIMITATIONS & CONSTRAINTS OF INFORM

There are certain areas of the three dimensions of INFORM that are not covered or covered only partially. The main constraints are related to limitations of the methodology and incomplete data availability.

8.1. Methodological limitations

Flaws of a deterministic approach in Hazard & Exposure dimension. A deterministic model performs well only for a given set of initial conditions. Hazards are determined by their probability of occurrence and severity of the event, and cannot be defined properly by only one set of parameters. If there is only one set of initial condition to be chosen the question rises if is it better to consider low intensity events or high intensity events? There are arguments for both. Low intensity events occur more often, affect larger areas and are less harmful, while high intensity events occur seldom, affect smaller areas but are much more detrimental. In that case probabilistic loss estimation methods (Box 4) would take into account all the exposed assets and their physical vulnerabilities and probability of occurrence of hazard event. The INFORM methodology for estimation of Hazard & Exposure is based on a deterministic approach. An alternative probabilistic approach would offer a more complete view but would also mean much higher processing and data requirements.

Interactions among dimensions are not considered. For example, the measures of disaster risk reduction in the Lack of Coping Capacity dimension might reduce the exposure data in the Hazard & Exposure dimension. The methodology is not able to introduce such interactions in a quantitative manner.

The usage of proxies limits the "representativeness". Certain phenomena that were addressed as important for the humanitarian risk assessment cannot be measured exactly in the way we want or adequate indicators are not available. In such situations, proxy measures are used which measure something that is close enough to reflect similar behaviour and can provide relative differences among the countries for the ranking purposes. The proper representativeness of phenomena is limited to the presence of causes, consequences, measurable parts of the process or even accompanying processes. For example, the Malaria Mortality Rate is a proxy used to rank countries by the prevalence of malaria as the latter data are deemed unreliable.

8.2. Data limitations

Extensive hazard events and sudden onset hazard events with a more limited geographic extent such as landslides, forest fires and volcanoes, are not included. One reason is lack of data availability while the other is their lower relevance in terms of causing humanitarian crises. According to the CRED EM-DAT database [41] the death toll of natural hazards during 1900-1999 is less than 0.2% due to volcanic eruptions, landslides and wildfires. On the other hand the rapid onset hazards with a more limited geographic extent seldom exceed entry criteria of the EM-DAT database. From that point of view their presence in the database is incomplete and the cumulative death toll is higher, as one event rarely causes humanitarian crises.

Biological hazards (i.e., epidemics / large scale epidemics / pandemics) are not included. They can have a large impact not only on mortality and morbidity but also on travel and trade as well as socio-economic effects. To consider their potential threat the data on probability of re-emerging diseases with certain level of impact are needed and are not so easily available.

Technological hazards are not included. Technological hazards originate from technological or industrial accidents that may arise as a result of an intentional plan (terrorist attack), a random process (human error), natural hazard event (Natech), or the lack of maintenance or ageing processes. The likelihood of such events is partially related to the presence of critical assets (uranium tailings, UXO, nuclear power plants, chemical plants) in the country and partially to the probability of occurrence of triggering event. The list of critical assets (uranium tailings, UXO, nuclear power plants, chemical plants) by country is therefore not enough to define the country's risk. To consider the consequences, data with a certain level of impact are needed, for example in terms of physical exposure, and each critical asset should come together with impact area not constrained by country borders. These data are currently not available.

Lower reliability of disaster risk reduction component. The disaster risk reduction component is based on the scores of Hyogo Framework for Action self-assessment reports of which the reliability is unknown. But it is not stand alone indicator and its trustfulness is estimated with the governance component. However, there are no other international frameworks for assessing the capacity to cope with humanitarian crises that would fit the scope so well [27]. Furthermore, UNISDR [39] sets out general guidance for building resilience to natural disasters, outlining a series of indicators for country governments to monitor their progress, which have been well accepted. Self-assessment reports cover more than 70% of the countries.

Missing data can distort the real value of the composite index. The presence of missing data cannot be completely avoided. The goal of the composite index is to aggregate the different aspects of the humanitarian risk. Whenever certain values of specific aspect are missing aggregation process fails as a tool to compensate a deficit in one dimension / category / components by surplus in another. In such cases more than one proxy measure for the same process is introduced, if they are available, to complement each other in poor coverage. It is a compromise between simplicity and accuracy of the model.

Limitations in the sensitivity of indicators and data updates affect the responsiveness of the INFORM index. Some indicators in the INFORM index are designed to reflect the real-time situation but there are time constraints that should be kept in mind. Firstly, there is a time lag between a situation changing and the indicator reflecting this change and, secondly, the indicators are usually issued with delays because they need to go through a validation process.

8.3. Ranking of countries

The composite index is a simplified view of the reality and the user should be aware of its limitations. Understanding humanitarian risk is a complex problem which can be referred to as a multidimensional phenomenon. The role of the theoretical framework is to specify single dimensions and their interrelations as well as to provide the basis for indicator selection. The ranking value of the composite index is the result of the methodology that defines the mathematical combination of individual indicators. Therefor not risk, but risk as described by the methodology of the composite index could be managed.

Furthermore, the INFORM index conveys only the information measured by indicators. Indicators have to be compliant with the selection criteria (Chapter 7.1) and the choice is sometimes more data-driven than user-driven. Different types of indicators are used:

- direct measures (e.g., number of uprooted people) which have a strong influence on the score,
- proxy measures (e.g., Gini index can be a proxy for inequality in education, livelihood, health conditions) which serve mainly for ranking,
- composite indices (e.g., HDI, MPI, …) that can be a combination of both.

The INFORM index can provide different type of results. One is the ranking of the country that sets a relationship among the countries in terms of 'certain country is ranked higher or lower than the other'. The other is the score of the countries which can be used for following trends in time series. The higher the presence of the direct measures over proxies, the larger is the relevance of the scores. For more qualitative assessment the countries can be grouped into quartiles of low, medium, high and very high risk of humanitarian crises. Furthermore, the same results can be gained in the level of dimensions and categories.

9. DATA PRE-PROCESSING OF THE CORE INDICATORS

Before the construction of the composite index and sub-indices, all raw data values of the core indicators are pre-processed. A pre-processed indicator is referred to as an index.

Pre-processing may include:

- Imputation of missing values,
- Transformation into non-dimensional scales, e.g., utilizing percentages, per capita or density functions,
- Log transformation,
- Re-scaling into range 0-10 in combination with min-max normalization,
    - Outliers identification,
    - Setting min and max values,
    - Inversion of values for the clear communication of the results: the higher the worse through all the dimensions, categories and components.

For each core indicator, the pre-processing steps are described in ANNEX B.

9.1. Imputation of missing values

In general, if data for some countries are not available for a given year, the data from the most recent year available is used. For indicators which encounter that problem, a threshold is defined how far back data can be used (ANNEX B). The acceptable span is dependent on the fluctuation and predictability of the indicator.

In the case of the missing data due to the weak coverage two approaches are applied. The first approach is to introduce more than one indicator for the same component to complement each other. The second approach is the prediction of the missing value based on the estimated relationship with another indicator. For example, Human Development Index plays an important role in the Socio-Economic Vulnerability category but data were missing for 2.6% of countries (i.e., Democratic People's Republic of Korea, Marshall Islands, Tuvalu, Nauru). Due to a strong relationship (Figure 12) of HDI with the GDP (PPP) per capita, missing values were imposed with the predicted value of HDI based on the known GDP (PPP) per capita for specific countries obtained from regression analysis executed on the rest of the set.

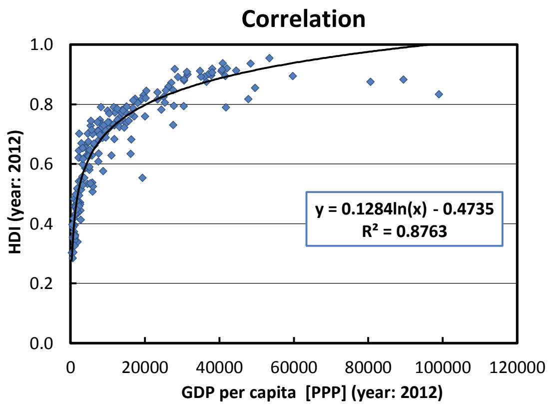

Figure 12: Regression analysis of correlation between HDI and GDP per capita (PPP)

9.2. Transformations

Transformations are applied whenever it can be justified to change the absolute differences among the countries.

The log transformation is used to reduce the positive skewness of data. Such datasets include those where the indicator is based on a people count with certain conditions. The log scale gives more weight to the differences between the countries with lower values and less weight to the countries with higher values of indicators. Log transformations take into account not only the absolute difference between two countries similar in performance but also the proportion of the gap compared to the real value of the indicator. The same gap on the lower side of the range is more important than being on the upper side of the rank. Therefore transformed data more clearly differentiate the small differences at all ranges of performance and improve the interpretation of differences between the countries on opposite ends of ranking.

9.3. Rescaling into a range of 0.0 - 10.0

Re-scaling normalises indicators to have an identical range of 0.0 – 10.0 with the notion that higher is worse. As outliers often cause min and max values to be very different from the bulk of the values in the dataset rescaling with predefined min and max values is applied (Equation 6).

Identification of outliers and setting min and max values. Fixed min and max values for each indicator dataset are preferred in order to:

- preserve the rescaling factor and make the transformation stable through the time series,
- exclude the distortion effect of outliers on indicator's set,
- consider the nature of the topic reflected which predefines the reasonable min and max values (e.g., expert opinion).

$$x_{i,norm}^{j} = \frac{x_i^j - x_{i,min}}{x_{i,max} - x_{i,min}} \times 10$$

Equation 6

x_i^j − data point for the j − th country from i − th indicator's dataset
$x_{i,min}$ − min value for i − th indicator's dataset
$x_{i,max}$ − max value for i − th indicator's dataset
$x_{i,norm}^{j}$ − normalized data point or the j − th country from i − th indicator's dataset

An outlier is a data point that is distinctly separate from the rest of the data. Outliers are indicative of heavy tailed distribution, a mixture of two distributions, or errors. In the first two cases they indicate that the distribution has high kurtosis and skewness or may be two distinct sub-populations, then one should be very cautious in using tools or intuitions that assume a normal distribution. In the case of errors one wishes to discard them or use statistics that are robust to outliers. There are many techniques to identify outliers:

- percentile rank, the technique to correct for outliers used in Environmental Sustainability Index. It trims variable distributions outside the 2.5 and 97.5 percentile scores. That is, any observed value greater than the 97.5 percentile is lowered to match the 97.5 percentile. Any observed value lower than the 2.5 percentile is raised to the 2.5 percentile. This way values of countries that are ranked very low and very high are disregarded and their number is fixed.
- box plot [32] based on interquartile range (IQR) where the lowest datum is still within 1.5 IQR of the lower quartile, and the highest datum is still within 1.5 IQR of the upper quartile and the rest of the data are treated as outliers. This approach focuses on the range containing 50% of the countries and then extends that range independently from the distribution. So the number of data points that exceeds the limits varies. For right–skewed distributions the boxplot typically labels too many large outliers and too few small outliers.

- the min and max values for which skewness is lower than 2 AND kurtosis is lower than 3.5. Skewness and kurtosis are calculated iteratively for the whole dataset without the obvious outliers, until pre-set conditions are met. The minimum and maximum data point of the remaining dataset are taken as min and max.

The last two options were used to find the indicative min and max values based on data from 2008-2013. They were adjusted to cover expected changes (beyond 2013) over time based on expert opinion. It is suggested to re-evaluate min and max values periodically, e.g. every five years.

Inversion. The methodology defines in what way single indicator affects the composite index. In the model all values are presented with the notion that higher is worse. So, whenever higher values of the indicator would contribute to a lower INFORM index, the following inversion of already rescaled dataset, is executed:

$$x_{i,norm,inv}^{j} = 10 - x_{i,norm}^{j}$$ **Equation 7**

$x_{i,norm}^{j}$ $- normalized\ data\ point\ for\ the\ j-th\ country\ from\ i-th\ indicator's\ \ dataset$

$x_{i,norm,inv}^{j}$ $- normalized\ data\ for\ the\ j-th\ country\ from\ i-th\ indicator's\ \ dataset\ inversed$

10. MATHEMATICAL COMBINATION

Different aggregation rules are possible. Which one to choose depends on the methodology which defines how the information from indicators should contribute to the composite index. Aggregation rules can be defined using mathematical operations such as:

- Minimum: the best indicator only
- Maximum: the worst indicator only
- Arithmetic average
- Geometric average

The INFORM methodology implements the arithmetic and geometric average. Aggregation rules are applied to indexes at each level in order to progress through the levels in a hierarchical bottom-up way , i.e. starting at indicator level and going one by one through the component level, the category level, to the dimension level. The final score of the INFORM index is calculated with the risk equation (Equation 4) in Chapter 0.

In arithmetic and geometric aggregations weighting can be applied to control the contribution of each indicator to the overall composite and should be justified by the theoretical framework. Practically, weights express a desired trade-off between indicators.

10.1. Arithmetic average

The arithmetic average is calculated according the Equation 8:

$$c_{AA}^{j} = \frac{1}{n^c}\sum_{i=1}^{n^c} s_i^j$$ Equation 8

s_i^j $- \ i - th \ subcomponent \ of \ the \ component \ c \ \ for \ country \ j$
c_{AA}^j $- \ arithmetic \ average \ of \ component \ c \ for \ country \ j$
n^c $- \ number \ of \ subcomponentc \ of \ component \ c$

When methodology defines a weighting model, Equation 9 is used:

$$c_{AA}^{j} = \sum_{i=1}^{n^c} w_i^c s_i^j$$ Equation 9

w_i^c $- \ weight \ of \ the \ \ i - th \ subcomponent \ of \ the \ componet \ c$

where

$$\sum_{i=1}^{n^c} w_i^c = 1.$$ Equation 10

10.2. Geometric average

The geometric average is calculated according the Equation 11:

$$c_{GA}^{j} = \left(\prod_{i=1}^{n^c} s_i^j\right)^{\frac{1}{n^c}}$$ Equation 11

s_i^j $- \ i - th \ subcomponent \ of \ the \ component \ c \ \ for \ country \ j$
c_{GA}^j $- \ geometric \ average \ of \ component \ c \ for \ country \ j$
n^c $- \ number \ of \ subcomponentc \ of \ component \ c$

The geometric average is always smaller (or equal) than the arithmetic average (Figure 13) and is valid only for positive values. In our case the geometric average (Equation 11) would reward countries with lower scores, i.e., contributing to lower risk.

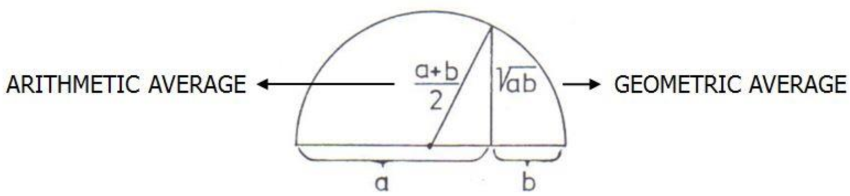

Figure 13: Arithmetic vs. geometric average

To use that characteristic of geometric mean to our advantage, i.e., to reward more those countries with higher scores, the following procedure is applied:

1. Inversion of index s_i following the notion higher the better to get $s_{i,inv}$

$$s_{i,inv} = 10 - s_i \qquad \text{Equation 12}$$

2. Rescaling it into the range of 1-10, i.e., $[a - b]$, to get $s_{i,inv,resc}$ and guarantee positive values (be noted that the selection of the range $[a - b]$ affects the results but the same range [1-10] was applied consistently for all aggregations using geometric average):

$$s_{i,inv,resc} = a + \frac{b-a}{10-0} \times s_{i,inv} \qquad \text{Equation 13}$$

3. Calculation of geometric average for each country j:

$$c^j_{inv,resc} = \left(\prod_{i=1}^{n^c} s^j_{i,inv,resc} \right)^{\frac{1}{n^c}} \qquad \text{Equation 14}$$

n^c $-$ *number of subcomponentc of component C*
$c^j_{inv,resc}$ $-$ *the geometric average score for the country j in component C*

When methodology defines the weighted model:

$$c^j_{inv,resc} = \prod_{i=1}^{n^c} \left(s^j_{i,inv,resc} \right)^{w_i^c} \qquad \text{Equation 15}$$

w_i^c $-$ *weight of the i − th subcomponent of the componet c*

where

$$\sum_{i=1}^{n^c} w_i^c = 1. \qquad \text{Equation 16}$$

4. Rescaling the score back into the range of 0-10:

$$c^j_{inv} = \frac{10-0}{b-a} \times \left(c^j_{inv,resc} - a \right) \qquad \text{Equation 17}$$

5. Inversion of the score with the notion that higher is worse, i.e., contribution to higher risk:

$$c^j_{GA} = 10 - c^j_{inv} \qquad \text{Equation 18}$$

c^j_{GA} $-$ *geometric average of component c for country j*

10.3. Arithmetic vs. geometric average

For ranking purposes, aggregation is a tool to compensate a deficit in one dimension by surplus in another. With arithmetic average compensation is constant while with geometric average compensation is lower and rewards more the indicators with higher scores. For a country with high and low scores, an equal improvement for low scores will have a much greater effect on the aggregation score than an equal improvement in the high score. So, the country should focus in those sectors with the lowest score if it wants to improve its position in ranking in case of the geometric aggregation.

To provide an understanding of the implication of using either formula (Chapter 12), let us consider the Hazard & Exposure dimension which is aggregated by two categories with equal weights, Natural and Human Hazard. For example, we consider Ethiopia and Nigeria (Table 12). These two countries have almost equal arithmetic average in those two categories. However, arithmetic average implies that in order to have a high score in the Hazard & Exposure dimension, then both the Natural AND the Human Hazard category have to be high. Instead, the use of a geometric average implies that it is enough for a country to have a high score either on the Natural OR on the Human Hazard category, in order for the country to have a high Hazard & Exposure score. As a high exposure in at least one of the hazard category put already the country at high risk of exposure to hazards, it is more logical to use geometric average.

Table 12: Different aggregation rules (example)

	Natural Hazard	Human Hazard	Hazard & exposure	
			Arithmetic Average	Geometric Average
Ethiopia	5.4	6.7	6.0	6.1
Nigeria	2.4	9.6	6.0	7.3

11. STATISTICAL ANALYSIS

11.1. Correlation analysis

Correlation analysis reveals bivariate (i.e., pairwise) Pearson's correlation coefficients between the indexes (i.e., variables), positioned in the same level or different levels of the composite index structure (ANNEX A). A lack of correlation among the sub-indices of the same component/category/dimension, that is the indices within the same level, is a useful property. It indicates that they are measuring different "statistical dimensions" in data. The less they are correlated the more variables are needed to explain the same level of the variance. The covariance of indices may be further investigated via factor analysis[21]. How many "factors" should be retained in the composite index without losing to much information can be decided by, among others, variance explained criteria [21]. Usually the rule is to keep enough factors to account for 90% of

[21] An extended statistical audit will be performed in 2014 by JRC, and will be published separately.

the variation. This is the way to reduce the number of variables by finding dominant ones within the full set.

Table 13: Statistical influence of the INFORM categories within dimensions

	Hazard & Exposure	Vulnerability	Lack of Coping Capacity	INFORM
	CC^2	CC^2	CC^2	CC^2
Natural 50%	0.54			
Human 50%	0.78			
Socio- economic 50%		0.71		
Vulnerable Groups 50%		0.72		
Institutional 50%			0.83	
Infrastructure 50%			0.90	
Hazard & Exposure 33%				0.66
Vulnerability 33%				0.68
Lack of Coping Capacity 33%				0.6

CC - Pearson's correlation coefficient

A square of a Pearson's correlation coefficient between the sub-indices and one-level-up aggregate index (component/category/dimension) can measure the influence of sub-index on the aggregate index due to correlation [22]. The relative differences among those correlations explain the influence of a given sub-index for the aggregate index

The results of the correlation analysis are shown in Table 13 - Table 15. Similar Pearson's correlation coefficients (always squared) of the categories within the same dimension justifies the equal weighting imposed in the INFORM methodology (Table 13).

Table 14: Statistical influences of underlying components

	Natural	*Human*	*Socio-Economic Vulnerability*	*Vulnerable Groups*	*Institutional*	*Infrastructure*
	CC²	CC²	CC²	CC²	CC²	CC²
Earthquakes 20%	0.51					
Tsunamis 20%	0.31					
Floods 20%	0.49					
Tropical cyclones 20%	0.28					
Droughts 20%	0.08					
Current Highly Violent Conflict		0.65				
Conflict Probability		0.95				
Development & Deprivation 50%			0.85			
Inequality 25%			0.59			
Aid Dependency 25%			0.62			
Uprooted people 50%				0.80		
Other Vulnerable Groups 50%				0.36		
DRR 50%					0.77	
Governance 50%					0.85	
Communication 33%						0.84
Physical infrastructure 33%						0.87
Access to health care 33%						0.86

· Pearson's correlation coefficient

For the lower levels (A square of a Pearson's correlation coefficient between the sub-indices and one-level-up aggregate index (component/category/dimension) can measure the influence of sub-index on the aggregate index due to correlation [22]. The relative differences among those correlations explain the influence of a given sub-index for the aggregate index

The results of the correlation analysis are shown in Table 13 - Table 15. Similar Pearson's correlation coefficients (always squared) of the categories within the same dimension justifies the equal weighting imposed in the INFORM methodology (Table 13).

Table 14) results suggest that all underlying components contribute in a similar way to the variation of the aggregated score of the next level. Within the Socio-Economic Vulnerability category the Development & Deprivation component has a stronger influence as intended through a double nominal weight. The Human Hazard category is a specific case where the aggregated score is based on the maximum of the two components and not on the average. For this reason is not possible to assign a nominal weight to the two components. So, the overall index is well-structured and balanced in the underlying components.

Furthermore, the sub-components of the Other Vulnerable Groups component (Table 15) equally share influence. The exception for Recent Shocks may be tolerated due to the unpredictability of hazard events.

The results of the correlation analysis are time-dependent and will change with updated datasets.

Table 15: Dispersion of influences within the Other Vulnerable Groups component

	Other Vulnerable Groups	
	CC^2	Norm
HIV, TBC, Malaria Prevalence 25%	0.69	0.27
Children U5 25%	0.72	0.28
Recent Shocks 25%	0.47	0.18
Food Security 25%	0.69	0.27

CC - Pearson's correlation coefficient
Norm - Normalized influence

12. INTERPRETATION OF THE INFORM INDEX RESULTS

The INFORM index is scored between 0.0 and 10.0. The low values of the index represent a positive performance, and the high values of the index represent a negative performance in terms of managing humanitarian risk. The notion that higher is the worse is consistently applied also at dimension, category and component level. For the interpretation of the results index values are divided into four quartiles: low, medium, high and very high. Figure 14 shows the correlations between the categories within one dimension (a, b, c) as well as dimensions within the INFORM model (Figure 14d). Regarding the categories, the bad pairwise correlations suggest their independence in the model. Regarding the dimensions, the high correlation is shown between the Vulnerability and the Lack of Coping Capacity dimension (Pearson's correlation coefficient is 0.81 – ANNEX A) and the importance of all three dimensions to calculate the risk.

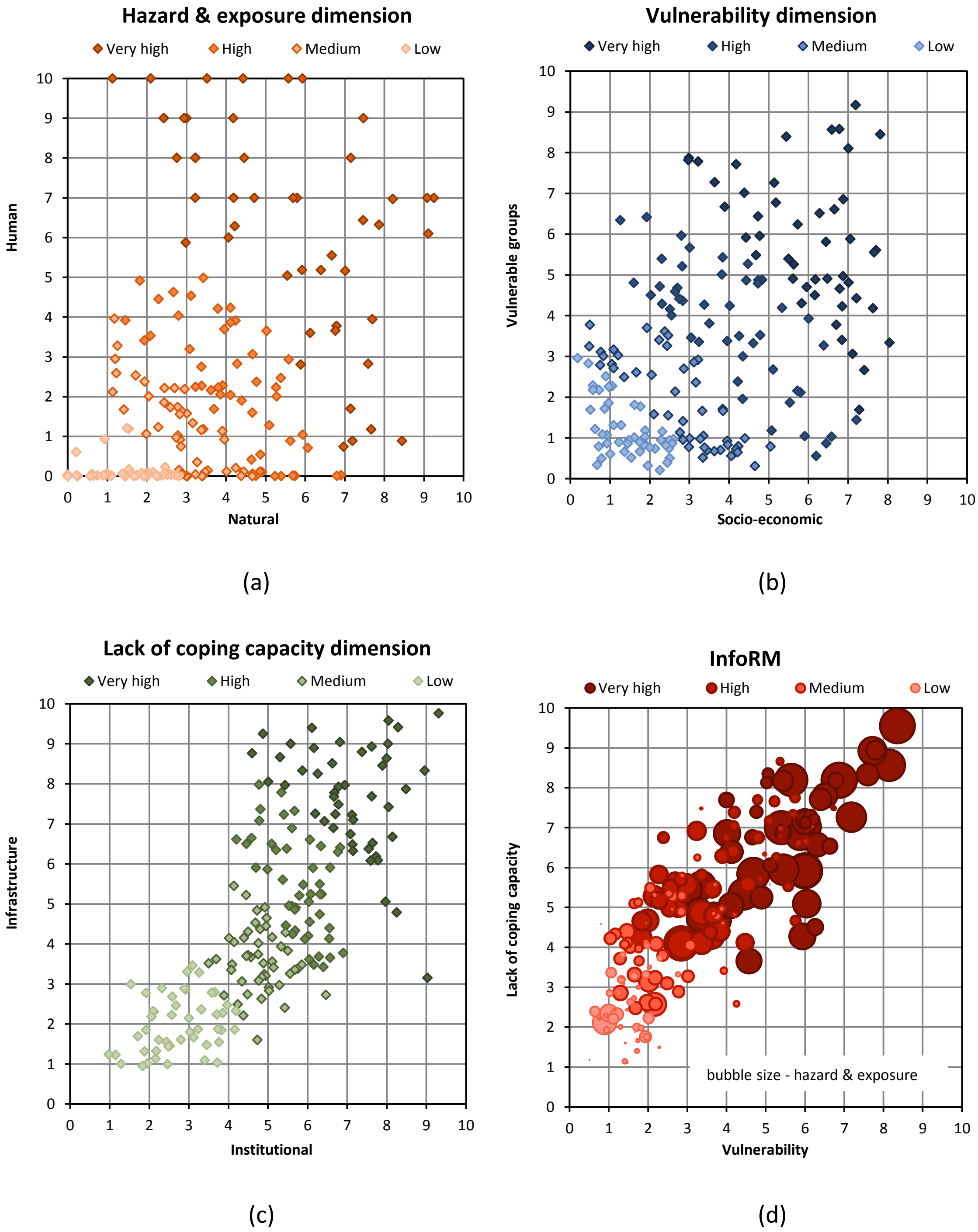

Figure 14: The aggregation of categories into dimensions and dimensions into the INFORM 2015 Index

Table 16 shows the first ten ranking countries in each dimension and in the INFORM index, while Table 17 shows the value of the dimension and category indexes for the first ten countries ranked by the INFORM index.

Table 16: Top ten countries in each of the dimensions and the INFORM 2015 index

INFORM rank	COUNTRY	InfoRM	INFORM rank	COUNTRY	Hazard & Exposure	INFORM rank	COUNTRY	Vulnerability	INFORM rank	COUNTRY	Lack of Coping Capacity
1	Somalia	8.8	3	Afghanistan	8.7	1	Somalia	8.4	1	Somalia	9.6
2	CAR	8.2	1	Somalia	8.6	2	CAR	8.1	9	Chad	8.9
3	Afghanistan	7.9	12	Syria	8.4	9	Chad	7.8	4	South Sudan	8.9
4	South Sudan	7.8	29	Philippines	8.3	4	South Sudan	7.7	69	Guinea-Bissau	8.7
5	Sudan	7.2	52	Mexico	8.3	8	Congo DR	7.6	2	CAR	8.6
6	Yemen	7.2	10	Myanmar	8.2	5	Sudan	7.2	38	Guinea	8.4
7	Iraq	7.0	7	Iraq	8.2	3	Afghanistan	6.9	8	Congo DR	8.3
8	Congo DR	7.0	6	Yemen	7.9	20	Niger	6.8	6	Yemen	8.2
9	Chad	6.8	19	Bangladesh	7.9	91	Liberia	6.7	3	Afghanistan	8.2
10	Myanmar	6.8	2	CAR	7.8	26	Burundi	6.6	20	Niger	8.2

Table 17: Top ten countries in INFORM 2015 with the dimension and category values (ANNEX D)

	COUNTRY	Natural	Human	Hazard & Exposure	Socio-Economic Vulnerability	Vulnerable Groups	Vulnerability	Institutional	Infrastructure	Lack of Coping Capacity	InfoRM
1	Somalia	5.6	10.0	8.6	7.2	9.2	8.4	9.3	9.8	9.6	8.8
2	CAR	1.1	10.0	7.8	7.8	8.4	8.1	8.0	9.0	8.6	8.2
3	Afghanistan	5.9	10.0	8.7	6.9	6.9	6.9	7.9	8.5	8.2	7.9
4	South Sudan	2.9	9.0	7.0	6.6	8.6	7.7	8.3	9.4	8.9	7.8
5	Sudan	4.2	9.0	7.3	5.4	8.4	7.2	6.7	7.8	7.3	7.2
6	Yemen	2.1	10.0	7.9	4.7	6.4	5.6	8.5	7.9	8.2	7.2
7	Iraq	3.5	10.0	8.2	3.0	7.9	6.0	7.8	6.1	7.0	7.0
8	Congo DR	3.2	7.0	5.4	7.0	8.1	7.6	8.0	8.6	8.3	7.0
9	Chad	3.0	5.9	4.6	6.8	8.6	7.8	8.0	9.6	8.9	6.8
10	Myanmar	9.1	7.0	8.2	4.8	6.0	5.4	7.5	6.4	7.0	6.8

The maps below (Figure 15 - Figure 18, larger one are in ANNEX E) highlight countries with low, medium, high and very high risk for the INFORM index and indexes of the three dimensions.

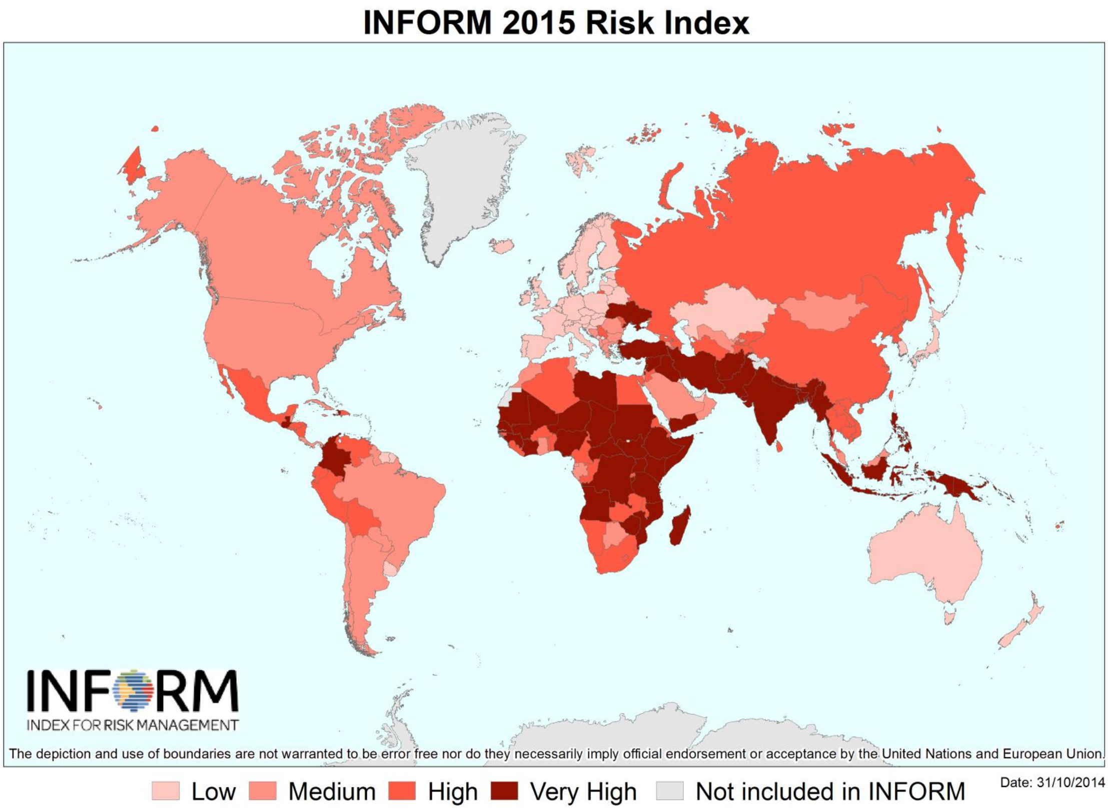

Figure 15: World map – INFORM 2015 index in quartiles

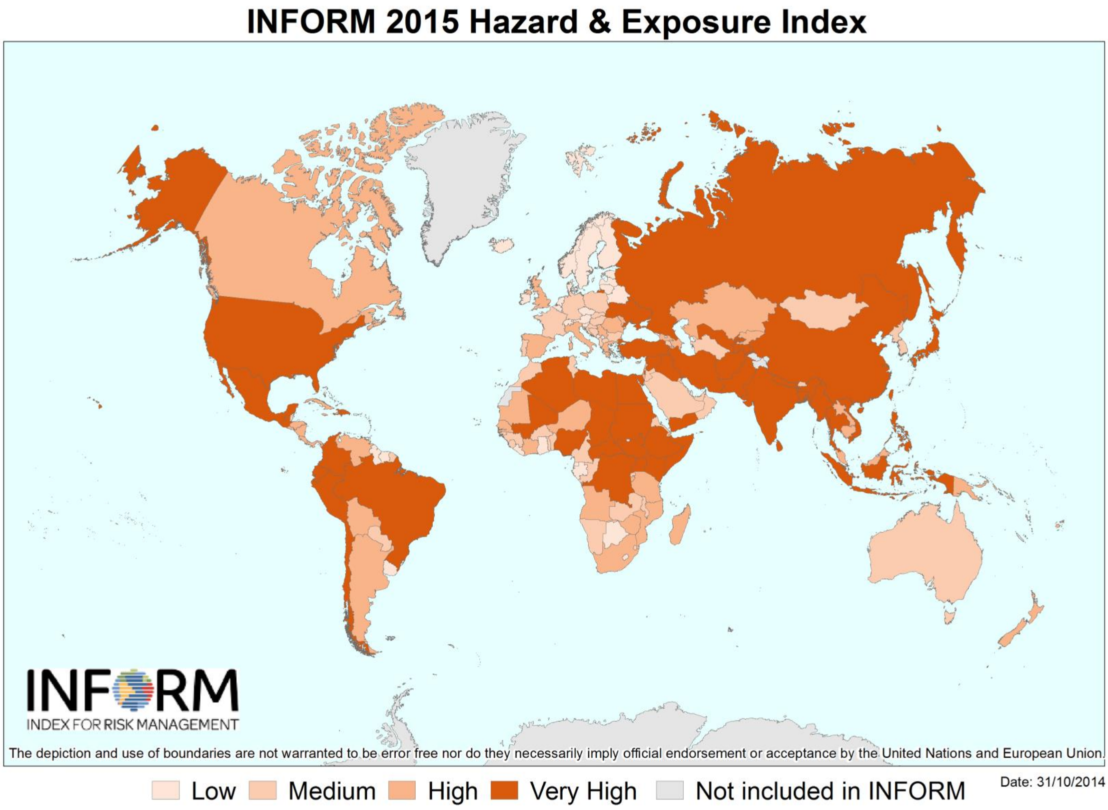

Figure 16: World map – Hazard & Exposure dimension of the INFORM 2015 index in quartiles

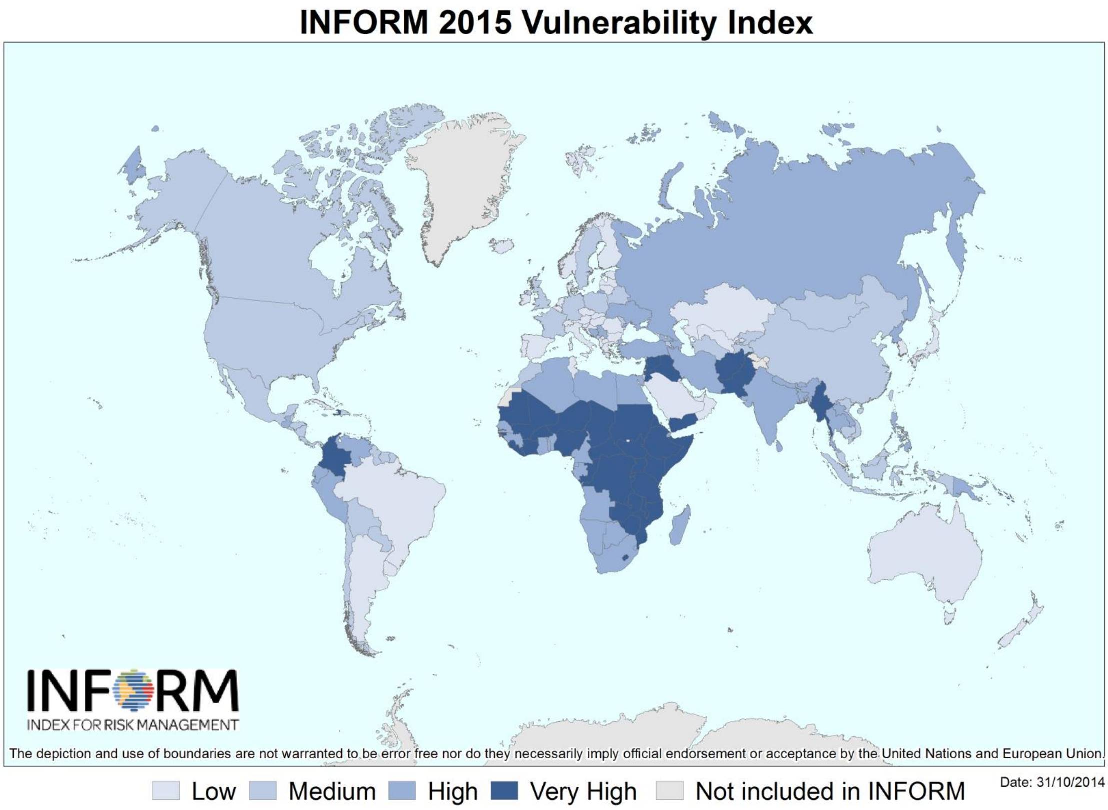

Figure 17: World map – Vulnerability dimension of the INFORM 2015 index in quartiles

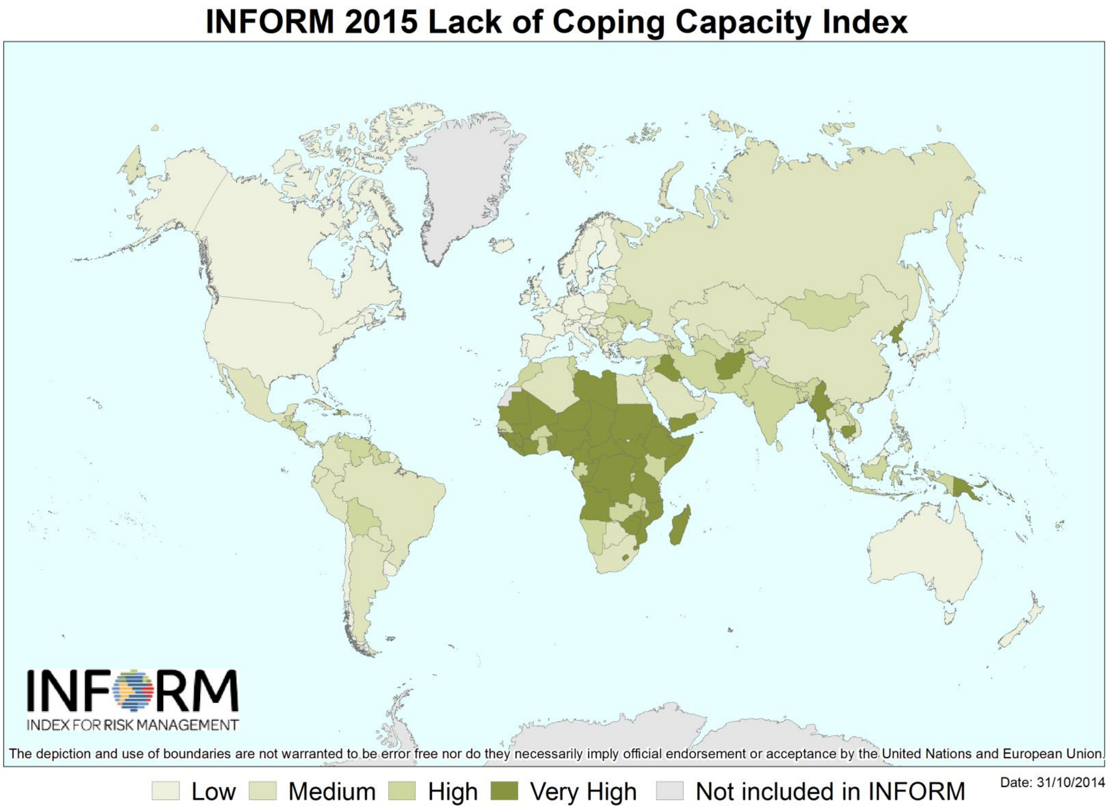

Figure 18: World map – Lack of Coping Capacity dimension of the INFORM 2015 index in quartiles

12.1. Uses of INFORM index

As said in the introduction the INFORM index answers the following questions:

1. **Which countries are at risk for a need of humanitarian assistance in response to humanitarian crises?**
   If the country ranks high (Table 17) in INFORM index, it is at risk for a need of humanitarian assistance when hazard event/s would occur. It is expected that such countries would have difficulties to cope with the complex emergencies in which large groups of people would not be able to access their fundamental needs.

2. **Which countries are prone to humanitarian crisis?**
   The countries prone to humanitarian crises have high rank (Table 16) in the Hazard & Exposure dimension. Among top ten countries in the Hazard & Exposure dimension there are five (i.e., Somalia, Afghanistan, Sudan, Yemen and Myanmar) that are among top ten in INFORM index as well. Even more, it is interesting to note that all five of them score very high in Human Hazard category (Table 17). On the other side, among top ten countries in the Hazard & Exposure dimension lowest INFORM rank observed is 68 which belongs to Mexico.

3. **Which are the underlying factors that may lead to humanitarian crisis requiring humanitarian assistance?**
   Based on the methodology high vulnerability and low coping capacity coupled with a high probability of physical exposure to hazard event contribute to a high risk of a country needing humanitarian assistance in a crisis situation. High rank in the Hazard & Exposure dimension is therefore only one of the factors that may lead to humanitarian crisis requiring humanitarian assistance. The other underlying factors can be sought down through the levels of the Vulnerability and the Lack of Coping Capacity dimensions (Table 17).

4. **How does the country's risk change with time?**
   The INFORM methodology allows comparisons of the index over the years because rescaling of the core indicators with min-max normalization is calculated with fixed min and max values for each indicator dataset. Time series can be observed for the ranks and scores.

12.2. Comparison of INFORM index with climate change risk indices

INFORM index can be compared in a fair manner with World Risk Index [4], because both of them consider the counterbalancing relationship of hazard & exposure on one side and the population's resilience on the other side. The Spearman's correlation coefficient is a nonparametric measure of statistical dependence between two ranked variables while Pearson's correlation coefficient is a measure of a linear relationship between the scores of the two variables. The similarity of the INFORM index with WRI is very weak. This result is expected as the WRI is describing long-term climate risk, which is significantly different from eminent humanitarian risk, since it considers climate change and adaptive capacity.

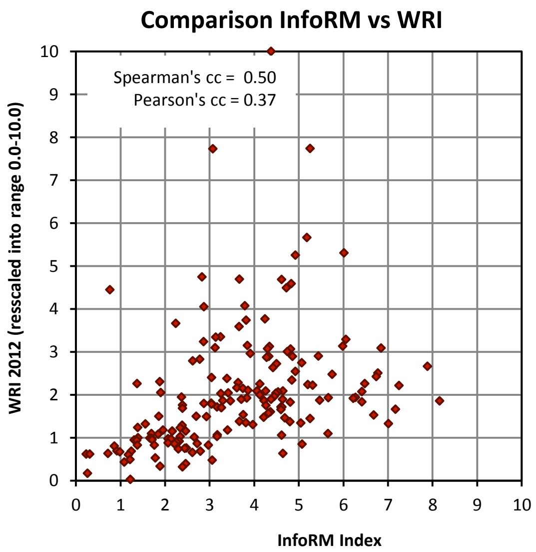

Figure 19: Comparison of INFORM 2015 index with and WRI 2014

12.3. Other comparisons

12.3.1. INFORM index vs GDP per capita

There is a high correlation (Pearson's correlation coefficient is -0.71)[22] between the INFORM index and GDP per capita, but GDP does not explain all variances of the INFORM index (Figure 20). Among the dimensions the Lack of Coping Capacity has the highest correlation with GDP per capita and the Hazard & Exposure dimension the lowest. A high GDP per capita has a positive effect on the government's effort to increase the resilience of the society and it seems that high Hazard & Exposure index of the country reflects some negative influence of hazard events on the economic development of the country, or the other way around.

12.3.2. INFORM index vs HDI

Due to high correlation between GDP and HDI (Chapter 9.1), the conclusions of the comparison of INFORM with HDI are very similar to the one drawn with the GDP (Figure 21). Compared to the GDP per capita there is an even higher correlation (Pearson's correlation coefficient is -0.86) between the INFORM index and HDI, but INFORM still introduces high variances among the countries with similar HDI. Among the dimensions the Lack of Coping Capacity has the highest correlation with HDI and the Hazard & Exposure dimension the lowest.

[22] Only in the case of linear regression Pearson's correlation coefficient squared equals the coefficient of determination R^2

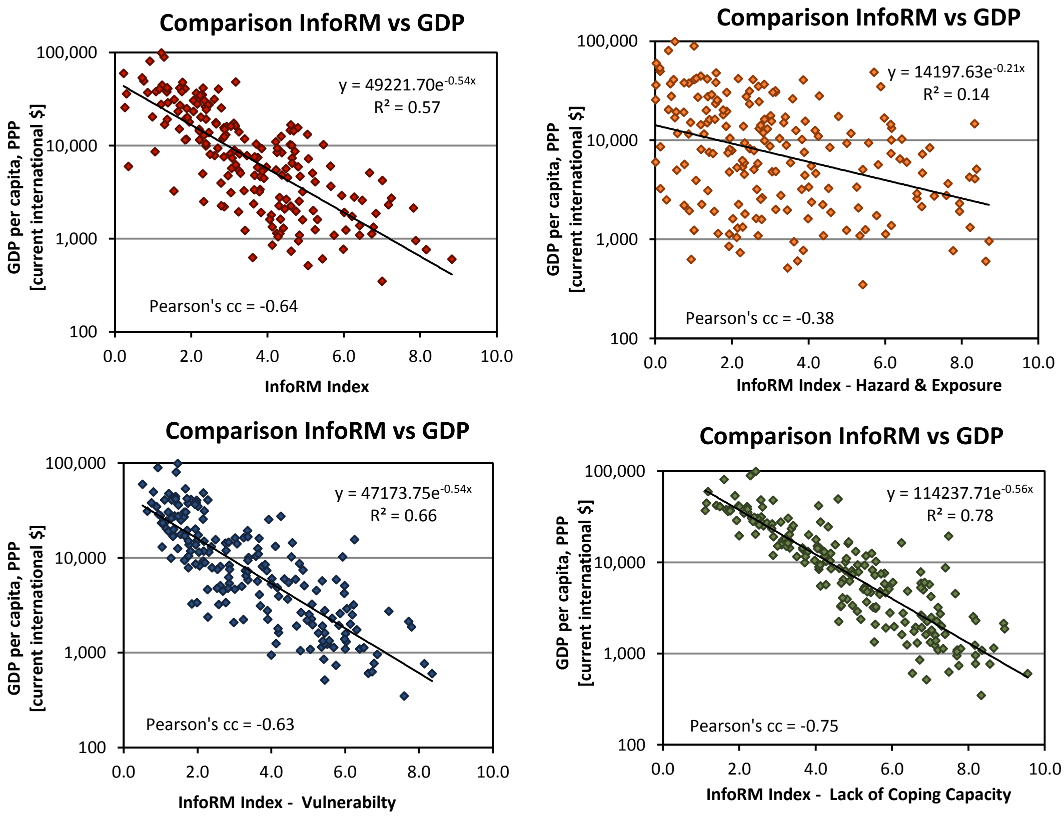

Figure 20: Comparison of INFORM 2015 index with GDP per capita, PPP

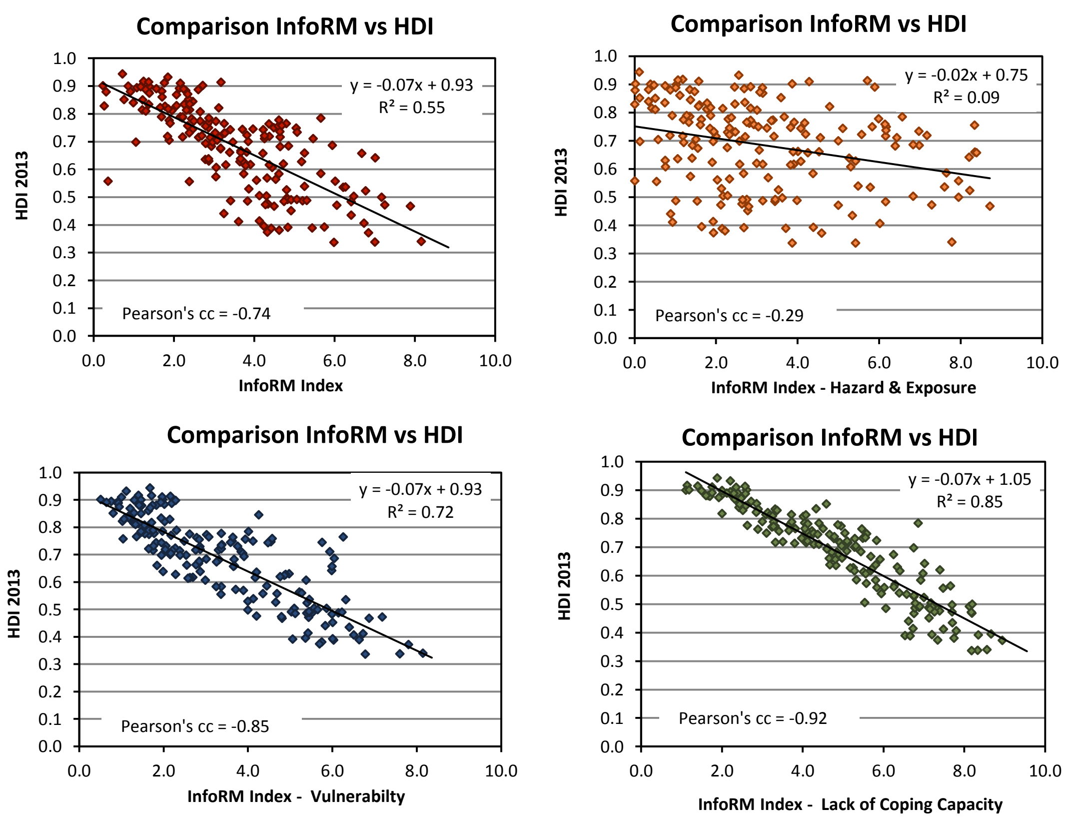

Figure 21: Comparison of INFORM 2015 index with HDI 2013

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ANNEX A: CORRELATION MATRIX[23]

	Earthquakes	Floods	Tsunamis	Tropical cyclones	Droughts	Natural	Conflict Probability	Current Highly violent conflicts	Human	Development & Deprivation	Inequality	Aid Dependency	Social-Economics Vulnerability	Uprooted people	HIV, TBC, Malaria Prevalence	Children U5	Recent Shocks	Food Security	Other Vulnerable Groups	Vulnerable Groups	DRR	Governance	Institutional	Communication	Physical infrastructure	Access to health care	Infrastructure	HAZARD	VULNERABILITY	COPING CAPACITY	RISK
Earthquakes	1.00	0.42	0.33	0.18	0.08	0.72	0.24	0.09	0.21	-0.27	-0.13	-0.19	-0.26	0.19	-0.39	-0.24	-0.17	-0.11	-0.29	0.03	-0.10	0.06	-0.04	-0.22	-0.10	-0.10	-0.15	0.49	-0.13	-0.12	0.20
Floods	0.42	1.00	0.12	0.38	0.01	0.70	0.21	0.11	0.19	-0.07	0.12	-0.12	-0.05	0.14	-0.17	-0.04	0.11	-0.01	-0.05	0.10	-0.09	-0.01	-0.06	-0.07	-0.06	0.02	-0.04	0.49	0.03	-0.06	0.24
Tsunamis	0.33	0.12	1.00	0.00	0.23	0.56	0.54	0.22	0.48	0.06	0.00	-0.30	-0.08	0.37	0.04	0.21	0.02	0.19	0.12	0.33	-0.22	0.25	0.10	0.09	0.24	0.13	0.17	0.58	0.14	0.15	0.44
Tropical cyclones	0.18	0.38	0.00	1.00	-0.13	0.52	-0.04	-0.03	-0.05	-0.08	0.09	-0.01	-0.04	-0.24	-0.19	-0.10	0.01	-0.03	-0.11	-0.24	-0.11	-0.10	-0.14	-0.01	-0.16	0.00	-0.06	0.24	-0.16	-0.11	0.03
Droughts	0.08	0.01	0.23	-0.13	1.00	0.28	0.39	0.17	0.36	0.38	0.29	0.15	0.34	0.23	0.27	0.41	0.30	0.35	0.41	0.35	0.15	0.41	0.34	0.37	0.49	0.35	0.44	0.37	0.40	0.43	0.49
Natural	0.72	0.70	0.56	0.52	0.28	1.00	0.40	0.15	0.35	-0.03	0.12	-0.16	-0.05	0.19	-0.20	0.04	0.08	0.11	-0.01	0.15	-0.14	0.19	0.04	0.02	0.10	0.12	0.09	0.73	0.06	0.07	0.45
Conflict Probability	0.24	0.21	0.54	-0.04	0.39	0.40	1.00	0.68	0.97	0.34	0.27	-0.06	0.24	0.69	0.21	0.46	0.08	0.40	0.36	0.70	0.10	0.53	0.42	0.30	0.46	0.43	0.43	0.87	0.55	0.46	0.81
Current Highly violent conflicts	0.09	0.11	0.22	-0.03	0.17	0.15	0.68	1.00	0.81	0.22	0.15	0.05	0.19	0.58	0.14	0.32	0.05	0.26	0.25	0.58	0.13	0.37	0.35	0.22	0.29	0.32	0.29	0.69	0.46	0.34	0.63
Human	0.21	0.19	0.48	-0.05	0.36	0.35	0.97	0.81	1.00	0.33	0.25	-0.03	0.23	0.71	0.20	0.45	0.07	0.38	0.35	0.71	0.11	0.53	0.43	0.29	0.44	0.43	0.42	0.88	0.55	0.45	0.82
Development & Deprivation	-0.27	-0.07	0.06	-0.08	0.38	-0.03	0.34	0.22	0.33	1.00	0.61	0.55	0.92	0.19	0.73	0.88	0.36	0.73	0.87	0.52	0.49	0.70	0.69	0.89	0.81	0.79	0.89	0.22	0.83	0.87	0.67
Inequality	-0.13	0.12	0.00	0.09	0.29	0.12	0.27	0.15	0.25	0.61	1.00	0.46	0.77	0.01	0.50	0.51	0.33	0.49	0.56	0.27	0.40	0.56	0.55	0.54	0.60	0.68	0.65	0.23	0.60	0.64	0.52
Aid Dependency	-0.19	-0.12	-0.30	-0.01	0.15	-0.16	-0.06	0.05	-0.03	0.55	0.46	1.00	0.79	-0.07	0.43	0.40	0.26	0.35	0.49	0.19	0.55	0.38	0.46	0.60	0.37	0.53	0.53	-0.08	0.59	0.53	0.29
Social-Economics Vulnerability	-0.26	-0.05	-0.08	-0.04	0.34	-0.05	0.24	0.19	0.23	0.92	0.77	0.79	1.00	0.09	0.69	0.77	0.39	0.65	0.81	0.44	0.58	0.68	0.70	0.86	0.73	0.80	0.86	0.15	0.84	0.85	0.61
Uprooted people	0.19	0.14	0.37	-0.24	0.23	0.19	0.69	0.58	0.71	0.19	0.01	-0.07	0.09	1.00	0.11	0.31	0.01	0.24	0.21	0.89	-0.06	0.25	0.19	0.18	0.27	0.21	0.24	0.59	0.58	0.23	0.62
HIV, TBC, Malaria Prevalence	-0.39	-0.17	0.04	-0.19	0.27	-0.20	0.21	0.14	0.20	0.73	0.50	0.43	0.69	0.11	1.00	0.73	0.27	0.58	0.86	0.47	0.38	0.52	0.54	0.73	0.67	0.64	0.73	0.04	0.67	0.70	0.44
Children U5	-0.24	-0.04	0.21	-0.10	0.41	0.04	0.46	0.32	0.45	0.88	0.51	0.40	0.77	0.31	0.73	1.00	0.30	0.71	0.88	0.61	0.42	0.67	0.65	0.85	0.83	0.80	0.89	0.34	0.80	0.84	0.72
Recent Shocks	-0.17	0.11	0.02	0.01	0.30	0.08	0.08	0.05	0.07	0.36	0.33	0.26	0.39	0.01	0.27	0.30	1.00	0.22	0.52	0.24	0.14	0.23	0.22	0.33	0.24	0.29	0.31	0.09	0.37	0.30	0.27
Food Security	-0.11	-0.01	0.19	-0.03	0.35	0.11	0.40	0.26	0.38	0.73	0.49	0.35	0.65	0.24	0.58	0.71	0.22	1.00	0.82	0.54	0.36	0.59	0.57	0.66	0.68	0.62	0.70	0.34	0.69	0.69	0.66
Other Vulnerable Groups	-0.29	-0.05	0.12	-0.11	0.41	-0.01	0.36	0.25	0.35	0.87	0.56	0.49	0.81	0.21	0.86	0.88	0.52	0.82	1.00	0.60	0.44	0.65	0.65	0.84	0.78	0.75	0.85	0.25	0.81	0.82	0.66
Vulnerable Groups	0.03	0.10	0.33	-0.24	0.35	0.15	0.70	0.58	0.71	0.52	0.27	0.19	0.44	0.89	0.47	0.61	0.24	0.54	0.60	1.00	0.18	0.51	0.46	0.51	0.55	0.50	0.56	0.58	0.85	0.56	0.80
DRR	-0.10	-0.09	-0.22	-0.11	0.15	-0.14	0.10	0.13	0.11	0.49	0.40	0.55	0.58	-0.06	0.38	0.42	0.14	0.36	0.44	0.18	1.00	0.56	0.88	0.47	0.45	0.55	0.53	0.01	0.46	0.71	0.38
Governance	0.06	-0.01	0.25	-0.10	0.41	0.19	0.53	0.37	0.53	0.70	0.56	0.38	0.68	0.25	0.52	0.67	0.23	0.59	0.65	0.51	0.56	1.00	0.92	0.64	0.70	0.74	0.75	0.46	0.69	0.89	0.74
Institutional	-0.04	-0.06	0.10	-0.14	0.34	0.04	0.42	0.35	0.43	0.69	0.55	0.46	0.70	0.19	0.54	0.65	0.22	0.57	0.65	0.46	0.88	0.92	1.00	0.64	0.68	0.72	0.73	0.33	0.68	0.91	0.67
Communication	-0.22	-0.07	0.09	-0.01	0.37	0.02	0.30	0.22	0.29	0.89	0.54	0.60	0.86	0.18	0.73	0.85	0.33	0.66	0.84	0.51	0.47	0.64	0.64	1.00	0.78	0.77	0.91	0.22	0.80	0.85	0.64
Physical infrastructure	-0.10	-0.06	0.24	-0.16	0.49	0.10	0.46	0.29	0.44	0.81	0.60	0.37	0.73	0.27	0.67	0.83	0.24	0.68	0.78	0.55	0.45	0.70	0.68	0.78	1.00	0.79	0.93	0.36	0.74	0.89	0.73
Access to health care	-0.10	0.02	0.13	0.00	0.35	0.12	0.43	0.32	0.43	0.79	0.68	0.53	0.80	0.21	0.64	0.80	0.29	0.62	0.75	0.50	0.55	0.74	0.72	0.77	0.79	1.00	0.92	0.38	0.76	0.89	0.74
Infrastructure	-0.15	-0.04	0.17	-0.06	0.44	0.09	0.43	0.29	0.42	0.89	0.65	0.53	0.86	0.24	0.73	0.89	0.31	0.70	0.85	0.56	0.53	0.75	0.73	0.91	0.93	0.92	1.00	0.35	0.82	0.95	0.76
HAZARD	0.49	0.49	0.58	0.24	0.37	0.73	0.87	0.69	0.88	0.22	0.23	-0.08	0.15	0.59	0.04	0.34	0.09	0.34	0.25	0.58	0.01	0.46	0.33	0.22	0.36	0.38	0.35	1.00	0.43	0.36	0.81
VULNERABILITY	-0.13	0.03	0.14	-0.16	0.40	0.06	0.55	0.46	0.55	0.83	0.60	0.59	0.84	0.58	0.67	0.80	0.37	0.69	0.81	0.85	0.46	0.69	0.68	0.80	0.74	0.76	0.82	0.43	1.00	0.82	0.82
COPING CAPACITY	-0.12	-0.06	0.15	-0.11	0.43	0.07	0.46	0.34	0.45	0.87	0.64	0.53	0.85	0.23	0.70	0.84	0.30	0.69	0.82	0.56	0.71	0.89	0.91	0.85	0.89	0.89	0.95	0.36	0.82	1.00	0.77
RISK	0.20	0.24	0.44	0.03	0.49	0.45	0.81	0.63	0.82	0.67	0.52	0.29	0.61	0.62	0.44	0.72	0.27	0.66	0.66	0.80	0.38	0.74	0.67	0.64	0.73	0.74	0.76	0.81	0.82	0.77	1.00

23 Element i,j equals to the Pearson's correlation coefficient between the i^{th} row and the j^{th} column variable.

ANNEX B: FACT SHEETS OF CORE INDICATORS

N.	Name of core indicator	Position in the INFORM model		
1	Physical exposure to earthquake MMI VI (absolute)	Earthquake	Natural	Hazard & Exposure
2	Physical exposure to earthquake MMI VI (relative)	Earthquake	Natural	Hazard & Exposure
3	Physical exposure to earthquake MMI VIII (absolute)	Earthquake	Natural	Hazard & Exposure
4	Physical exposure to earthquake MMI VIII (relative)	Earthquake	Natural	Hazard & Exposure
5	Physical exposure to tsunamis (absolute)	Tsunami	Natural	Hazard & Exposure
6	Physical exposure to tsunamis (relative)	Tsunami	Natural	Hazard & Exposure
7	Physical exposure to flood (absolute)	Flood	Natural	Hazard & Exposure
8	Physical exposure to flood (relative)	Flood	Natural	Hazard & Exposure
9	Physical exposure to surge from tropical cyclone (absolute)	Tropical Cyclone	Natural	Hazard & Exposure
10	Physical exposure to surge from tropical cyclone (relative)	Tropical Cyclone	Natural	Hazard & Exposure
11	Physical exposure to tropical cyclone of SS 1 (absolute)	Tropical Cyclone	Natural	Hazard & Exposure
12	Physical exposure to tropical cyclone of SS 1 (relative)	Tropical Cyclone	Natural	Hazard & Exposure
13	Physical exposure to tropical cyclone of SS 3 (absolute)	Tropical Cyclone	Natural	Hazard & Exposure
14	Physical exposure to tropical cyclone of SS 3 (relative)	Tropical Cyclone	Natural	Hazard & Exposure
15	People affected by droughts (absolute)	Drought	Natural	Hazard & Exposure
16	People affected by droughts (relative)	Drought	Natural	Hazard & Exposure
17	Frequency of Drought events	Drought	Natural	Hazard & Exposure
18	Agriculture Drought probability	Drought	Natural	Hazard & Exposure
19	GCRI Violent Internal Conflict probability	Projected Conflict Risk	Human	Hazard & Exposure
20	GCRI High Violent Internal Conflict probability	Projected Conflict Risk	Human	Hazard & Exposure
21	Current National Power Conflict Intensity	Current Conflicts Intensity	Human	Hazard & Exposure
22	Current Subnational Conflict Intensity	Current Conflicts Intensity	Human	Hazard & Exposure
23	Human Development Index	Poverty & Development	Socio-Economic Vulnerability	Vulnerability
24	Multidimensional Poverty Index	Poverty & Development	Socio-Economic Vulnerability	Vulnerability
25	Gender Inequality Index	Inequality	Socio-Economic Vulnerability	Vulnerability
26	Gini Coefficient	Inequality	Socio-Economic Vulnerability	Vulnerability
27	Public Aid per capita	Aid Dependency	Socio-Economic Vulnerability	Vulnerability
28	Net ODA Received (% of GNI)	Aid Dependency	Socio-Economic Vulnerability	Vulnerability
29	Total Persons of Concern (absolute)	Uprooted people	Vulnerable Groups	Vulnerability
30	Total Persons of Concern (relative)	Uprooted people	Vulnerable Groups	Vulnerability
31	Children Underweight	Other Vulnerable Groups Children under-5	Vulnerable Groups	Vulnerability
32	Child Mortality	Other Vulnerable Groups Children under-5	Vulnerable Groups	Vulnerability
33	Prevalence of HIV-AIDS above 15years	Other Vulnerable Groups Health Conditions	Vulnerable Groups	Vulnerability
34	Tuberculosis prevalence	Other Vulnerable Groups Health Conditions	Vulnerable Groups	Vulnerability
35	Malaria mortality rate	Other Vulnerable Groups Health Conditions	Vulnerable Groups	Vulnerability
36	Relative number of affected population by natural disasters in the last three years	Other Vulnerable Groups Recent Shocks	Vulnerable Groups	Vulnerability
37	Prevalence of undernourishment	Other Vulnerable Groups Food Security	Vulnerable Groups	Vulnerability
38	Average dietary supply adequacy	Other Vulnerable Groups Food Security	Vulnerable Groups	Vulnerability
39	Domestic Food Price Level Index	Other Vulnerable Groups Food Security	Vulnerable Groups	Vulnerability
40	Domestic Food Price Volatility Index	Other Vulnerable Groups Food Security	Vulnerable Groups	Vulnerability
41	Hyogo Framework for Action	DRR implementation	Institutional	Lack of Coping Capacity
42	Government effectiveness	Governance	Institutional	Lack of Coping Capacity
43	Corruption Perception Index	Governance	Institutional	Lack of Coping Capacity
44	Access to electricity (% of population)	Communication	Infrastructure	Lack of Coping Capacity
45	Internet Users (per 100 people)	Communication	Infrastructure	Lack of Coping Capacity
46	Mobile cellular subscriptions (per 100 people)	Communication	Infrastructure	Lack of Coping Capacity
47	Adult literacy rate	Communication	Infrastructure	Lack of Coping Capacity
48	Road density (km of road per 100 sq. km of land area)	Physical Connectivity	Infrastructure	Lack of Coping Capacity
49	Access to Improved water source (% of pop with access)	Physical Connectivity	Infrastructure	Lack of Coping Capacity
50	Access to Improved sanitation facilities (% of pop with access)	Physical Connectivity	Infrastructure	Lack of Coping Capacity
51	Physicians density	Access to health system	Infrastructure	Lack of Coping Capacity
52	Health expenditure per capita	Access to health system	Infrastructure	Lack of Coping Capacity
53	Measles immunization coverage	Access to health system	Infrastructure	Lack of Coping Capacity

ANNEX C: INFORM INDEX - COUNTRIES BY ALPHABETIC ORDER

COUNTRY	ISO3	Natural	Human	Hazard & Exposure	Social-Economics Vulnerability	Vulnerable Groups	Vulnerability	Institutional	Infrastructure	Lack of Coping Capacity	INFORM 2015	RANK
Afghanistan	AFG	5.9	10.0	8.7	6.9	6.9	6.9	7.9	8.5	8.2	7.9	3
Albania	ALB	3.5	0.1	2.0	2.6	0.9	1.7	6.3	3.7	5.1	2.6	127
Algeria	DZA	3.2	8.0	6.2	3.2	3.4	3.3	4.9	4.9	4.9	4.6	47
Angola	AGO	1.8	4.9	3.5	4.4	4.9	4.7	6.4	7.1	6.8	4.8	41
Antigua and Barbuda	ATG	5.7	0.0	3.4	2.5	0.7	1.7	4.7	1.6	3.3	2.7	125
Argentina	ARG	3.9	2.1	3.0	1.9	1.2	1.5	5.0	2.8	4.0	2.7	126
Armenia	ARM	4.0	0.1	2.3	2.4	3.3	2.9	6.6	3.7	5.3	3.3	98
Australia	AUS	4.4	0.1	2.6	0.5	1.7	1.1	2.1	2.3	2.2	1.8	160
Austria	AUT	2.5	0.0	1.4	0.8	2.8	1.8	2.5	1.4	2.0	1.7	165
Azerbaijan	AZE	4.0	3.7	3.8	1.9	6.4	4.5	6.6	4.4	5.6	4.6	53
Bahamas	BHS	3.4	0.0	1.9	2.3	0.9	1.6	3.1	3.5	3.3	2.2	151
Bahrain	BHR	0.2	0.6	0.4	1.9	0.9	1.4	4.2	1.9	3.1	1.2	179
Bangladesh	BGD	9.1	6.1	7.9	3.8	5.4	4.7	5.1	6.5	5.8	6.0	19
Barbados	BRB	3.0	0.0	1.6	2.5	0.5	1.6	2.6	2.7	2.6	1.9	157
Belarus	BLR	1.5	1.2	1.4	1.1	2.8	2.0	5.0	2.9	4.0	2.2	149
Belgium	BEL	1.6	0.1	0.9	0.9	2.5	1.7	2.2	1.1	1.7	1.4	174
Belize	BLZ	4.4	0.0	2.5	3.0	1.0	2.1	5.4	5.6	5.5	3.0	110
Benin	BEN	3.9	1.1	2.6	5.8	2.1	4.2	6.3	8.3	7.4	4.3	62
Bhutan	BTN	4.7	0.1	2.7	5.1	1.2	3.4	5.2	6.3	5.8	3.7	85
Bolivia	BOL	3.8	2.2	3.1	3.9	1.7	2.8	5.9	5.5	5.7	3.7	88
Bosnia and Herzegovina	BIH	3.5	0.1	1.9	2.7	4.7	3.8	5.9	3.5	4.8	3.3	97
Botswana	BWA	2.5	0.2	1.4	4.0	3.4	3.7	4.4	5.2	4.8	2.9	112
Brazil	BRA	4.1	6.0	5.1	2.6	1.0	1.8	4.9	3.5	4.2	3.4	94
Brunei Darussalam	BRN	0.2	0.0	0.1	1.0	0.6	0.8	4.8	4.4	4.6	0.8	186
Bulgaria	BGR	3.2	1.3	2.3	1.8	1.8	1.8	4.5	2.7	3.7	2.5	131
Burkina Faso	BFA	2.4	1.9	2.1	7.0	4.8	6.0	4.8	8.0	6.7	4.4	58
Burundi	BDI	2.7	4.6	3.7	6.7	6.6	6.6	6.8	6.3	6.5	5.4	26
Cabo Verde	CPV	2.0	0.0	1.1	6.5	0.9	4.2	4.1	5.4	4.8	2.8	122
Cambodia	KHM	5.0	3.7	4.4	4.3	2.0	3.2	7.1	6.7	6.9	4.6	50
Cameroon	CMR	2.6	1.7	2.2	4.7	5.5	5.1	7.1	7.2	7.2	4.3	65
Canada	CAN	6.1	0.7	3.9	0.8	3.0	2.0	2.3	2.9	2.6	2.7	123
Central African Republic	CAF	1.1	10.0	7.8	7.8	8.4	8.1	8.0	9.0	8.6	8.2	2
Chad	TCD	3.0	5.9	4.6	6.8	8.6	7.8	8.0	9.6	8.9	6.8	9
Chile	CHL	7.2	0.9	4.8	2.5	1.5	2.0	3.0	3.3	3.1	3.1	105

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China	CHN	7.9	6.3	7.2	1.9	3.7	2.9	4.0	4.1	4.1	4.4	59
Colombia	COL	5.8	7.0	6.4	3.0	7.8	5.9	4.4	4.2	4.3	5.5	25
Comoros	COM	1.9	0.1	1.0	7.4	2.7	5.5	7.6	6.5	7.1	3.4	93
Congo	COG	1.3	3.3	2.3	4.4	5.9	5.2	7.6	7.7	7.7	4.5	54
Congo DR	COD	3.2	7.0	5.4	7.0	8.1	7.6	8.0	8.6	8.3	7.0	8
Costa Rica	CRI	4.9	0.1	2.8	2.9	2.7	2.8	2.9	2.9	2.9	2.8	119
Côte d'Ivoire	CIV	1.5	3.9	2.8	6.9	5.0	6.0	7.2	7.1	7.1	4.9	36
Croatia	HRV	3.2	0.0	1.8	1.6	1.0	1.3	3.6	2.8	3.2	2.0	155
Cuba	CUB	4.9	0.1	2.8	2.3	0.2	1.3	4.1	3.3	3.7	2.4	135
Cyprus	CYP	2.5	0.1	1.4	1.3	6.3	4.3	3.0	2.2	2.6	2.5	130
Czech Republic	CZE	2.0	0.1	1.1	1.0	2.3	1.6	3.8	1.5	2.7	1.7	164
Denmark	DNK	0.7	0.0	0.4	0.6	2.3	1.5	1.0	1.2	1.1	0.9	185
Djibouti	DJI	4.6	0.4	2.8	4.7	4.9	4.8	6.2	7.3	6.8	4.5	55
Dominica	DMA	2.2	0.0	1.2	4.7	0.3	2.8	3.9	2.7	3.3	2.2	148
Dominican Republic	DOM	7.1	1.7	5.0	2.8	1.4	2.2	5.6	4.9	5.3	3.8	79
Ecuador	ECU	7.0	0.7	4.6	3.4	4.3	3.8	4.5	4.3	4.4	4.3	68
Egypt	EGY	5.7	7.0	6.4	2.6	4.0	3.3	5.5	3.8	4.7	4.6	46
El Salvador	SLV	5.9	1.0	3.9	4.0	0.8	2.5	5.4	4.5	5.0	3.7	87
Equatorial Guinea	GNQ	1.0	0.1	0.5	4.2	2.4	3.4	8.1	6.7	7.5	2.4	137
Eritrea	ERI	2.8	1.6	2.2	6.5	4.9	5.7	8.0	7.4	7.7	4.6	49
Estonia	EST	0.6	0.1	0.3	1.4	0.9	1.2	3.1	1.7	2.4	1.0	183
Ethiopia	ETH	4.2	6.3	5.3	6.3	6.5	6.4	4.9	9.3	7.7	6.4	15
Fiji	FJI	6.8	0.0	4.2	3.6	0.7	2.3	6.4	5.2	5.8	3.8	81
Finland	FIN	0.0	0.0	0.0	0.7	2.2	1.5	1.7	1.7	1.7	0.3	189
France	FRA	3.1	2.3	2.7	0.8	3.1	2.0	2.8	1.6	2.2	2.3	144
Gabon	GAB	1.4	1.7	1.5	3.0	3.5	3.3	6.6	5.9	6.2	3.2	103
Gambia	GMB	1.5	0.2	0.9	6.8	4.7	5.8	6.8	6.4	6.6	3.2	100
Georgia	GEO	4.2	3.9	4.1	3.0	5.7	4.5	4.9	3.2	4.1	4.2	70
Germany	DEU	2.8	0.2	1.6	0.5	3.2	2.0	2.5	1.0	1.8	1.8	163
Ghana	GHA	1.5	1.2	1.4	4.4	3.0	3.7	4.5	6.5	5.6	3.0	108
Greece	GRC	4.3	2.8	3.6	1.3	1.3	1.3	3.7	1.9	2.9	2.4	138
Grenada	GRD	3.4	0.0	1.8	2.8	1.0	1.9	4.6	3.7	4.1	2.5	132
Guatemala	GTM	6.8	3.7	5.4	4.5	5.3	4.9	5.5	5.0	5.2	5.2	31
Guinea	GIN	1.2	4.0	2.7	6.0	3.9	5.1	7.6	8.9	8.4	4.8	38
Guinea-Bissau	GNB	1.1	2.1	1.6	6.0	4.7	5.4	9.0	8.3	8.7	4.2	69
Guyana	GUY	2.6	0.0	1.4	4.4	1.0	2.9	6.3	5.2	5.8	2.9	117

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Haiti	HTI	6.1	3.6	5.0	7.1	3.1	5.4	7.4	8.8	8.2	6.1	18
Honduras	HND	5.3	2.2	3.9	4.2	0.8	2.7	6.1	5.2	5.7	3.9	77
Hungary	HUN	2.9	0.7	1.9	1.6	1.8	1.7	2.5	1.5	2.0	1.9	159
Iceland	ISL	1.4	0.0	0.8	0.7	0.8	0.8	2.1	2.3	2.2	1.1	181
India	IND	8.2	7.0	7.6	3.8	5.0	4.4	4.7	5.9	5.3	5.7	23
Indonesia	IDN	7.5	6.4	7.0	2.5	3.5	3.0	5.0	5.9	5.4	4.9	37
Iran	IRN	7.0	5.2	6.2	2.8	5.2	4.1	5.7	4.3	5.0	5.0	34
Iraq	IRQ	3.5	10.0	8.2	3.0	7.9	6.0	7.8	6.1	7.0	7.0	7
Ireland	IRL	1.9	0.0	1.0	0.9	1.7	1.3	2.4	1.6	2.0	1.4	171
Israel	ISR	3.1	3.2	3.1	1.1	3.2	2.2	3.2	1.9	2.6	2.6	128
Italy	ITA	3.4	2.8	3.1	1.1	2.3	1.7	3.7	1.0	2.5	2.3	139
Jamaica	JAM	5.1	1.3	3.4	3.3	1.0	2.2	4.5	3.7	4.1	3.1	104
Japan	JPN	8.4	0.9	5.9	0.9	0.9	0.9	2.1	2.2	2.1	2.2	146
Jordan	JOR	3.0	1.6	2.3	3.6	7.3	5.8	5.7	3.4	4.7	4.0	76
Kazakhstan	KAZ	3.6	2.2	2.9	1.5	0.5	1.0	5.3	3.0	4.2	2.3	140
Kenya	KEN	4.2	7.0	5.8	5.1	7.3	6.3	5.7	7.3	6.6	6.2	17
Kiribati	KIR	1.5	0.0	0.8	6.8	3.4	5.4	6.7	7.2	7.0	3.1	107
Korea DPR	PRK	3.4	1.2	2.3	4.8	3.5	4.2	9.0	3.2	7.0	4.1	74
Korea Republic of	KOR	4.2	0.2	2.5	0.8	0.5	0.6	2.6	2.2	2.4	1.6	168
Kuwait	KWT	1.9	2.4	2.2	2.0	0.8	1.4	5.4	2.4	4.1	2.3	142
Kyrgyzstan	KGZ	5.4	2.5	4.1	3.4	1.1	2.3	6.0	4.2	5.2	3.6	90
Lao PDR	LAO	4.7	1.6	3.3	4.3	3.5	3.9	5.6	6.9	6.3	4.3	64
Latvia	LVA	1.0	0.0	0.5	1.7	0.9	1.3	4.0	2.5	3.3	1.3	175
Lebanon	LBN	4.7	3.1	3.9	4.2	7.7	6.3	5.6	3.3	4.5	4.8	42
Lesotho	LSO	2.0	1.1	1.5	6.2	4.5	5.4	6.7	6.9	6.8	3.8	80
Liberia	LBR	0.9	0.9	0.9	7.7	5.6	6.7	6.9	8.0	7.5	3.6	91
Libya	LBY	4.5	8.0	6.6	2.3	5.4	4.0	8.2	4.8	6.9	5.7	24
Liechtenstein	LIE	1.9	0.0	1.0	0.6	1.2	0.9	1.5	3.0	2.3	1.3	176
Lithuania	LTU	1.4	0.1	0.7	1.5	0.9	1.2	3.8	1.8	2.9	1.4	172
Luxembourg	LUX	0.7	0.0	0.3	1.0	1.9	1.4	1.9	1.3	1.6	0.9	184
Macedonia FYR	MKD	2.8	1.0	1.9	2.3	1.2	1.8	4.8	3.1	4.0	2.4	136
Madagascar	MDG	5.6	0.9	3.6	5.1	2.7	4.0	5.6	9.0	7.7	4.8	40
Malawi	MWI	3.3	0.4	1.9	6.7	3.8	5.4	5.3	7.8	6.7	4.1	72
Malaysia	MYS	3.4	2.3	2.8	2.4	3.6	3.0	3.3	3.3	3.3	3.0	109
Maldives	MDV	0.3	0.0	0.1	3.0	0.8	1.9	5.7	3.4	4.6	1.1	182
Mali	MLI	2.8	8.0	6.0	7.1	5.9	6.5	6.2	8.9	7.8	6.7	11

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Malta	MLT	0.0	0.0	0.0	1.7	2.6	2.1	3.5	1.5	2.5	0.3	190
Marshall Islands	MHL	0.6	0.0	0.3	7.6	4.2	6.2	7.7	6.2	7.0	2.3	141
Mauritania	MRT	3.9	2.3	3.1	6.4	5.8	6.1	5.9	8.3	7.3	5.2	30
Mauritius	MUS	5.7	0.0	3.4	3.5	0.7	2.2	3.7	2.8	3.2	2.9	114
Mexico	MEX	7.5	9.0	8.3	2.2	3.4	2.8	4.1	4.1	4.1	4.6	52
Micronesia	FSM	1.4	0.0	0.7	7.2	1.4	5.0	6.1	6.6	6.3	2.9	116
Moldova Republic of	MDA	3.8	4.2	4.0	3.2	2.4	2.8	6.2	3.5	5.0	3.8	82
Mongolia	MNG	2.8	0.9	1.9	3.3	1.7	2.5	6.0	4.6	5.3	3.0	111
Montenegro	MNE	2.4	0.0	1.3	2.1	2.5	2.3	4.3	3.1	3.7	2.2	147
Morocco	MAR	2.9	2.2	2.6	4.2	0.7	2.6	5.7	4.9	5.3	3.3	96
Mozambique	MOZ	5.6	2.9	4.4	7.2	4.4	6.0	4.6	8.8	7.2	5.7	22
Myanmar	MMR	9.1	7.0	8.2	4.8	6.0	5.4	7.5	6.4	7.0	6.8	10
Namibia	NAM	2.7	1.0	1.9	4.8	4.9	4.9	4.6	6.6	5.7	3.7	84
Nauru	NRU	1.1	0.0	0.6	5.1	0.8	3.2	7.1	6.5	6.8	2.3	143
Nepal	NPL	6.8	3.8	5.5	4.0	4.2	4.1	6.3	6.4	6.4	5.2	28
Netherlands	NLD	2.0	0.1	1.1	0.5	2.8	1.7	1.8	0.9	1.4	1.4	173
New Zealand	NZL	6.9	0.0	4.3	0.9	1.1	1.0	1.9	2.8	2.4	2.2	150
Nicaragua	NIC	5.3	2.0	3.8	4.0	0.9	2.6	5.8	5.2	5.5	3.8	83
Niger	NER	3.1	4.5	3.9	7.7	5.6	6.8	6.1	9.4	8.2	6.0	20
Nigeria	NGA	2.4	9.0	6.8	4.4	7.0	5.9	5.0	8.0	6.8	6.5	13
Norway	NOR	0.2	0.0	0.1	0.2	3.0	1.7	1.9	1.9	1.9	0.7	187
Oman	OMN	3.4	1.2	2.4	2.4	0.4	1.5	4.9	3.2	4.1	2.4	133
Pakistan	PAK	7.1	8.0	7.6	3.9	6.7	5.4	5.5	6.4	5.9	6.3	16
Palau	PLW	2.3	0.0	1.2	4.2	0.6	2.6	6.0	3.6	4.9	2.5	129
Palestine	PSE	2.4	9.0	6.8	5.2	6.8	6.0	6.4	3.4	5.1	5.9	21
Panama	PAN	3.2	2.2	2.8	3.2	2.9	3.1	4.8	3.2	4.1	3.2	99
Papua New Guinea	PNG	3.7	1.7	2.8	6.4	3.3	5.0	6.8	9.0	8.1	4.8	39
Paraguay	PRY	2.8	1.7	2.3	3.8	1.7	2.8	5.4	4.3	4.9	3.2	102
Peru	PER	7.7	3.9	6.2	2.5	4.2	3.4	4.7	4.8	4.8	4.6	48
Philippines	PHL	9.3	7.0	8.3	2.6	4.6	3.7	4.9	4.4	4.7	5.2	29
Poland	POL	2.3	1.2	1.8	1.4	2.5	1.9	4.2	2.3	3.3	2.3	145
Portugal	PRT	2.9	0.1	1.6	1.4	0.7	1.0	3.3	2.4	2.9	1.7	167
Qatar	QAT	1.0	0.0	0.5	2.1	0.7	1.5	3.0	1.8	2.4	1.2	178
Romania	ROU	4.8	2.4	3.7	1.9	1.0	1.5	4.8	4.0	4.4	2.9	115
Russian Federation	RUS	4.7	7.0	6.0	2.3	4.3	3.4	6.5	2.7	4.9	4.6	51
Rwanda	RWA	2.9	1.6	2.3	6.2	4.9	5.6	4.2	6.6	5.5	4.1	73

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Saint Kitts and Nevis	KNA	5.2	0.0	3.0	4.1	0.6	2.5	3.8	2.3	3.1	2.9	118
Saint Lucia	LCA	4.8	0.0	2.7	3.8	0.7	2.4	4.1	3.5	3.8	2.9	113
St Vincent and the Grenadines	VCT	1.7	0.0	0.9	3.3	0.5	2.0	3.5	3.5	3.5	1.8	161
Samoa	WSM	2.3	0.0	1.2	6.2	0.6	3.9	4.7	4.5	4.6	2.8	120
Sao Tome and Principe	STP	0.0	0.0	0.0	6.6	1.0	4.4	6.1	5.9	6.0	0.4	188
Saudi Arabia	SAU	1.9	3.4	2.7	2.0	0.3	1.2	5.1	3.4	4.3	2.4	134
Senegal	SEN	2.8	4.0	3.4	5.8	4.3	5.1	4.8	7.1	6.1	4.7	43
Serbia	SRB	4.4	1.9	3.2	2.3	4.7	3.6	5.1	3.6	4.4	3.7	86
Seychelles	SYC	3.0	0.0	1.6	5.5	1.9	3.9	4.2	2.5	3.4	2.8	121
Sierra Leone	SLE	1.2	2.6	1.9	6.9	4.2	5.7	5.3	8.7	7.3	4.3	63
Singapore	SGP	0.0	0.0	0.0	0.7	0.3	0.5	1.1	1.2	1.2	0.2	191
Slovakia	SVK	2.7	2.2	2.5	1.2	0.9	1.1	4.4	2.2	3.4	2.1	154
Slovenia	SVN	2.7	0.0	1.5	0.8	1.1	0.9	2.2	1.6	1.9	1.4	170
Solomon Islands	SLB	4.7	0.0	2.6	8.0	3.3	6.2	6.7	7.7	7.2	4.9	35
Somalia	SOM	5.6	10.0	8.6	7.2	9.2	8.4	9.3	9.8	9.6	8.8	1
South Africa	ZAF	3.4	5.0	4.3	3.5	3.8	3.7	5.0	4.6	4.8	4.2	71
South Sudan	SSD	2.9	9.0	7.0	6.6	8.6	7.7	8.3	9.4	8.9	7.8	4
Spain	ESP	4.1	2.0	3.1	1.1	1.3	1.2	3.4	1.1	2.3	2.1	153
Sri Lanka	LKA	6.4	5.2	5.8	2.7	4.4	3.6	4.8	3.7	4.3	4.5	56
Sudan	SDN	4.2	9.0	7.3	5.4	8.4	7.2	6.7	7.8	7.3	7.2	5
Suriname	SUR	1.1	0.0	0.6	3.4	0.8	2.2	5.7	4.9	5.3	1.9	158
Swaziland	SWZ	1.7	2.5	2.1	4.6	3.3	4.0	7.1	6.3	6.8	3.9	78
Sweden	SWE	0.9	0.0	0.5	0.5	3.8	2.3	2.0	1.0	1.5	1.2	180
Switzerland	CHE	2.2	0.1	1.2	0.6	2.2	1.4	1.3	1.0	1.1	1.2	177
Syria	SYR	4.4	10.0	8.4	3.2	7.8	6.0	6.3	5.5	5.9	6.7	12
Tajikistan	TJK	5.5	5.0	5.3	3.1	2.9	3.0	6.0	5.1	5.6	4.4	57
Tanzania	TZA	4.1	3.9	4.0	5.6	5.3	5.5	5.4	8.0	6.9	5.3	27
Thailand	THA	5.9	5.2	5.6	2.0	4.5	3.4	4.5	3.7	4.1	4.3	67
Timor-Leste	TLS	4.9	0.5	3.0	4.7	4.8	4.8	6.8	7.9	7.4	4.7	44
Togo	TGO	1.2	2.9	2.1	5.3	4.2	4.8	6.6	8.5	7.7	4.3	66
Tonga	TON	2.8	0.0	1.5	5.9	1.0	3.9	5.6	4.2	5.0	3.1	106
Trinidad and Tobago	TTO	2.4	0.1	1.3	1.9	0.8	1.4	4.8	2.6	3.8	1.9	156
Tunisia	TUN	2.4	2.2	2.3	2.4	0.8	1.6	5.9	4.1	5.1	2.7	124
Turkey	TUR	6.7	5.5	6.1	2.8	6.0	4.6	3.7	3.6	3.7	4.7	45
Turkmenistan	TKM	4.0	0.9	2.6	2.6	2.1	2.4	8.0	5.1	6.7	3.5	92
Tuvalu	TUV	0.3	0.0	0.1	7.3	1.7	5.1	6.3	4.7	5.6	1.5	169

COUNTRY	ISO3	Natural	Human	Hazard & Exposure	Social-Economics Vulnerability	Vulnerable Groups	Vulnerability	Institutional	Infrastructure	Lack of Coping Capacity	INFORM 2015	RANK
Uganda	UGA	3.2	8.0	6.2	5.7	6.2	6.0	6.8	7.5	7.1	6.4	14
Ukraine	UKR	3.0	9.0	7.0	1.6	4.8	3.4	6.9	3.8	5.6	5.1	32
United Arab Emirates	ARE	2.9	0.0	1.6	1.8	0.7	1.2	2.9	2.9	2.9	1.8	162
United Kingdom	GBR	2.1	3.5	2.8	1.1	2.7	1.9	2.2	1.3	1.8	2.1	152
United States of America	USA	7.6	2.8	5.7	1.2	3.0	2.2	2.7	2.5	2.6	3.2	101
Uruguay	URY	1.7	0.0	0.9	2.5	0.9	1.8	3.7	2.2	3.0	1.7	166
Uzbekistan	UZB	5.9	2.8	4.5	2.1	1.6	1.8	5.1	4.2	4.7	3.4	95
Vanuatu	VUT	5.4	0.0	3.1	5.7	2.2	4.2	5.4	7.2	6.4	4.4	60
Venezuela	VEN	4.1	4.2	4.2	2.8	4.4	3.6	6.5	4.1	5.5	4.4	61
Viet Nam	VNM	7.7	1.2	5.3	2.8	1.1	2.0	5.3	3.9	4.7	3.7	89
Yemen	YEM	2.1	10.0	7.9	4.7	6.4	5.6	8.5	7.9	8.2	7.2	6
Zambia	ZMB	2.0	2.0	2.0	5.6	4.9	5.3	4.8	7.4	6.3	4.1	75
Zimbabwe	ZWE	2.3	4.5	3.4	5.5	5.4	5.4	7.6	6.1	6.9	5.1	33

ANNEX D: INFORM INDEX - COUNTRIES BY RANK

COUNTRY	ISO3	Natural	Human	Hazard & Exposure	Social-Economics Vulnerability	Vulnerable Groups	Vulnerability	Institutional	Infrastructure	Lack of Coping Capacity	INFORM 2015	RANK
Somalia	SOM	5.6	10.0	8.6	7.2	9.2	8.4	9.3	9.8	9.6	8.8	1
Central African Republic	CAF	1.1	10.0	7.8	7.8	8.4	8.1	8.0	9.0	8.6	8.2	2
Afghanistan	AFG	5.9	10.0	8.7	6.9	6.9	6.9	7.9	8.5	8.2	7.9	3
South Sudan	SSD	2.9	9.0	7.0	6.6	8.6	7.7	8.3	9.4	8.9	7.8	4
Sudan	SDN	4.2	9.0	7.3	5.4	8.4	7.2	6.7	7.8	7.3	7.2	5
Yemen	YEM	2.1	10.0	7.9	4.7	6.4	5.6	8.5	7.9	8.2	7.2	6
Iraq	IRQ	3.5	10.0	8.2	3.0	7.9	6.0	7.8	6.1	7.0	7.0	7
Congo DR	COD	3.2	7.0	5.4	7.0	8.1	7.6	8.0	8.6	8.3	7.0	8
Chad	TCD	3.0	5.9	4.6	6.8	8.6	7.8	8.0	9.6	8.9	6.8	9
Myanmar	MMR	9.1	7.0	8.2	4.8	6.0	5.4	7.5	6.4	7.0	6.8	10
Mali	MLI	2.8	8.0	6.0	7.1	5.9	6.5	6.2	8.9	7.8	6.7	11
Syria	SYR	4.4	10.0	8.4	3.2	7.8	6.0	6.3	5.5	5.9	6.7	12
Nigeria	NGA	2.4	9.0	6.8	4.4	7.0	5.9	5.0	8.0	6.8	6.5	13
Uganda	UGA	3.2	8.0	6.2	5.7	6.2	6.0	6.8	7.5	7.1	6.4	14
Ethiopia	ETH	4.2	6.3	5.3	6.3	6.5	6.4	4.9	9.3	7.7	6.4	15
Pakistan	PAK	7.1	8.0	7.6	3.9	6.7	5.4	5.5	6.4	5.9	6.3	16
Kenya	KEN	4.2	7.0	5.8	5.1	7.3	6.3	5.7	7.3	6.6	6.2	17
Haiti	HTI	6.1	3.6	5.0	7.1	3.1	5.4	7.4	8.8	8.2	6.1	18
Bangladesh	BGD	9.1	6.1	7.9	3.8	5.4	4.7	5.1	6.5	5.8	6.0	19
Niger	NER	3.1	4.5	3.9	7.7	5.6	6.8	6.1	9.4	8.2	6.0	20
Palestine	PSE	2.4	9.0	6.8	5.2	6.8	6.0	6.4	3.4	5.1	5.9	21
Mozambique	MOZ	5.6	2.9	4.4	7.2	4.4	6.0	4.6	8.8	7.2	5.7	22
India	IND	8.2	7.0	7.6	3.8	5.0	4.4	4.7	5.9	5.3	5.7	23
Libya	LBY	4.5	8.0	6.6	2.3	5.4	4.0	8.2	4.8	6.9	5.7	24
Colombia	COL	5.8	7.0	6.4	3.0	7.8	5.9	4.4	4.2	4.3	5.5	25
Burundi	BDI	2.7	4.6	3.7	6.7	6.6	6.6	6.8	6.3	6.5	5.4	26
Tanzania	TZA	4.1	3.9	4.0	5.6	5.3	5.5	5.4	8.0	6.9	5.3	27
Nepal	NPL	6.8	3.8	5.5	4.0	4.2	4.1	6.3	6.4	6.4	5.2	28
Philippines	PHL	9.3	7.0	8.3	2.6	4.6	3.7	4.9	4.4	4.7	5.2	29
Mauritania	MRT	3.9	2.3	3.1	6.4	5.8	6.1	5.9	8.3	7.3	5.2	30
Guatemala	GTM	6.8	3.7	5.4	4.5	5.3	4.9	5.5	5.0	5.2	5.2	31
Ukraine	UKR	3.0	9.0	7.0	1.6	4.8	3.4	6.9	3.8	5.6	5.1	32
Zimbabwe	ZWE	2.3	4.5	3.4	5.5	5.4	5.4	7.6	6.1	6.9	5.1	33
Iran	IRN	7.0	5.2	6.2	2.8	5.2	4.1	5.7	4.3	5.0	5.0	34

COUNTRY	ISO3	Natural	Human	Hazard & Exposure	Social-Economics Vulnerability	Vulnerable Groups	Vulnerability	Institutional	Infrastructure	Lack of Coping Capacity	INFORM 2015	RANK
Solomon Islands	SLB	4.7	0.0	2.6	8.0	3.3	6.2	6.7	7.7	7.2	4.9	35
Côte d'Ivoire	CIV	1.5	3.9	2.8	6.9	5.0	6.0	7.2	7.1	7.1	4.9	36
Indonesia	IDN	7.5	6.4	7.0	2.5	3.5	3.0	5.0	5.9	5.4	4.9	37
Guinea	GIN	1.2	4.0	2.7	6.0	3.9	5.1	7.6	8.9	8.4	4.8	38
Papua New Guinea	PNG	3.7	1.7	2.8	6.4	3.3	5.0	6.8	9.0	8.1	4.8	39
Madagascar	MDG	5.6	0.9	3.6	5.1	2.7	4.0	5.6	9.0	7.7	4.8	40
Angola	AGO	1.8	4.9	3.5	4.4	4.9	4.7	6.4	7.1	6.8	4.8	41
Lebanon	LBN	4.7	3.1	3.9	4.2	7.7	6.3	5.6	3.3	4.5	4.8	42
Senegal	SEN	2.8	4.0	3.4	5.8	4.3	5.1	4.8	7.1	6.1	4.7	43
Timor-Leste	TLS	4.9	0.5	3.0	4.7	4.8	4.8	6.8	7.9	7.4	4.7	44
Turkey	TUR	6.7	5.5	6.1	2.8	6.0	4.6	3.7	3.6	3.7	4.7	45
Egypt	EGY	5.7	7.0	6.4	2.6	4.0	3.3	5.5	3.8	4.7	4.6	46
Algeria	DZA	3.2	8.0	6.2	3.2	3.4	3.3	4.9	4.9	4.9	4.6	47
Peru	PER	7.7	3.9	6.2	2.5	4.2	3.4	4.7	4.8	4.8	4.6	48
Eritrea	ERI	2.8	1.6	2.2	6.5	4.9	5.7	8.0	7.4	7.7	4.6	49
Cambodia	KHM	5.0	3.7	4.4	4.3	2.0	3.2	7.1	6.7	6.9	4.6	50
Russian Federation	RUS	4.7	7.0	6.0	2.3	4.3	3.4	6.5	2.7	4.9	4.6	51
Mexico	MEX	7.5	9.0	8.3	2.2	3.4	2.8	4.1	4.1	4.1	4.6	52
Azerbaijan	AZE	4.0	3.7	3.8	1.9	6.4	4.5	6.6	4.4	5.6	4.6	53
Congo	COG	1.3	3.3	2.3	4.4	5.9	5.2	7.6	7.7	7.7	4.5	54
Djibouti	DJI	4.6	0.4	2.8	4.7	4.9	4.8	6.2	7.3	6.8	4.5	55
Sri Lanka	LKA	6.4	5.2	5.8	2.7	4.4	3.6	4.8	3.7	4.3	4.5	56
Tajikistan	TJK	5.5	5.0	5.3	3.1	2.9	3.0	6.0	5.1	5.6	4.4	57
Burkina Faso	BFA	2.4	1.9	2.1	7.0	4.8	6.0	4.8	8.0	6.7	4.4	58
China	CHN	7.9	6.3	7.2	1.9	3.7	2.9	4.0	4.1	4.1	4.4	59
Vanuatu	VUT	5.4	0.0	3.1	5.7	2.2	4.2	5.4	7.2	6.4	4.4	60
Venezuela	VEN	4.1	4.2	4.2	2.8	4.4	3.6	6.5	4.1	5.5	4.4	61
Benin	BEN	3.9	1.1	2.6	5.8	2.1	4.2	6.3	8.3	7.4	4.3	62
Sierra Leone	SLE	1.2	2.6	1.9	6.9	4.2	5.7	5.3	8.7	7.3	4.3	63
Lao PDR	LAO	4.7	1.6	3.3	4.3	3.5	3.9	5.6	6.9	6.3	4.3	64
Cameroon	CMR	2.6	1.7	2.2	4.7	5.5	5.1	7.1	7.2	7.2	4.3	65
Togo	TGO	1.2	2.9	2.1	5.3	4.2	4.8	6.6	8.5	7.7	4.3	66
Thailand	THA	5.9	5.2	5.6	2.0	4.5	3.4	4.5	3.7	4.1	4.3	67
Ecuador	ECU	7.0	0.7	4.6	3.4	4.3	3.8	4.5	4.3	4.4	4.3	68
Guinea-Bissau	GNB	1.1	2.1	1.6	6.0	4.7	5.4	9.0	8.3	8.7	4.2	69
Georgia	GEO	4.2	3.9	4.1	3.0	5.7	4.5	4.9	3.2	4.1	4.2	70

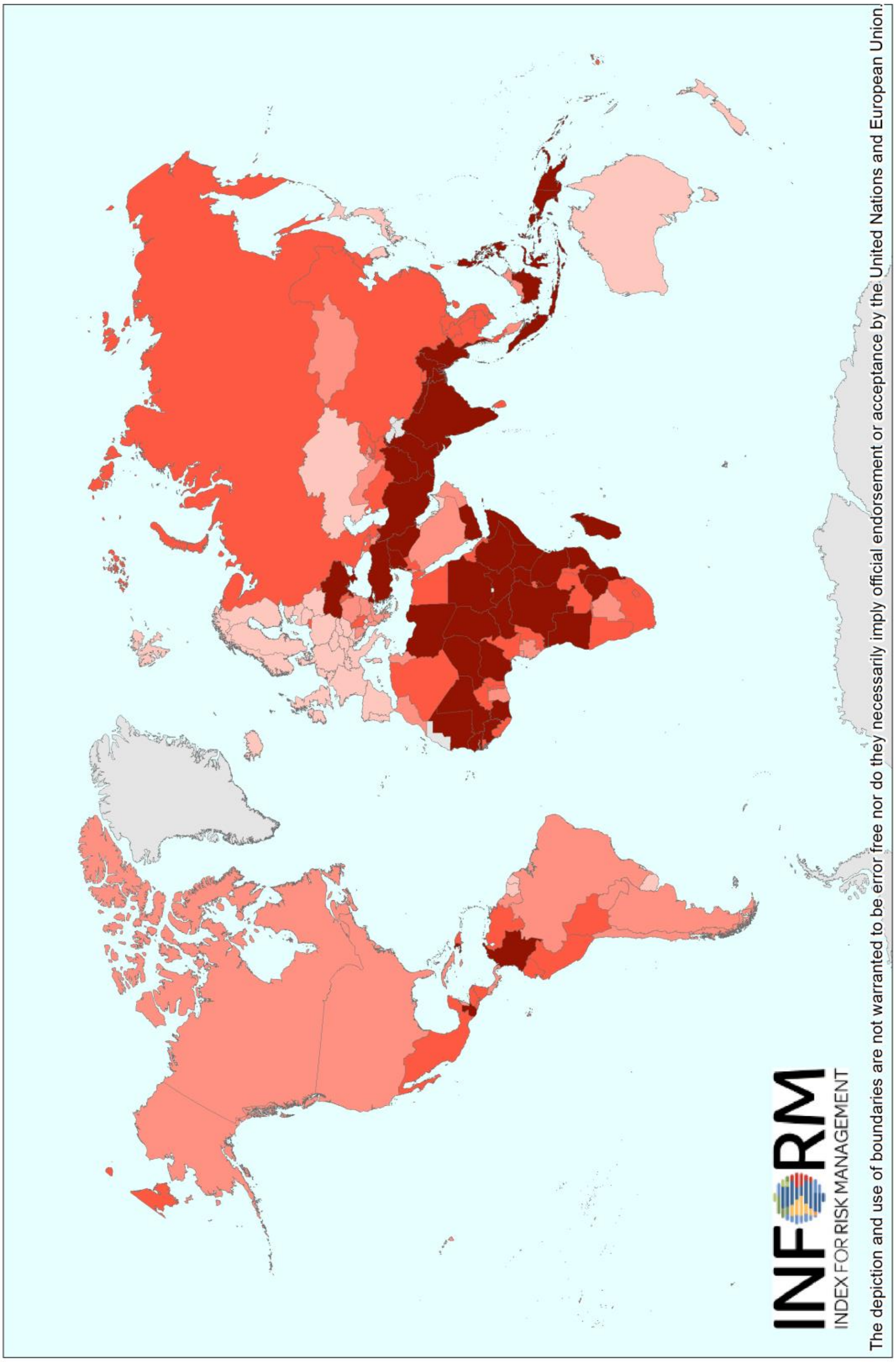
COUNTRY	ISO3	Natural	Human	Hazard & Exposure	Social-Economics Vulnerability	Vulnerable Groups	Vulnerability	Institutional	Infrastructure	Lack of Coping Capacity	INFORM 2015	RANK
South Africa	ZAF	3.4	5.0	4.3	3.5	3.8	3.7	5.0	4.6	4.8	4.2	71
Malawi	MWI	3.3	0.4	1.9	6.7	3.8	5.4	5.3	7.8	6.7	4.1	72
Rwanda	RWA	2.9	1.6	2.3	6.2	4.9	5.6	4.2	6.6	5.5	4.1	73
Korea DPR	PRK	3.4	1.2	2.3	4.8	3.5	4.2	9.0	3.2	7.0	4.1	74
Zambia	ZMB	2.0	2.0	2.0	5.6	4.9	5.3	4.8	7.4	6.3	4.1	75
Jordan	JOR	3.0	1.6	2.3	3.6	7.3	5.8	5.7	3.4	4.7	4.0	76
Honduras	HND	5.3	2.2	3.9	4.2	0.8	2.7	6.1	5.2	5.7	3.9	77
Swaziland	SWZ	1.7	2.5	2.1	4.6	3.3	4.0	7.1	6.3	6.8	3.9	78
Dominican Republic	DOM	7.1	1.7	5.0	2.8	1.4	2.2	5.6	4.9	5.3	3.8	79
Lesotho	LSO	2.0	1.1	1.5	6.2	4.5	5.4	6.7	6.9	6.8	3.8	80
Fiji	FJI	6.8	0.0	4.2	3.6	0.7	2.3	6.4	5.2	5.8	3.8	81
Moldova Republic of	MDA	3.8	4.2	4.0	3.2	2.4	2.8	6.2	3.5	5.0	3.8	82
Nicaragua	NIC	5.3	2.0	3.8	4.0	0.9	2.6	5.8	5.2	5.5	3.8	83
Namibia	NAM	2.7	1.0	1.9	4.8	4.9	4.9	4.6	6.6	5.7	3.7	84
Bhutan	BTN	4.7	0.1	2.7	5.1	1.2	3.4	5.2	6.3	5.8	3.7	85
Serbia	SRB	4.4	1.9	3.2	2.3	4.7	3.6	5.1	3.6	4.4	3.7	86
El Salvador	SLV	5.9	1.0	3.9	4.0	0.8	2.5	5.4	4.5	5.0	3.7	87
Bolivia	BOL	3.8	2.2	3.1	3.9	1.7	2.8	5.9	5.5	5.7	3.7	88
Viet Nam	VNM	7.7	1.2	5.3	2.8	1.1	2.0	5.3	3.9	4.7	3.7	89
Kyrgyzstan	KGZ	5.4	2.5	4.1	3.4	1.1	2.3	6.0	4.2	5.2	3.6	90
Liberia	LBR	0.9	0.9	0.9	7.7	5.6	6.7	6.9	8.0	7.5	3.6	91
Turkmenistan	TKM	4.0	0.9	2.6	2.6	2.1	2.4	8.0	5.1	6.7	3.5	92
Comoros	COM	1.9	0.1	1.0	7.4	2.7	5.5	7.6	6.5	7.1	3.4	93
Brazil	BRA	4.1	6.0	5.1	2.6	1.0	1.8	4.9	3.5	4.2	3.4	94
Uzbekistan	UZB	5.9	2.8	4.5	2.1	1.6	1.8	5.1	4.2	4.7	3.4	95
Morocco	MAR	2.9	2.2	2.6	4.2	0.7	2.6	5.7	4.9	5.3	3.3	96
Bosnia and Herzegovina	BIH	3.5	0.1	1.9	2.7	4.7	3.8	5.9	3.5	4.8	3.3	97
Armenia	ARM	4.0	0.1	2.3	2.4	3.3	2.9	6.6	3.7	5.3	3.3	98
Panama	PAN	3.2	2.2	2.8	3.2	2.9	3.1	4.8	3.2	4.1	3.2	99
Gambia	GMB	1.5	0.2	0.9	6.8	4.7	5.8	6.8	6.4	6.6	3.2	100
United States of America	USA	7.6	2.8	5.7	1.2	3.0	2.2	2.7	2.5	2.6	3.2	101
Paraguay	PRY	2.8	1.7	2.3	3.8	1.7	2.8	5.4	4.3	4.9	3.2	102
Gabon	GAB	1.4	1.7	1.5	3.0	3.5	3.3	6.6	5.9	6.2	3.2	103
Jamaica	JAM	5.1	1.3	3.4	3.3	1.0	2.2	4.5	3.7	4.1	3.1	104
Chile	CHL	7.2	0.9	4.8	2.5	1.5	2.0	3.0	3.3	3.1	3.1	105
Tonga	TON	2.8	0.0	1.5	5.9	1.0	3.9	5.6	4.2	5.0	3.1	106

COUNTRY	ISO3	Natural	Human	Hazard & Exposure	Social-Economics Vulnerability	Vulnerable Groups	Vulnerability	Institutional	Infrastructure	Lack of Coping Capacity	INFORM 2015	RANK
Kiribati	KIR	1.5	0.0	0.8	6.8	3.4	5.4	6.7	7.2	7.0	3.1	107
Ghana	GHA	1.5	1.2	1.4	4.4	3.0	3.7	4.5	6.5	5.6	3.0	108
Malaysia	MYS	3.4	2.3	2.8	2.4	3.6	3.0	3.3	3.3	3.3	3.0	109
Belize	BLZ	4.4	0.0	2.5	3.0	1.0	2.1	5.4	5.6	5.5	3.0	110
Mongolia	MNG	2.8	0.9	1.9	3.3	1.7	2.5	6.0	4.6	5.3	3.0	111
Botswana	BWA	2.5	0.2	1.4	4.0	3.4	3.7	4.4	5.2	4.8	2.9	112
Saint Lucia	LCA	4.8	0.0	2.7	3.8	0.7	2.4	4.1	3.5	3.8	2.9	113
Mauritius	MUS	5.7	0.0	3.4	3.5	0.7	2.2	3.7	2.8	3.2	2.9	114
Romania	ROU	4.8	2.4	3.7	1.9	1.0	1.5	4.8	4.0	4.4	2.9	115
Micronesia	FSM	1.4	0.0	0.7	7.2	1.4	5.0	6.1	6.6	6.3	2.9	116
Guyana	GUY	2.6	0.0	1.4	4.4	1.0	2.9	6.3	5.2	5.8	2.9	117
Saint Kitts and Nevis	KNA	5.2	0.0	3.0	4.1	0.6	2.5	3.8	2.3	3.1	2.9	118
Costa Rica	CRI	4.9	0.1	2.8	2.9	2.7	2.8	2.9	2.9	2.9	2.8	119
Samoa	WSM	2.3	0.0	1.2	6.2	0.6	3.9	4.7	4.5	4.6	2.8	120
Seychelles	SYC	3.0	0.0	1.6	5.5	1.9	3.9	4.2	2.5	3.4	2.8	121
Cabo Verde	CPV	2.0	0.0	1.1	6.5	0.9	4.2	4.1	5.4	4.8	2.8	122
Canada	CAN	6.1	0.7	3.9	0.8	3.0	2.0	2.3	2.9	2.6	2.7	123
Tunisia	TUN	2.4	2.2	2.3	2.4	0.8	1.6	5.9	4.1	5.1	2.7	124
Antigua and Barbuda	ATG	5.7	0.0	3.4	2.5	0.7	1.7	4.7	1.6	3.3	2.7	125
Argentina	ARG	3.9	2.1	3.0	1.9	1.2	1.5	5.0	2.8	4.0	2.7	126
Albania	ALB	3.5	0.1	2.0	2.6	0.9	1.7	6.3	3.7	5.1	2.6	127
Israel	ISR	3.1	3.2	3.1	1.1	3.2	2.2	3.2	1.9	2.6	2.6	128
Palau	PLW	2.3	0.0	1.2	4.2	0.6	2.6	6.0	3.6	4.9	2.5	129
Cyprus	CYP	2.5	0.1	1.4	1.3	6.3	4.3	3.0	2.2	2.6	2.5	130
Bulgaria	BGR	3.2	1.3	2.3	1.8	1.8	1.8	4.5	2.7	3.7	2.5	131
Grenada	GRD	3.4	0.0	1.8	2.8	1.0	1.9	4.6	3.7	4.1	2.5	132
Oman	OMN	3.4	1.2	2.4	2.4	0.4	1.5	4.9	3.2	4.1	2.4	133
Saudi Arabia	SAU	1.9	3.4	2.7	2.0	0.3	1.2	5.1	3.4	4.3	2.4	134
Cuba	CUB	4.9	0.1	2.8	2.3	0.2	1.3	4.1	3.3	3.7	2.4	135
Macedonia FYR	MKD	2.8	1.0	1.9	2.3	1.2	1.8	4.8	3.1	4.0	2.4	136
Equatorial Guinea	GNQ	1.0	0.1	0.5	4.2	2.4	3.4	8.1	6.7	7.5	2.4	137
Greece	GRC	4.3	2.8	3.6	1.3	1.3	1.3	3.7	1.9	2.9	2.4	138
Italy	ITA	3.4	2.8	3.1	1.1	2.3	1.7	3.7	1.0	2.5	2.3	139
Kazakhstan	KAZ	3.6	2.2	2.9	1.5	0.5	1.0	5.3	3.0	4.2	2.3	140
Marshall Islands	MHL	0.6	0.0	0.3	7.6	4.2	6.2	7.7	6.2	7.0	2.3	141
Kuwait	KWT	1.9	2.4	2.2	2.0	0.8	1.4	5.4	2.4	4.1	2.3	142

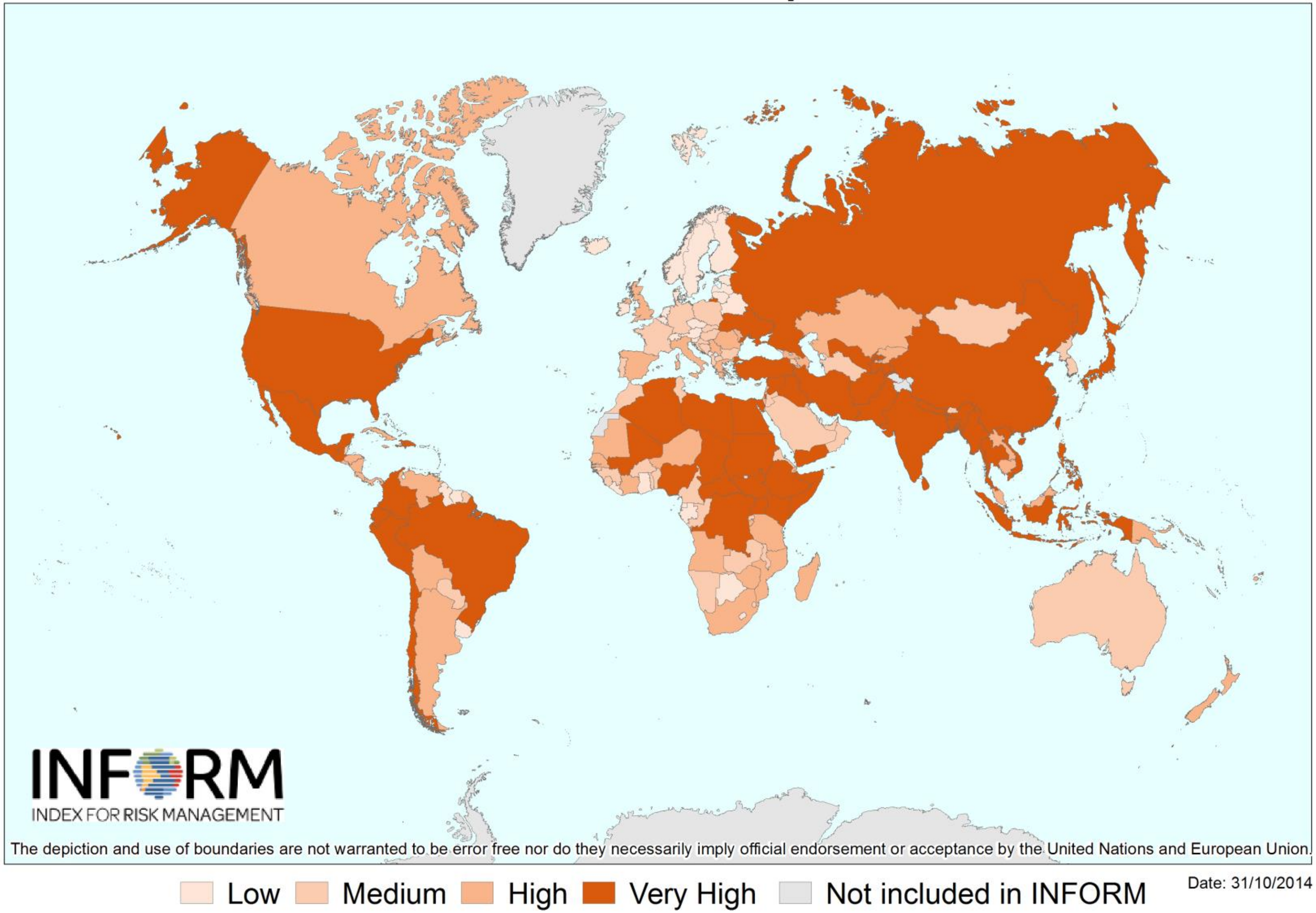
COUNTRY	ISO3	Natural	Human	Hazard & Exposure	Social-Economics Vulnerability	Vulnerable Groups	Vulnerability	Institutional	Infrastructure	Lack of Coping Capacity	INFORM 2015	RANK
Nauru	NRU	1.1	0.0	0.6	5.1	0.8	3.2	7.1	6.5	6.8	2.3	143
France	FRA	3.1	2.3	2.7	0.8	3.1	2.0	2.8	1.6	2.2	2.3	144
Poland	POL	2.3	1.2	1.8	1.4	2.5	1.9	4.2	2.3	3.3	2.3	145
Japan	JPN	8.4	0.9	5.9	0.9	0.9	0.9	2.1	2.2	2.1	2.2	146
Montenegro	MNE	2.4	0.0	1.3	2.1	2.5	2.3	4.3	3.1	3.7	2.2	147
Dominica	DMA	2.2	0.0	1.2	4.7	0.3	2.8	3.9	2.7	3.3	2.2	148
Belarus	BLR	1.5	1.2	1.4	1.1	2.8	2.0	5.0	2.9	4.0	2.2	149
New Zealand	NZL	6.9	0.0	4.3	0.9	1.1	1.0	1.9	2.8	2.4	2.2	150
Bahamas	BHS	3.4	0.0	1.9	2.3	0.9	1.6	3.1	3.5	3.3	2.2	151
United Kingdom	GBR	2.1	3.5	2.8	1.1	2.7	1.9	2.2	1.3	1.8	2.1	152
Spain	ESP	4.1	2.0	3.1	1.1	1.3	1.2	3.4	1.1	2.3	2.1	153
Slovakia	SVK	2.7	2.2	2.5	1.2	0.9	1.1	4.4	2.2	3.4	2.1	154
Croatia	HRV	3.2	0.0	1.8	1.6	1.0	1.3	3.6	2.8	3.2	2.0	155
Trinidad and Tobago	TTO	2.4	0.1	1.3	1.9	0.8	1.4	4.8	2.6	3.8	1.9	156
Barbados	BRB	3.0	0.0	1.6	2.5	0.5	1.6	2.6	2.7	2.6	1.9	157
Suriname	SUR	1.1	0.0	0.6	3.4	0.8	2.2	5.7	4.9	5.3	1.9	158
Hungary	HUN	2.9	0.7	1.9	1.6	1.8	1.7	2.5	1.5	2.0	1.9	159
Australia	AUS	4.4	0.1	2.6	0.5	1.7	1.1	2.1	2.3	2.2	1.8	160
St Vincent and the Grenadines	VCT	1.7	0.0	0.9	3.3	0.5	2.0	3.5	3.5	3.5	1.8	161
United Arab Emirates	ARE	2.9	0.0	1.6	1.8	0.7	1.2	2.9	2.9	2.9	1.8	162
Germany	DEU	2.8	0.2	1.6	0.5	3.2	2.0	2.5	1.0	1.8	1.8	163
Czech Republic	CZE	2.0	0.1	1.1	1.0	2.3	1.6	3.8	1.5	2.7	1.7	164
Austria	AUT	2.5	0.0	1.4	0.8	2.8	1.8	2.5	1.4	2.0	1.7	165
Uruguay	URY	1.7	0.0	0.9	2.5	0.9	1.8	3.7	2.2	3.0	1.7	166
Portugal	PRT	2.9	0.1	1.6	1.4	0.7	1.0	3.3	2.4	2.9	1.7	167
Korea Republic of	KOR	4.2	0.2	2.5	0.8	0.5	0.6	2.6	2.2	2.4	1.6	168
Tuvalu	TUV	0.3	0.0	0.1	7.3	1.7	5.1	6.3	4.7	5.6	1.5	169
Slovenia	SVN	2.7	0.0	1.5	0.8	1.1	0.9	2.2	1.6	1.9	1.4	170
Ireland	IRL	1.9	0.0	1.0	0.9	1.7	1.3	2.4	1.6	2.0	1.4	171
Lithuania	LTU	1.4	0.1	0.7	1.5	0.9	1.2	3.8	1.8	2.9	1.4	172
Netherlands	NLD	2.0	0.1	1.1	0.5	2.8	1.7	1.8	0.9	1.4	1.4	173
Belgium	BEL	1.6	0.1	0.9	0.9	2.5	1.7	2.2	1.1	1.7	1.4	174
Latvia	LVA	1.0	0.0	0.5	1.7	0.9	1.3	4.0	2.5	3.3	1.3	175
Liechtenstein	LIE	1.9	0.0	1.0	0.6	1.2	0.9	1.5	3.0	2.3	1.3	176
Switzerland	CHE	2.2	0.1	1.2	0.6	2.2	1.4	1.3	1.0	1.1	1.2	177
Qatar	QAT	1.0	0.0	0.5	2.1	0.7	1.5	3.0	1.8	2.4	1.2	178

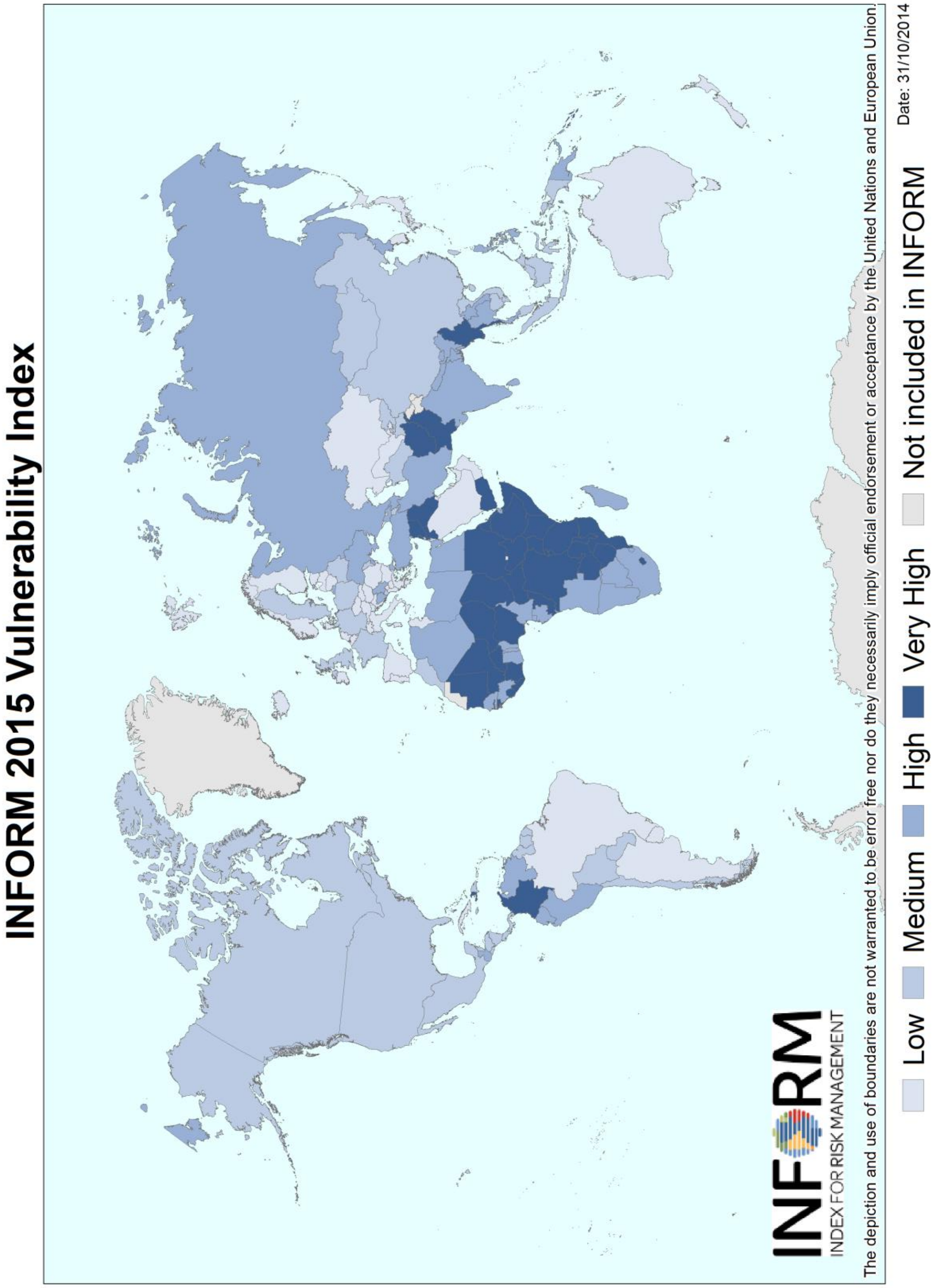
COUNTRY	ISO3	Natural	Human	Hazard & Exposure	Social-Economics Vulnerability	Vulnerable Groups	Vulnerability	Institutional	Infrastructure	Lack of Coping Capacity	INFORM 2015	RANK
Bahrain	BHR	0.2	0.6	0.4	1.9	0.9	1.4	4.2	1.9	3.1	1.2	179
Sweden	SWE	0.9	0.0	0.5	0.5	3.8	2.3	2.0	1.0	1.5	1.2	180
Iceland	ISL	1.4	0.0	0.8	0.7	0.8	0.8	2.1	2.3	2.2	1.1	181
Maldives	MDV	0.3	0.0	0.1	3.0	0.8	1.9	5.7	3.4	4.6	1.1	182
Estonia	EST	0.6	0.1	0.3	1.4	0.9	1.2	3.1	1.7	2.4	1.0	183
Luxembourg	LUX	0.7	0.0	0.3	1.0	1.9	1.4	1.9	1.3	1.6	0.9	184
Denmark	DNK	0.7	0.0	0.4	0.6	2.3	1.5	1.0	1.2	1.1	0.9	185
Brunei Darussalam	BRN	0.2	0.0	0.1	1.0	0.6	0.8	4.8	4.4	4.6	0.8	186
Norway	NOR	0.2	0.0	0.1	0.2	3.0	1.7	1.9	1.9	1.9	0.7	187
Sao Tome and Principe	STP	0.0	0.0	0.0	6.6	1.0	4.4	6.1	5.9	6.0	0.4	188
Finland	FIN	0.0	0.0	0.0	0.7	2.2	1.5	1.7	1.7	1.7	0.3	189
Malta	MLT	0.0	0.0	0.0	1.7	2.6	2.1	3.5	1.5	2.5	0.3	190
Singapore	SGP	0.0	0.0	0.0	0.7	0.3	0.5	1.1	1.2	1.2	0.2	191

ANNEX E: MAPS OF INDEXES

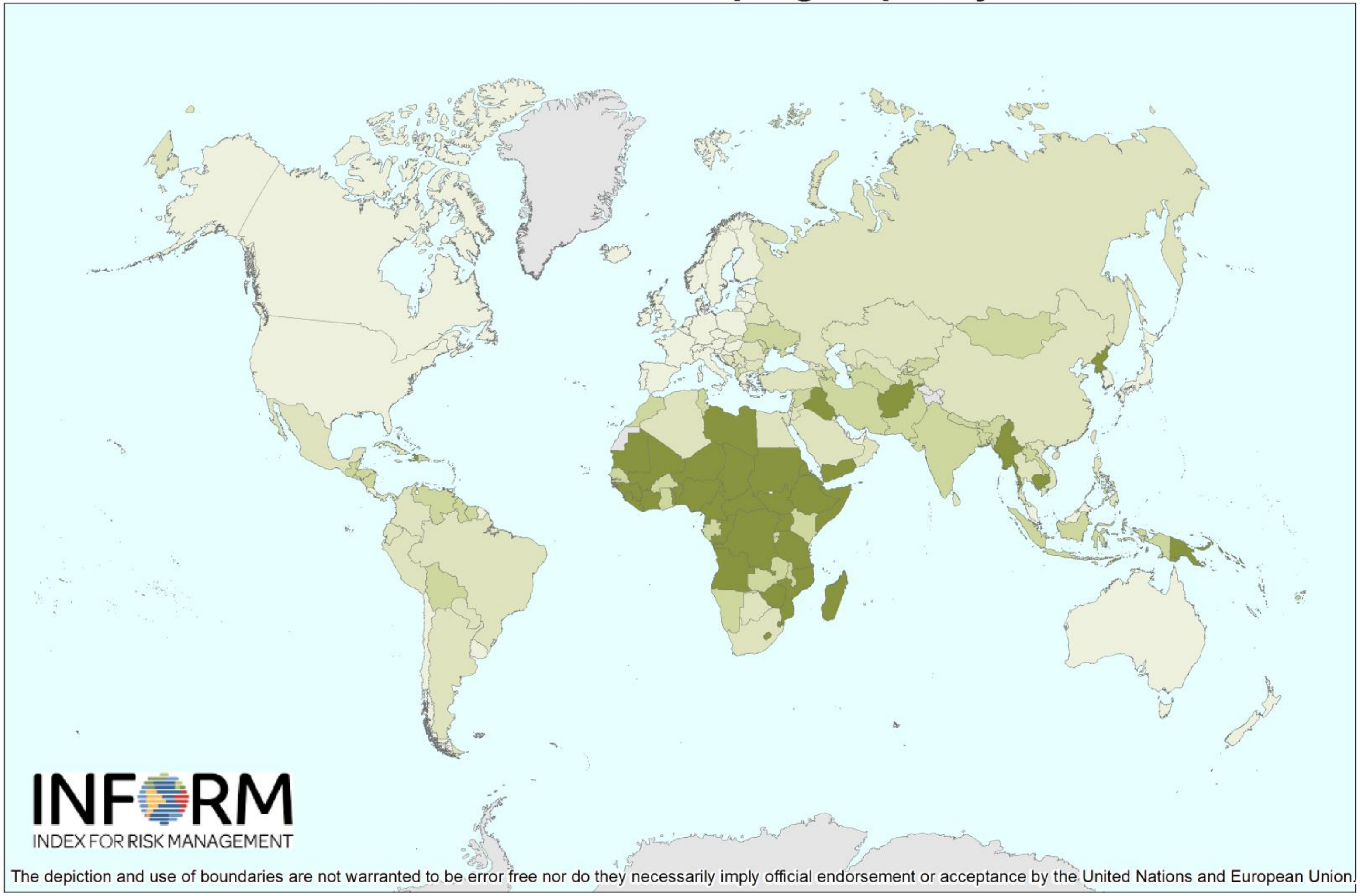


INFORM 2015 Hazard & Exposure Index




INFORM 2015 Vulnerability Index
INFORM
INDEX FOR RISK MANAGEMENT
The depiction and use of boundaries are not warranted to be error free nor do they necessarily imply official endorsement or acceptance by the United Nations and European Union.
Low
Medium
High
Very High
Not included in INFORM
Date: 31/10/2014

INFORM 2015 Lack of Coping Capacity Index



Low Medium High Very High Not included in INFORM

Date: 31/10/2014

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Abstract

This report describes the concept and methodology of the composite Index for Risk Management (INFORM). The INFORM initiative began in 2012 as a convergence of interests of UN agencies, donors, NGOs and research institutions to establish a common evidence-base for global humanitarian risk analysis.

INFORM identifies the countries at a high risk of humanitarian crisis that are more likely to require international assistance. The INFORM model is based on risk concepts published in scientific literature and envisages three dimensions of risk: Hazards & Exposure, Vulnerability and Lack of Coping Capacity. The INFORM model is split into different levels to provide a quick overview of the underlying factors leading to humanitarian risk.

The INFORM index supports a proactive crisis and disaster management framework. It will be helpful for an objective allocation of resources for disaster management as well as for coordinated actions focused on anticipating, mitigating, and preparing for humanitarian emergencies.

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Key policy areas include: environment and climate change; energy and transport; agriculture and food security; health and consumer protection; information society and digital agenda; safety and security including nuclear; all supported through a cross-cutting and multi-disciplinary approach.

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