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Index for Risk Management - InfoRM

Concept and Methodology

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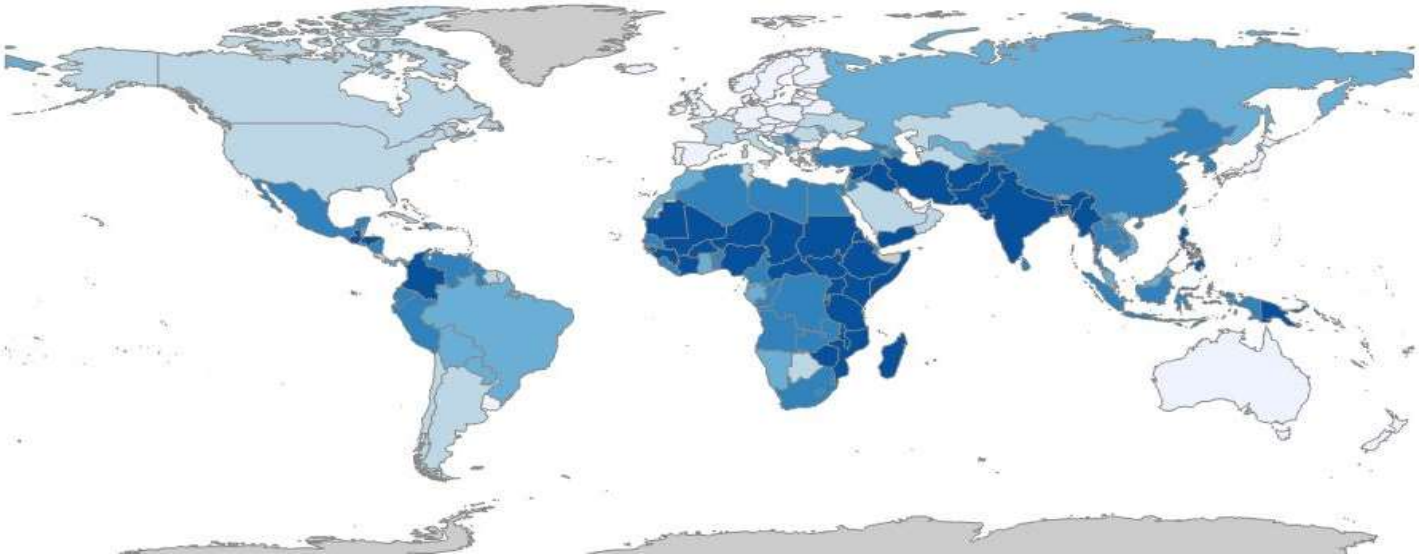

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V0.1	15/12/2013	Draft version for core InfoRM partners
V1.0	20/01/2014	First version of InfoRM methodology
V1.0.1	27/01/2014	Added acknowledgments and corrected data values

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 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
ASIS	Agriculture Stress Index System
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 Analysis
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 State
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)
UNCHR	United Nations refugee agency
UNDOC	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 (are 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 106 million people in 115 countries were affected by natural disasters in 2012. 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. 2012 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 government, 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 management framework. Such as 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.

The scope of this publication is to describe the methodology of the InfoRM index in detail. It can be considered as the first version of the methodology, as it is expected to change based on feedback of real use by participating organisations, suggestions of new partners, and availability of new science and data.

The first version of the methodology is published in January 2014. Feedback will be collected in a planned process of implementation cases, as well as through generic feedback forums. An updated version of the methodology is planned to be released around November 2014, after which is intended to stay unchanged for a few years to ensure comparability over time.

More information and updated versions of this document will be available on the InfoRM website: http://inform.jrc.ec.europa.eu.

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, UNCHR, 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 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 manmade 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 even market), 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.

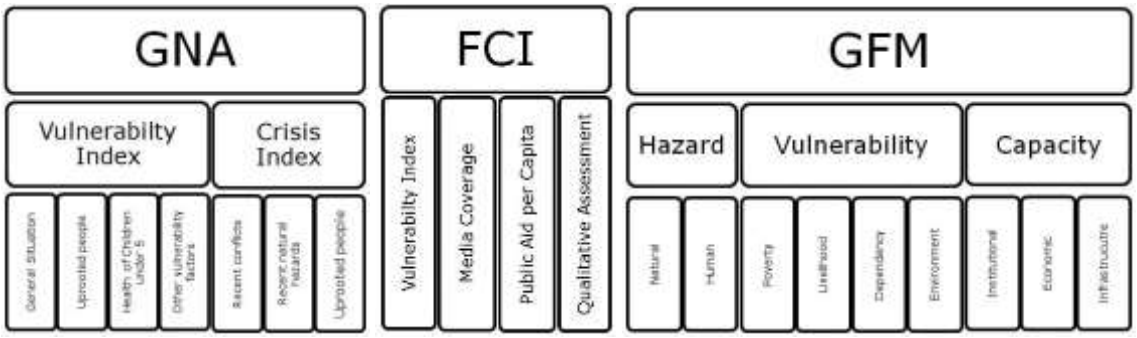

Figure 1: Global Needs Assessment Model (left), Forgotten Crisis index (middle) and Global Focus Model (right)

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 refelct 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.

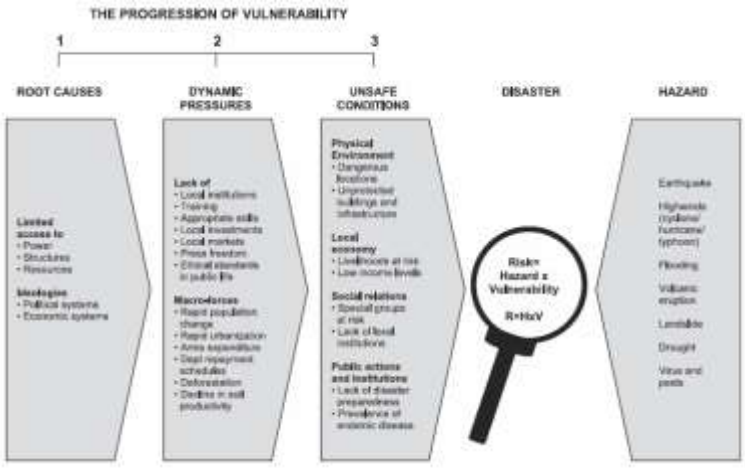

Figure 3: PAR model [41]

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.

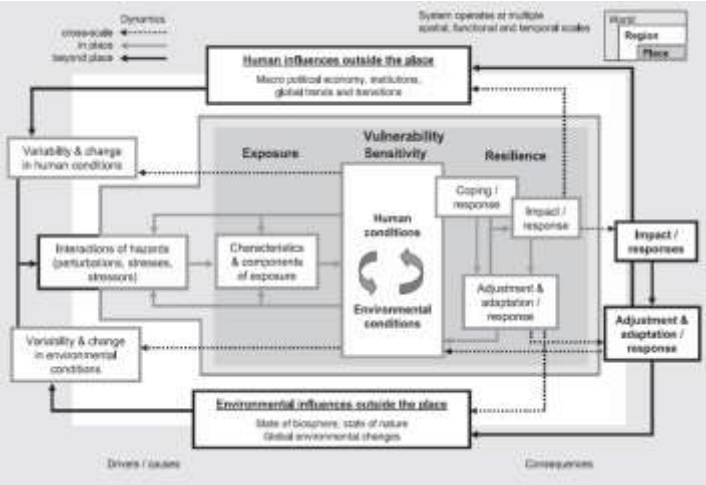

Figure 4: Coupled human-environment system [33]

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

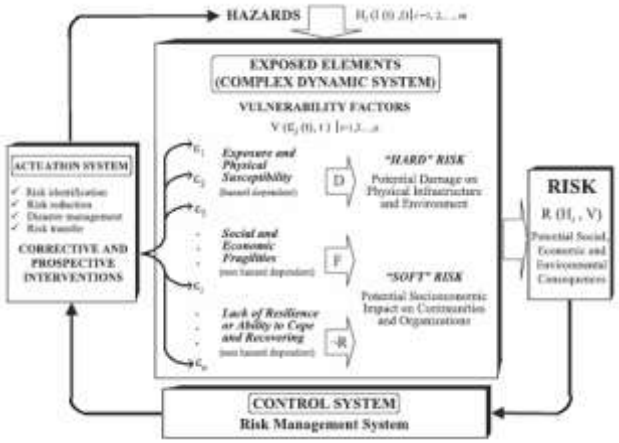

Figure 5: Holistic approach [6].

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	Conflict intensity	Regime stability	Extrajudicial and Unlawful killings	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):

$$Risk = Hazard \times Vulnerability \qquad \text{Equation 1}$$

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:

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

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:

$$Risk = Hazard\&Exposure \times Vulnerability \times Lack of Coping\ Capacity \qquad \text{Equation 3}$$

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.

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

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

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

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, 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., Conflict Barometer, Relative Number of Affected Population by Natural Disasters, Number of Regugees. 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

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

[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 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.

people needing assistance. This raises a question 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.

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	-	EM-DAT database for the period 1990 - now

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

[5] http://www.emdat.be/criteria-and-definition
[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 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 see 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 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] overcome 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 level 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 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 earthquake 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 the InfoRM index the Drought component reflects the number of affected people per year based on historical events in EM-DAT database for the period from 1990 up to now, that it the period when reporting is assumed to be consistent.

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.

Droughts have devastating impacts on food security and food production. Food Insecurity is a component under Vulnerability dimension and the Vulnerable Group category (Chapter 7.3.3). While fluctuation in food production can be captured by the Agriculture Stress Index System (ASIS) [9] that is a remote sensing based approach, which monitors vegetation indices (VHI -

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

Vegetation Health Index) across global crop areas during growth season and can detect where crops may be affected by drought. VHI is proved to be a valid drought indicator for the African continent, and is highly correlated with the drought events recorded during the period (1981–2009). At the moment the ASIS data are available only for the African continent [29], but it is foreseen that the ASIS data will replace the number of people affected by drought per year.

Scalability: The preferable asset of ASIS data will be geographical and temporal scalability, i.e., calculation of subnational indexes with seasonal component based on the historical archive of remote sensing data. This is not the case with the current drought exposure indicators.

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																			
Component level	GEOMETRIC AVERAGE																			
	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							
									GEOMETRIC AVERAGE				ARITHMETIC AVERAGE							
									CW SS1		CW SS3									
Core indicators	ARITHMETIC AVERAGE		ARITHMETIC AVERAGE						ARITHMETIC AVERAGE		ARITHMETIC AVERAGE									
	Log(absolute)	Relative	Log(absolute)	Relative	Log(absolute)	Relative	Log(absolute)	Relative	Log(absolute)	Relative	Log(absolute)	Relative	Log(absolute)	Relative			Log(absolute)	Relative		

absolute - absolute value of physical exposure
relative - relative value of physical exposure

7.2.3. Category: Human Hazard

Human made hazards can be technological (e.g., industrial accidents with environmental impact) or sociological in nature. Data interpreting technological hazards are not currently available (Chapter 8.2), therefore the InfoRM's Human Hazard category considers only sociological hazards encompassing crime, civil disorder, terrorism or war. The quantitative value shall refer to risk of conflicts, unrest or crime in the country. This category comprises three proxy measures for which existing indicators were chosen:

- Conflict Intensity
    - Conflict Barometer (source: HIIK),
- Regime Stability
    - Political Stability and Absence of Violence (source: WGI),
- Extrajudicial and Unlawful killings
    - Intentional Homicides per 100,000 persons (source: UNDOC).

A conflict is considered to be a dynamic process made up of a sequence of interlocking conflict episodes. **Conflict Intensity** is captured by the Conflict Barometer[10] provided annually by The Heidelberg Institute for International Conflict Research (HIIK). The Conflict Barometer rates political conflict in the past year on two criteria: instruments for 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 1-5 in discrete steps (Table 5). To emphasize the increasing differences between the intensity levels, the score of the Conflict Barometer was squared and then rescaled into a range of 0 to10.

Table 5: Conflict Intensity adopted by HIIK

Intensity level	Conflict Barometer	Conflict Intensity (InfoRM)
0	No dispute	0
1	dispute	0.4
2	non-violent crises	1.6
3	violent crises	3.6
4	limited war	6.4
5	war	10

A second aspect in the estimation of the likelihood of the human hazard events is covered by the **Regime Stability** component. It is captured by the Political Stability and Absence of Violence Index that measures perceptions of the likelihood that the government will be destabilized or overthrown by unconstitutional or violent means, including politically-motivated violence and terrorism. The Political Stability and Absence of Violence index is one of the six dimensions of the Worldwide Governance Indicators [19] by the World Bank and is measured annually. It is

[10] http://www.hiik.de/en/konfliktbarometer/index.html: According to the new conflict methodology in Heidelberg, the HIIK understands a *political conflict* as a *positional difference regarding values relevant to a society – the conflict items – between at least two decisive and directly involved actors, which is being carried out using observable and interrelated conflict means that lie beyond established regulatory procedures and threaten a core state function or the order of international law, or hold out the prospect to do so*.

very much correlated with the Conflict Barometer but when the two of them are aggregated with the arithmetic average they complement each other. The discrete values of Conflict barometer become more continuous, for example within the Conflict Barometer level 5, Syria is on the top and Mexico is the last.

A third aspect considered is the security conditions in the country, in particular of interest for proactive crisis management. These have different time spans then the level of conflict intensity and are an intrinsic characteristic of the institutional system. Corruption, crime and violation of political rights are signs of bad institutional performance. This can be evaluated from two angles: legitimacy of the constituent regime on one side, or measuring the consequences of low performance of the security system. If the first angle is partially covered by the Regime Stability component, the other is reflected in the **Extrajudicial and Unlawful Killings** component captured by Intentional Homicide Rates published annually by UNDOC (United Nations Office on Drugs and Crime). Among the organizations involved in InfoRM index higher Intentional Homicide Rates are seen as an indicator for greater crisis management needs. For instance, the ECHO 2013 Humanitarian Implementation Plan treats the acute violence in Central America and Mexico as a humanitarian context[11].

Intentional Homicides Rates[12] capture domestic disputes that end in killing, interpersonal violence, violent conflicts over land resources, inter-gang violence over turf control, and predatory violence and killing by armed groups while deaths arising from armed conflict are considered separately. There is often little difference in intensity between large-scale criminal violence and low level armed conflict. As a result, Intentional Homicides Rate data should be interpreted with particular caution in countries affected by armed conflict. The difference lies in the motivation, politically driven conflicts or economically driven criminal activity. Furthermore, the violent activities of organized crime groups have often also broader political consequences. Such groups blur the boundaries between criminal and political types of violence[13].

Global Burden of Armed Violence report 2011 [11] shows the disaggregated data to look for patterns of different types of intentional homicides. Some of the outcomes are cited here:

- The proportion of homicides related to gangs or organized crime is significantly higher in countries in Central and South America than in those of Asia or Europe.
- Homicide rates related to robbery or theft tend to be higher in countries with greater income inequality, including in the Americas.
- The proportion of homicides related to intimate partners or family members represents a significant proportion of homicides in some countries in Europe and Asia.
- The relative weakness of a country's rule of law is broadly linked with higher overall homicide rates.
- A nexus appears to exist between high homicide rates, a high proportion of homicides committed with firearms, and a low proportion of cases solved by law enforcement

[11] http://www.alnap.org/resource/8852
[12] http://www.unodc.org/documents/data-and-analysis/IHS%20methodology.pdf
[13] http://www.genevadeclaration.org/measurability/global-burden-of-armed-violence.html

It is concluded that societies with high proportion of homicides committed with firearms also experience higher overall violent deaths.

Using all three indicators together may expose countries where casualties of human hazard events may reach the level of the humanitarian crisis. Certain caution with Intentional Homicide Rates data is essential as suggested by the data provider (UNDOC). For example, Afghanistan has a low homicide rate but a high intensity conflict level, and it is considered to be at high risk of human hazard. Therefore the Intentional Homicide Rates data will be used only in cases when it will result in worse conditions of the country based on the Conflict Intensity and Regime Stability components otherwise the indicator of Intentional Homicide Rates is discarded.

The resulting risk of the Human Hazard is based on the Conflict Intensity and the Regime Stability component aggregated with arithmetic average combined with Extrajudicial and Unlawful Killings component only if their aggregation with arithmetic average yields even higher values. In that case 66/33 weighting scheme is applied to preserve the initial one third contribution of Extrajudicial and Unlawful Killings component.

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 the scientific purposes. The data for Intentional Homicide Rates on subnational scale do not exist. In case of Political Stability and Absence of Violence Index the unit of analysis is locked to country level. Both of them are published annually.

Table 6: Aggregation of the Human Hazard category

Functional level (Category)	Human Hazard		
Aggregation	ARITHMETIC AVERAGE 66/33 (if Conflict Intensity and Regime Stability >Extrajudicial and Unlawful killings 100/0)		
	66% (100%)		33% (0%)
	ARITHMETIC AVERAGE		Extrajudicial and Unlawful Killings
Component level	Conflict Intensity	Regime Stability	
Core indicator	Conflict Barometer	Political Stability and Absence of Violence	Intentional Homicides per 100,000 Persons

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.

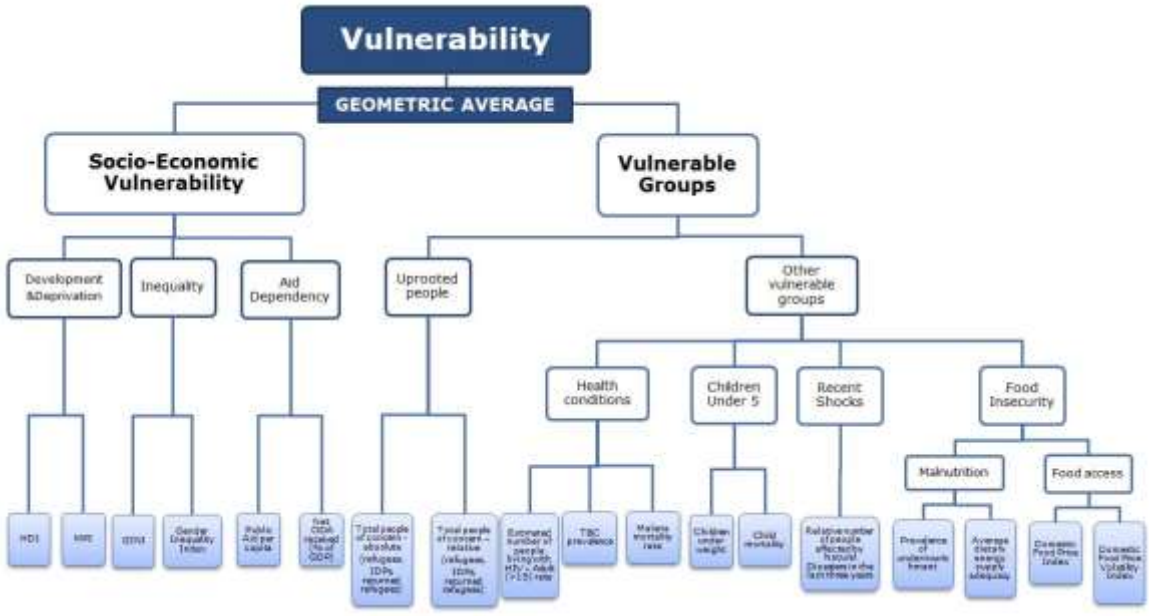

Figure 9: Graphical presentation of the Vulnerability dimension

7.3.2. Category: Socio-Economic Vulnerability

The question is what makes a population vulnerable when faced with 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 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) and shows 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 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

Functional level (Category)	Socio-Economic Vulnerability						
Aggregation	ARITHMETIC AVERAGE 50/25/25						
	50%		25%		25%		
Component level	Development & Deprivation		Inequality		Aid Dependency		
Core Indicators	ARITHMETIC AVERAGE		ARITHMETIC AVERAGE		ARITHMETIC AVERAGE		
	Human Development Index	Multidimensional Poverty Index	GINI index	Gender Inequality Distribution	Public Aid per capita		Net ODA Received (% of GNI)
					SUM		
					Total ODA in the last 2years per capita	Total Humanitarian Funding in the last 2year per capita	

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

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

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.
- 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 difficult accessible areas, 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 make them also at 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 130000 foreign and migrant workers. Most were paid low wages in small business 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; therefore 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 lack of protection and inadequate health service, issues common to other ages. Their declining health as well as their social (e.g. isolation) and economic marginalization made 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: UNCHR),
    - Number of returned refugees (source: UNCHR),
    - Number of Internally Displaced Persons (source: IOM).
- Other Vulnerable Groups:
    - Health Conditions:
        - Prevalence of HIV-AIDS above 15 years (source: WHO),
        - Tuberculosis Revalence (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).
    - Food Insecurity:[15]
        - Malnutrition:
            - Prevalence of Undernourishment: the percentage of the population whose food intake is insufficient to meet dietary energy requirements continuously (source: FAO).
            - Average Dietary Energy Supply Adequacy: average dietary energy supply as a percentage of the average dietary energy requirement (source: FAO).
        - 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).

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

GNA Score	% of total population	Level of Vulnerability	Index of uprooted people (relative)
6	> 10%	high	10.0
5	> 3% AND < 10%		8.3
4	> 1% AND < 3%	medium	6.7
3	> 0.5% AND < 1%		5.0
2	> 0.1% AND < 0.5%	low	3.3
1	> 0.005% AND < 0.1%		1.7
0	< 0.005%	no vulnerability	0.0

[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.

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).

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 Insecurity					
				ARITHMETIC AVERAGE			ARITHMETIC AVERAGE			ARITHMETIC AVERAGE					
										Malnutrition		Food Access			
										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

A **Health Condition** index refer 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. While the Child Mortality shows general health condition of the children. It 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.

The FAO definition of **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 suggests two components of Food Security index, Malnutrition and Food Access, as proxy measures for the number of people lacking secure access to food. The **Malnutrition** component concerns the actual quality and type of food supplied to provide the nutritional balance necessary for healthy and active life. It captures trends in chronic hunger. While the **Food Access** component refers to the economic aspect and its stability. It reflects acute short-term changes in malnutrition. Poor people are more vulnerable to price volatility. When prices rise they are forced to shift to less expensive but often less nutritious foods.

The combination of chronic hunger and swings in prices may lead to famine and hunger for the poor people. Therefore, the two components, Malnutrition and Food Access, are aggregated with an arithmetic average. Both components are the arithmetic average of the raw indicators. The Malnutrition component is aggregated with equal weights while 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

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

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[18] 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.

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

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 Need 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.

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

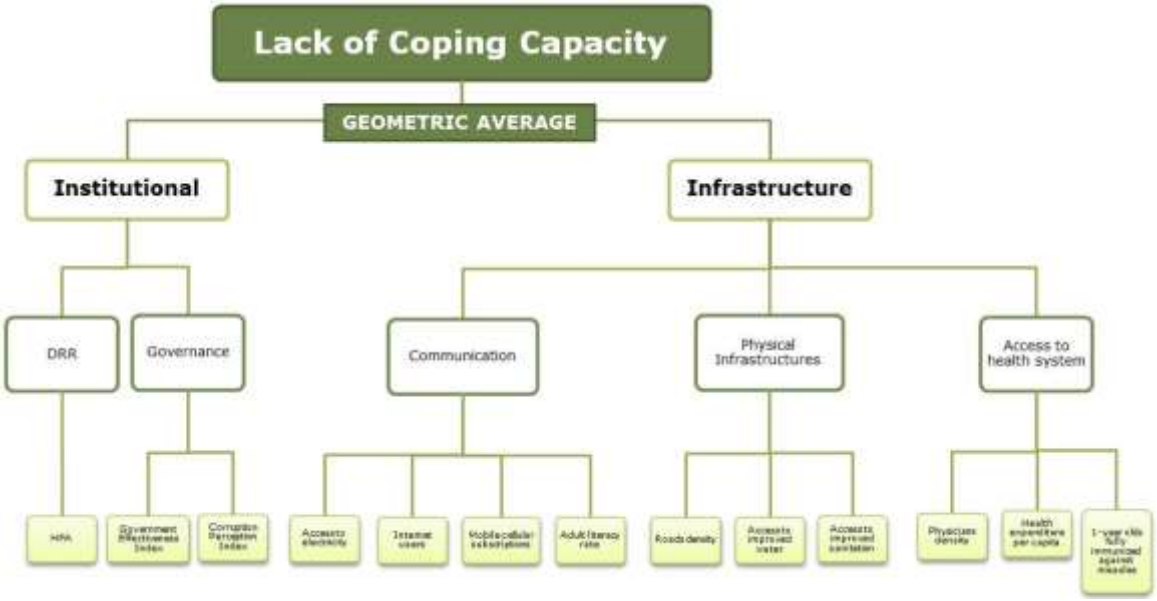

Figure 10: Graphical presentation of the Lack of Coping Capacity dimension

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[19] 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.

Table 10: Institutional category

Functional level (Category)	Institutional		
Component level	ARITHMETIC AVERAGE		
	Disaster Risk Reduction	Governance	
Core Indicators	Hyogo Framework for Action Scores	ARITHMETIC AVERAGE	
		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 to measure 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.

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

Table 11: Infrastructure category

Functional level (Category)	Infrastructure									
Component level	ARITHMETIC AVERAGE									
	Communication				Physical infrastructure			Access to health system		
Core Indicators	ARITHMETIC AVERAGE				ARITHMETIC AVERAGE			ARITHMETIC AVERAGE		
	Access to Electricity	Internet Users	Mobile Cellular Subscriptions	Adult Literacy Rate	Roads Density	Access to Improved Water Source	Access to Improved Sanitation Facolities	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 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 has 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 on-set hazards with a more limited geographic extent seldom exceed entry criteria of EM-DAT database. From that point of view their presence in database is incomplete and the cumulative death toll is higher, while 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 measures for the same process are 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 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 is the presence of the direct measures over proxies the relevance of the scores is the better. 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. 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 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 11) 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.

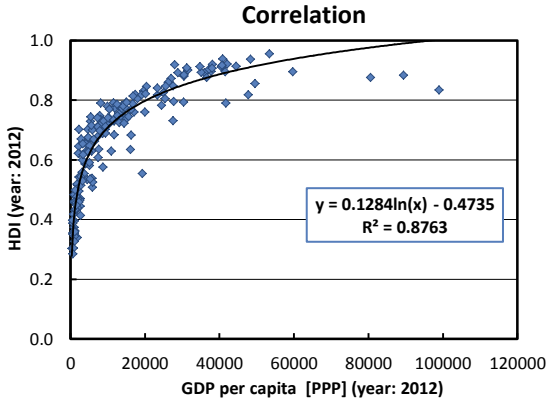

Figure 11: Regression analysis of correlation between HDI and GDP per capita (PPP)

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 indicator. 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.

The square transformation is used when linear, usually qualitative, scale does not portray the increase in the severity of the situation as it happens in the case of the Conflict Barometer (Chapter 7.2.3).

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).

$$x_{i,norm}^{j} = \frac{x_i^j - x_{i,min}}{x_{i,max} - x_{i,min}} \times 10 \qquad \text{Equation 6}$$

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

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 on 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:

$$x^{j}_{i,norm,inv} = 10 - x^{j}_{i,norm} \qquad \text{Equation 7}$$

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

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 5.

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:

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

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:

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

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

where

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

10.2. Geometric average

The geometric average is calculated according the Equation 11:

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

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 12) 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.

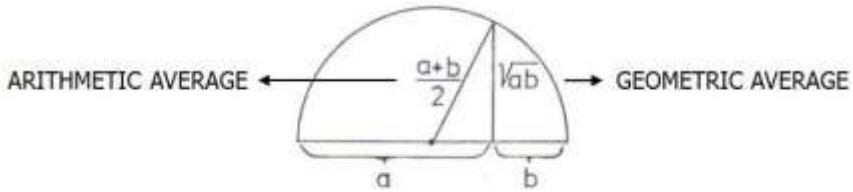

Figure 12: Arithmetic vs. geometric average

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 $s_{i,inv}$

$$s_{i,inv} = 10 - s_i$$ 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):

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

3. Calculation of geometric average for each country j:

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

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

When methodology defines the weighted model:

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

$w^c_i \quad - weight\ of\ the\ \ i - th\ subcomponent\ of\ the\ componet\ c$

where

$$\sum_{i=1}^{n^c} w^c_i = 1.$$ Equation 16

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

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

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

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

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

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 two countries 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

	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[20]. 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

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

account for 90% of 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	Norm	CC^2	Norm	CC^2	Norm	CC^2	Norm
Natural 50%	0.63	0.45						
Human 50%	0.76	0.55						
Socio- economic 50%			0.73	0.50				
Vulnerable Groups 50%			0.73	0.50				
Institutional 50%					0.81	0.48		
Infrastructure 50%					0.90	0.52		
Hazard & Exposure 33%							0.61	0.28
Vulnerability 33%							0.79	0.37
Lack of Coping Capacity 33%							0.74	0.35

CC - Pearson's correlation coefficient
Norm - Normalized influence

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. In weighted arithmetic or geometric average (including the case of equal weights), nominal weights are defined by the methodology. However the relative influence of indices for the aggregated index depends on their distribution after normalization as well as their correlation structure. So, it can be the case that the nominal weighting scheme of the composite index is not reflecting the statistical importance of individual indices within the structure. In that case is good practice to adjust the weighting scheme.

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). The higher influence of the Vulnerability dimension and the Lack of Coping Capacity dimension compared to the Hazard & Exposure dimension is appreciated in order to increase the sensitivity of the composite index to the indicator that can be most influenced by DRR activities. So, dimensions and categories of the composite index are well structured and balanced.

Table 14: Normalized influences of underlying components

	Natural		*Human*		*Socio-Economic Vulnerability*		*Vulnerable Groups*		*Institutional*		*Infrastructure*	
	CC^2	Norm	CC^2	Norm	CC^2	Norm	CC^2	Norm	CC^2	Norm	CC^2	Norm
Earthquakes 20%	0.39	0.24										
Tsunamis 20%	0.41	0.25										
Floods 20%	0.33	0.20										
Tropical cyclones 20%	0.22	0.13										
Droughts 20%	0.29	0.18										
Conflict Intensity 33% (50%)			0.84	0.47								
Regime Stability 33% (50%)			0.80	0.45								
Extrajudicial and Unlawful Killings 33% (0%)			0.14	0.08								
Development & Deprivation 50%					0.85	0.42						
Inequality 25%					0.53	0.26						
Aid Dependency 25%					0.63	0.31						
Uprooted people 50%							0.75	0.63				
Other Vulnerable Groups 50%							0.44	0.37				
DRR 50%									0.77	0.47		
Governance 50%									0.85	0.53		
Communication 33%											0.83	0.33
Physical infrastructure 33%											0.87	0.34
Access to health care 33%											0.85	0.33

CC - Pearson's correlation coefficient
Norm - Normalized influence

For the lower levels (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. Within the Human Hazard category the normalized influences of the three components reflect the double rule (Chapter 7.2.3) for the consideration of the Extrajudicial and Unlawful Killings component. 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

11.2. Uncertainty analysis

During the construction of the composite index many judgments had to be made. Despite rigorous procedures to consistently back up decisions with relevant literature, omission of a certain level of subjectivity was impossible. It is present in the selection of individual indicators, the treatment of missing values, the choice of aggregation model, the weights of the indicators, etc. All the subjective choices are sources of the uncertainty. How robust the model is to these uncertainties it is the subject of sensitivity and uncertainty analysis. If the sensitivity analysis studies how the given composite index depends upon the information fed in, the closely related uncertainty analysis quantifies the overall uncertainty in country rankings as a result of the uncertainties in the model input [30].

Herein, the variation in weighting schemes of the main dimensions is analysed and the impact on the country's rank and score is shown. The weights attached to the three dimensions (Hazard & Exposure, Vulnerability and the Lack of Coping Capacity) are varied from 20% to 60%. The baseline scenario is 33% each.

The median rank (Figure 13) of all simulated scenarios is practically identical to the baseline weighting scheme. The maximum absolute difference between original and median ranks is ±2 for 8 countries. This suggests that the risk classification provided by InfoRM is representative of a plurality of scenarios in the weighting schemes and not a mere symptom of the 33%-33%-33% weights choice. Furthermore, for many countries the results are very stable as shown by a 90% confidence interval.

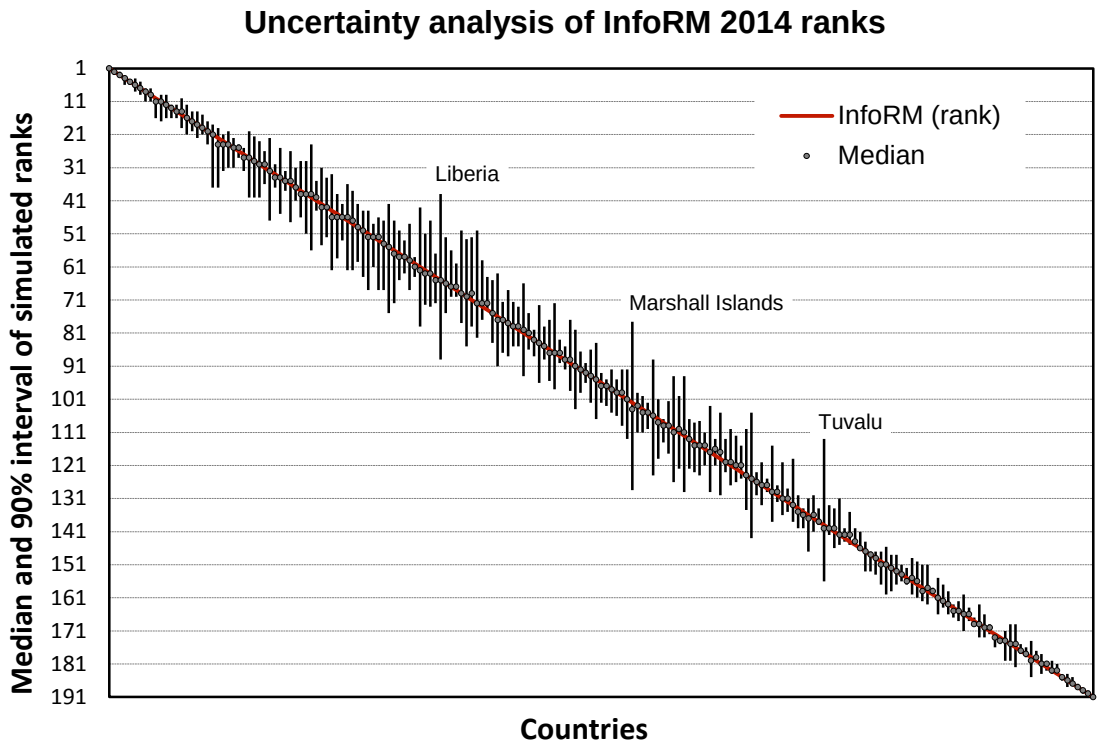

Figure 13: The impact of simulation on the country's rank

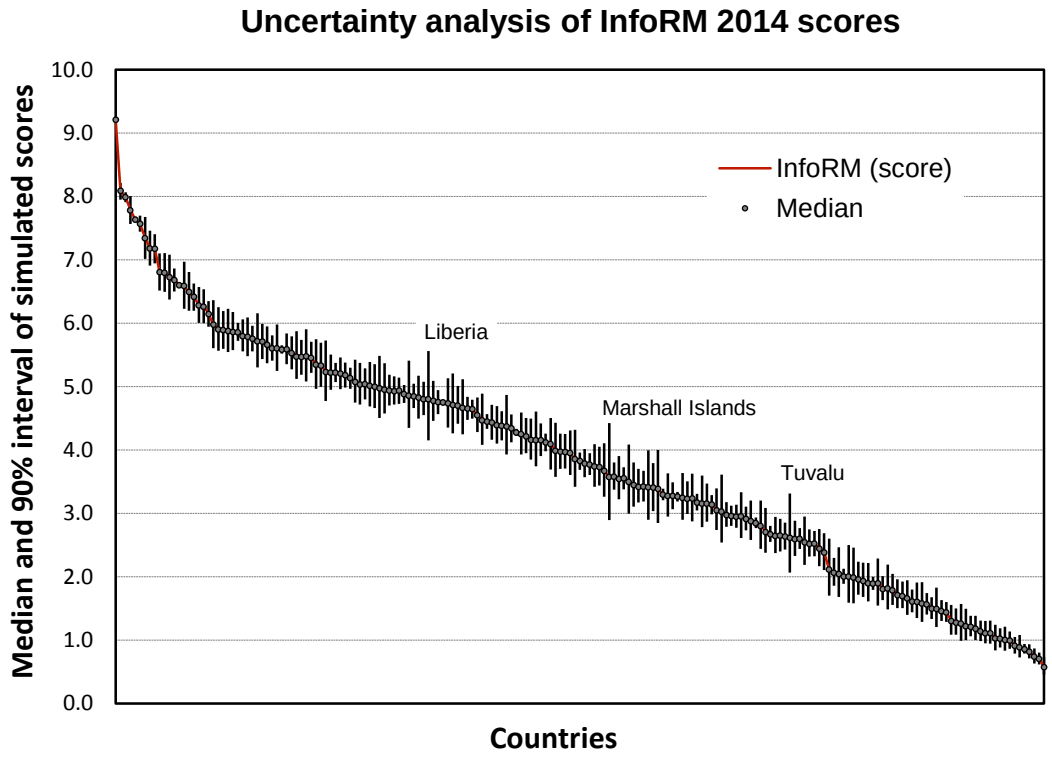

Figure 14: The impact of simulation on the country's score

Similarly, Figure 14 shows the impact of the simulation on a country's score against the median score of all simulated scenarios and their 90% confidence interval. The maximum absolute e difference between original and median scores is 0.021. It can be easily seen whether a country's score is indeed, for example, greater than 7.5 or between 5 and 7.5 given the uncertainty in the weights.

Table 16: The top three countries sensitive to weighting schema

COUNTRY	Hazard & Exposure	Vulnerability	Lack of Coping Capacity	InfoRM
Liberia	2.0	7.2	7.4	4.8
Marshall Islands	1.1	6.8	6.9	3.7
Tuvalu	0.7	5.2	5.4	2.6

Table 16 shows the dimension indexes of the three countries which have the widest 90% confidence interval of the simulation results. All three of them have in common the huge absolute difference between the Hazard & Exposure dimension (low value) and the other two dimensions, the Vulnerability and the Lack of Coping capacity (high or very high value). Therefore their simulation results are more dispersed, which make them more sensitive to choice of the weights.

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 15 shows the correlations between the categories within one dimension (a, b, c) as well as dimensions within the InfoRM model (Figure 15d). 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.

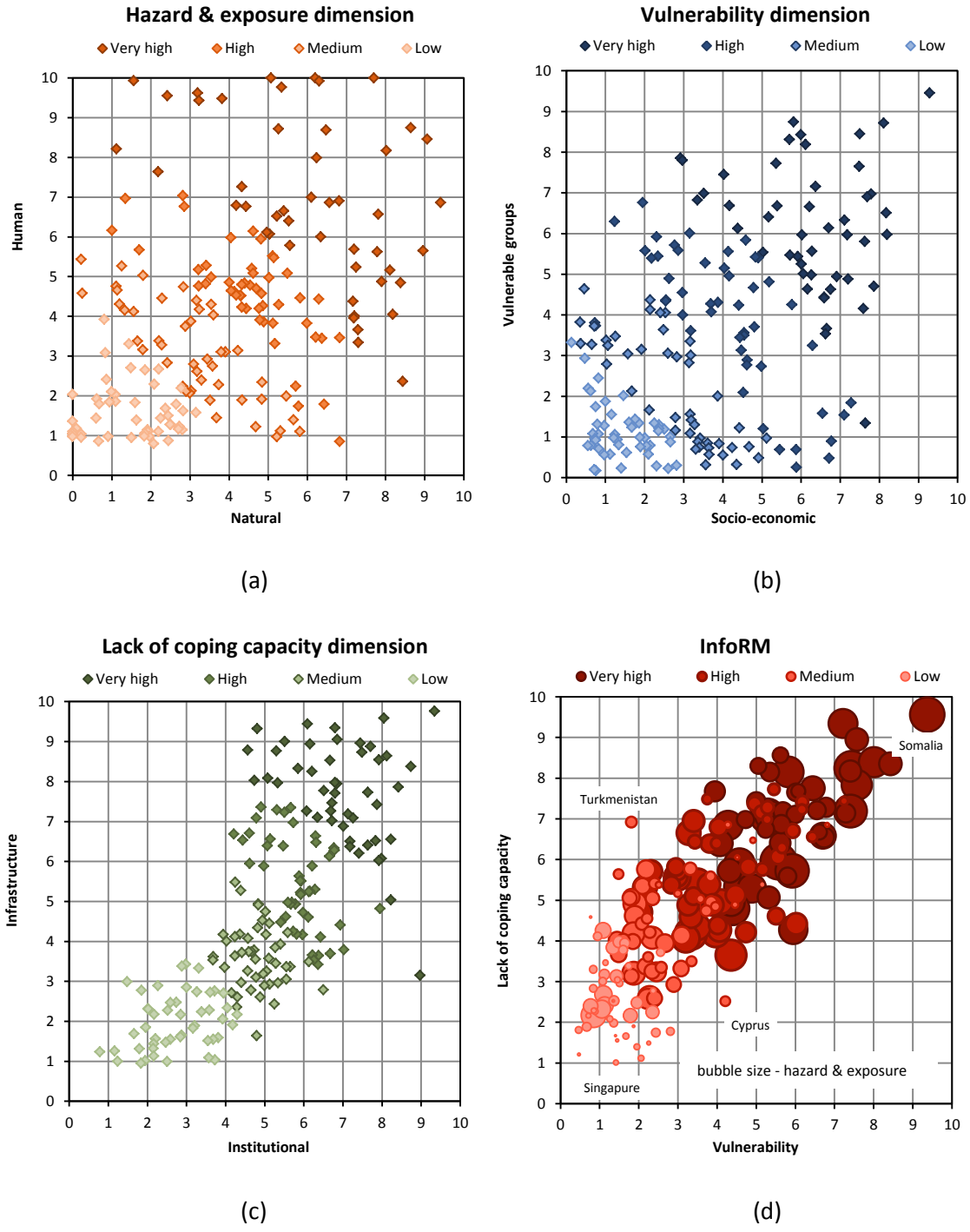

Figure 15: The aggregation of categories into dimensions and dimensions into the InfoRM Index

Table 17 shows the first ten ranking countries in each dimension and in the InfoRM index, while Table 18 shows the value of the dimension and category indexes for the first ten countries ranked by the InfoRM index.

Table 17: Top ten countries in each of the dimensions and the InfoRM index

InfoRM rank	COUNTRY	InfoRM	InfoRM rank	COUNTRY	Hazard & Exposure	InfoRM rank	COUNTRY	Vulnerability	InfoRM rank	COUNTRY	Lack of Coping Capacity
1	Somalia	9.2	13	Pakistan	9.2	1	Somalia	9.4	1	Somalia	9.6
2	Afghanistan	8.1	10	Myanmar	8.8	7	CAR	8.5	8	Chad	9.0
3	DR of the Congo	8.0	1	Somalia	8.8	3	DR of the Congo	8.0	29	Guinea-Bissau	8.6
4	Mali	7.7	2	Afghanistan	8.7	4	Mali	7.6	3	DR of the Congo	8.4
5	Sudan	7.6	22	India	8.7	8	Chad	7.6	7	CAR	8.4
6	South Sudan	7.6	16	Syrian Arab Republic	8.5	2	Afghanistan	7.4	6	South Sudan	8.4
7	CAR	7.4	36	Philippines	8.4	5	Sudan	7.4	87	Guinea	8.3
8	Chad	7.3	5	Sudan	8.3	11	Haiti	7.4	2	Afghanistan	8.2
9	Yemen	7.2	69	Mexico	8.1	12	Niger	7.3	12	Niger	8.2
10	Myanmar	6.9	9	Yemen	7.8	18	Zimbabwe	7.3	11	Haiti	8.1

Table 18: Top ten countries in InfoRM 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	6.2	10.0	8.8	9.3	9.5	9.4	9.3	9.8	9.6	9.2
2	Afghanistan	6.3	9.9	8.7	8.2	6.5	7.4	7.9	8.5	8.2	8.1
3	DR of the Congo	3.2	9.6	7.7	7.5	8.4	8.0	8.1	8.6	8.4	8.0
4	Mali	3.8	9.5	7.7	7.5	7.6	7.6	6.2	8.9	7.8	7.7
5	Sudan	5.3	9.8	8.3	6.0	8.4	7.4	6.6	7.8	7.2	7.6
6	South Sudan	5.3	8.7	7.4	5.7	8.3	7.2	6.8	9.3	8.4	7.6
7	CAR	1.1	8.2	5.7	8.1	8.9	8.5	7.7	8.9	8.4	7.4
8	Chad	4.4	6.8	5.7	5.8	8.7	7.6	8.1	9.6	9.0	7.3
9	Yemen	1.6	9.9	7.8	5.2	6.4	5.8	8.4	7.9	8.1	7.2
10	Myanmar	9.1	8.5	8.8	5.0	5.5	5.3	7.6	6.4	7.1	6.9

The maps below (Figure 16 - Figure 19, 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.

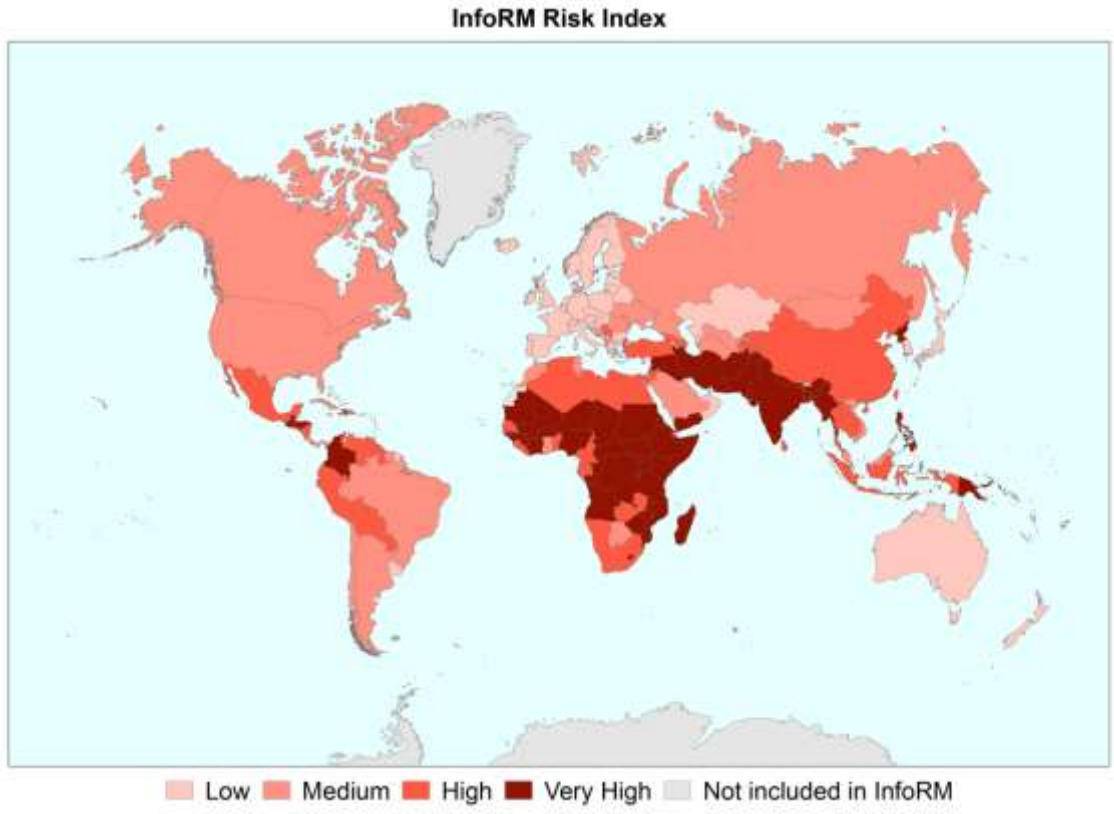

Figure 16: World map - InfoRM index in quartiles

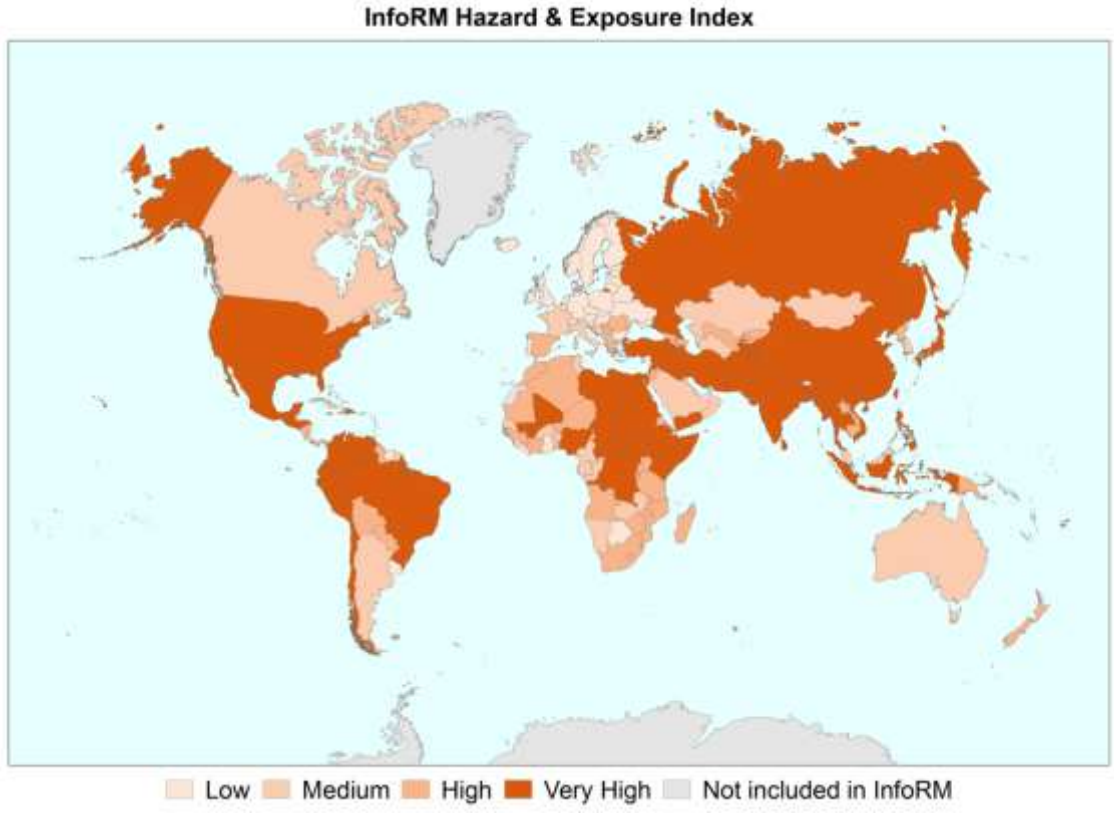

Figure 17: World map – Hazard & Exposure dimension of the InfoRM index in quartiles

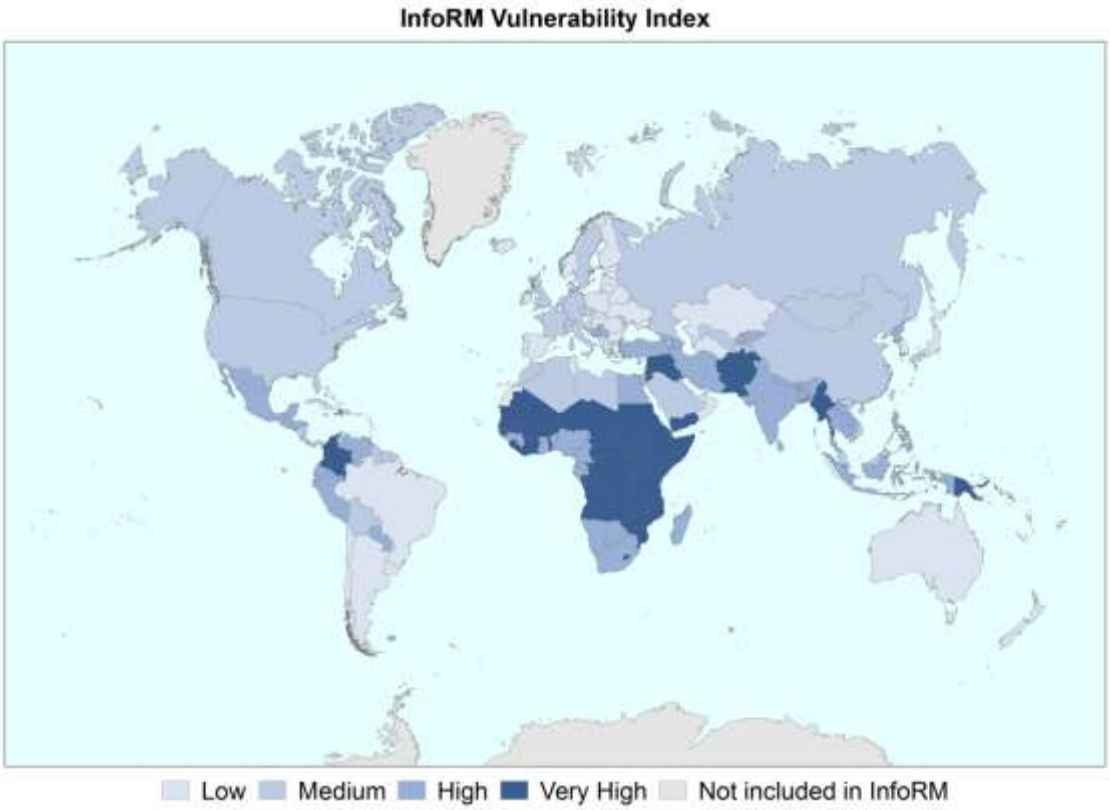

Figure 18: World map – Vulnerability dimension of the InfoRM index in quartiles

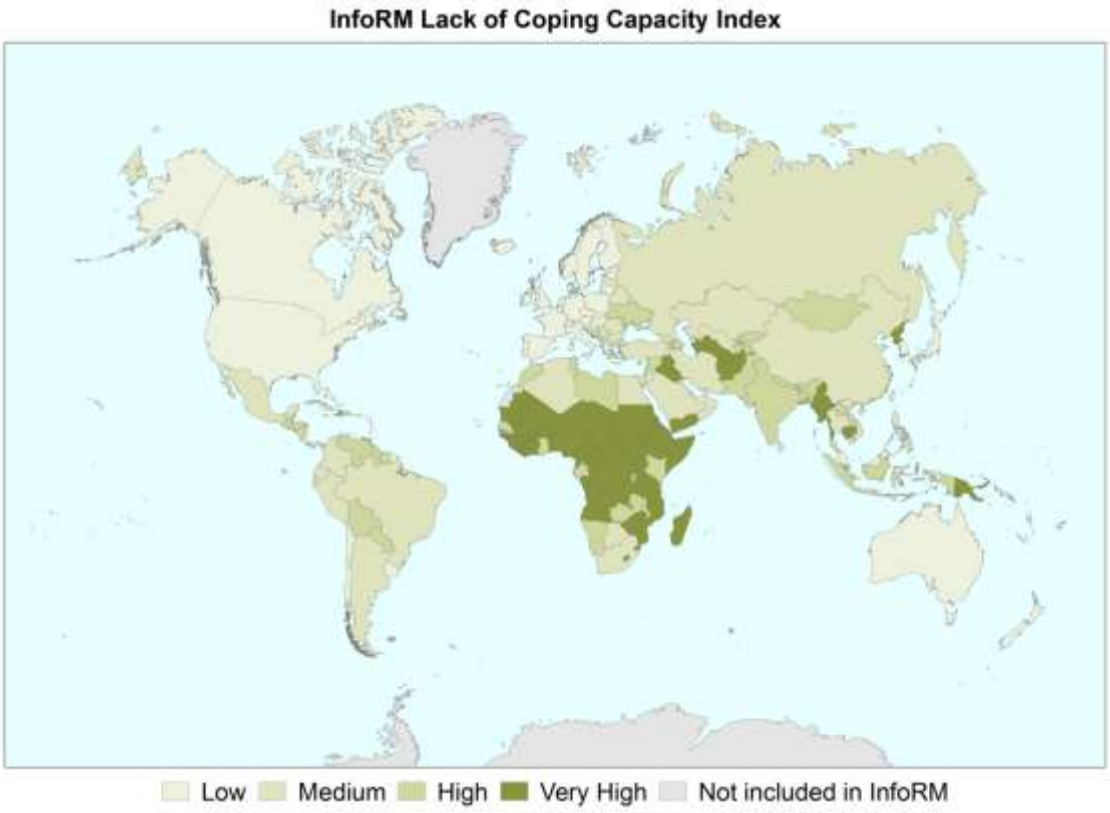

Figure 19: World map – Lack of Coping Capacity dimension of the InfoRM index in quartiles

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 18) in InfoRM index, it is at risk for a need of humanitarian assistance when hazard event/s would occur. It is expected that such country would have difficulties to cope with the complex emergencies in which large group 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 17) 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 18). 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 18).

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 other risk indices

InfoRM index can be compared in a fair manner with Global Focus Model [34] and World Risk Index [4], because all three 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 GFM is very high but this cannot be said for the WRI. This result is expected as the GFM model was a major inspiration for InfoRM with an identical purpose, while WRI is describing long-term climate risk,

which is significantly different from eminent humanitarian risk, since it considers climate change and adaptive capacity.

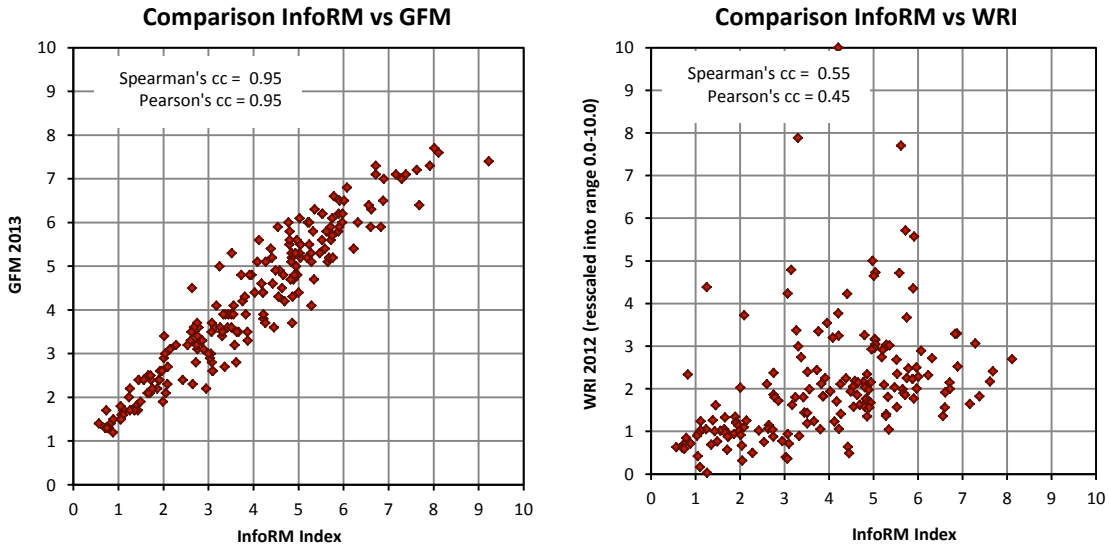

Figure 20: Comparison of InfoRM index with GFM (left) and WRI (right)

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)[21] between the InfoRM index and GDP per capita, but GDP does not explain all variances of the InfoRM index (Figure 21). 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 22). 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.

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

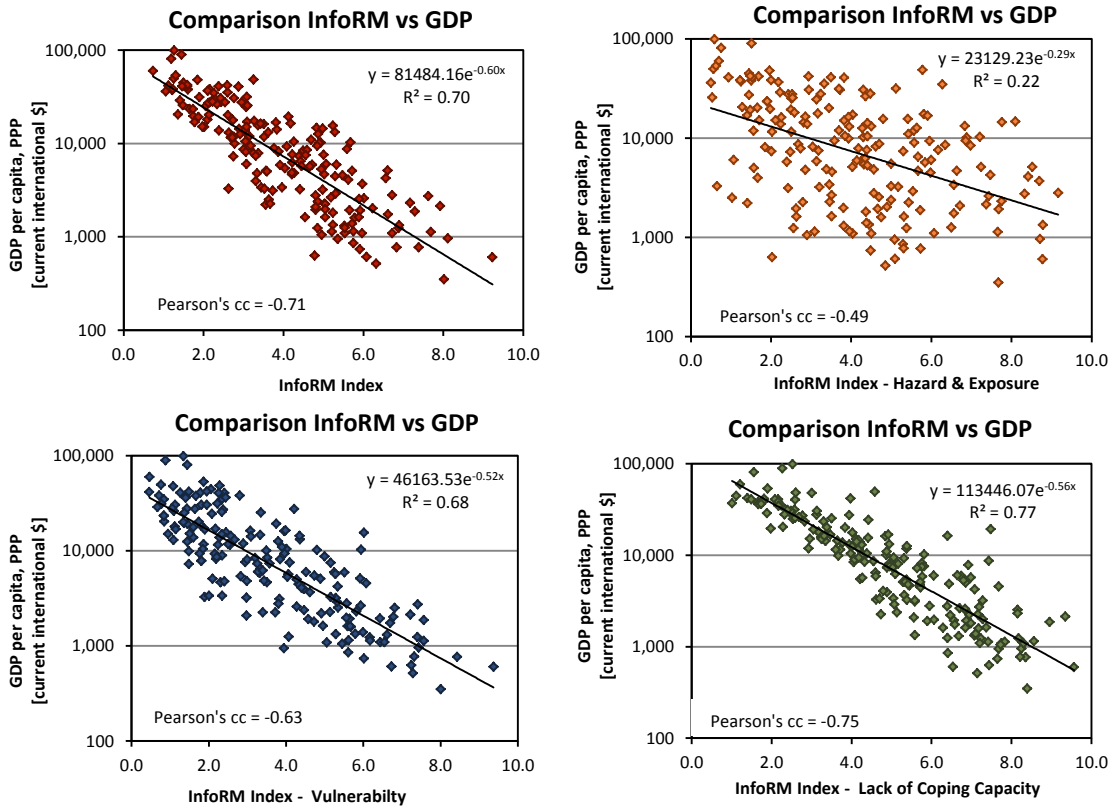

Figure 21: Comparison of InfoRM index with GDP per capita, PPP

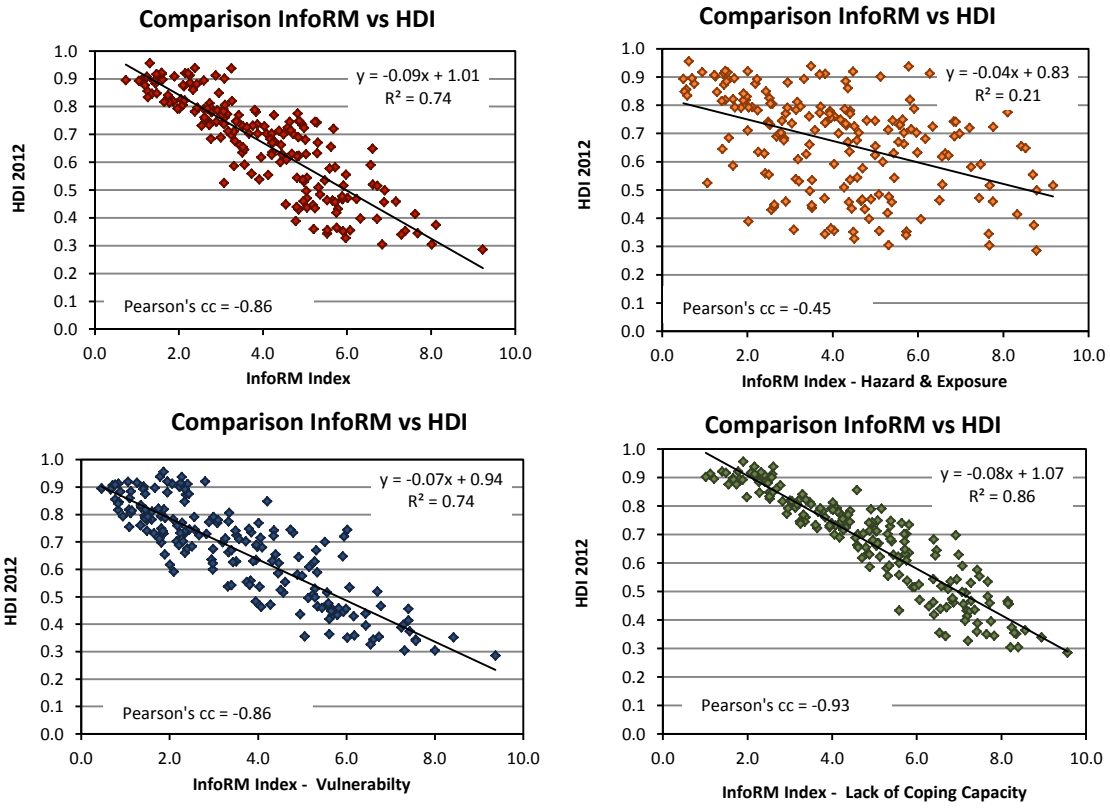

Figure 22: Comparison of InfoRM index with HDI 2012

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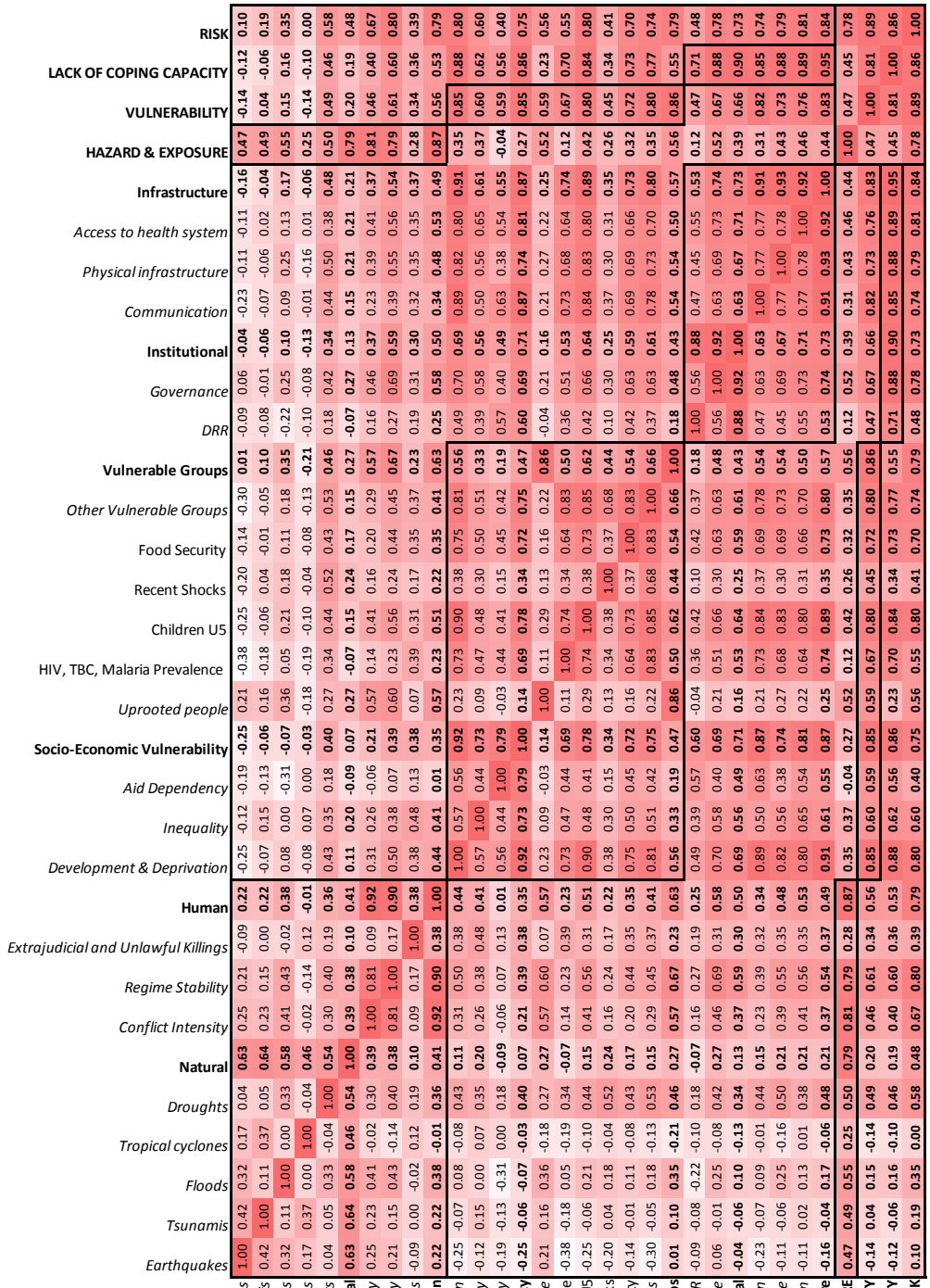
ANNEX A: CORRELATION MATRIX[22]



[22] 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

No.	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)			
3	Physical exposure to earthquake MMI VIII (absolute)			
4	Physical exposure to earthquake MMI VIII (relative)			
5	Physical exposure to tsunamis (absolute)	Tsunami		
6	Physical exposure to tsunamis (relative)			
7	Physical exposure to flood (absolute)	Flood		
8	Physical exposure to flood (relative)			
9	Physical exposure to surge from tropical cyclone (absolute)	Tropical Cyclone		
10	Physical exposure to surge from tropical cyclone (relative)			
11	Physical exposure to tropical cyclone of SS 1 (absolute)			
12	Physical exposure to tropical cyclone of SS 1 (relative)			
13	Physical exposure to tropical cyclone of SS 3 (absolute)			
14	Physical exposure to tropical cyclone of SS 3 (relative)			
15	People affected by droughts (absolute)	Drought		
16	People affected by droughts (relative)			
17	Conflict Barometer	Conflict Intensity	Human	
18	Political Stability and Absence of Violence/Terrorism	Regime Stability		
19	Intentional Homicide	Extrajudicial and Unlawful killings		
20	Human Development Index	Poverty & Development	Socio-Economic Vulnerability	Vulnerability
21	Multidimensional Poverty Index			
22	Gender Inequality Index	Inequality		
23	Gini Coefficient			
24	Public Aid per capita	Aid Dependency		
25	Net ODA Received (% of GNI)			
26	Total Persons of Concern (absolute)	Uprooted people	Vulnerable Groups	
27	Total Persons of Concern (relative)			
28	Children Underweight	Other Vulnerable Groups Children under-5		
29	Child Mortality			
30	Prevalence of HIV-AIDS above 15years	Other Vulnerable Groups Health Conditions		
31	Tuberculosis prevalence			
32	Malaria mortality rate			
33	Relative number of affected population by natural disasters in the last three years	Other Vulnerable Groups Recent Shocks		
34	Prevalence of undernourishment	Other Vulnerable Groups Food Security		
35	Average dietary supply adequacy			
36	Domestic Food Price Level Index			
37	Domestic Food Price Volatility Index			
38	Hyogo Framework for Action	DRR implementation	Institutional	Lack of Coping Capacity
39	Government effectiveness	Governance		
40	Corruption Perception Index			
41	Access to electricity (% of population)	Communication	Infrastructure	
42	Internet Users (per 100 people)			
43	Mobile cellular subscriptions (per 100 people)			
44	Adult literacy rate			
45	Road density (km of road per 100 sq. km of land area)			
46	Access to Improved water source (% of population with access)	Physical Connectivity		
47	Access to Improved sanitation facilities (% of population with access)			
48	Physicians density	Access to health system		
49	Health expenditure per capita			
50	Measles immunization coverage			

	Dimension:	**Hazards & Exposure**
	Category:	**Natural Hazard**
	Component:	**Earthquake**

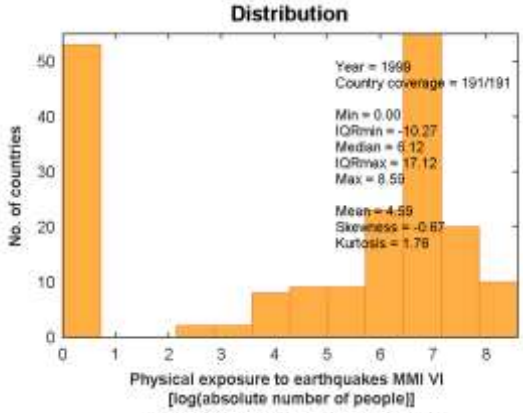
INDICATOR	Indicator:	**Physical exposure to earthquakes MMI VI (absolute)**
	InfoRM Code:	HA.NAT.EQ.MMI6-ABS
	Long Name:	Physical exposure to earthquakes of MMI VI - average annual population exposed (inhabitants)
	Description:	The indicator is based on the estimated number of people exposed to earthquakes of Modified Mercalli Intensity MMI 6 per year. It results from the combination of the hazard zones and the total population living in the spatial unit. It thus indicates the expected number of people exposed in the hazard zone in one year.
	Relevance:	Earthquake is one of the rapid on-set hazards considered in the natural hazard category. The MMI 6 is considered as low intensity level.
	Validity / Limitation of indicator:	The indicator is dependent on quality of population estimates and the seismic hazard map.

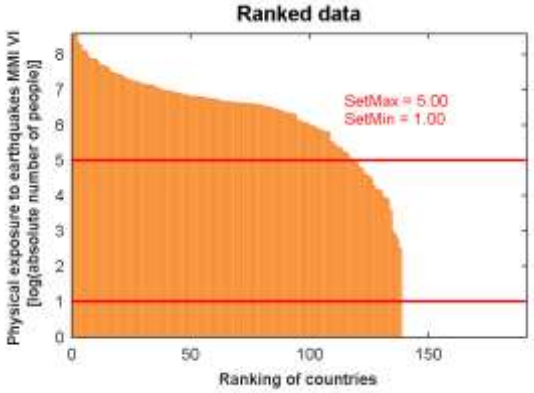
INDICATOR NOTES	Unit of Measure:	Average annual population exposed per country			
	Indicator Creation Method:	For each country, the physical exposure, which is an expected average annual population (year of reference 2011) exposed, was derived by calculating the zonal statistic (sum of each raster values within the bounds of each zonal polygon) within each national level. This product was compiled by EC/JRC for InfoRM.			
	Additional notes:	The conversion from the ground shaking (pga) to intensity (MMI) is based on the USGS ShakeMaps scale.			
	Pre-processing:	Transformation:	Log	Min:	1
		Normalisation:	MIN-MAX	Max:	5

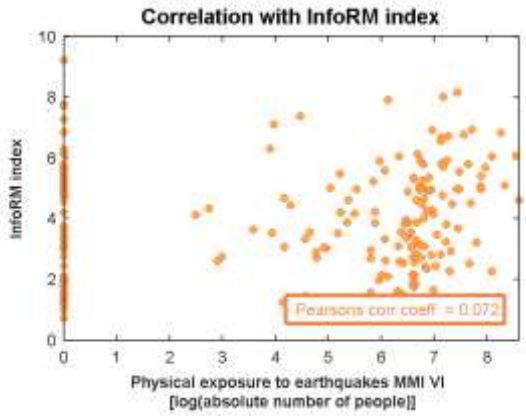
SOURCE	Variable:	GSHAP Seismic hazard map (475-return period, 10% probability of exceedance in 50-year of exposure)
	Citation:	Global Seismic Hazard Assessment Program
	Date of publication:	1999
	Reference time:	Up to 1997
	Periodicity:	--
	URL:	http://www.seismo.ethz.ch/GSHAP/
	Data Type:	ASCII
	Country coverage:	191/191 (100%)

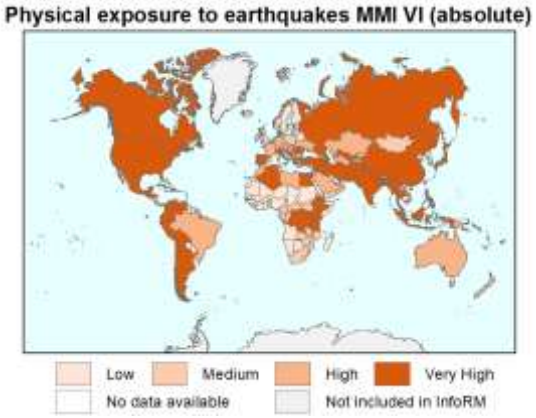
SOURCE	Variable:	ORNL LandScan population density
	Citation:	Oak Ridge National Laboratory
	Date of publication:	2012
	Reference time:	2011
	Periodicity:	Annual
	URL:	http://www.ornl.gov/sci/landscan/
	Data Type:	Raster (ESRI/GRID)
	Country coverage:	191/191 (100%)

FIGURES		
	Distribution:	Histogram of the raw indicator dataset
	Ranked data:	Ranking of the raw indicator dataset
	Correlation with InfoRM index:	Correlation between the raw indicator dataset and InfoRM index
	World map:	Normalized indicator divided in quartiles









	Dimension:	**Hazards & Exposure**
	Category:	**Natural Hazard**
	Component:	**Earthquake**

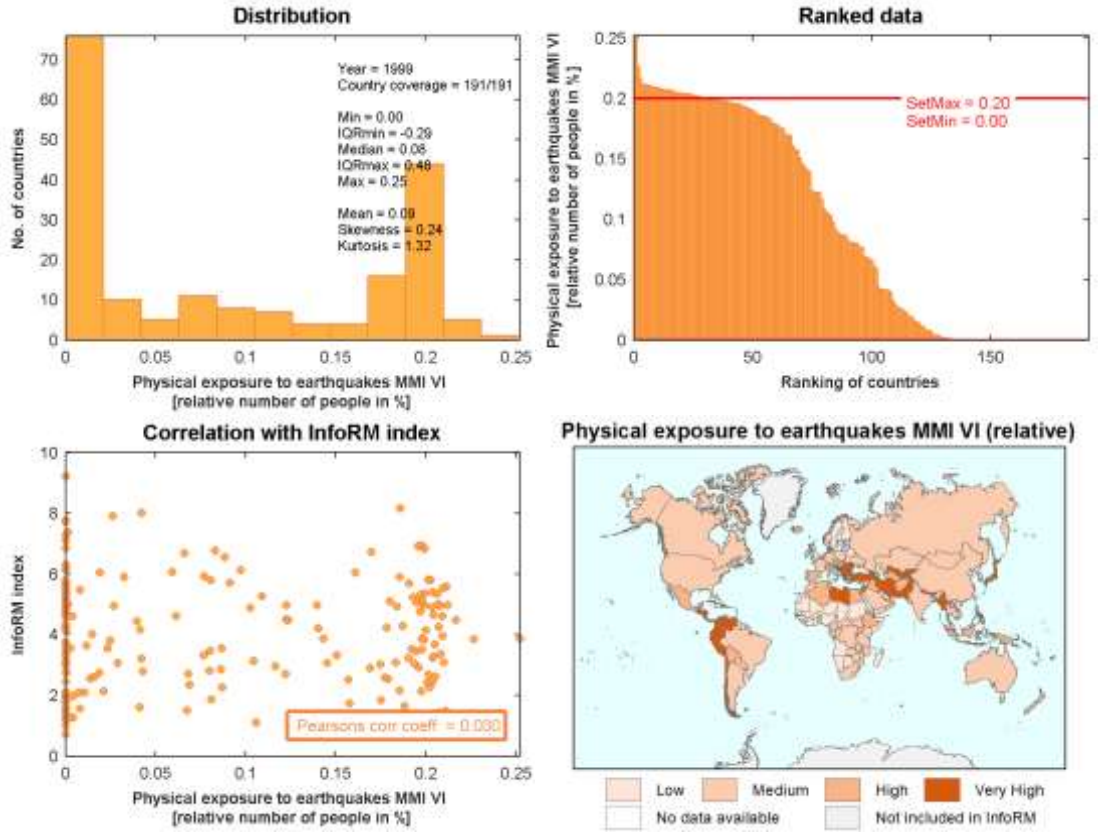
INDICATOR	Indicator:	**Physical exposure to earthquakes MMI VI (relative)**
	InfoRM Code:	HA.NAT.EQ.MMI6-REL
	Long Name:	Physical exposure to earthquakes of MMI VI - average annual population exposed (percentage of the total population)
	Description:	The indicator is based on the estimated number of people exposed to earthquakes of Modified Mercalli Intensity MMI 6 per year. It results from the combination of the hazard zones and the total population living in the spatial unit. It thus indicates the percentage of expected average annual population potentially at risk.
	Relevance:	Earthquake is one of the rapid on-set hazards considered in the natural hazard category. The MMI 6 is considered as low intensity level.
	Validity / Limitation of indicator:	The indicator is dependent on quality of population estimates and the seismic hazard map.

INDICATOR NOTES	Unit of Measure:	Percentage of expected average annual population exposed per country			
	Indicator Creation Method:	1. For each country, the physical exposure, which is an expected average annual population (year of reference 2011) exposed, was derived by calculating the zonal statistic (sum of each raster values within the bounds of each zonal polygon) within each national level. 2. The exposed population was summed up and divided by total population, in order to obtain one exposure index per country. This product was compiled by EC/JRC for InfoRM.			
	Additional notes:	The conversion from the ground shaking (PGA) to intensity (MMI) is based on the USGS ShakeMaps scale.			
	Pre-processing:	Transformation:	--	Min:	0%
		Normalisation:	MIN-MAX	Max:	0.2%

SOURCE	Variable:	GSHAP Seismic hazard map (475-return period, 10% probability of exceedance in 50-year of exposure)
	Citation:	Global Seismic Hazard Assessment Program
	Date of publication:	1999
	Reference time:	Up to 1997
	Periodicity:	--
	URL:	http://www.seismo.ethz.ch/GSHAP/
	Data Type:	ASCII
	Country coverage:	191/191 (100%)

SOURCE		
	Variable:	ORNL LandScan population density
	Citation:	Oak Ridge National Laboratory
	Date of publication:	2012
	Reference time:	2011
	Periodicity:	Annual
	URL:	http://www.ornl.gov/sci/landscan/
	Data Type:	Raster (ESRI/GRID)
	Country coverage:	191/191 (100%)

FIGURES		
	Distribution:	Histogram of the raw indicator dataset
	Ranked data:	Ranking of the raw indicator dataset
	Correlation with InfoRM index:	Correlation between the raw indicator dataset and InfoRM index
	World map:	Normalized indicator divided in quartiles



	Dimension:	**Hazards & Exposure**
	Category:	**Natural Hazard**
	Component:	**Earthquake**

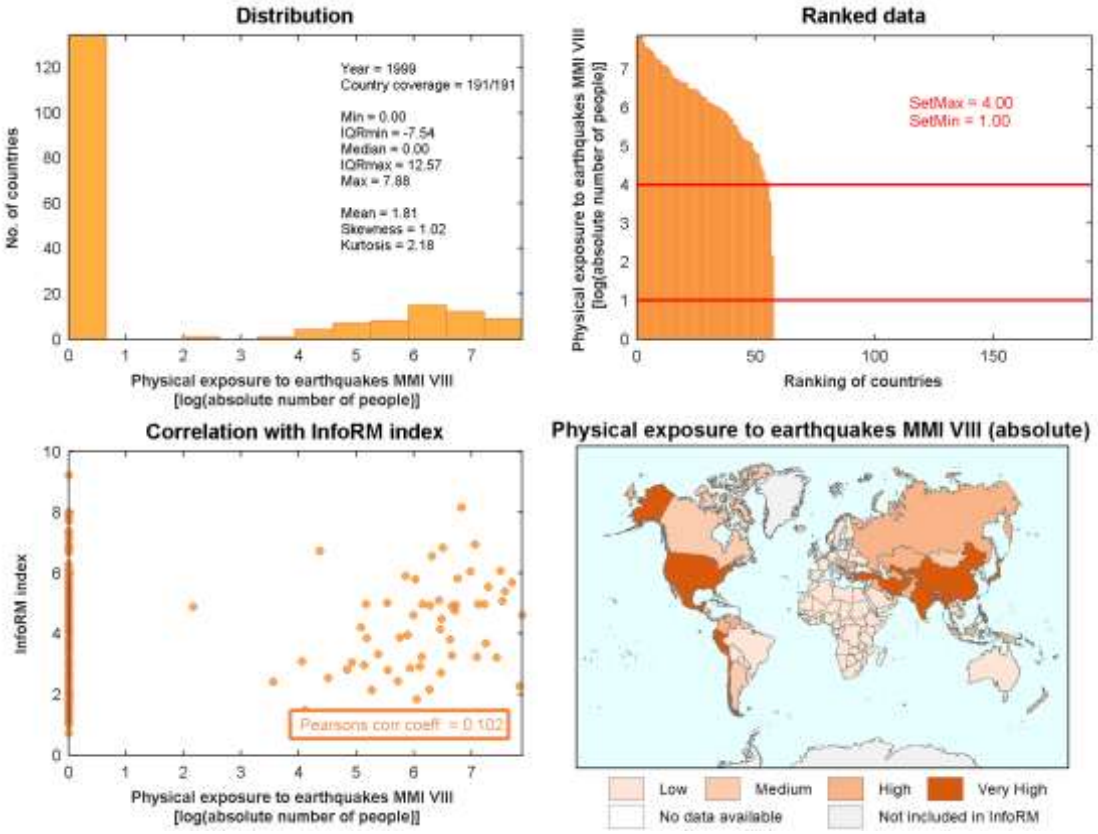
INDICATOR	Indicator:	**Physical exposure to earthquakes MMI VIII (absolute)**
	InfoRM Code:	HA.NAT.EQ.MMI8-ABS
	Long Name:	Physical exposure to earthquakes of MMI VIII - average annual population exposed (inhabitants)
	Description:	The indicator is based on the estimated number of people exposed to earthquakes of Modified Mercalli Intensity MMI 8 per year. It results from the combination of the hazard zones and the total population living in the spatial unit. It thus indicates the expected number of people exposed in the hazard zone in one year.
	Relevance:	Earthquake is one of the rapid on-set hazards considered in the natural hazard category. The MMI 8 is considered as high intensity level.
	Validity / Limitation of indicator:	

INDICATOR NOTES	Unit of Measure:	Average annual population exposed per country			
	Indicator Creation Method:	For each country, the physical exposure, which is an expected average annual population (year of reference 2011) exposed, was derived by calculating the zonal statistic (sum of each raster values within the bounds of each zonal polygon) within each national level. This product was compiled by EC/JRC for InfoRM.			
	Additional notes:				
	Pre-processing:	Transformation:	Log	Min:	1
		Normalisation:	MIN-MAX	Max:	4

SOURCE	Variable:	GSHAP Seismic hazard map (475-return period, 10% probability of exceedance in 50-year of exposure)
	Citation:	Global Seismic Hazard Assessment Program
	Date of publication:	1999
	Reference time:	Up to 1997
	Periodicity:	--
	URL:	http://www.seismo.ethz.ch/GSHAP/
	Data Type:	ASCII
	Country coverage:	191/191 (100%)

SOURCE	Variable:	ORNL LandScan population density
	Citation:	Oak Ridge National Laboratory
	Date of publication:	2012
	Reference time:	2011
	Periodicity:	Annual
	URL:	http://www.ornl.gov/sci/landscan/
	Data Type:	Raster (ESRI/GRID)
	Country coverage:	191/191 (100%)

FIGURES		
	Distribution:	Histogram of the raw indicator dataset
	Ranked data:	Ranking of the raw indicator dataset
	Correlation with InfoRM index:	Correlation between the raw indicator dataset and InfoRM index
	World map:	Normalized indicator divided in quartiles



	Dimension:	**Hazards & Exposure**
	Category:	**Natural Hazard**
	Component:	**Earthquake**

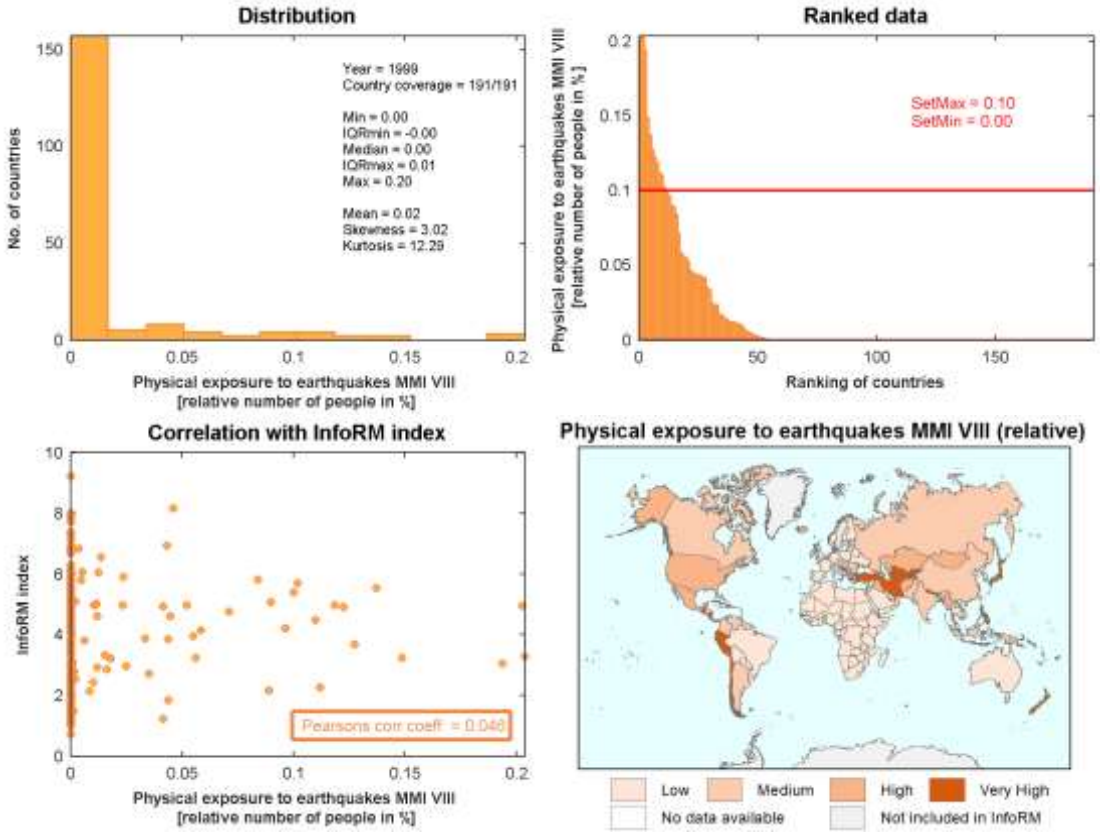
INDICATOR	Indicator:	**Physical exposure to earthquakes MMI VIII (relative)**
	InfoRM Code:	HA.NAT.EQ.MMI8-REL
	Long Name:	Physical exposure to earthquakes of MMI IX - average annual population exposed (percentage of the total population)
	Description:	The indicator is based on the estimated number of people exposed to earthquakes of Modified Mercalli Intensity MMI 8 per year. It results from the combination of the hazard zones and the total population living in the spatial unit. It thus indicates the percentage of expected average annual population potentially at risk.
	Relevance:	Earthquake is one of the rapid on-set hazards considered in the natural hazard category. The MMI 8 is considered as high intensity level.
	Validity / Limitation of indicator:	

INDICATOR NOTES	Unit of Measure:	Percentage of expected average annual population exposed per country			
	Indicator Creation Method:	1. For each country, the physical exposure, which is an expected average annual population (year of reference 2011) exposed, was derived by calculating the zonal statistic (sum of each raster values within the bounds of each zonal polygon) within each national level. 2. The exposed population was summed up and divided by total population, in order to obtain one exposure index per country. This product was compiled by EC/JRC for InfoRM.			
	Additional notes:				
	Pre-processing:	Transformation:	--	Min:	0%
		Normalisation:	MIN-MAX	Max:	0.1%

SOURCE	Variable:	GSHAP Seismic hazard map (475-return period, 10% probability of exceedance in 50-year of exposure)
	Citation:	Global Seismic Hazard Assessment Program
	Date of publication:	1999
	Reference time:	Up to 1997
	Periodicity:	--
	URL:	http://www.seismo.ethz.ch/GSHAP/
	Data Type:	ASCII
	Country coverage:	191/191 (100%)

SOURCE		
	Variable:	ORNL LandScan population density
	Citation:	Oak Ridge National Laboratory
	Date of publication:	2012
	Reference time:	2011
	Periodicity:	Annual
	URL:	http://www.ornl.gov/sci/landscan/
	Data Type:	Raster (ESRI/GRID)
	Country coverage:	191/191 (100%)

FIGURES		
	Distribution:	Histogram of the raw indicator dataset
	Ranked data:	Ranking of the raw indicator dataset
	Correlation with InfoRM index:	Correlation between the raw indicator dataset and InfoRM index
	World map:	Normalized indicator divided in quartiles



	Dimension:	**Hazards & Exposure**
	Category:	**Natural Hazard**
	Component:	**Tsunami**

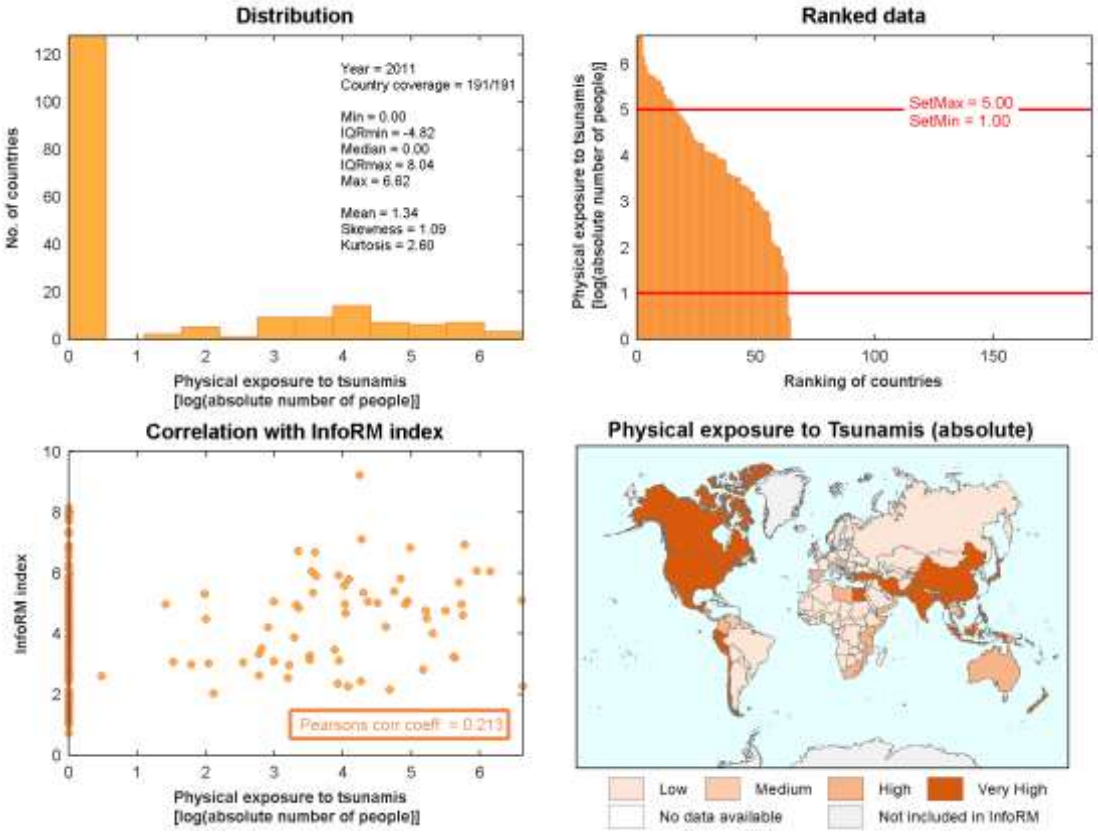
INDICATOR	Indicator:	**Physical exposure to Tsunamis (absolute)**
	InfoRM Code:	HA.NAT.TS-ABS
	Long Name:	Physical exposure to tsunamis - average annual population exposed (inhabitants)
	Description:	The indicator is based on the estimated number of people exposed to tsunamis per year. It results from the combination of the hazard zones and the total population living in the spatial unit. It thus indicates the expected number of people exposed in the hazard zone in one year.
	Relevance:	Tsunami is one of the rapid on-set hazards considered in the natural hazard category.
	Validity / Limitation of indicator:	The indicator is based on the estimated number of people exposed to tsunamis per year per country. It results from the combination of the (annual) frequency of tsunamis and the total population living in the country unit exposed for each event. It thus indicates how many people per year are potentially at risk.

INDICATOR NOTES	Unit of Measure:	Average annual population exposed per country			
	Indicator Creation Method:	For each country, the physical exposure, which is an expected average annual population (year of reference 2011) exposed, was derived by calculating the zonal statistic (sum of each raster values within the bounds of each zonal polygon) within each national level. This product was compiled by EC/JRC for InfoRM.			
	Additional notes:				
	Pre-processing:	Transformation:	Log	Min:	1
		Normalisation:	MIN-MAX	Max:	5

SOURCE	Variable:	Physical exposure to tsunamis
	Citation:	Preview database of UNEP Global Risk Data Platform (GRID)
	Date of publication:	05/05/2011
	Reference time:	2011
	Periodicity:	--
	URL:	http://preview.grid.unep.ch
	Data Type:	Raster (tif)
	Country coverage:	191/191 (100%)

SOURCE	Variable:	ORNL LandScan population density
	Citation:	Oak Ridge National Laboratory
	Date of publication:	2012
	Reference time:	2011
	Periodicity:	Annual
	URL:	http://www.ornl.gov/sci/landscan/
	Data Type:	Raster (ESRI/GRID)
	Country coverage:	191/191 (100%)

FIGURES		
	Distribution:	Histogram of the raw indicator dataset
	Ranked data:	Ranking of the raw indicator dataset
	Correlation with InfoRM index:	Correlation between the raw indicator dataset and InfoRM index
	World map:	Normalized indicator divided in quartiles



	Dimension:	**Hazards & Exposure**
	Category:	**Natural Hazard**
	Component:	**Tsunami**

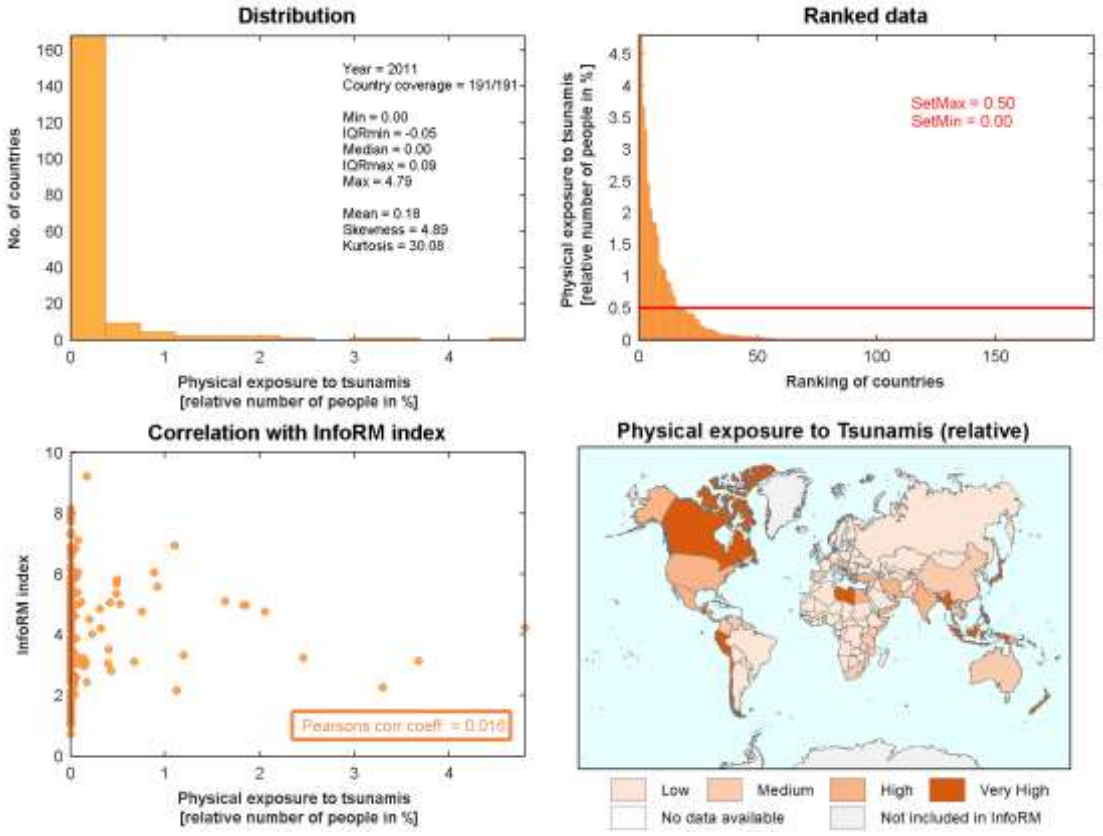
INDICATOR	Indicator:	**Physical exposure to Tsunamis (relative)**
	InfoRM Code:	HA.NAT.TS-REL
	Long Name:	Physical exposure to tsunamis - average annual population exposed (percentage of the total population)
	Description:	The indicator is based on the estimated number of people exposed to tsunamis per year. It results from the combination of the hazard zones and the total population living in the spatial unit. It thus indicates the percentage of expected average annual population potentially at risk.
	Relevance:	Tsunami is one of the rapid on-set hazards considered in the natural hazard category.
	Validity / Limitation of indicator:	The indicator is based on the estimated number of people exposed to tsunamis per year per country. It results from the combination of the (annual) frequency of tsunamis and the total population living in the Country unit exposed for each event. It thus indicates how many people per year are potentially at risk.

INDICATOR NOTES	Unit of Measure:	Percentage of expected average annual population exposed per country			
	Indicator Creation Method:	1. For each country, the physical exposure, which is an expected average annual population (year of reference 2011) exposed, was derived by calculating the zonal statistic (sum of each raster values within the bounds of each zonal polygon) within each national level. 2. The exposed population was summed up and divided by total population, in order to obtain one exposure index per country. This product was compiled by EC/JRC for InfoRM.			
	Additional notes:				
	Pre-processing:	Transformation:	--	Min:	0%
		Normalisation:	MIN-MAX	Max:	0.5%

SOURCE	Variable:	Physical exposure to tsunamis
	Citation:	Preview database of UNEP Global Risk Data Platform (GRID)
	Date of publication:	05/05/2011
	Reference time:	2011
	Periodicity:	--
	URL:	http://preview.grid.unep.ch
	Data Type:	Raster (tif)
	Country coverage:	191/191 (100%)

SOURCE		
	Variable:	ORNL LandScan population density
	Citation:	Oak Ridge National Laboratory
	Date of publication:	2012
	Reference time:	2011
	Periodicity:	Annual
	URL:	http://www.ornl.gov/sci/landscan/
	Data Type:	Raster (ESRI/GRID)
	Country coverage:	191/191 (100%)

FIGURES		
	Distribution:	Histogram of the raw indicator dataset
	Ranked data:	Ranking of the raw indicator dataset
	Correlation with InfoRM index:	Correlation between the raw indicator dataset and InfoRM index
	World map:	Normalized indicator divided in quartiles



	Dimension:	**Hazards & Exposure**
	Category:	**Natural Hazard**
	Component:	**Flood**

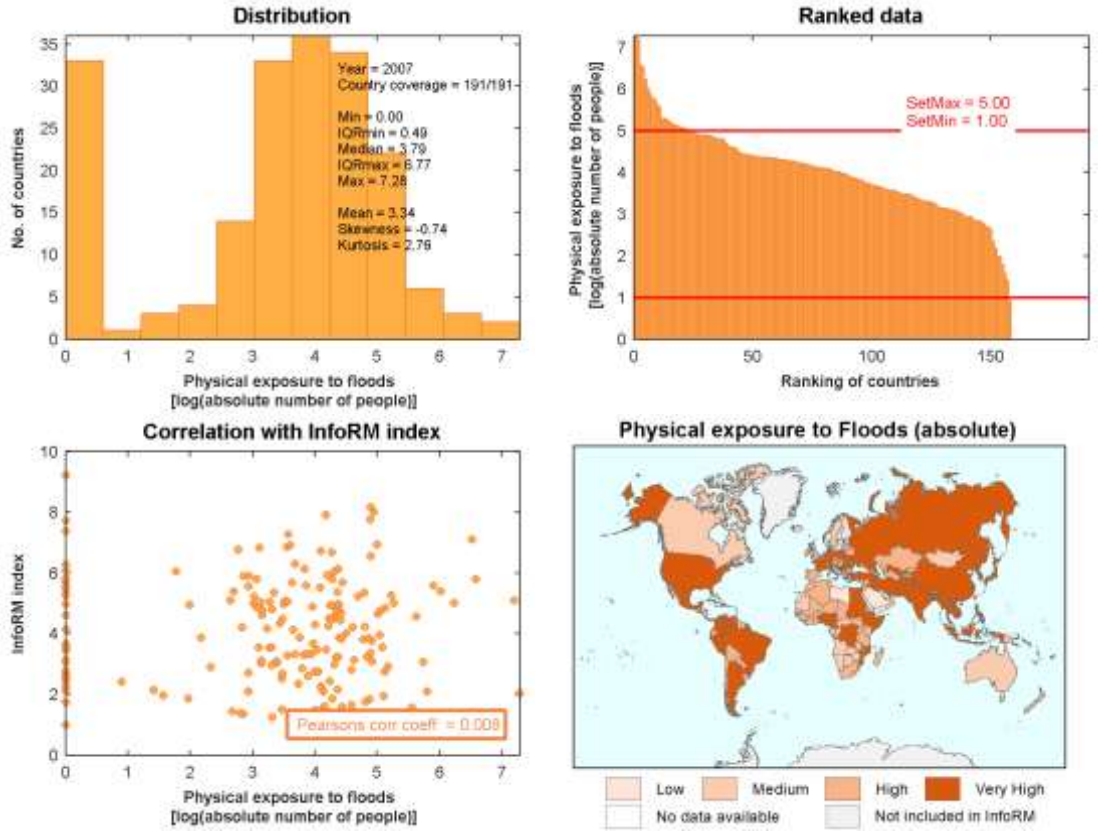
INDICATOR	Indicator:	**Physical exposure to Floods (absolute)**
	InfoRM Code:	HA.NAT.FL-ABS
	Long Name:	Physical exposure to floods - average annual population exposed (inhabitants)
	Description:	The indicator is based on the estimated number of people exposed to floods per year. It results from the combination of the hazard zones and the total population living in the spatial unit. It thus indicates the expected number of people exposed in the hazard zone in one year.
	Relevance:	Flood is one of the rapid on-set hazards considered in the natural hazard category.
	Validity / Limitation of indicator:	The indicator is based on the estimated number of people exposed to floods per year per country. It results from the combination of the (annual) frequency of floods and the total population living in the country unit exposed for each event. It thus indicates how many people per year are potentially at risk.

INDICATOR NOTES	Unit of Measure:	Average annual population exposed per country			
	Indicator Creation Method:	For each country, the physical exposure, which is an expected average annual population (year of reference 2011) exposed, was derived by calculating the zonal statistic (sum of each raster values within the bounds of each zonal polygon) within each national level. This product was compiled by EC/JRC for InfoRM.			
	Additional notes:				
	Pre-processing:	Transformation:	Log	Min:	1
		Normalisation:	MIN-MAX	Max:	5

SOURCE	Variable:	Physical exposure to floods
	Citation:	Preview database of UNEP Global Risk Data Platform (GRID)
	Date of publication:	05/05/2011
	Reference time:	1999-2007
	Periodicity:	--
	URL:	http://preview.grid.unep.ch
	Data Type:	Raster (tif)
	Country coverage:	191/191 (100%)

SOURCE	Variable:	ORNL LandScan population density
	Citation:	Oak Ridge National Laboratory
	Date of publication:	2012
	Reference time:	2011
	Periodicity:	Annual
	URL:	http://www.ornl.gov/sci/landscan/
	Data Type:	Raster (ESRI/GRID)
	Country coverage:	191/191 (100%)

FIGURES		
	Distribution:	Histogram of the raw indicator dataset
	Ranked data:	Ranking of the raw indicator dataset
	Correlation with InfoRM index:	Correlation between the raw indicator dataset and InfoRM index
	World map:	Normalized indicator divided in quartiles



	Dimension:	**Hazards & Exposure**
	Category:	**Natural Hazard**
	Component:	**Flood**

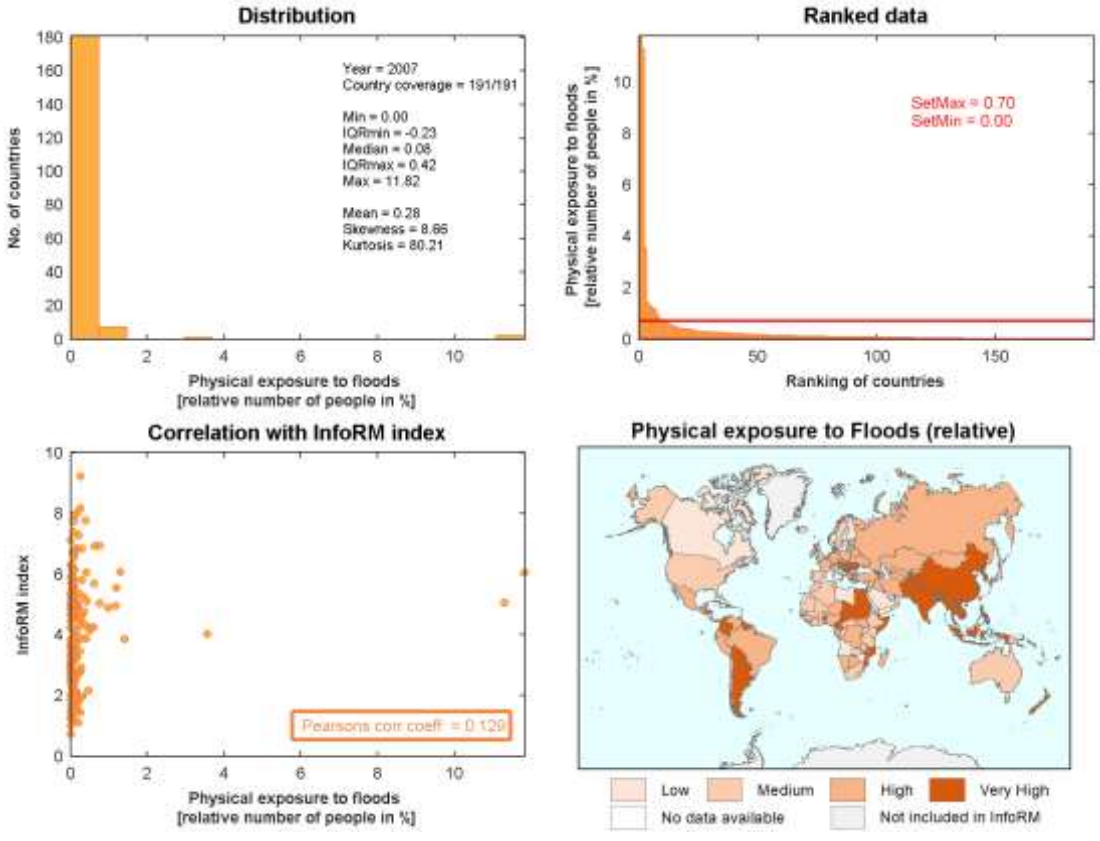
INDICATOR	Indicator:	**Physical exposure to Floods (relative)**
	InfoRM Code:	HA.NAT.FL-REL
	Long Name:	Physical exposure to floods - average annual population exposed (percentage of the total population)
	Description:	The indicator is based on the estimated number of people exposed to floods per year. It results from the combination of the hazard zones and the total population living in the spatial unit. It thus indicates the percentage of expected average annual population potentially at risk.
	Relevance:	Flood is one of the rapid on-set hazards considered in the natural hazard category.
	Validity / Limitation of indicator:	The indicator is based on the estimated number of people exposed to floods per year per country. It results from the combination of the (annual) frequency of floods and the total population living in the country unit exposed for each event. It thus indicates how many people per year are potentially at risk.

INDICATOR NOTES	Unit of Measure:	Percentage of expected average annual population exposed per country			
	Indicator Creation Method:	1. For each country, the physical exposure, which is an expected average annual population (year of reference 2011) exposed, was derived by calculating the zonal statistic (sum of each raster values within the bounds of each zonal polygon) within each national level. 2. The exposed population was summed up and divided by total population, in order to obtain one exposure index per country. This product was compiled by EC/JRC for InfoRM.			
	Additional notes:				
	Pre-processing:	Transformation:	--	Min:	0%
		Normalisation:	MIN-MAX	Max:	0.7%

SOURCE	Variable:	Physical exposure to floods
	Citation:	Preview database of UNEP Global Risk Data Platform (GRID)
	Date of publication:	05/05/2011
	Reference time:	1999-2007
	Periodicity:	--
	URL:	http://preview.grid.unep.ch
	Data Type:	Raster (tif)
	Country coverage:	191/191 (100%)

SOURCE		
	Variable:	ORNL LandScan population density
	Citation:	Oak Ridge National Laboratory
	Date of publication:	2012
	Reference time:	2011
	Periodicity:	Annual
	URL:	http://www.ornl.gov/sci/landscan/
	Data Type:	Raster (ESRI/GRID)
	Country coverage:	191/191 (100%)

FIGURES		
	Distribution:	Histogram of the raw indicator dataset
	Ranked data:	Ranking of the raw indicator dataset
	Correlation with InfoRM index:	Correlation between the raw indicator dataset and InfoRM index
	World map:	Normalized indicator divided in quartiles



	Dimension:	**Hazards & Exposure**
	Category:	**Natural Hazard**
	Component:	**Tropical Cyclone**

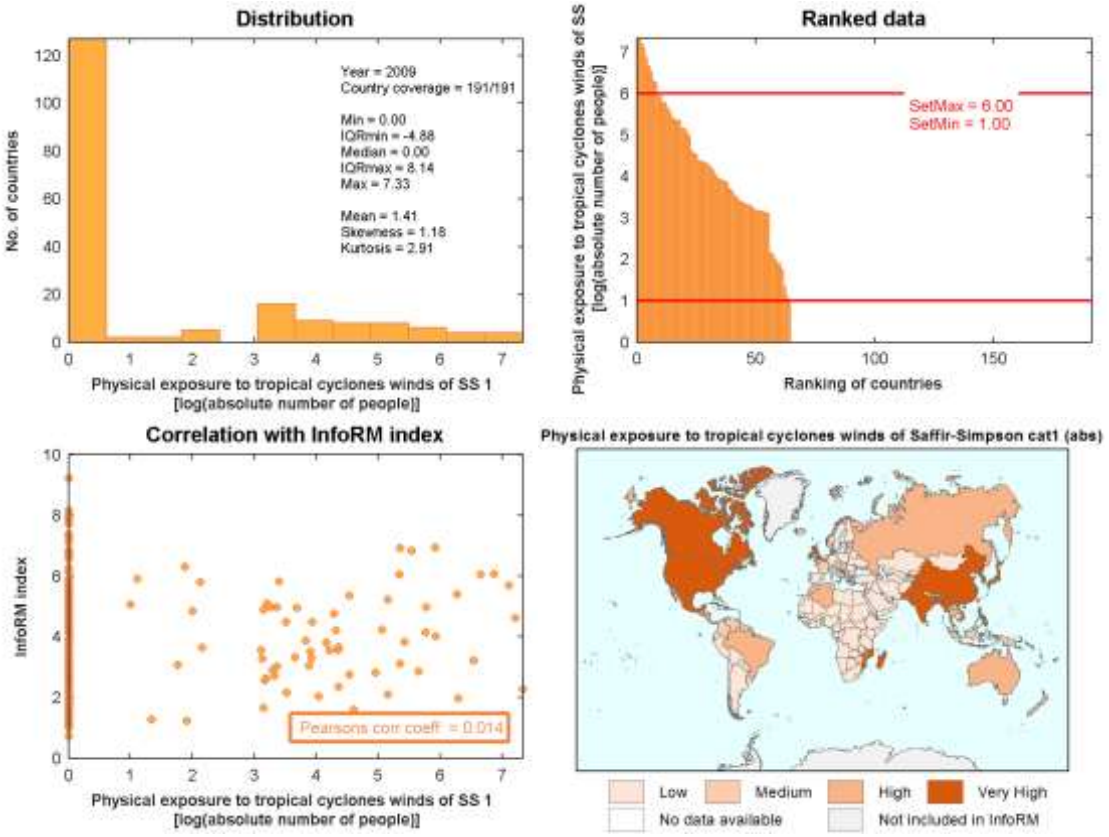
INDICATOR	Indicator:	**Physical exposure to tropical cyclones winds of Saffir-Simpson category 1 (absolute)**
	InfoRM Code:	HA.NAT.TC.SS1-ABS
	Long Name:	Physical exposure to tropical cyclones winds of SS1 - average annual population exposed (inhabitants)
	Description:	The indicator is based on the estimated number of people exposed to tropical cyclones winds of Saffir-Simpson (SS) category 1 per year. It results from the combination of the hazard zones and the total population living in the spatial unit. It thus indicates the expected number of people exposed in the hazard zone in one year.
	Relevance:	Tropical cyclone is one of the rapid on-set hazards considered in the natural hazard category. The SS 1 is considered as low intensity level.
	Validity / Limitation of indicator:	

INDICATOR NOTES	Unit of Measure:	Average annual population exposed per country			
	Indicator Creation Method:	For each country, the physical exposure, which is an expected average annual population (year of reference 2011) exposed, was derived by calculating the zonal statistic (sum of each raster values within the bounds of each zonal polygon) within each national level. This product was compiled by EC/JRC for InfoRM.			
	Additional notes:				
	Pre-processing:	Transformation:	Log	Min:	1
		Normalisation:	MIN-MAX	Max:	6

SOURCE	Variable:	Physical exposure to tropical cyclone of Saffir-Simpson category 1
	Citation:	Preview database of UNEP Global Risk Data Platform (GRID)
	Date of publication:	05/05/2011
	Reference time:	1970-2009
	Periodicity:	--
	URL:	http://preview.grid.unep.ch
	Data Type:	Raster (tif)
	Country coverage:	191/191 (100%)

SOURCE	Variable:	ORNL LandScan population density
	Citation:	Oak Ridge National Laboratory
	Date of publication:	2012
	Reference time:	2011
	Periodicity:	Annual
	URL:	http://www.ornl.gov/sci/landscan/
	Data Type:	Raster (ESRI/GRID)
	Country coverage:	191/191 (100%)

FIGURES		
	Distribution:	Histogram of the raw indicator dataset
	Ranked data:	Ranking of the raw indicator dataset
	Correlation with InfoRM index:	Correlation between the raw indicator dataset and InfoRM index
	World map:	Normalized indicator divided in quartiles



	Dimension:	**Hazards & Exposure**
	Category:	**Natural Hazard**
	Component:	**Tropical Cyclone**

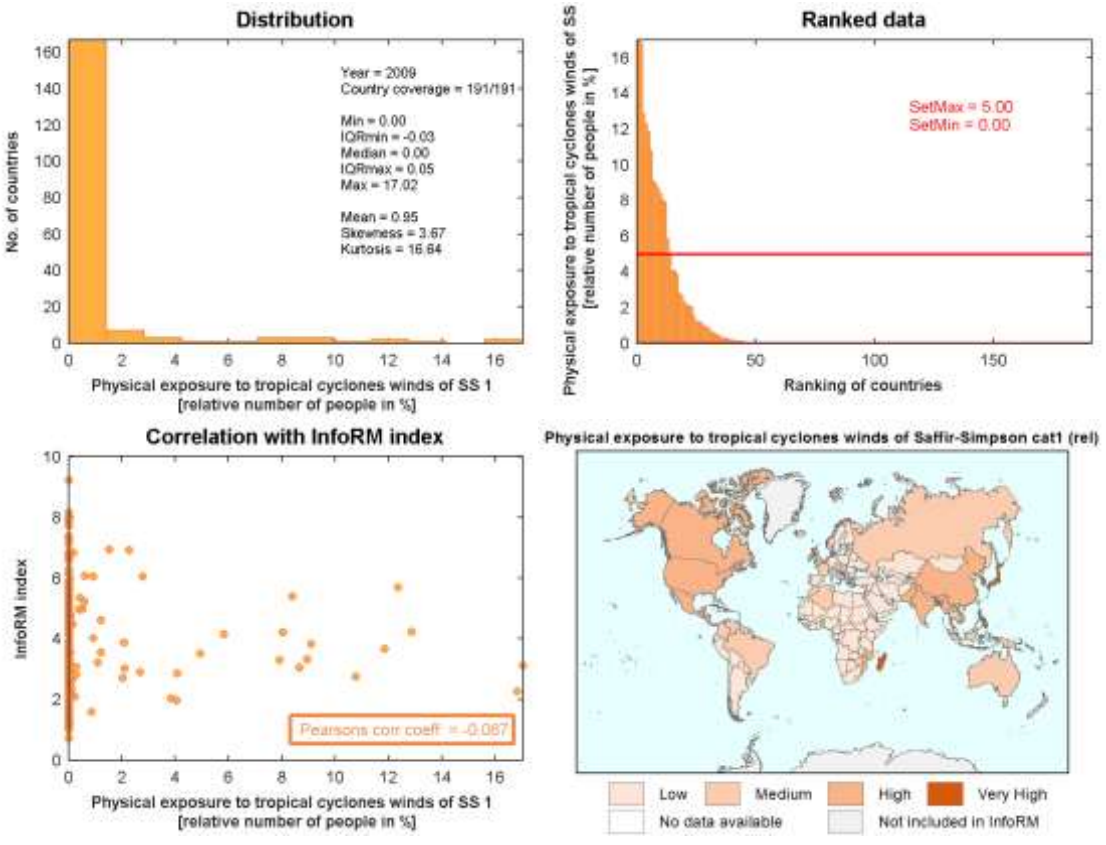
INDICATOR	Indicator:	**Physical exposure to tropical cyclones winds of Saffir-Simpson category 1 (relative)**
	InfoRM Code:	HA.NAT.TC.SS1-REL
	Long Name:	Physical exposure to tropical cyclones winds of SS1 - average annual population exposed (percentage of the total population)
	Description:	The indicator is based on the estimated number of people exposed to tropical cyclones winds of Saffir-Simpson (SS) category 1 per year. It results from the combination of the hazard zones and the total population living in the spatial unit. It thus indicates the percentage of expected average annual population potentially at risk.
	Relevance:	Tropical cyclone is one of the rapid on-set hazards considered in the natural hazard category. The SS 1 is considered as low intensity level.
	Validity / Limitation of indicator:	

INDICATOR NOTES	Unit of Measure:	Percentage of expected average annual population exposed per country			
	Indicator Creation Method:	1. For each country, the physical exposure, which is an expected average annual population (year of reference 2011) exposed, was derived by calculating the zonal statistic (sum of each raster values within the bounds of each zonal polygon) within each national level. 2. The exposed population was summed up and divided by total population, in order to obtain one exposure index per country. This product was compiled by EC/JRC for InfoRM.			
	Additional notes:				
	Pre-processing:	Transformation:	--	Min:	0%
		Normalisation:	MIN-MAX	Max:	5%

SOURCE	Variable:	Physical exposure to tropical cyclone of Saffir-Simpson category 1
	Citation:	Preview database of UNEP Global Risk Data Platform (GRID)
	Date of publication:	05/05/2011
	Reference time:	1970-2009
	Periodicity:	--
	URL:	http://preview.grid.unep.ch
	Data Type:	Raster (tif)
	Country coverage:	191/191 (100%)

SOURCE		
	Variable:	ORNL LandScan population density
	Citation:	Oak Ridge National Laboratory
	Date of publication:	2012
	Reference time:	2011
	Periodicity:	Annual
	URL:	http://www.ornl.gov/sci/landscan/
	Data Type:	Raster (ESRI/GRID)
	Country coverage:	191/191 (100%)

FIGURES		
	Distribution:	Histogram of the raw indicator dataset
	Ranked data:	Ranking of the raw indicator dataset
	Correlation with InfoRM index:	Correlation between the raw indicator dataset and InfoRM index
	World map:	Normalized indicator divided in quartiles



	Dimension:	**Hazards & Exposure**
	Category:	**Natural Hazard**
	Component:	**Tropical Cyclone**

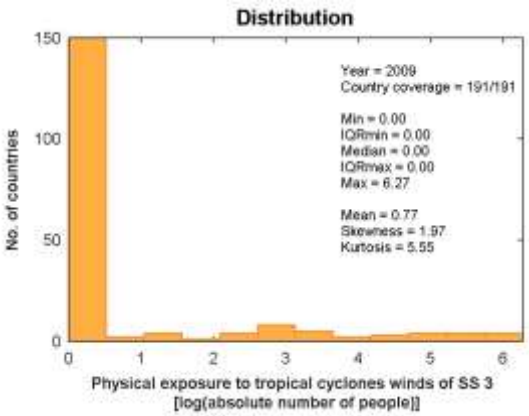
INDICATOR	Indicator:	**Physical exposure to tropical cyclones winds of Saffir-Simpson category 3 (absolute)**
	InfoRM Code:	HA.NAT.TC.SS3-ABS
	Long Name:	Physical exposure to tropical cyclones winds of SS3 - average annual population exposed (inhabitants)
	Description:	The indicator is based on the estimated number of people exposed to tropical cyclones winds of Saffir-Simpson (SS) category 3 per year. It results from the combination of the hazard zones and the total population living in the spatial unit. It thus indicates the expected number of people exposed in the hazard zone in one year.
	Relevance:	Tropical cyclone is one of the rapid on-set hazards considered in the natural hazard category. The SS 3 is considered as high intensity level.
	Validity / Limitation of indicator:	

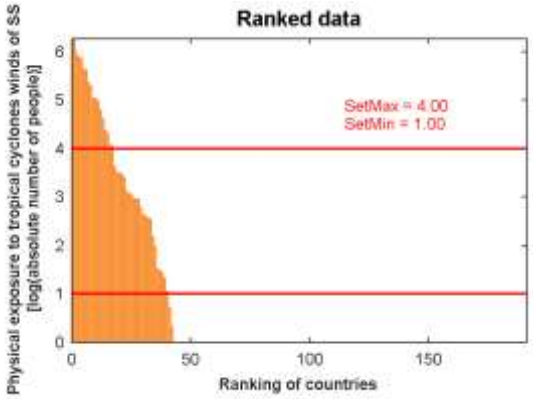
INDICATOR NOTES	Unit of Measure:	Average annual population exposed per country			
	Indicator Creation Method:	For each country, the physical exposure, which is an expected average annual population (year of reference 2011) exposed, was derived by calculating the zonal statistic (sum of each raster values within the bounds of each zonal polygon) within each national level. This product was compiled by EC/JRC for InfoRM.			
	Additional notes:				
	Pre-processing:	Transformation:	Log	Min:	1
		Normalisation:	MIN-MAX	Max:	4

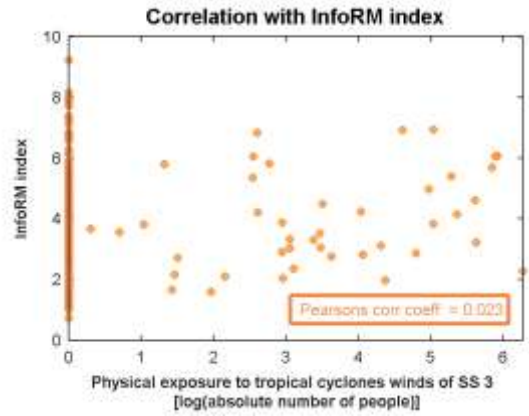
SOURCE	Variable:	Physical exposure to tropical cyclone of Saffir-Simpson category 3
	Citation:	Preview database of UNEP Global Risk Data Platform (GRID)
	Date of publication:	05/05/2011
	Reference time:	1970-2009
	Periodicity:	--
	URL:	http://preview.grid.unep.ch
	Data Type:	Raster (tif)
	Country coverage:	191/191 (100%)

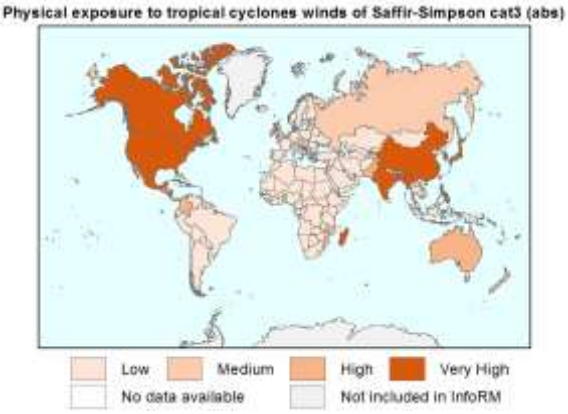
SOURCE	Variable:	ORNL LandScan population density
	Citation:	Oak Ridge National Laboratory
	Date of publication:	2012
	Reference time:	2011
	Periodicity:	Annual
	URL:	http://www.ornl.gov/sci/landscan/
	Data Type:	Raster (ESRI/GRID)
	Country coverage:	191/191 (100%)

FIGURES		
	Distribution:	Histogram of the raw indicator dataset
	Ranked data:	Ranking of the raw indicator dataset
	Correlation with InfoRM index:	Correlation between the raw indicator dataset and InfoRM index
	World map:	Normalized indicator divided in quartiles









	Dimension:	**Hazards & Exposure**
	Category:	**Natural Hazard**
	Component:	**Tropical Cyclone**

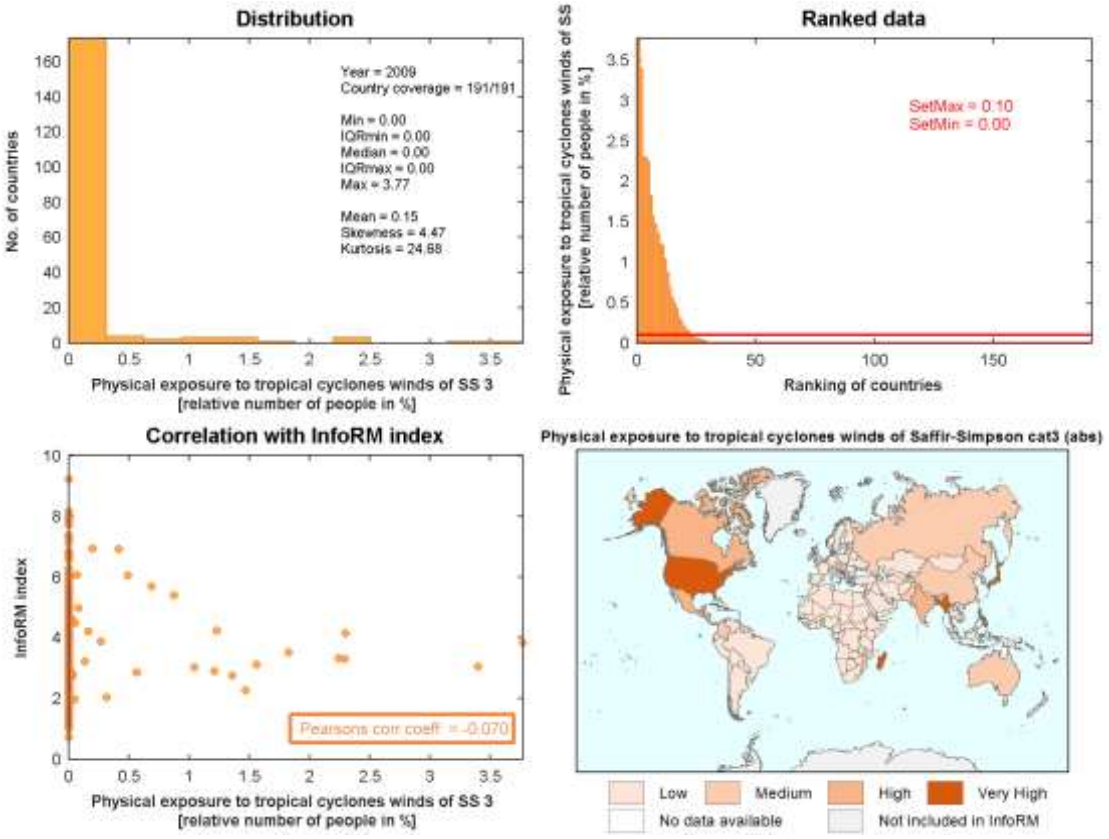
INDICATOR	Indicator:	**Physical exposure to tropical cyclones winds of Saffir-Simpson category 3 (relative)**
	InfoRM Code:	HA.NAT.TC.SS3-REL
	Long Name:	Physical exposure to tropical cyclones winds of SS3 - average annual population exposed (percentage of the total population)
	Description:	The indicator is based on the estimated number of people exposed to tropical cyclones winds of Saffir-Simpson (SS) category 3 per year. It results from the combination of the hazard zones and the total population living in the spatial unit. It thus indicates the percentage of expected average annual population potentially at risk.
	Relevance:	Tropical cyclone is one of the rapid on-set hazards considered in the natural hazard category. The SS 3 is considered as low intensity level.
	Validity / Limitation of indicator:	

INDICATOR NOTES	Unit of Measure:	Percentage of expected average annual population exposed per country			
	Indicator Creation Method:	1. For each country, the physical exposure, which is an expected average annual population (year of reference 2011) exposed, was derived by calculating the zonal statistic (sum of each raster values within the bounds of each zonal polygon) within each national level. 2. The exposed population was summed up and divided by total population, in order to obtain one exposure index per country. This product was compiled by EC/JRC for InfoRM.			
	Additional notes:				
	Pre-processing:	Transformation:	--	Min:	0%
		Normalisation:	MIN-MAX	Max:	0.1%

SOURCE	Variable:	Physical exposure to tropical cyclone of Saffir-Simpson category 3
	Citation:	Preview database of UNEP Global Risk Data Platform (GRID)
	Date of publication:	05/05/2011
	Reference time:	1970-2009
	Periodicity:	--
	URL:	http://preview.grid.unep.ch
	Data Type:	Raster (tif)
	Country coverage:	191/191 (100%)

SOURCE		
	Variable:	ORNL LandScan population density
	Citation:	Oak Ridge National Laboratory
	Date of publication:	2012
	Reference time:	2011
	Periodicity:	Annual
	URL:	http://www.ornl.gov/sci/landscan/
	Data Type:	Raster (ESRI/GRID)
	Country coverage:	191/191 (100%)

FIGURES		
	Distribution:	Histogram of the raw indicator dataset
	Ranked data:	Ranking of the raw indicator dataset
	Correlation with InfoRM index:	Correlation between the raw indicator dataset and InfoRM index
	World map:	Normalized indicator divided in quartiles



	Dimension:	**Hazards & Exposure**
	Category:	**Natural Hazard**
	Component:	**Tropical Cyclone**

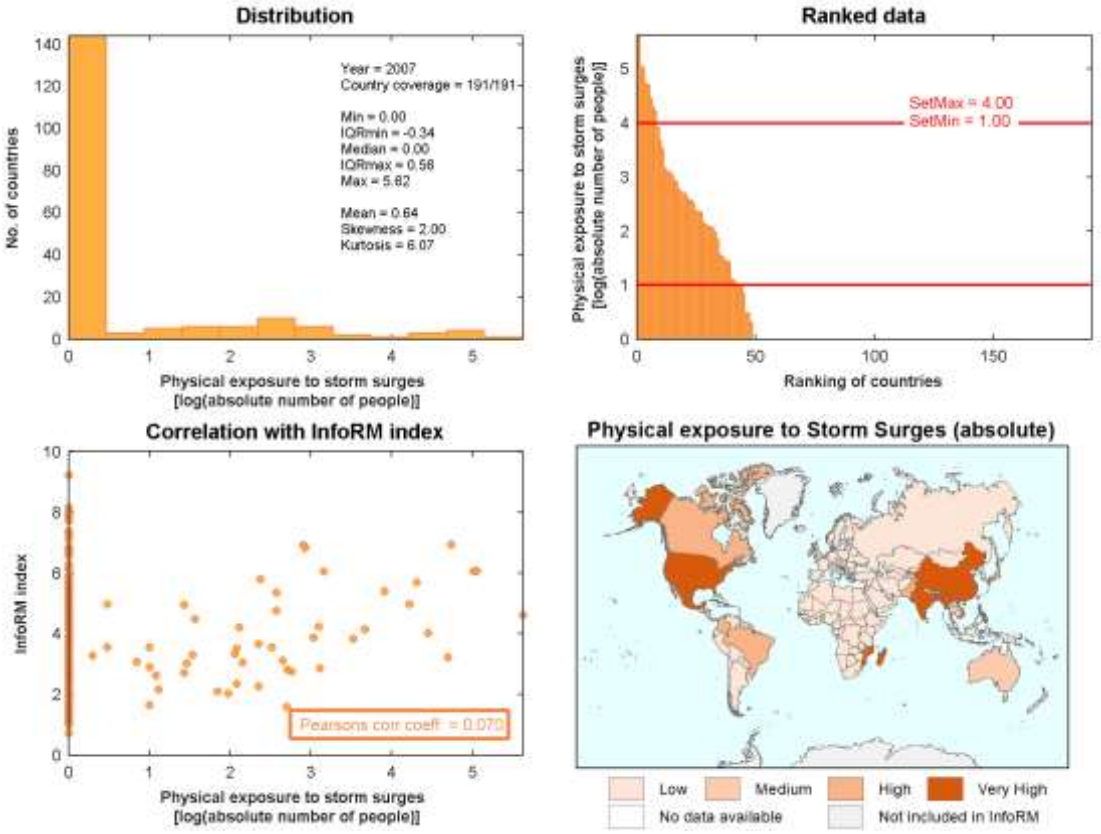
INDICATOR	Indicator:	**Physical exposure to Storm Surges (absolute)**
	InfoRM Code:	HA.NAT.TC.CS-ABS
	Long Name:	Physical exposure to storm surges of Saffir-Simpson category 1 - average annual population exposed (inhabitants)
	Description:	The indicator is based on the estimated number of people exposed to storm surges of Saffir-Simpson category 1 per year. It results from the combination of the hazard zones and the total population living in the spatial unit. It thus indicates the expected number of people exposed in the hazard zone in one year.
	Relevance:	Tropical cyclone is one of the rapid on-set hazards considered in the natural hazard category.
	Validity / Limitation of indicator:	

INDICATOR NOTES	Unit of Measure:	Average annual population exposed per country			
	Indicator Creation Method:	For each country, the physical exposure, which is an expected average annual population (year of reference 2011) exposed, was derived by calculating the zonal statistic (sum of each raster values within the bounds of each zonal polygon) within each national level. This product was compiled by EC/JRC for InfoRM.			
	Additional notes:				
	Pre-processing:	Transformation:	Log	Min:	1
		Normalisation:	MIN-MAX	Max:	4

SOURCE	Variable:	Physical exposure to surge from tropical cyclone of Saffir-Simpson category 1
	Citation:	Preview database of UNEP Global Risk Data Platform (GRID)
	Date of publication:	03/04/2012
	Reference time:	1975-2007
	Periodicity:	--
	URL:	http://preview.grid.unep.ch
	Data Type:	Raster (tif)
	Country coverage:	191/191 (100%)

SOURCE	Variable:	ORNL LandScan population density
	Citation:	Oak Ridge National Laboratory
	Date of publication:	2012
	Reference time:	2011
	Periodicity:	Annual
	URL:	http://www.ornl.gov/sci/landscan/
	Data Type:	Raster (ESRI/GRID)
	Country coverage:	191/191 (100%)

FIGURES		
	Distribution:	Histogram of the raw indicator dataset
	Ranked data:	Ranking of the raw indicator dataset
	Correlation with InfoRM index:	Correlation between the raw indicator dataset and InfoRM index
	World map:	Normalized indicator divided in quartiles



	Dimension:	**Hazards & Exposure**
	Category:	**Natural Hazard**
	Component:	**Tropical Cyclone**

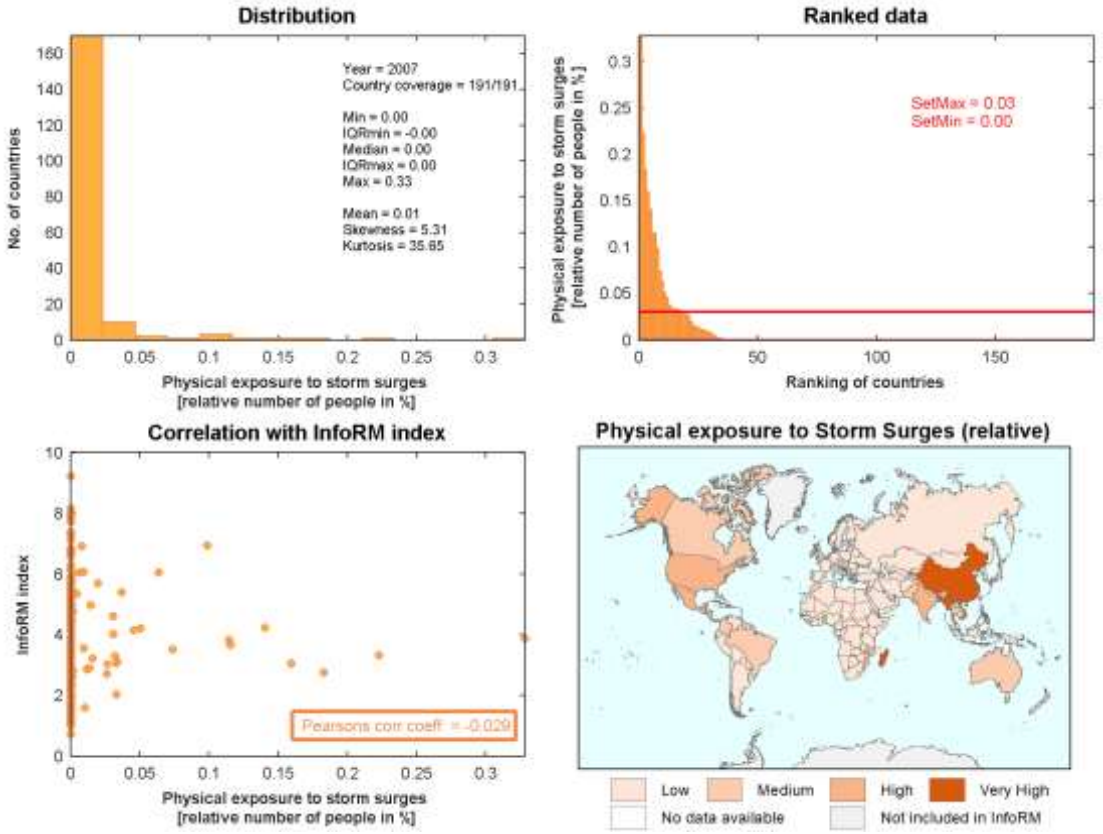
INDICATOR	Indicator:	**Physical exposure to Storm Surge (relative)**
	InfoRM Code:	HA.NAT.TC.CS-REL
	Long Name:	Physical exposure to storm surges of Saffir-Simpson category 1 - average annual population exposed (percentage of the total population)
	Description:	The indicator is based on the estimated number of people exposed to storm surges of Saffir-Simpson category 1 per year. It results from the combination of the hazard zones and the total population living in the spatial unit. It thus indicates the percentage of expected average annual population potentially at risk.
	Relevance:	Tropical cyclone is one of the rapid on-set hazards considered in the natural hazard category.
	Validity / Limitation of indicator:	

INDICATOR NOTES	Unit of Measure:	Percentage of expected average annual population exposed per country			
	Indicator Creation Method:	1. For each country, the physical exposure, which is an expected average annual population (year of reference 2011) exposed, was derived by calculating the zonal statistic (sum of each raster values within the bounds of each zonal polygon) within each national level. 2. The exposed population was summed up and divided by total population, in order to obtain one exposure index per country. This product was compiled by EC/JRC for InfoRM.			
	Additional notes:				
	Pre-processing:	Transformation:	--	Min:	0%
		Normalisation:	MIN-MAX	Max:	0.03%

SOURCE	Variable:	Physical exposure to surge from tropical cyclone of Saffir-Simpson category 1
	Citation:	Preview database of UNEP Global Risk Data Platform (GRID)
	Date of publication:	03/04/2012
	Reference time:	1975-2007
	Periodicity:	--
	URL:	http://preview.grid.unep.ch
	Data Type:	Raster (tif)
	Country coverage:	191/191 (100%)

SOURCE		
	Variable:	ORNL LandScan population density
	Citation:	Oak Ridge National Laboratory
	Date of publication:	2012
	Reference time:	2011
	Periodicity:	Annual
	URL:	http://www.ornl.gov/sci/landscan/
	Data Type:	Raster (ESRI/GRID)
	Country coverage:	191/191 (100%)

FIGURES		
	Distribution:	Histogram of the raw indicator dataset
	Ranked data:	Ranking of the raw indicator dataset
	Correlation with InfoRM index:	Correlation between the raw indicator dataset and InfoRM index
	World map:	Normalized indicator divided in quartiles



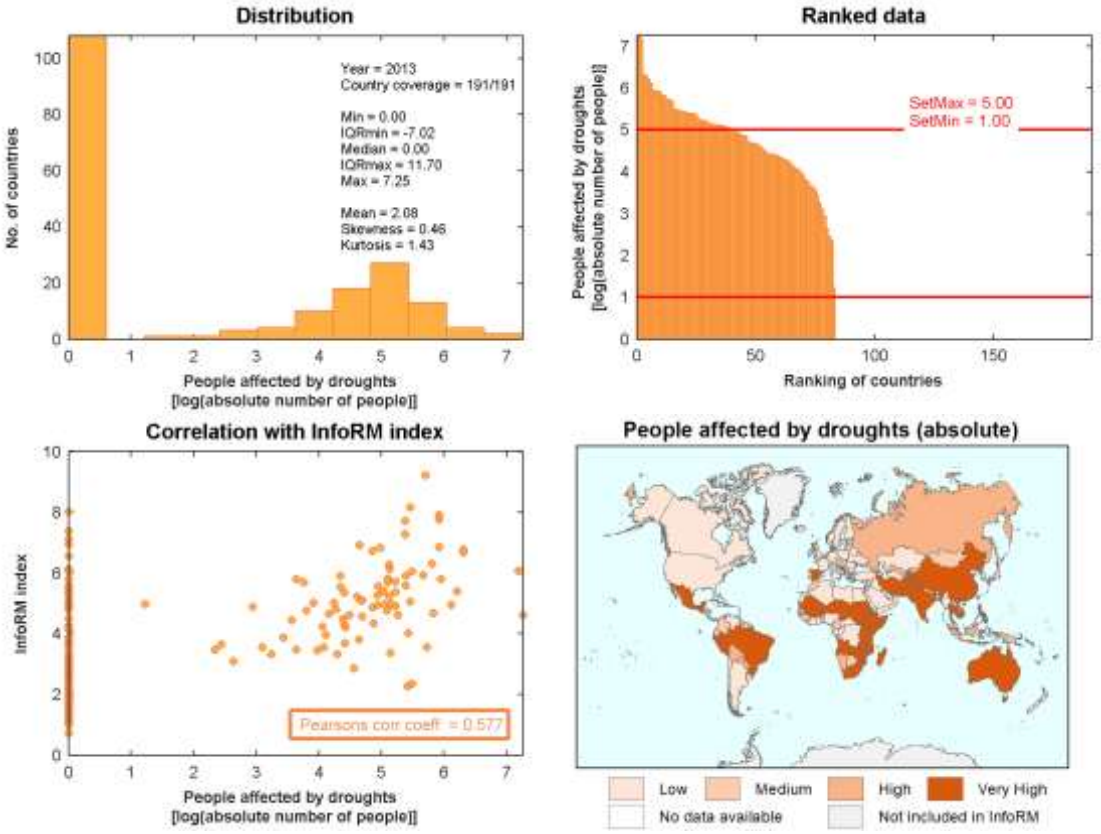
	Dimension:	**Hazards & Exposure**
	Category:	**Natural Hazard**
	Component:	**Drought**

INDICATOR	Indicator:	**People affected by Droughts (absolute)**
	InfoRM Code:	HA.NAT.DR-ABS
	Long Name:	People affected by droughts 1990-2013 - average annual population affected (inhabitants)
	Description:	The indicator shows the average annual affected population by droughts per country on the period from 1990 to 2013.
	Relevance:	Drought is the only one slow on-set hazards considered in the natural hazard category.
	Validity / Limitation of indicator:	The indicator is based on the total number of people affected by droughts per year per country. It thus indicates how many people per year are at risk.

INDICATOR NOTES	Unit of Measure:	Average annual population affected per country			
	Indicator Creation Method:	The total affected per country in the period from 1990 to 2013 has been divided by the number of reference periods (23) in order to obtain the annual average affected population per country.			
	Additional notes:				
	Pre-processing:	Transformation:	Log	Min:	1
		Normalisation:	MIN-MAX	Max:	5

SOURCE	Variable:	Total number of affected by droughts
	Citation:	EM-DAT, CRED
	Date of publication:	01/12/2013
	Reference time:	1990-2013
	Periodicity:	Every 3 months
	URL:	http://www.emdat.be/
	Data Type:	Tabular (csv)
	Country coverage:	191/191 (100%)

FIGURES		
	Distribution:	Histogram of the raw indicator dataset
	Ranked data:	Ranking of the raw indicator dataset
	Correlation with InfoRM index:	Correlation between the raw indicator dataset and InfoRM index
	World map:	Normalized indicator divided in quartiles



	Dimension:	**Hazards & Exposure**
	Category:	**Natural Hazard**
	Component:	**Drought**

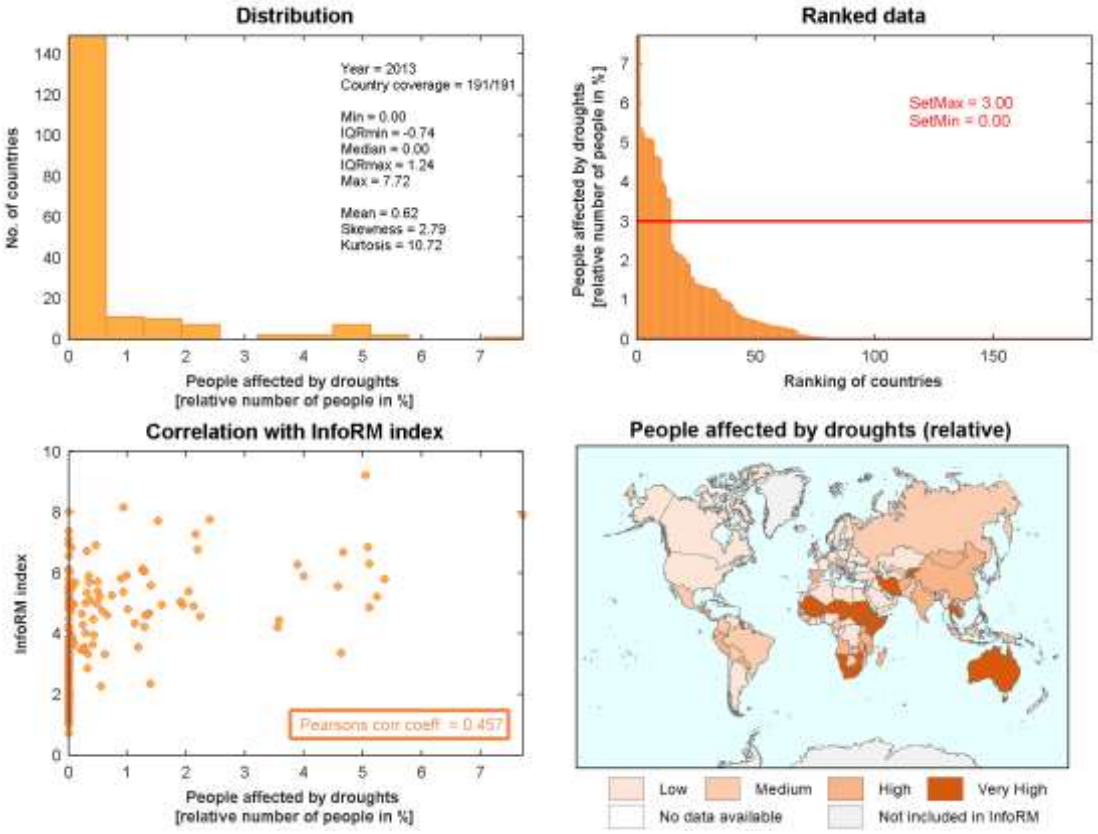
INDICATOR	Indicator:	**People affected by Droughts (relative)**
	InfoRM Code:	HA.NAT.DR-REL
	Long Name:	People affected by droughts 1990-2013 - average annual population affected (percentage of the total population)
	Description:	The indicator shows the percentage of the average annual affected population per country by droughts on the period from 1990 to 2013.
	Relevance:	Drought is the only one slow on-set hazards considered in the natural hazard category.
	Validity / Limitation of indicator:	The indicator is based on the total number of people affected by droughts per year per country. It thus indicates how many people per year are at risk.

INDICATOR NOTES	Unit of Measure:	Percentage of the average annual population affected per country			
	Indicator Creation Method:	1. The total affected per country in the period from 1990 to 2013 has been divided by the number of reference periods (23) in order to obtain the annual average affected population per country. 2. The average affected population was divided by total population of each country.			
	Additional notes:				
	Pre-processing:	Transformation:	--	Min:	0%
		Normalisation:	MIN-MAX	Max:	3%

SOURCE	Variable:	Total number of affected by droughts
	Citation:	EM-DAT, CRED
	Date of publication:	01/12/2013
	Reference time:	1990-2013
	Periodicity:	Every 3 months
	URL:	http://www.emdat.be/
	Data Type:	Tabular (csv)
	Country coverage:	191/191 (100%)

SOURCE	Variable:	ORNL LandScan population density
	Citation:	Oak Ridge National Laboratory
	Date of publication:	2012
	Reference time:	2011
	Periodicity:	Annual
	URL:	http://www.ornl.gov/sci/landscan/
	Data Type:	Raster (ESRI/GRID)
	Country coverage:	191/191 (100%)

FIGURES		
	Distribution:	Histogram of the raw indicator dataset
	Ranked data:	Ranking of the raw indicator dataset
	Correlation with InfoRM index:	Correlation between the raw indicator dataset and InfoRM index
	World map:	Normalized indicator divided in quartiles



	Dimension:	**Hazards & Exposure**
	Category:	**Human Hazard**
	Component:	**Conflict Intensity**

INDICATOR	Indicator:	**Conflict Barometer**
	InfoRM Code:	HA.HUM.CON
	Long Name:	Conflict Barometer
	Description:	The HIIK's annual publication Conflict Barometer describes the recent trends in global conflict developments, escalations, de-escalations, and settlements.
	Relevance:	The Human Hazard component of InfoRM refers to risk of conflicts, unrest or crime in the country. The Conflict Barometer describes the conflict intensity component.
	Validity / Limitation of indicator:	No distinction has been made between national and subnational conflict, resulting that country involved in a national wide war (i.e. Syria) are equally rated as country with very localized conflict (i.e. Turkey).

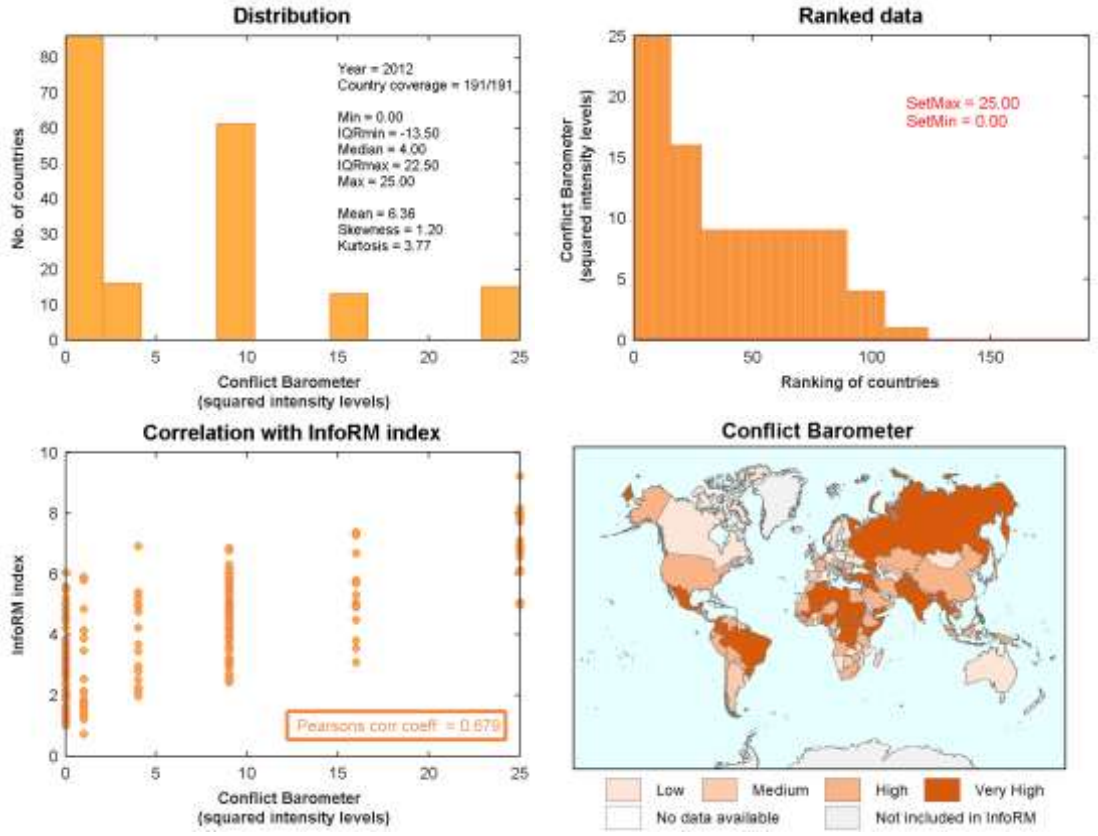
INDICATOR NOTES	Unit of Measure:	Level of intensity in a scale from 1 to 5
	Indicator Creation Method:	The methodological approach consists of the conflict definition and the measuring of the conflict intensity distinguishes five levels of intensity according to the dynamic conflict model: dispute, non-violent crises, violent crises, limited war und war. These levels of conflict are distinguished by the stage of physical violence applied in the course of conflict. Important criterions to determine the level of violence are the instruments for the use of force (use of weapons and use of personnel) and the consequences of the use of force (casualties, refugees and demolition).
	Additional notes:	To emphasize the increasing differences between the intensity levels, the score of the Conflict Barometer was squared and then rescaled into a range of 0 to10.

Intensity level	Conflict Barometer definition	Conflict intensity (InfoRM)
0	No dispute	0
1	Dispute	0.4
2	non-violent crises	1.6
3	violent crises	3.6
4	limited war	6.4
5	war	10

Pre-processing:	Transformation:	Squared	Min:	0
	Normalisation:	MIN-MAX	Max:	25

SOURCE		
	Variable:	Conflict Barometer
	Citation:	Heidelberg Institute for International Conflict Research (HIIK)
	Date of publication:	01/02/2013
	Reference time:	2012
	Periodicity:	Annual (February)
	URL:	http://www.hiik.de/en/konfliktbarometer/index.html
	Data Type:	Tabular (pdf)
	Country coverage:	191/191 (100%)

FIGURES		
	Distribution:	Histogram of the raw indicator dataset
	Ranked data:	Ranking of the raw indicator dataset
	Correlation with InfoRM index:	Correlation between the raw indicator dataset and InfoRM index
	World map:	Normalized indicator divided in quartiles



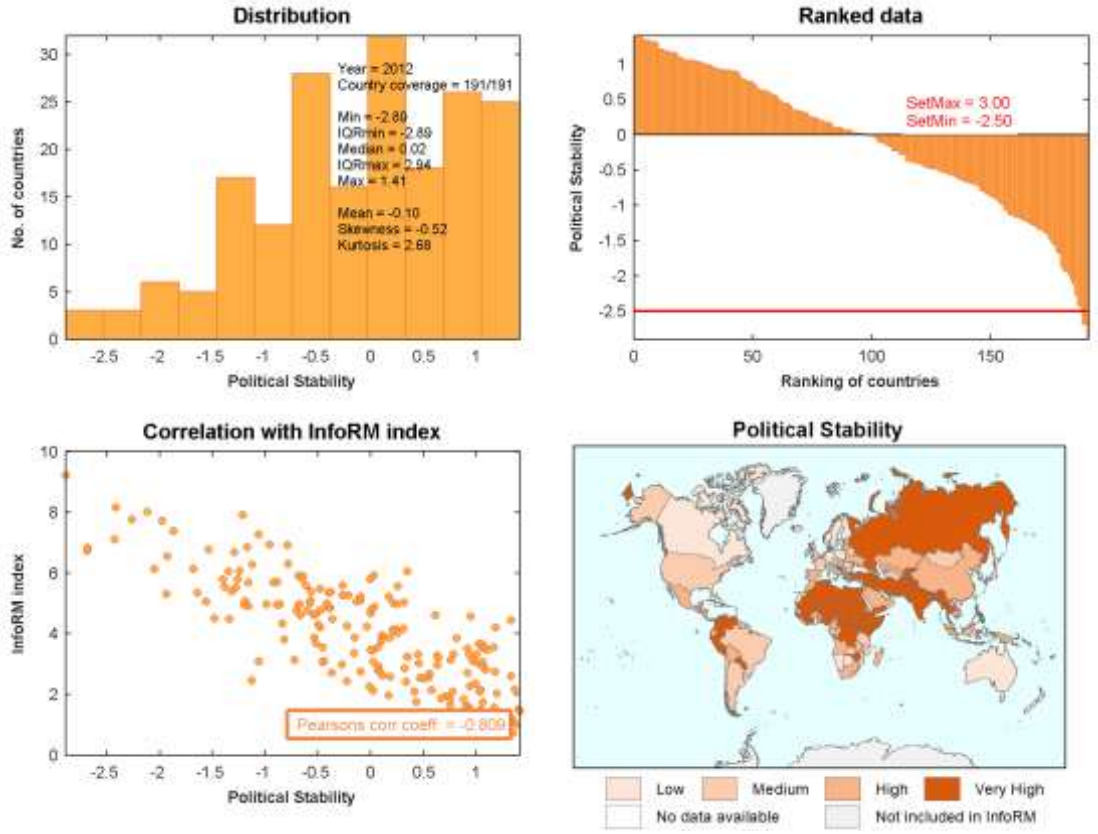
	Dimension:	**Hazards & Exposure**
	Category:	**Human Hazard**
	Component:	**Regime Stability**

INDICATOR	Indicator:	**Political Stability**
	InfoRM Code:	HA.HUM.PS
	Long Name:	Political Stability and Absence of Violence/Terrorism
	Description:	Political Stability and Absence of Violence/Terrorism measures perceptions of the likelihood that the government will be destabilized or overthrown by unconstitutional or violent means, including politically-motivated violence and terrorism.
	Relevance:	The Human Hazard component of InfoRM refers to risk of conflicts, unrest or crime in the country. The Political Stability measures the legitimacy of the constituent regime.
	Validity / Limitation of indicator:	

INDICATOR NOTES	Unit of Measure:	Index [-0.25/0.25]			
	Indicator Creation Method:	The WGI are composite governance indicators based on 31 underlying data sources. These data sources are rescaled and combined to create the six aggregate indicators using a statistical methodology known as an unobserved components model.			
	Additional notes:				
	Pre-processing:	Transformation:	--	Min:	-2.5
		Normalisation:	MAX-MIN	Max:	2.5

SOURCE	Variable:	Political Stability and Absence of Violence/Terrorism
	Citation:	Worldwide Governance Indicators World Bank
	Date of publication:	2013
	Reference time:	2012
	Periodicity:	Annual
	URL:	http://info.worldbank.org/governance/wgi/index.asp
	Data Type:	Tabular (Excel)
	Country coverage:	191/191 (100%)

FIGURES		
	Distribution:	Histogram of the raw indicator dataset
	Ranked data:	Ranking of the raw indicator dataset
	Correlation with InfoRM index:	Correlation between the raw indicator dataset and InfoRM index
	World map:	Normalized indicator divided in quartiles



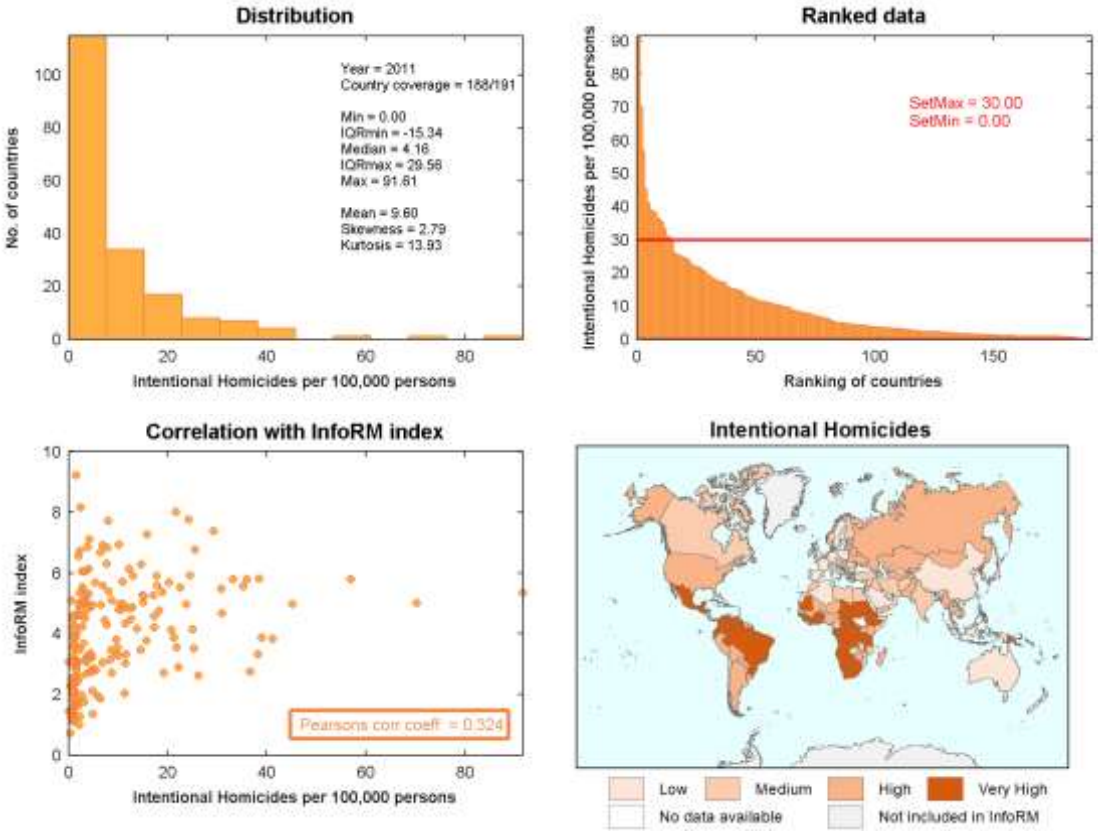
	Dimension:	**Hazards & Exposure**
	Category:	**Human Hazard**
	Component:	**Extrajudicial and Unlawful Killings**

INDICATOR	Indicator:	**Intentional Homicides**
	InfoRM Code:	HA.HUM.HOM
	Long Name:	Intentional Homicides per 100,000 persons
	Description:	Intentional Homicides rates capture domestic disputes that end in killing, interpersonal violence, violent conflicts over land resources, inter-gang violence over turf control, and predatory violence and killing by armed groups while deaths arising from armed conflict are considered separately.
	Relevance:	The Human Hazard component of InfoRM refers to risk of conflicts, unrest or crime in the country. The Intentional Homicides measures the consequences of low performance of the security system.
	Validity / Limitation of indicator:	

INDICATOR NOTES	Unit of Measure:	Number per 100,000 persons			
	Indicator Creation Method:	The dataset covers 207 countries and territories and provides data on homicide levels, trends and contextual characteristics drawn from a variety of national and international sources relating to homicide.			
	Additional notes:	Due to the uncertainty of the data, the homicide rate data have been used only in cases when it would result in worse conditions of the country based on the conflict intensity and regime stability components otherwise the indicator of homicide rate is discarded.			
	Pre-processing:	Transformation:	--	Min:	0
		Normalisation:	MIN-MAX	Max:	30

SOURCE	Variable:	Intentional Homicides per 100,000 persons
	Citation:	UNODC
	Date of publication:	2013
	Reference time:	2006-2011
	Periodicity:	Annual (not for all countries)
	URL:	https://www.unodc.org/unodc/en/data-and-analysis/homicide.html
	Data Type:	Tabular (Excel)
	Country coverage:	181/191 (98%)

FIGURES		
	Distribution:	Histogram of the raw indicator dataset
	Ranked data:	Ranking of the raw indicator dataset
	Correlation with InfoRM index:	Correlation between the raw indicator dataset and InfoRM index
	World map:	Normalized indicator divided in quartiles



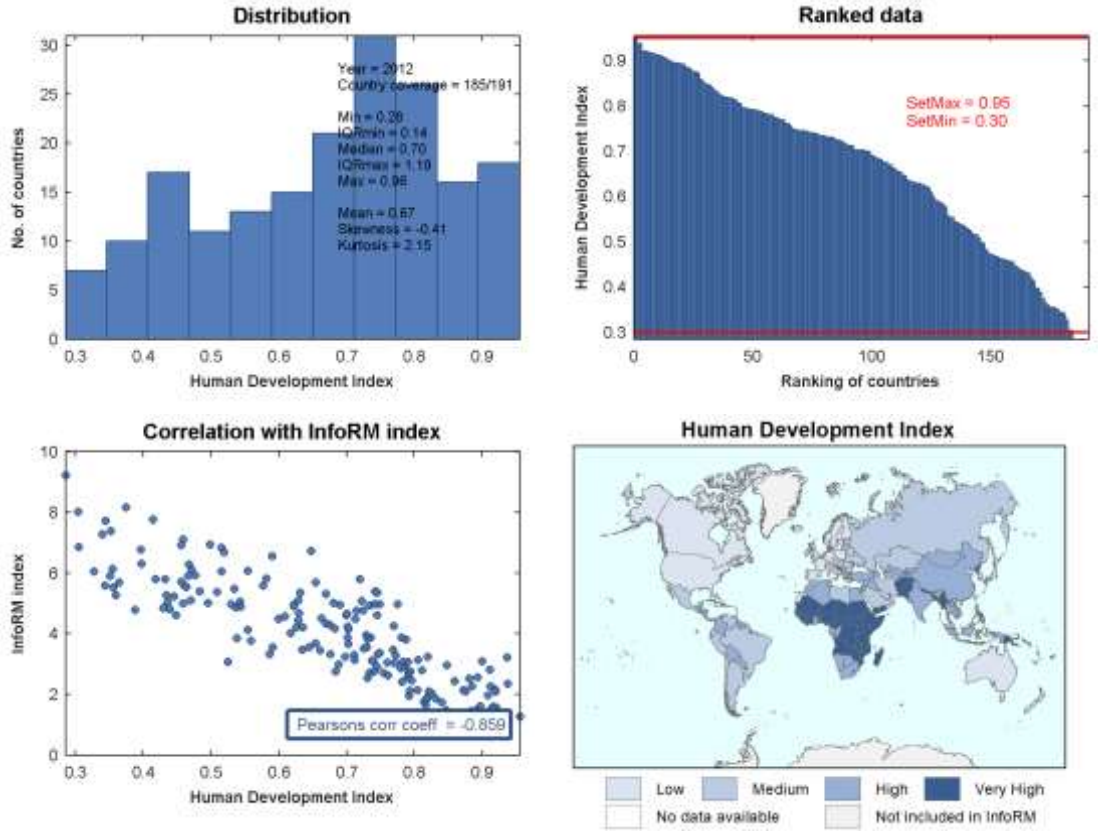
	Dimension:	**Vulnerability**
	Category:	**Socio-Economic Vulnerability**
	Component:	**Development & Deprivation**

INDICATOR	Indicator:	**Human Development Index**
	InfoRM Code:	VU.SEV.PD.HDI
	Long Name:	Human Development Index
	Description:	The Human Development Index measure development by combining indicators of life expectancy, educational attainment and income into a composite index.
	Relevance:	It is assumed that the more developed a country is the better its people will be able to respond to humanitarian needs using their own individual or national resources.
	Validity / Limitation of indicator:	

INDICATOR NOTES	Unit of Measure:	Index [0 – 1]			
	Indicator Creation Method:	The HDI sets a minimum and a maximum for each dimension, called goalposts, and then shows where each country stands in relation to these goalposts, expressed as a value between 0 and 1. The HDI is the geometric mean of normalized indices from each of these three dimensions.			
	Additional notes:	Missing values imputed by regression analysis of correlation between HDI and GDP per capita, PPP for: Democratic People's Republic of Korea, Marshall Islands, Tuvalu, Nauru.			
	Pre-processing:	Transformation:	--	Min:	0.3
		Normalisation:	MAX-MIN	Max:	0.95

SOURCE	Variable:	Human Development Index HDI
	Citation:	UNDP
	Date of publication:	14/03/2013
	Reference time:	2012
	Periodicity:	Annual (March)
	URL:	http://hdr.undp.org/en
	Data Type:	Tabular (Excel), API
	Country coverage:	185/191 (97%)

FIGURES		
	Distribution:	Histogram of the raw indicator dataset
	Ranked data:	Ranking of the raw indicator dataset
	Correlation with InfoRM index:	Correlation between the raw indicator dataset and InfoRM index
	World map:	Normalized indicator divided in quartiles



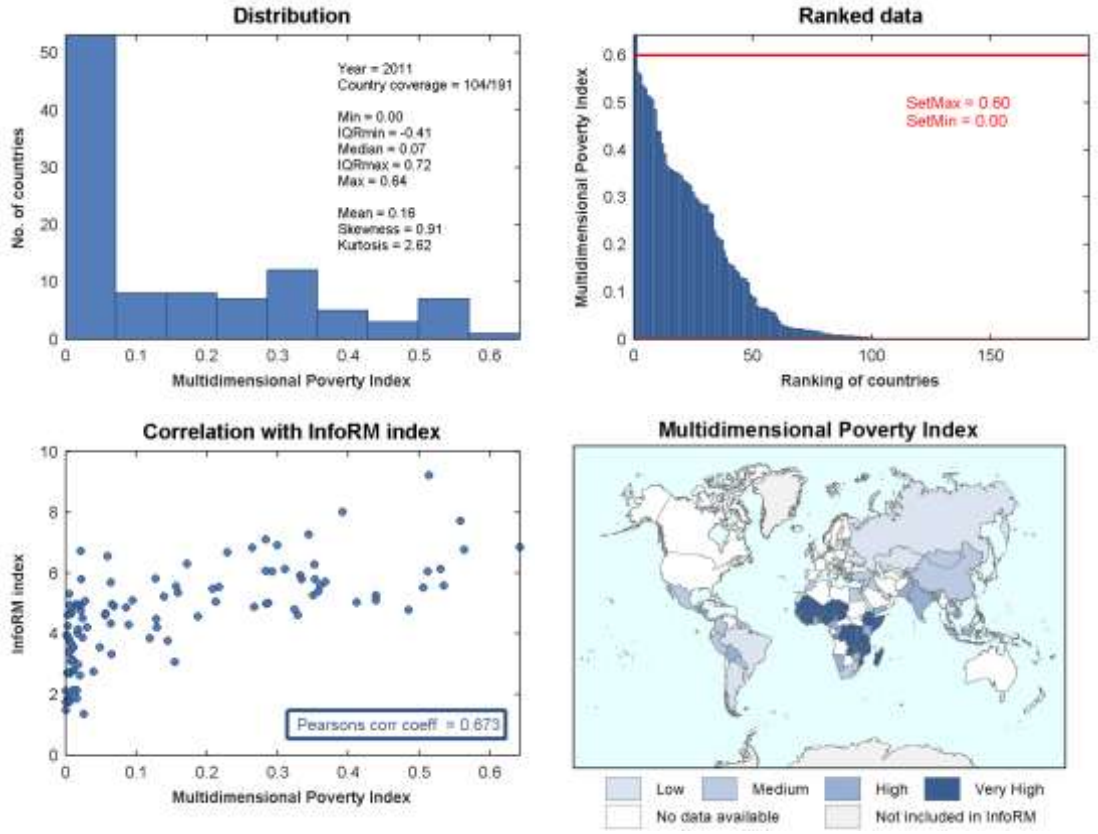
	Dimension:	**Vulnerability**
	Category:	**Socio-economic Vulnerability**
	Component:	**Development & Deprivation**

INDICATOR	Indicator:	**Multidimensional Poverty Index**
	InfoRM Code:	VU.SEV.PD.MPI
	Long Name:	Multidimensional Poverty Index
	Description:	The Multidimensional Poverty MPI Index identifies overlapping deprivations at the household level across the same three dimensions as the Human Development Index (living standards, health, and education) and shows the average number of poor people and deprivations with which poor households contend.
	Relevance:	While the HDI measures the average achievement of a country in terms of development, the MPI, focuses on the section of the population below the threshold of the basic criteria for human development.
	Validity / Limitation of indicator:	

INDICATOR NOTES	Unit of Measure:	Index [0 – 1]			
	Indicator Creation Method:	Each person is assigned a deprivation score according to his or her household's deprivations in each of 10 component indicators. The maximum score is 100%, with each dimension equally weighted; thus the maximum score in each dimension is 33.3%.			
	Additional notes:				
	Pre-processing:	Transformation:	--	Min:	0
		Normalisation:	MIN-MAX	Max:	0.6

SOURCE	Variable:	Multidimensional Poverty Index MPI
	Citation:	UNDP
	Date of publication:	14/03/2013
	Reference time:	2007-2011
	Periodicity:	Annual (March)
	URL:	http://hdr.undp.org/en
	Data Type:	Tabular (Excel), API
	Country coverage:	104/191 (54%)

FIGURES		
	Distribution:	Histogram of the raw indicator dataset
	Ranked data:	Ranking of the raw indicator dataset
	Correlation with InfoRM index:	Correlation between the raw indicator dataset and InfoRM index
	World map:	Normalized indicator divided in quartiles



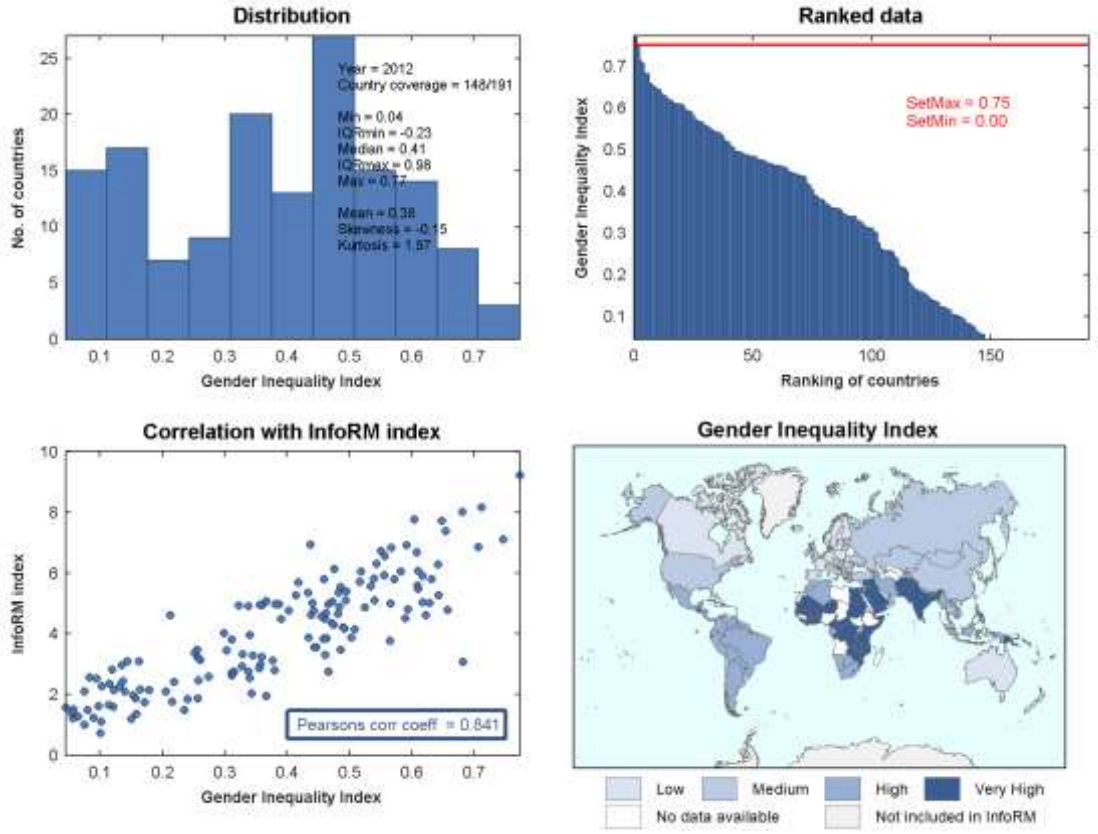
	Dimension:	**Vulnerability**
	Category:	**Socio-Economic Vulnerability**
	Component:	**Inequality**

INDICATOR	Indicator:	**Gender Inequality Index**
	InfoRM Code:	VU.SEV.INQ.GII
	Long Name:	Gender Inequality Index
	Description:	The Gender Inequality Index (GII) reflects gender-based disadvantages in three dimensions—reproductive health, empowerment and the labour market. The value of GII range between 0 to 1, with 0 being 0% inequality, indicating women fare equally in comparison to men and 1 being 100% inequality, indicating women fare poorly in comparison to men.
	Relevance:	The Inequality component introduces the dispersion of conditions within population presented in Development & Deprivation component. Countries with unequal distribution of human development also experience high inequality between women and men, and countries with high gender inequality also experience unequal distribution of human development.
	Validity / Limitation of indicator:	

INDICATOR NOTES	Unit of Measure:	Index [0 – 1]			
	Indicator Creation Method:	The index is based on the general mean of general means of different orders—the first aggregation is by the geometric mean across dimensions; these means, calculated separately for women and men, are then aggregated using a harmonic mean across genders.			
	Additional notes:				
	Pre-processing:	Transformation:	--	Min:	0
		Normalisation:	MIN-MAX	Max:	0.75

SOURCE	Variable:	Gender Inequality Index
	Citation:	UNDP
	Date of publication:	14/03/2013
	Reference time:	2012
	Periodicity:	Annual (March)
	URL:	http://hdr.undp.org/en
	Data Type:	Tabular (Excel, API)
	Country coverage:	148/191 (77%)

FIGURES		
	Distribution:	Histogram of the raw indicator dataset
	Ranked data:	Ranking of the raw indicator dataset
	Correlation with InfoRM index:	Correlation between the raw indicator dataset and InfoRM index
	World map:	Normalized indicator divided in quartiles



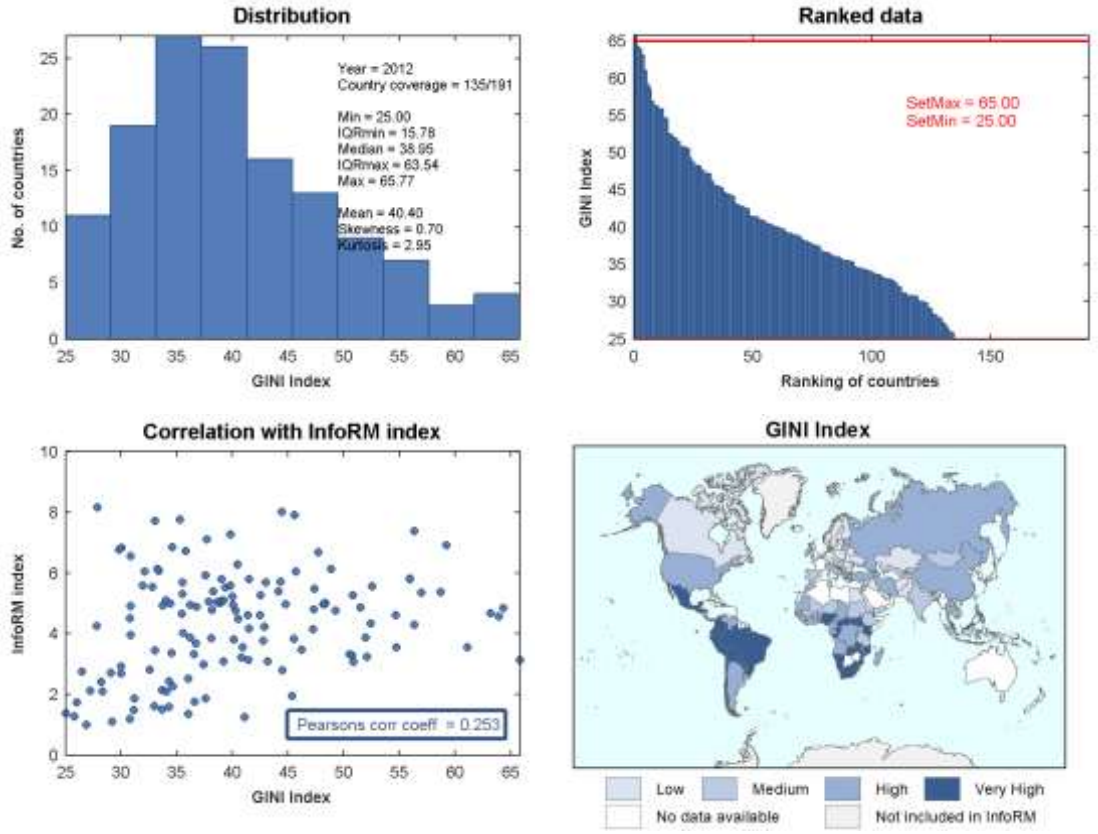
	Dimension:	**Vulnerability**
	Category:	**Socio-economic Vulnerability**
	Component:	**Inequality**

INDICATOR	Indicator:	**GINI Index**
	InfoRM Code:	VU.SEV.INQ.GINI
	Long Name:	Income Gini coefficient - Inequality in income or consumption
	Description:	Gini index measures the extent to which the distribution of income or consumption expenditure among individuals or households within an economy deviates from a perfectly equal distribution. Thus a Gini index of 0 represents perfect equality, while an index of 100 implies perfect inequality.
	Relevance:	The Inequality component introduces the dispersion of conditions within population presented in Development & Deprivation component. The GINI index depict the wealth distribution within a country.
	Validity / Limitation of indicator:	

INDICATOR NOTES	Unit of Measure:	Index [0 – 100]			
	Indicator Creation Method:	A Lorenz curve plots the cumulative percentages of total income received against the cumulative number of recipients, starting with the poorest individual or household. The Gini index measures the area between the Lorenz curve and a hypothetical line of absolute equality, expressed as a percentage of the maximum area under the line.			
	Additional notes:				
	Pre-processing:	Transformation:	--	Min:	25
		Normalisation:	MIN-MAX	Max:	65

SOURCE	Variable:	Gender Inequality Index
	Citation:	World Bank
	Date of publication:	20/12/2013
	Reference time:	2000-2012
	Periodicity:	Annual (not for every country)
	URL:	http://data.worldbank.org/indicator/SI.POV.GINI
	Data Type:	Tabular (Excel)
	Country coverage:	135/191 (71%)

FIGURES		
	Distribution:	Histogram of the raw indicator dataset
	Ranked data:	Ranking of the raw indicator dataset
	Correlation with InfoRM index:	Correlation between the raw indicator dataset and InfoRM index
	World map:	Normalized indicator divided in quartiles



	Dimension:	**Vulnerability**
	Category:	**Socio-Economic Vulnerability**
	Component:	**Aid Dependency**

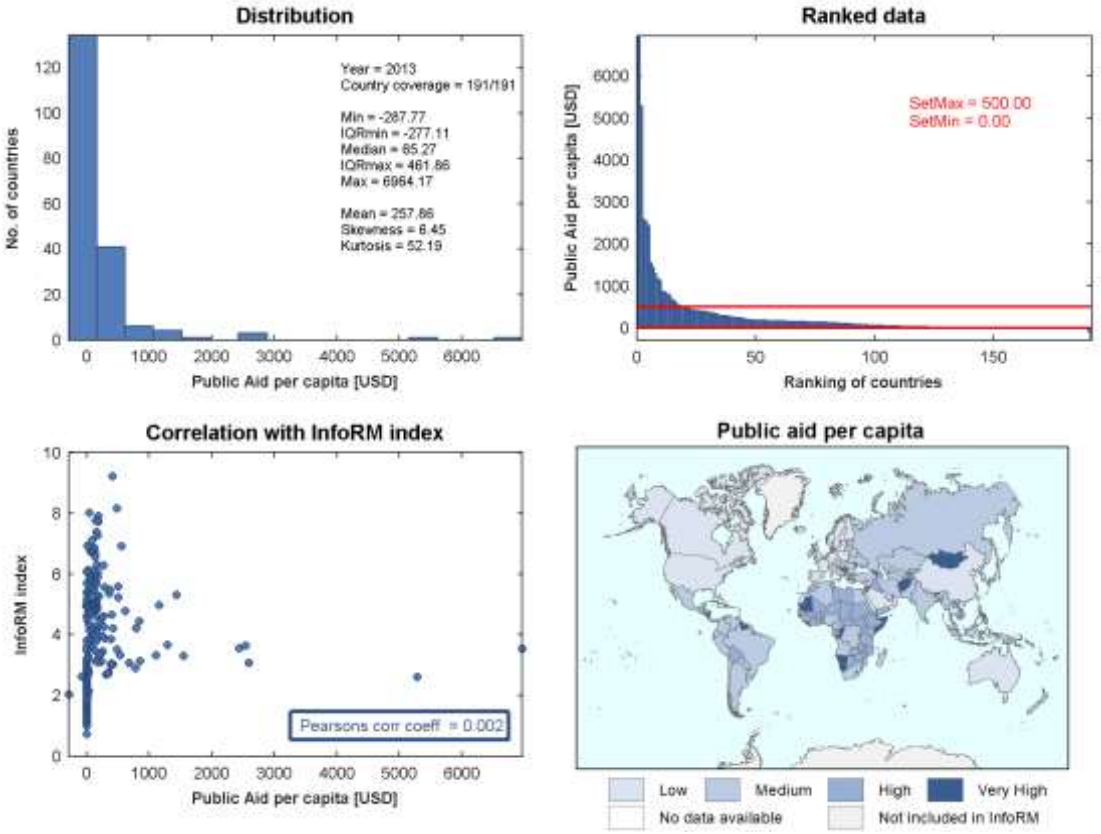
INDICATOR	Indicator:	**Public Aid per capita**
	InfoRM Code:	VU.SEV.AD.AID-REL
	Long Name:	Public Aid per capita (current USD)
	Description:	This indicator is calculated by adding the public development aid and the humanitarian aid.
	Relevance:	The Aid Dependency component points out the countries that lack sustainability in development growth due to economic instability and humanitarian crisis.
	Validity / Limitation of indicator:	

INDICATOR NOTES	Unit of Measure:	Current USD per capita			
	Indicator Creation Method:	This indicator is calculated by adding the public development aid and the humanitarian aid. Public development aid is calculated on the basis of data provided by the OECD Development Assistance Committee over the last two years for which data are available. It includes all the major donors and all categories of aid (grants, loans, technical cooperation, emergency aid, public aid etc., minus repayments of principal and interest paid on loans). The humanitarian aid is calculated on the basis of data provided by the OCHA Financial Tracking System over the last two years plus the year in which the exercise is done.			
	Additional notes:				
	Pre-processing:	Transformation:	--	Min:	0
		Normalisation:	MIN-MAX	Max:	500

SOURCE	Variable:	Net official development assistance (ODA)
	Citation:	Development Assistance Committee of the Organisation for Economic Co-operation and Development
	Date of publication:	20/12/2013
	Reference time:	2011-2012
	Periodicity:	Annual
	URL:	http://stats.oecd.org/qwids/
	Data Type:	Tabular (Excel)
	Country coverage:	

SOURCE		
	Variable:	Financial Tracking System
	Citation:	UN-OCHA
	Date of publication:	20/12/2013
	Reference time:	2010-2012
	Periodicity:	Annual
	URL:	http://fts.unocha.org/pageloader.aspx
	Data Type:	Tabular (Excel)
	Country coverage:	191/191 (100%)

FIGURES		
	Distribution:	Histogram of the raw indicator dataset
	Ranked data:	Ranking of the raw indicator dataset
	Correlation with InfoRM index:	Correlation between the raw indicator dataset and InfoRM index
	World map:	Normalized indicator divided in quartiles



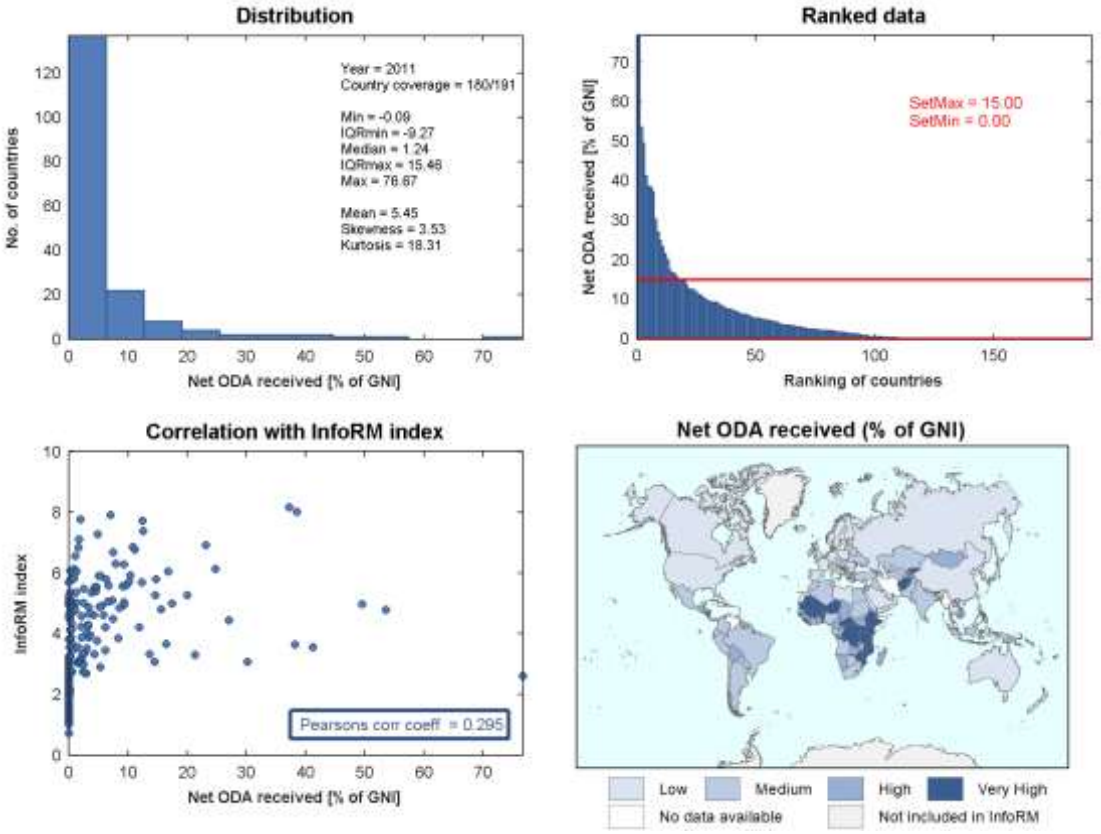
	Dimension:	**Vulnerability**
	Category:	**Socio-economic Vulnerability**
	Component:	**Aid Dependency**

INDICATOR	Indicator:	**Net ODA Received (% of GNI)**
	InfoRM Code:	VU.SEV.AD.ODA-GNI
	Long Name:	Net ODA received (% of GNI)
	Description:	Net official development assistance (ODA) consists of disbursements of loans made on concessional terms (net of repayments of principal) and grants by official agencies of the members of the Development Assistance Committee (DAC), by multilateral institutions, and by non-DAC countries to promote economic development and welfare in countries and territories in the DAC list of ODA recipients. It includes loans with a grant element of at least 25 percent (calculated at a rate of discount of 10 percent).
	Relevance:	The Aid Dependency component points out the countries that lack sustainability in development growth due to economic instability and humanitarian crisis.
	Validity / Limitation of indicator:	

INDICATOR NOTES	Unit of Measure:	Percentage			
	Indicator Creation Method:	The Net official development assistance (ODA) of the last year are divided by the GNI estimated by World Bank.			
	Additional notes:				
	Pre-processing:	Transformation:	--	Min:	0%
		Normalisation:	MIN-MAX	Max:	15%

SOURCE	Variable:	Net ODA received (% of GNI)
	Citation:	World Bank
	Date of publication:	20/12/2013
	Reference time:	2011
	Periodicity:	Annual
	URL:	http://data.worldbank.org/indicator/DT.ODA.ODAT.GN.ZS
	Data Type:	Tabular (Excel)
	Country coverage:	180/191 (94%)

FIGURES		
	Distribution:	Histogram of the raw indicator dataset
	Ranked data:	Ranking of the raw indicator dataset
	Correlation with InfoRM index:	Correlation between the raw indicator dataset and InfoRM index
	World map:	Normalized indicator divided in quartiles



	Dimension:	**Vulnerability**
	Category:	**Vulnerability Groups**
	Component:	**Uprooted people**

INDICATOR	Indicator:	**Total Persons of Concern (absolute)**
	InfoRM Code:	VU.VGR.UP.POC-ABS
	Long Name:	Total number of people in refugee-like situations by country of asylum, internal displaced peoples (IDPs), returned refugees.
	Description:	"Persons of concern" includes refugees, asylum-seekers, returnees, stateless persons and groups of internally displaced persons (IDPs).
	Relevance:	Refugees, internally displaced persons (IDPs) and returnees (those who returned the previous year are also taken into account) are among the most vulnerable people in a humanitarian crisis.
	Validity / Limitation of indicator:	It is difficult to find accurate data on the number of internally displaced persons (IDPs) in a country. In many countries estimates are not reliable, for reasons of state censorship and lack of access by independent observers and also because it is not always easy to distinguish IDPs from the local population, especially if they take shelter with relatives or friends.

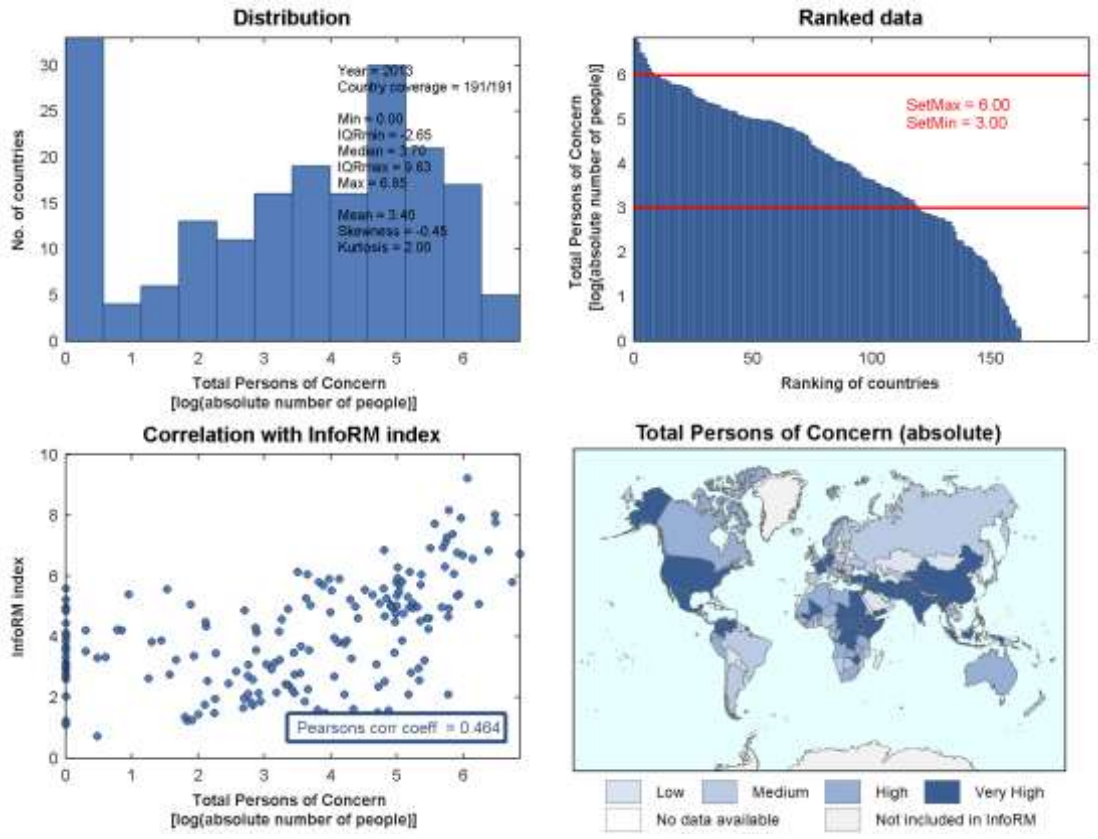
INDICATOR NOTES	Unit of Measure:	Number of persons of concern			
	Indicator Creation Method:	The total number of uprooted people is the sum of the highest figures from the selected sources for each uprooted group.			
	Additional notes:	For the ongoing crisis, real-time data are taken from the Operational Data Portals of UNHCR and UN-OCHA Situation Reports.			
	Pre-processing:	Transformation:	Log	Min:	3
		Normalisation:	MIN-MAX	Max:	6

SOURCE	Variable:	People in refugee-like situations by country of asylum, Number of IDPs, Returned refugees
	Citation:	Global Trends Report United Nations Refugee Agency, United Nations High Commission for Refugees (UNHCR)
	Date of publication:	01/06/2013
	Reference time:	2012
	Periodicity:	Annual (June)
	URL:	http://www.unhcr.org
	Data Type:	Tabular (Excel)
	Country coverage:	191/191 (100%)

SOURCE		
	Variable:	Total registered persons
	Citation:	United Nations Relief and Works Agency for Palestine Refugees in the Near East (UNRWA)
	Date of publication:	01/01/2013
	Reference time:	2012
	Periodicity:	Annual (January)
	URL:	http://www.unrwa.org/
	Data Type:	Tabular (pdf)
	Country coverage:	4/191 (2%)

SOURCE		
	Variable:	Number of Internal Displaced Persons (IDPs)
	Citation:	The Internal Displacement Monitoring Centre (IDMC)
	Date of publication:	20/12/2013
	Reference time:	2005-2013
	Periodicity:	Regularly updated
	URL:	http://www.internal-displacement.org/
	Data Type:	Tabular (html)
	Country coverage:	191/191 (100%)

FIGURES		
	Distribution:	Histogram of the raw indicator dataset
	Ranked data:	Ranking of the raw indicator dataset
	Correlation with InfoRM index:	Correlation between the raw indicator dataset and InfoRM index
	World map:	Normalized indicator divided in quartiles



	Dimension:	**Vulnerability**
	Category:	**Vulnerability Groups**
	Component:	**Uprooted people**

INDICATOR	Indicator:	**Total Persons of Concern (relative)**
	InfoRM Code:	VU.VGR.UP.POC-REL
	Long Name:	Total number of people in refugee-like situations by country of asylum, internal displaced peoples (IDPs), returned refugees (percentage of the total population).
	Description:	"Persons of concern" includes refugees, asylum-seekers, returnees, stateless persons and groups of internally displaced persons (IDPs).
	Relevance:	Refugees, internally displaced persons (IDPs) and returnees (those who returned the previous year are also taken into account) are among the most vulnerable people in a humanitarian crisis.
	Validity / Limitation of indicator:	It is difficult to find accurate data on the number of internally displaced persons (IDPs) in a country. In many countries estimates are not reliable, for reasons of state censorship and lack of access by independent observers and also because it is not always easy to distinguish IDPs from the local population, especially if they take shelter with relatives or friends.

INDICATOR NOTES	Unit of Measure:	Percentage of persons of concern per country			
	Indicator Creation Method:	The total number of uprooted people is the sum of the highest figures from the selected sources for each uprooted group. The result is divided by the total population of each country. The normalization has been applied to match the criteria used in the GVCA of ECHO:			
	Additional notes:	For the ongoing crisis, real-time data are taken from the Operational Data Portals of UNHCR and UN-OCHA Situation Reports.			
	Pre-processing:	Transformation:	--	Min:	0.005%
		Normalisation:	MIN-MAX	Max:	10%

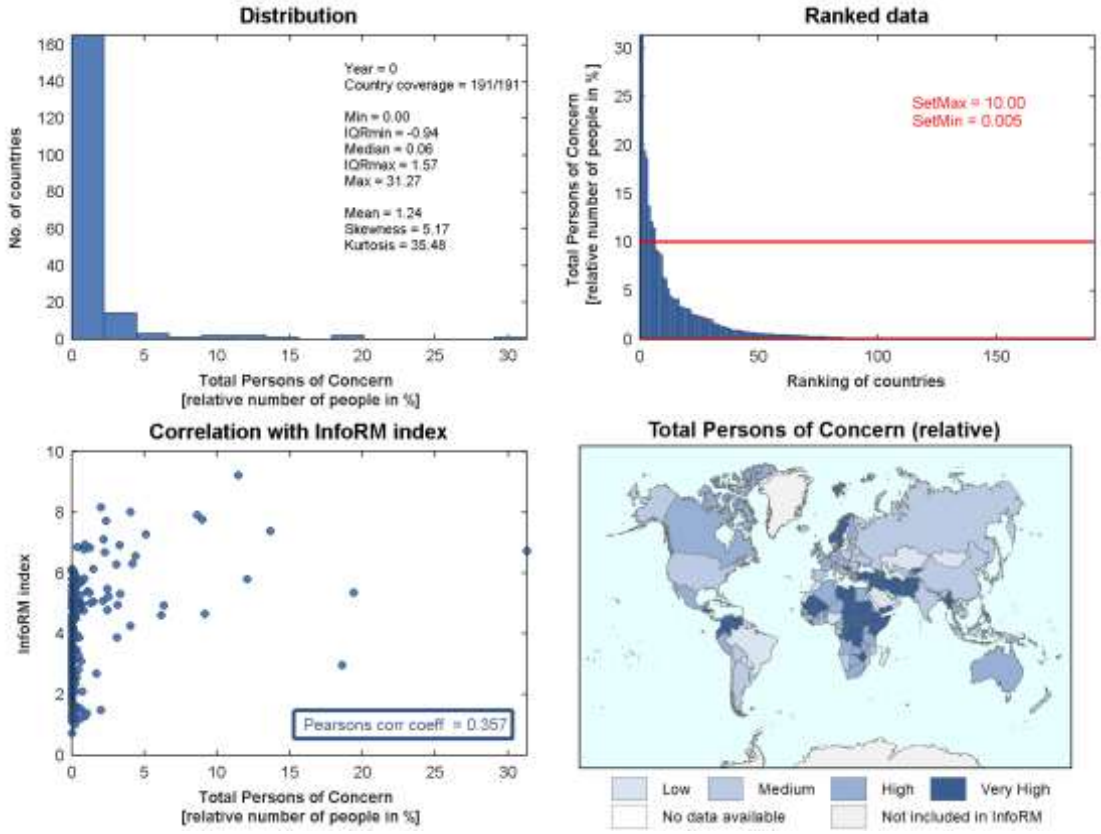
Score	% of total population	Level of Vulnerability
6	> 10%	high vulnerab.
5	> 3% AND < 10%	
4	> 1% AND < 3%	medium vulner.
3	> 0.5% AND < 1%	
2	> 0.1% AND < 0.5%	low vulnerab.
1	> 0.005% AND < 0.1%	
0	< 0.005%	no vulnerab.

SOURCE		
	Variable:	People in refugee-like situations by country of asylum, Number of IDPs, Returned refugees
	Citation:	Global Trends Report United Nations Refugee Agency, United Nations High Commission for Refugees (UNHCR)
	Date of publication:	01/06/2013
	Reference time:	2012
	Periodicity:	Annual (June)
	URL:	http://www.unhcr.org
	Data Type:	Tabular (Excel)
	Country coverage:	191/191 (100%)

SOURCE		
	Variable:	Total registered persons
	Citation:	United Nations Relief and Works Agency for Palestine Refugees in the Near East (UNRWA)
	Date of publication:	01/01/2013
	Reference time:	2012
	Periodicity:	Annual (January)
	URL:	http://www.unrwa.org/
	Data Type:	Tabular (pdf)
	Country coverage:	4/191 (2%)

SOURCE		
	Variable:	Number of Internal Displaced Persons (IDPs)
	Citation:	The Internal Displacement Monitoring Centre (IDMC)
	Date of publication:	20/12/2013
	Reference time:	2005-2013
	Periodicity:	Regularly updated
	URL:	http://www.internal-displacement.org/
	Data Type:	Tabular (html)
	Country coverage:	191/191 (100%)

FIGURES		
	Distribution:	Histogram of the raw indicator dataset
	Ranked data:	Ranking of the raw indicator dataset
	Correlation with InfoRM index:	Correlation between the raw indicator dataset and InfoRM index
	World map:	Normalized indicator divided in quartiles



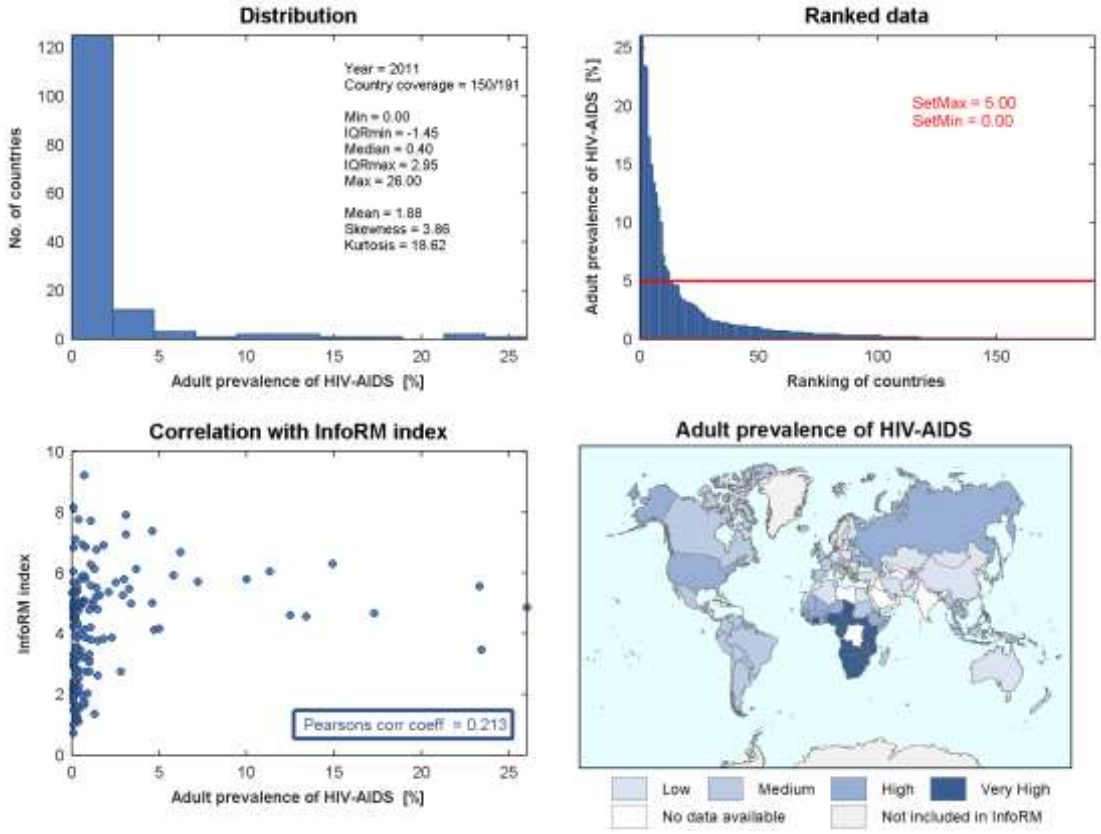
	Dimension:	**Vulnerability**
	Category:	**Vulnerable Groups**
	Component:	**Other Vulnerable Groups/Health conditions**

INDICATOR		
	Indicator:	**Adult Prevalence of HIV-AIDS**
	InfoRM Code:	VU.VGR.OG.HE.HIV
	Long Name:	HIV prevalence among adults aged 15-49 years (%)
	Description:	The estimated number of adults aged 15-49 years with HIV infection, whether or not they have developed symptoms of AIDS, expressed as per cent of total population in that age group.
	Relevance:	HIV-AIDS is considered as one of the three pandemics of low- and middle- income countries.
	Validity / Limitation of indicator:	Target 6.a of the Millenium development Goals is to "have halted by 2015 and begun to reverse the spread of HIV/AIDS". Indicator 6.1 is defined as "HIV prevalence among population aged 15-24 years".

INDICATOR NOTES					
	Unit of Measure:	Percentage			
	Indicator Creation Method:	The prevalence of HIV among the population 15-49 years old is measured as the number of individuals aged 15-49 living with HIV divided by the total population aged 15-49.			
	Additional notes:				
	Pre-processing:	Transformation:	--	Min:	0 %
		Normalisation:	MIN-MAX	Max:	5 %

SOURCE		
	Variable:	Estimated number of people living with HIV - Adult (>15) rate
	Citation:	WHO Global Health Observatory Data Repository
	Date of publication:	01/07/2013
	Reference time:	2011
	Periodicity:	Biennial (December)
	URL:	http://apps.who.int/ghodata
	Data Type:	Tabular (Excel)
	Country coverage:	150/191 (79%)

FIGURES	Distribution:	Histogram of the raw indicator dataset
	Ranked data:	Ranking of the raw indicator dataset
	Correlation with InfoRM index:	Correlation between the raw indicator dataset and InfoRM index
	World map:	Normalized indicator divided in quartiles



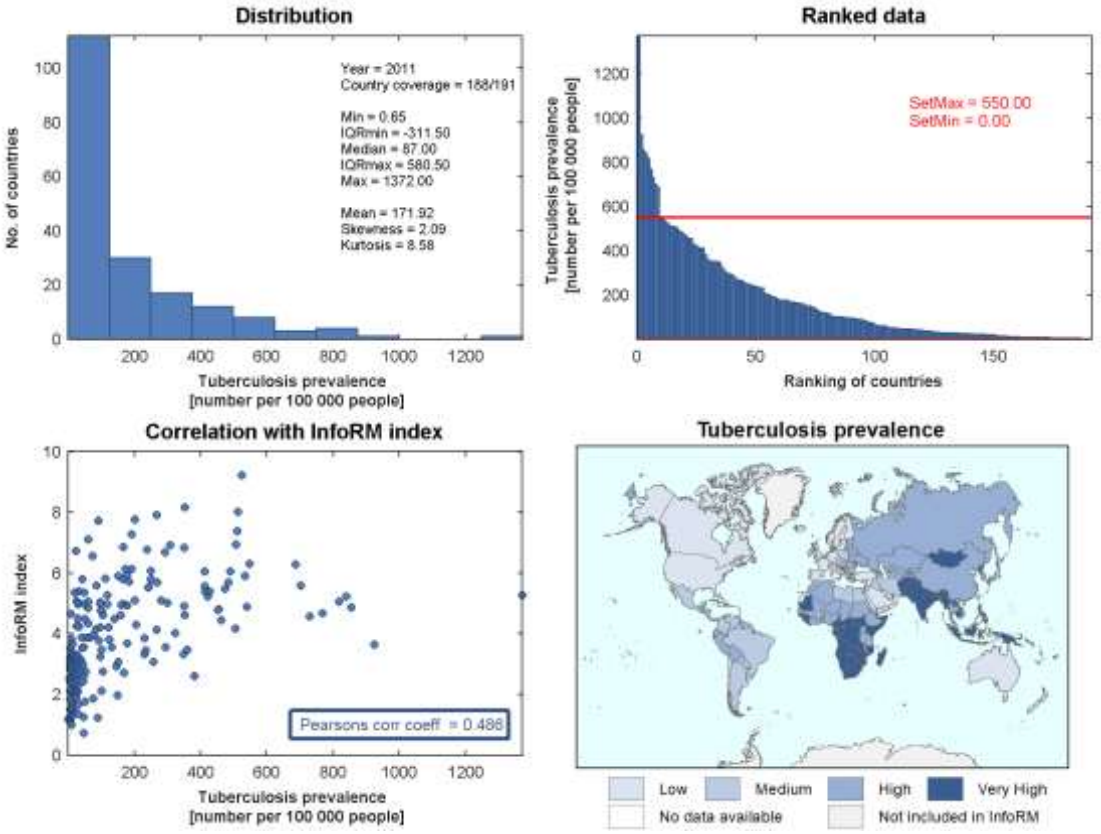
	Dimension:	**Vulnerability**
	Category:	**Vulnerable Groups**
	Component:	**Other Vulnerable Groups/Health conditions**

INDICATOR	Indicator:	**Tuberculosis Prevalence**
	InfoRM Code:	VU.VGR.OG.HE.TBC
	Long Name:	Estimated prevalence of tuberculosis (per 100 000 population)
	Description:	The number of cases of tuberculosis (all forms) in a population at a given point in time (the middle of the calendar year), expressed as the rate per 100 000 population. Estimates include cases of TB in people with HIV.
	Relevance:	Tuberculosis is considered as one of the three pandemics of low- and middle- income countries.
	Validity / Limitation of indicator:	Target 6.c of the Millennium development Goals is to "have halted by 2015 and begun to reverse the incidence of malaria and other major diseases". Indicator 6.9 is defined as "incidence, prevalence and death rates associated with TB".

INDICATOR NOTES	Unit of Measure:	Cases per 100,000 population			
	Indicator Creation Method:	Prevalence can be estimated in national population-based surveys. Where survey data are not available, estimates of prevalence are derived from estimates of incidence and the duration of disease.			
	Additional notes:				
	Pre-processing:	Transformation:	--	Min:	0
		Normalisation:	MIN-MAX	Max:	500

SOURCE	Variable:	Estimated prevalence of tuberculosis (per 100 000 population)
	Citation:	WHO Global Health Observatory Data Repository
	Date of publication:	20/12/2013
	Reference time:	2012
	Periodicity:	Annual (March)
	URL:	http://apps.who.int/ghodata
	Data Type:	Tabular (Excel)
	Country coverage:	188/191 (98%)

FIGURES	Distribution:	Histogram of the raw indicator dataset
	Ranked data:	Ranking of the raw indicator dataset
	Correlation with InfoRM index:	Correlation between the raw indicator dataset and InfoRM index
	World map:	Normalized indicator divided in quartiles



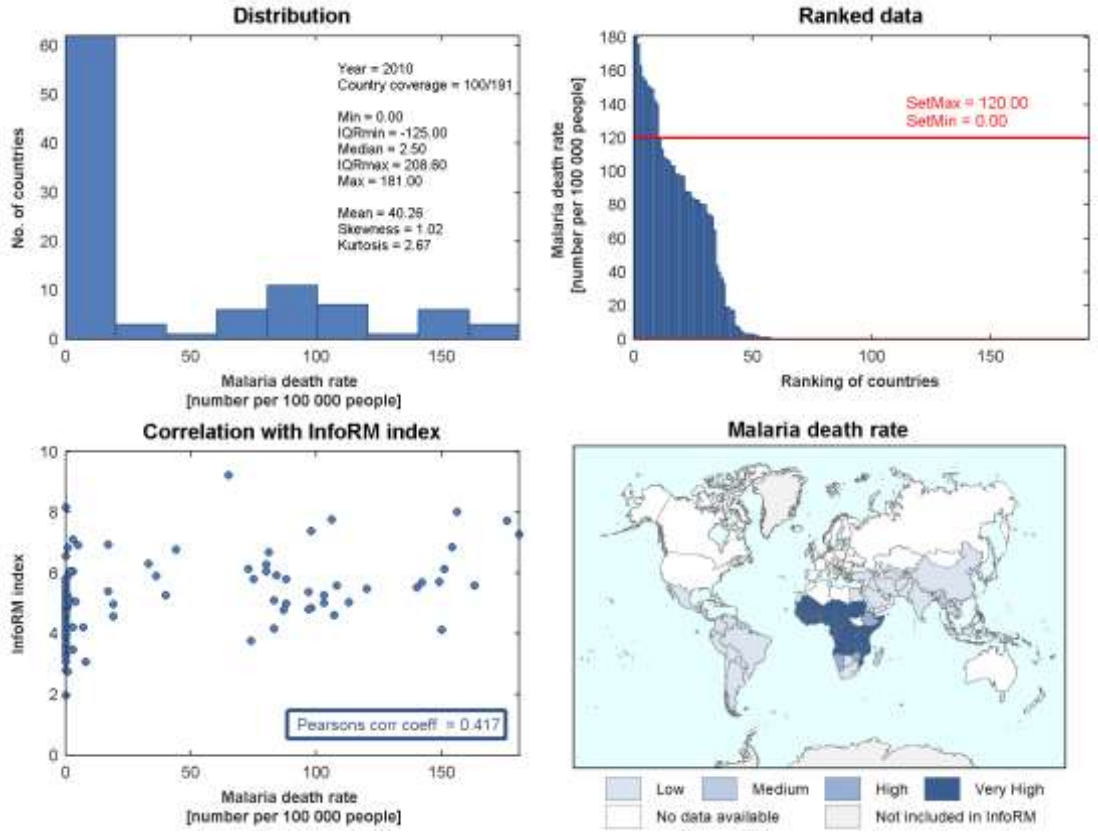
	Dimension:	**Vulnerability**
	Category:	**Vulnerable Groups**
	Component:	**Other Vulnerable Groups/Health conditions**

INDICATOR	Indicator:	**Malaria Mortality Rate**
	InfoRM Code:	VU.VGR.OG.HE.MAL
	Long Name:	Deaths due to malaria (per 100 000 population)
	Description:	The death rate associated with malaria is the number of deaths caused by malaria per 100,000 people per year.
	Relevance:	Malaria is considered as one of the three pandemics of low- and middle- income countries.
	Validity / Limitation of indicator:	Target 6.c of the Millenium development Goals is to "have halted by 2015 and begun to reverse the incidence of malaria and other major diseases". Indicator 6.6 is defined as "Incidence and death rates associated with malaria".

INDICATOR NOTES	Unit of Measure:	Number of deaths per 100,000 population			
	Indicator Creation Method:	The malaria death rate is expressed as the number of deaths due to malaria per 100,000 population per year with the population of a country derived from projections made by the UN Population Division.			
	Additional notes:	Information on the number of malaria cases, reporting completeness and case confirmation rates are compiled annually by the Ministries of Health (National Malaria Control Programs) from the administration of health services.			
	Pre-processing:	Transformation:	--	Min:	0
		Normalisation:	MIN-MAX	Max:	120

SOURCE	Variable:	Deaths due to malaria (per 100 000 population)
	Citation:	WHO Global Health Observatory Data Repository
	Date of publication:	15/07/2013
	Reference time:	2010
	Periodicity:	Annual (December)
	URL:	http://apps.who.int/ghodata
	Data Type:	Tabular (Excel)
	Country coverage:	100/191 (52%)

FIGURES		
	Distribution:	Histogram of the raw indicator dataset
	Ranked data:	Ranking of the raw indicator dataset
	Correlation with InfoRM index:	Correlation between the raw indicator dataset and InfoRM index
	World map:	Normalized indicator divided in quartiles



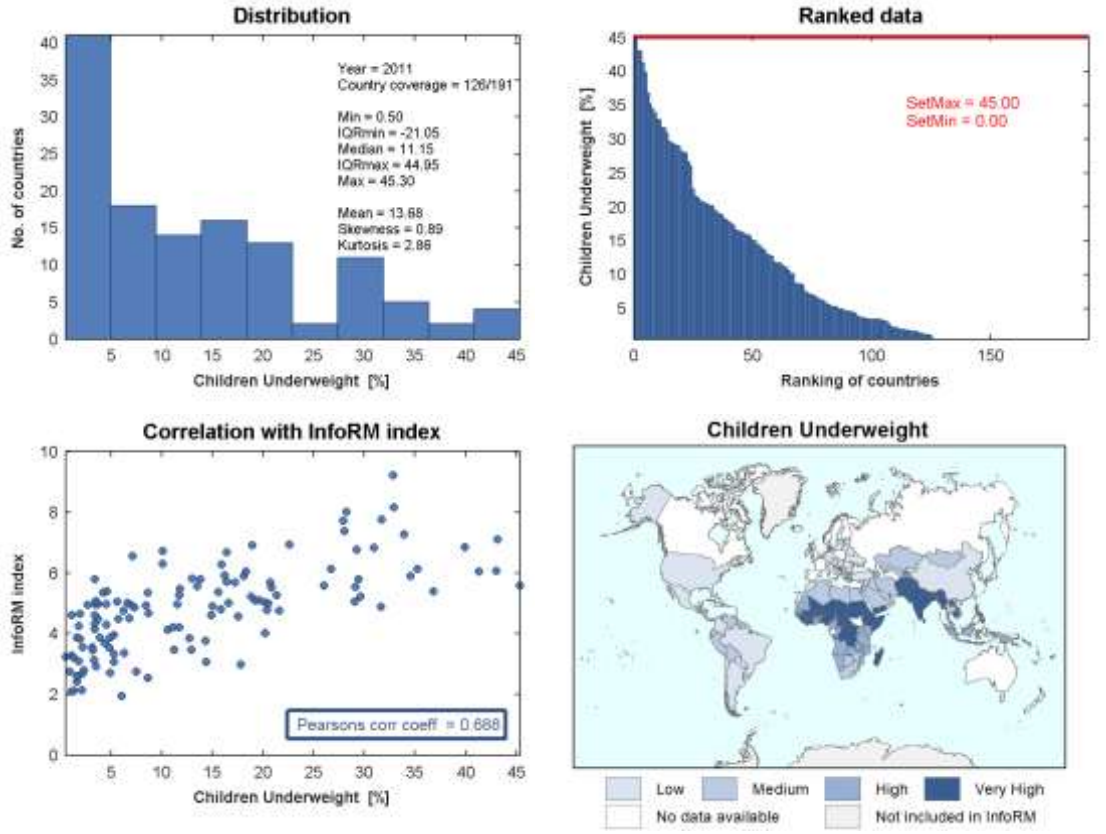
	Dimension:	**Vulnerability**
	Category:	**Vulnerable Groups**
	Component:	**Other Vulnerable Groups/Children under-five**

INDICATOR	Indicator:	**Children Underweight**
	InfoRM Code:	VU.VGR.OG.U5.UW
	Long Name:	Percentage of underweight (weight-for-age less than -2 standard deviations of the WHO Child Growth Standards median) among children aged 0-5 years.
	Description:	This indicator shows the ratio between weight and age of children under five.
	Relevance:	The Health Condition of Children Under Five component is referred to with two indicators, malnutrition and mortality of children under 5. Malnutrition of children under 5 extract the group of children that are in a weak health condition mainly due to hunger.
	Validity / Limitation of indicator:	Although the weight/height ratio indicating acute malnutrition (wasting) is a better indicator for emergency situations and the weight/age ratio does not distinguish between acute malnutrition (wasting) and chronic malnutrition (stunting), it was nevertheless decided to use the weight/age ratio in the Vulnerability component of InfoRM for two reasons: the weight/height ratio figures are not collected systematically for all countries, and by their very nature they rapidly become obsolete. (DG-ECHO GNA Methodology: http://ec.europa.eu/echo/files/policies/strategy/methodology_2011_2012.pdf) Children Underweight is an MDG indicator (MDG 4).

INDICATOR NOTES	Unit of Measure:	Percentage			
	Indicator Creation Method:	Percentage of children aged < 5 years underweight for age = (Number of children aged 0-5 years that fall below minus two standard deviations from the median weight-for-age of the WHO Child Growth Standards / Total number of children aged 0-5 years that were measured) * 100.			
	Additional notes:				
	Pre-processing:	Transformation:	--	Min:	0%
		Normalisation:	MIN-MAX	Max:	45%

SOURCE	Variable:	Children aged <5 years underweight (%)
	Citation:	WHO Global Health Observatory Data Repository
	Date of publication:	20/12/2013
	Reference time:	2011
	Periodicity:	Annual
	URL:	http://apps.who.int/ghodata
	Data Type:	Tabular (Excel)
	Country coverage:	126/191 (66%)

FIGURES		
	Distribution:	Histogram of the raw indicator dataset
	Ranked data:	Ranking of the raw indicator dataset
	Correlation with InfoRM index:	Correlation between the raw indicator dataset and InfoRM index
	World map:	Normalized indicator divided in quartiles



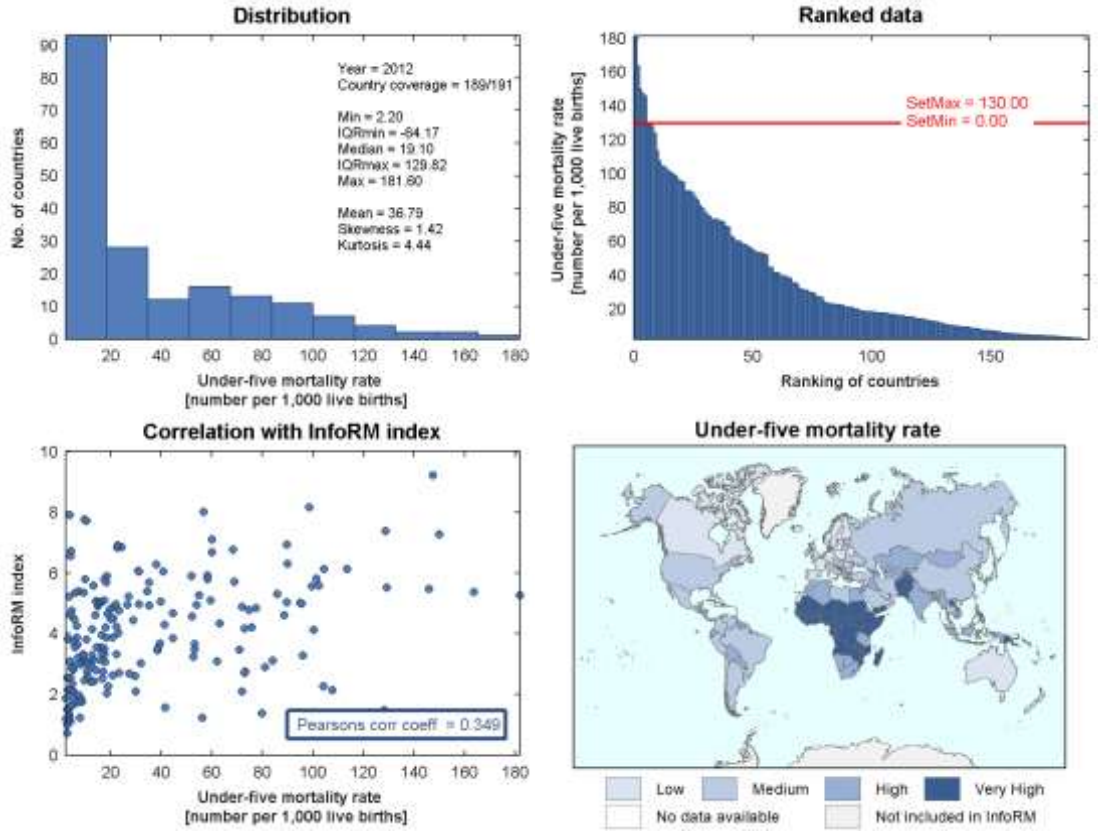
	Dimension:	**Vulnerability**
	Category:	**Vulnerable Groups**
	Component:	**Other Vulnerable Groups/Children under-five**

INDICATOR	Indicator:	**Under-five Mortality Rate**
	InfoRM Code:	VU.VGR.OG.U5.CM
	Long Name:	Mortality rate, under-5 (per 1,000 live births).
	Description:	This indicator shows the probability of death between birth and the end of the fifth year per 1000 live births.
	Relevance:	The Health Condition of Children Under Five component is referred to with two indicators, malnutrition and mortality of children under 5. The mortality of children under 5 shows general health condition of the children.
	Validity / Limitation of indicator:	Because data on the incidences and prevalence of diseases (morbidity data) frequently are unavailable, mortality rates are often used to identify vulnerable populations. Under-five mortality rate is an MDG indicator (MDG 4).

INDICATOR NOTES	Unit of Measure:	Deaths per 1000 live births			
	Indicator Creation Method:	The global estimation of child mortality has been obtained using a Bayesian B-spline bias-reduction model. The model is able to flexibly capture changes in U5MR over time, gives point estimates and credible intervals that reflect potential biases in data series and performs reasonably well in out-of-sample validation exercises.			
	Additional notes:				
	Pre-processing:	Transformation:	--	Min:	0
		Normalisation:	MIN-MAX	Max:	130

SOURCE	Variable:	Mortality rate, under-5 (per 1,000 live births)
	Citation:	UN Inter-agency Group for Child Mortality Estimation (UNICEF, WHO, World Bank, UN DESA Population Division)
	Date of publication:	13/09/2013
	Reference time:	2012
	Periodicity:	Annual
	URL:	www.childmortality.org
	Data Type:	Tabular (Excel)
	Country coverage:	189/191 (99%)

FIGURES	Distribution:	Histogram of the raw indicator dataset
	Ranked data:	Ranking of the raw indicator dataset
	Correlation with InfoRM index:	Correlation between the raw indicator dataset and InfoRM index
	World map:	Normalized indicator divided in quartiles



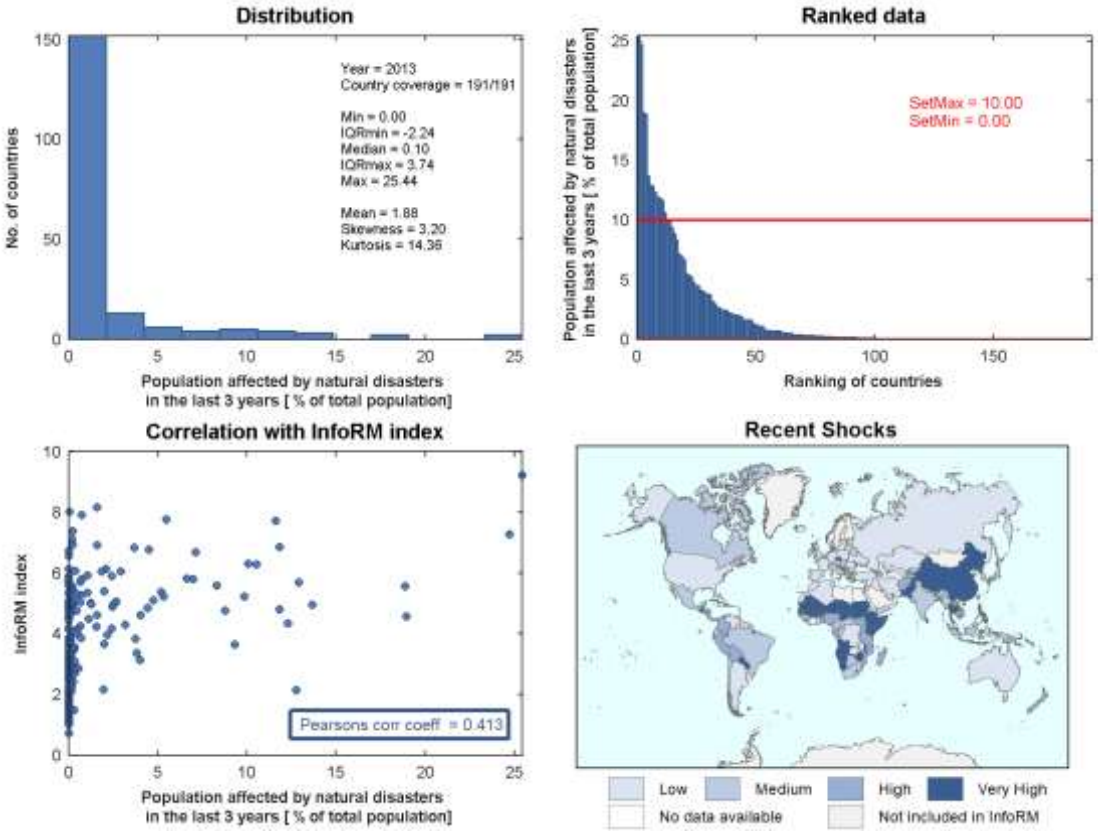
	Dimension:	**Vulnerability**
	Category:	**Vulnerable Groups**
	Component:	**Other Vulnerable Groups/Recent Shocks**

INDICATOR	Indicator:	**Population affected by natural disasters in the last 3 years**
	InfoRM Code:	VU.VGR.OG.NATDIS-REL
	Long Name:	Percentage of population affected by natural disasters in the last 12, 24, 36 months
	Description:	To account for increased vulnerability during the recovery period after a disaster, people affected by recent shocks in the past 3 years are considered. 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.
	Relevance:	The population affected by recent natural disasters are considered more vulnerable than the rest of the population. The indicator identify the countries that are recovering from humanitarian crisis situation.
	Validity / Limitation of indicator:	Although CRED recognises that the figures for people affected are not entirely reliable, since the definition leaves room for interpretation, it is nevertheless better to use this figure rather than the number of people killed, because it is the survivors who require emergency aid.

INDICATOR NOTES	Unit of Measure:	Percentage			
	Indicator Creation Method:	The affected population over the last 36 months are summed and then divided by the total population of the country. 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.			
	Additional notes:				
	Pre-processing:	Transformation:	--	Min:	0%
		Normalisation:	MIN-MAX	Max:	10%

SOURCE	Variable:	Population affected by natural disasters in the last 3 years
	Citation:	EM-DAT, CRED
	Date of publication:	31/12/2013
	Reference time:	2011-2013
	Periodicity:	Every 3 months
	URL:	http://www.emdat.be/
	Data Type:	Tabular (csv)
	Country coverage:	191/191 (100%)

FIGURES		
	Distribution:	Histogram of the raw indicator dataset
	Ranked data:	Ranking of the raw indicator dataset
	Correlation with InfoRM index:	Correlation between the raw indicator dataset and InfoRM index
	World map:	Normalized indicator divided in quartiles



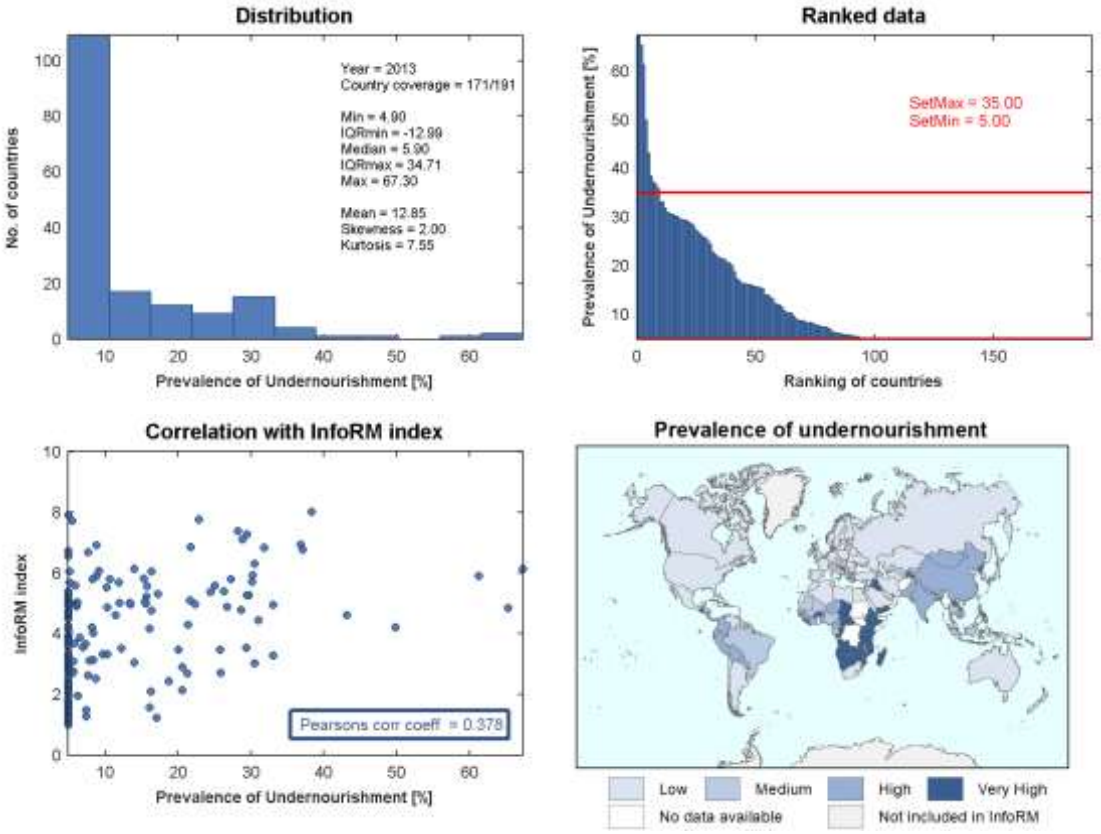
	Dimension:	**Vulnerability**
	Category:	**Vulnerable Groups**
	Component:	**Other Vulnerable Groups/Food Security – Malnutrition**

INDICATOR	Indicator:	**Prevalence of Undernourishment**
	InfoRM Code:	VU.VGR.OG.FS.MA.PU
	Long Name:	Prevalence of undernourishment (% of population)
	Description:	The Prevalence of Undernourishment expresses the probability that a randomly selected individual from the population consumes an amount of calories that is insufficient to cover her/his energy requirement for an active and healthy life.
	Relevance:	The malnutrition component concerns the actual quality and type of food supplied to provide the nutritional balance necessary for healthy and active life. It captures trends in chronic hunger.
	Validity / Limitation of indicator:	This is the traditional FAO hunger indicator, adopted as official Millennium Development Goal indicator for Goal 1, Target 1.9.

INDICATOR NOTES	Unit of Measure:	Percentage			
	Indicator Creation Method:	The indicator is computed by comparing a probability distribution of habitual daily Dietary Energy Consumption with a threshold level called the Minimum Dietary Energy Requirement. Both are based on the notion of an average individual in the reference population.			
	Additional notes:	The indicator is calculated on 3 year averages.			
	Pre-processing:	Transformation:	--	Min:	5%
		Normalisation:	MIN-MAX	Max:	35%

SOURCE	Variable:	Prevalence of undernourishment
	Citation:	ESS calculations, FAO
	Date of publication:	20/12/2013
	Reference time:	2011-2013
	Periodicity:	Annual
	URL:	http://www.fao.org/economic/ess/ess-fs/ess-fadata/en/
	Data Type:	Tabular (Excel)
	Country coverage:	171/191 (90%)

FIGURES		
	Distribution:	Histogram of the raw indicator dataset
	Ranked data:	Ranking of the raw indicator dataset
	Correlation with InfoRM index:	Correlation between the raw indicator dataset and InfoRM index
	World map:	Normalized indicator divided in quartiles



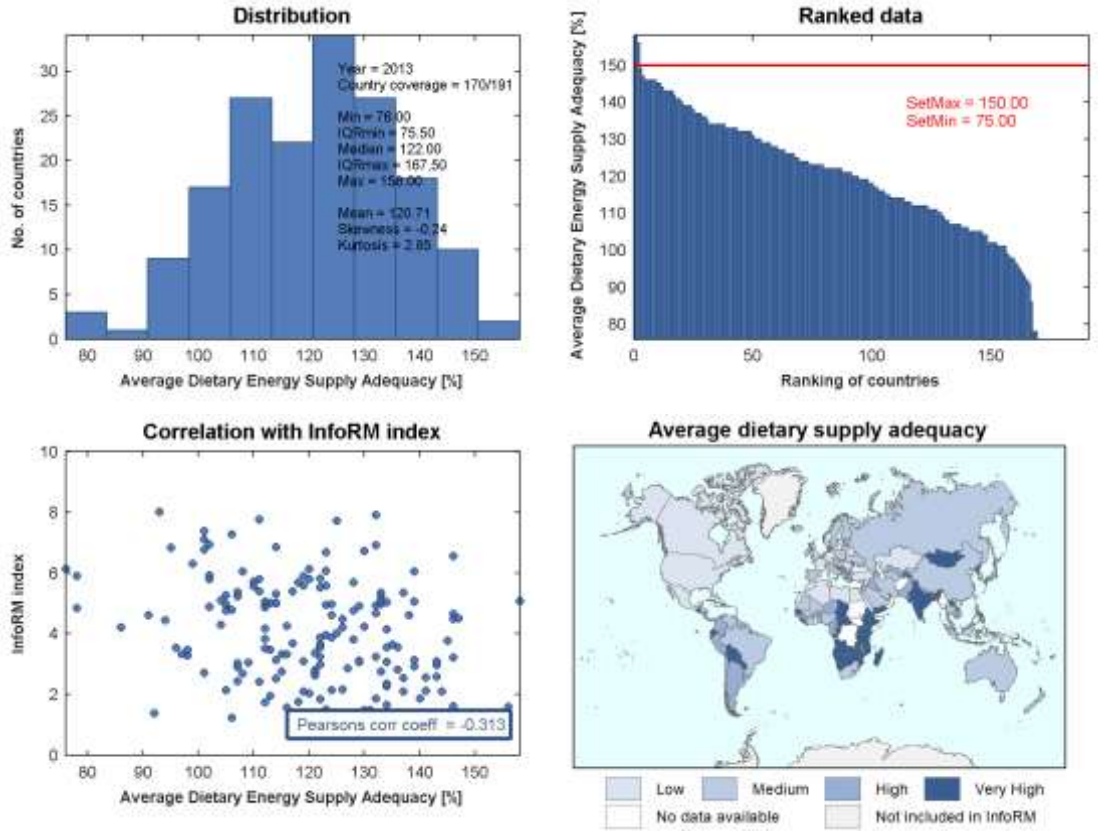
	Dimension:	**Vulnerability**
	Category:	**Vulnerable Groups**
	Component:	**Other Vulnerable Groups/Food Security – Malnutrition**

INDICATOR	Indicator:	**Average Dietary Supply Adequacy**
	InfoRM Code:	VU.VGR.OG.FS.MA.ADSA
	Long Name:	Average dietary supply adequacy
	Description:	Average dietary energy supply as a percentage of the average dietary energy requirement.
	Relevance:	The malnutrition component concerns the actual quality and type of food supplied to provide the nutritional balance necessary for healthy and active life. It captures trends in chronic hunger.
	Validity / Limitation of indicator:	Analysed together with the prevalence of undernourishment, it allows discerning whether undernourishment is mainly due to insufficiency of the food supply or to particularly bad distribution.

INDICATOR NOTES	Unit of Measure:	Percentage			
	Indicator Creation Method:	The indicator expresses the Dietary Energy Supply (DES) as a percentage of the Average Dietary Energy Requirement (ADER) in each country. Each country's or region's average supply of calories for food consumption is normalized by the average dietary energy requirement estimated for its population, to provide an index of adequacy of the food supply in terms of calories.			
	Additional notes:	The indicator is calculated as an average over 3 years to reduce the impact of possible errors in estimated DES, due to the difficulties in properly accounting of stock variations in major food. It thus provides an indicator of structural food supply adequacy.			
	Pre-processing:	Transformation:	--	Min:	75%
		Normalisation:	MAX-MIN	Max:	150%

SOURCE	Variable:	Average dietary supply adequacy
	Citation:	FAOSTAT and ESS calculations, FAO
	Date of publication:	20/12/2013
	Reference time:	2011-2013
	Periodicity:	Annual
	URL:	http://www.fao.org/economic/ess/ess-fs/ess-fadata/en/
	Data Type:	Tabular (Excel)
	Country coverage:	170/191 (89%)

FIGURES		
	Distribution:	Histogram of the raw indicator dataset
	Ranked data:	Ranking of the raw indicator dataset
	Correlation with InfoRM index:	Correlation between the raw indicator dataset and InfoRM index
	World map:	Normalized indicator divided in quartiles



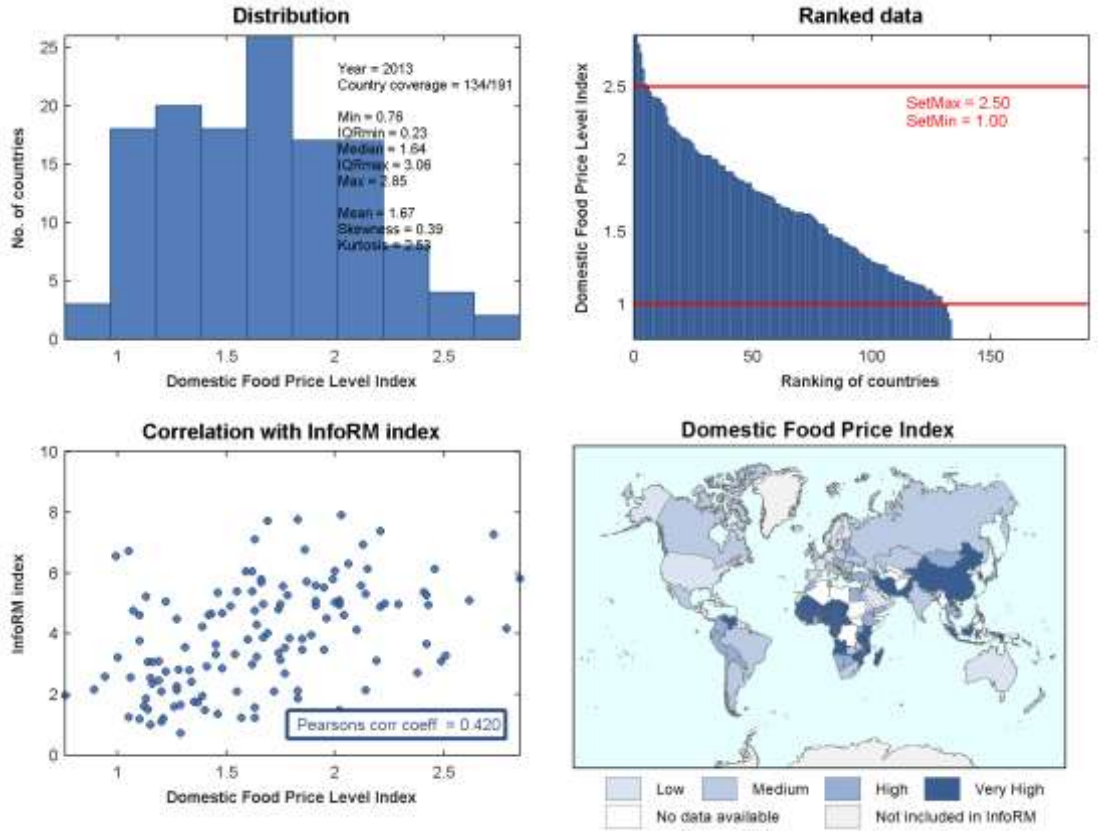
	Dimension:	**Vulnerability**
	Category:	**Vulnerable Groups**
	Component:	**Other Vulnerable Groups/Food Security – Food access**

INDICATOR	Indicator:	**Domestic Food Price Index**
	InfoRM Code:	VU.VGR.OG.FS.FA.DFPLI
	Long Name:	Domestic Food Price Index
	Description:	A measure of the monthly change in international prices of a basket of food commodities.
	Relevance:	Domestic Food Price Index refers to the economic aspect of the Food Access component.
	Validity / Limitation of indicator:	The indicator does not consider differences in shares of food expenditures over total expenditure across countries.

INDICATOR NOTES	Unit of Measure:	Index			
	Indicator Creation Method:	The Domestic Food Price Level Index is calculated by dividing the Food Purchasing Power Parity (FPPP) by the General PPP, thus providing an index of the price of food in the country relative to the price of the generic consumption basket. Data are available for 2005 from the ICP Program. It is then extended to other years by adjusting both numerator and denominator using the relative changes in Food CPI and General CPI as provided by ILO.			
	Additional notes:				
	Pre-processing:	Transformation:	--	Min:	1
		Normalisation:	MIN-MAX	Max:	2.5

SOURCE	Variable:	Domestic Food Price Level Index
	Citation:	FAO elaboration of data provided by ILO and the World Bank ICP (International Comparison Project)
	Date of publication:	20/12/2013
	Reference time:	2013
	Periodicity:	Annual
	URL:	http://www.fao.org/economic/ess/ess-fs/ess-fadata/en/
	Data Type:	Tabular (Excel)
	Country coverage:	134/191 (70%)

FIGURES		
	Distribution:	Histogram of the raw indicator dataset
	Ranked data:	Ranking of the raw indicator dataset
	Correlation with InfoRM index:	Correlation between the raw indicator dataset and InfoRM index
	World map:	Normalized indicator divided in quartiles



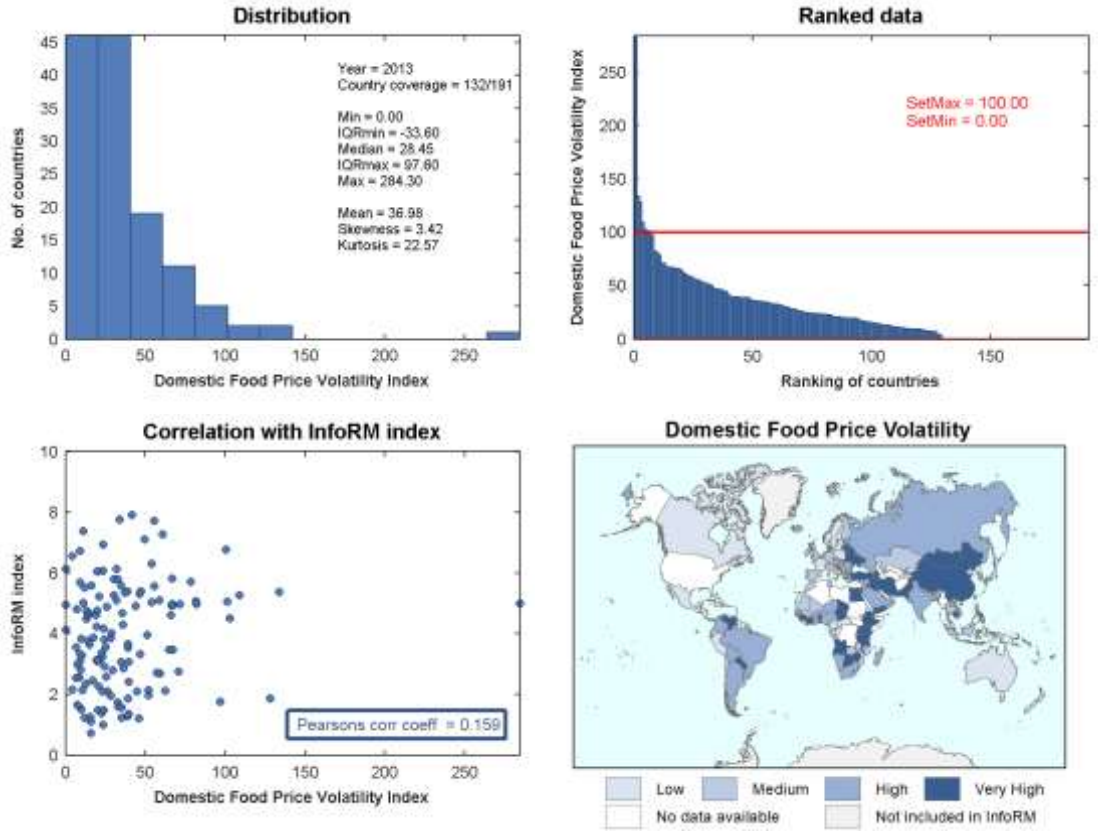
	Dimension:	**Vulnerability**
	Category:	**Vulnerable Groups**
	Component:	**Other Vulnerable Groups/Food Security – Food access**

INDICATOR	Indicator:	**Domestic Food Price Volatility**
	InfoRM Code:	VU.VGR.OG.FS.FA.DFPVI
	Long Name:	Domestic Food Price Volatility
	Description:	The Domestic Food Price Volatility compares the variations of the Domestic Food Price Index across countries and time.
	Relevance:	Domestic Food Price Volatility refers to the price stability aspect of the Food Access component.
	Validity / Limitation of indicator:	

INDICATOR NOTES	Unit of Measure:	Index			
	Indicator Creation Method:	The Domestic Food Price Volatility is a measure of variation of the Domestic Food Price Level Index. It has been computed as the Standard Deviation (SD) of the deviations from the trend over the previous five years.			
	Additional notes:				
	Pre-processing:	Transformation:	--	Min:	0
		Normalisation:	MIN-MAX	Max:	100

SOURCE	Variable:	Domestic Food Price Volatility
	Citation:	FAO elaboration of the Domestic Food Price Index. Data to compute the Domestic Food Price Index were provided by ILO and World Bank ICP (International Comparison Project)
	Date of publication:	20/12/2013
	Reference time:	2013
	Periodicity:	Annual
	URL:	http://www.fao.org/economic/ess/ess-fs/ess-fadata/en/
	Data Type:	Tabular (Excel)
	Country coverage:	132/191 (69%)

FIGURES		
	Distribution:	Histogram of the raw indicator dataset
	Ranked data:	Ranking of the raw indicator dataset
	Correlation with InfoRM index:	Correlation between the raw indicator dataset and InfoRM index
	World map:	Normalized indicator divided in quartiles



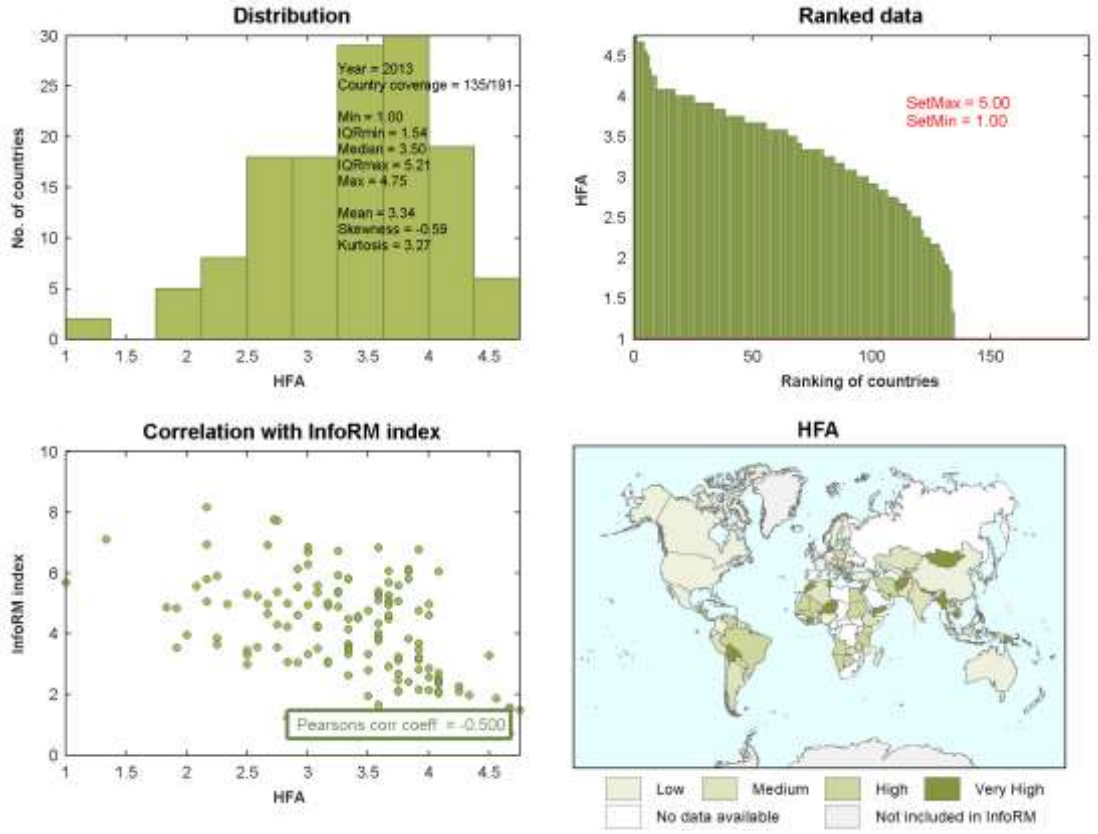
	Dimension:	**Lack of Coping Capacity**
	Category:	**Institutional**
	Component:	**Disaster Risk Reduction**

INDICATOR	Indicator:	**HFA**
	InfoRM Code:	CC.INS.DRR
	Long Name:	Hyogo Framework for Action scores
	Description:	The indicator for the Disaster Risk Reduction (DRR) activity in the country comes from the score of Hyogo Framework for Action self-assessment progress reports of the countries. HFA progress reports assess strategic priorities in the implementation of disaster risk reduction actions and establish baselines on levels of progress achieved in implementing the HFA's five priorities for action.
	Relevance:	The indicator quantifies the level of implementation of DRR activity.
	Validity / Limitation of indicator:	Self-evaluation has a risk of being perceived as a process of presenting inflated grades and being unreliable.

INDICATOR NOTES	Unit of Measure:	Index [1-5]			
	Indicator Creation Method:	For each of the 5 priority actions, the average of the scores of the underlying Indicators has been calculated. The final score is the average of the 5 priority action scores.			
	Additional notes:	We considered the latest national progress report available for each country.			
	Pre-processing:	Transformation:	--	Min:	1
		Normalisation:	MAX-MIN	Max:	5

SOURCE	Variable:	Hyogo Framework for Action Progress Reports
	Citation:	UNISDR
	Date of publication:	1/4/2013
	Reference time:	2007-2013
	Periodicity:	Biennial
	URL:	http://www.preventionweb.net/english/hyogo/progress/
	Data Type:	Taabular (Excel)
	Country coverage:	135/191 (71%)

FIGURES		
	Distribution:	Histogram of the raw indicator dataset
	Ranked data:	Ranking of the raw indicator dataset
	Correlation with InfoRM index:	Correlation between the raw indicator dataset and InfoRM index
	World map:	Normalized indicator divided in quartiles



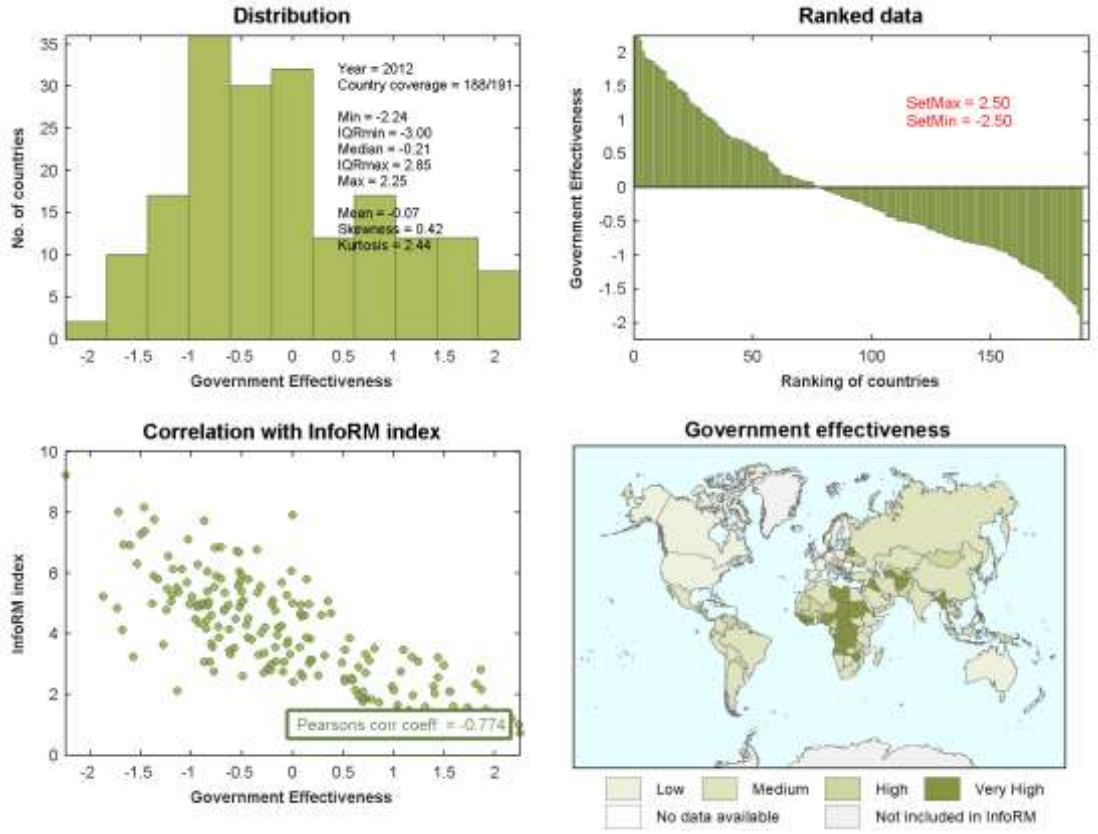
	Dimension:	**Lack of Coping Capacity**
	Category:	**Institutional**
	Component:	**Governance**

INDICATOR	Indicator:	**Government Effectiveness**
	InfoRM Code:	CC.INS.GOV.GE
	Long Name:	Government effectiveness
	Description:	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.
	Relevance:	The indicator shows the effectiveness of the governments' effort for building resilience across all sectors of society.
	Validity / Limitation of indicator:	

INDICATOR NOTES	Unit of Measure:	Index [-2.5/2.5]			
	Indicator Creation Method:	The WGI are composite governance indicators based on 31 underlying data sources. These data sources are rescaled and combined to create the six aggregate indicators using a statistical methodology known as an unobserved components model.			
	Additional notes:				
	Pre-processing:	Transformation:	--	Min:	-2.5
		Normalisation:	MAX-MIN	Max:	2.5

SOURCE	Variable:	Government effectiveness
	Citation:	Worldwide Governance Indicators World Bank
	Date of publication:	2013
	Reference time:	2012
	Periodicity:	Annual
	URL:	http://info.worldbank.org/governance/wgi/index.asp
	Data Type:	Tabular (Excel)
	Country coverage:	188/191 (98%)

FIGURES		
	Distribution:	Histogram of the raw indicator dataset
	Ranked data:	Ranking of the raw indicator dataset
	Correlation with InfoRM index:	Correlation between the raw indicator dataset and InfoRM index
	World map:	Normalized indicator divided in quartiles



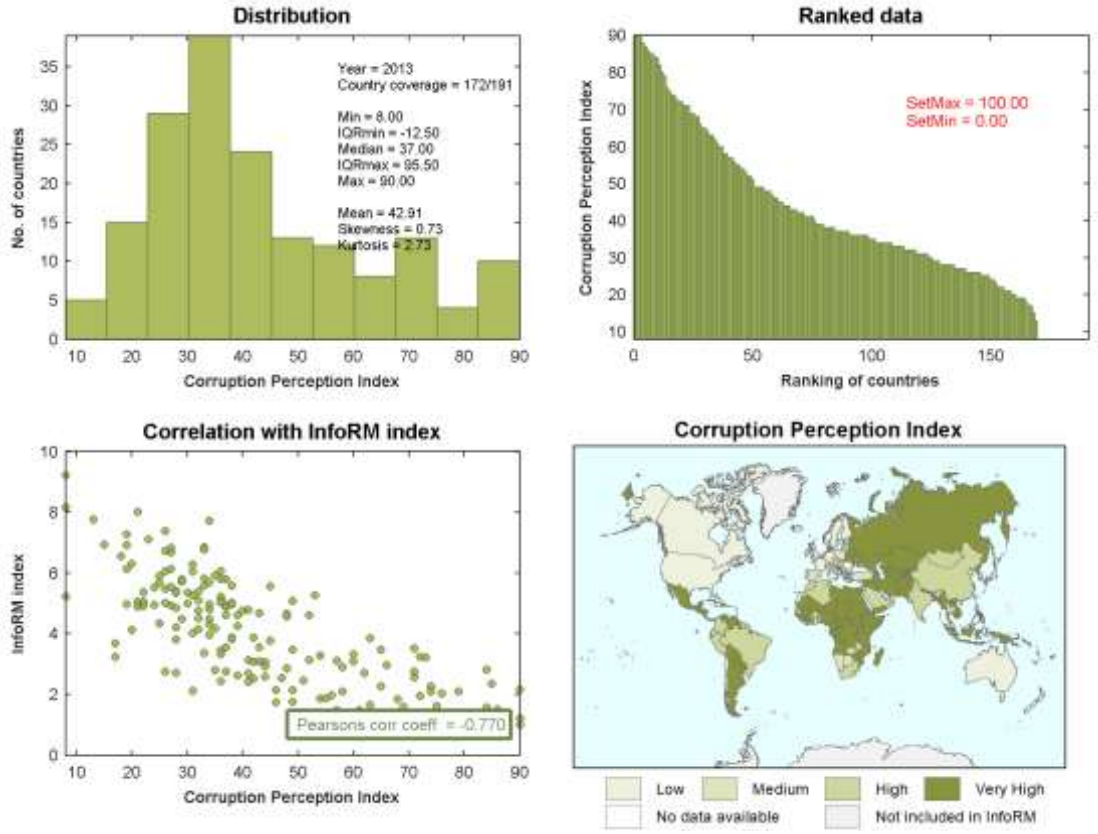
	Dimension:	**Lack of Coping Capacity**
	Category:	**Institutional**
	Component:	**Governance**

INDICATOR	Indicator:	**Corruption Perception Index**
	InfoRM Code:	CC.INS.GOV.CPI
	Long Name:	Corruption Perception Index CPI
	Description:	The CPI scores and ranks countries based on how corrupt a country's public sector is perceived to be. It is a composite index, a combination of surveys and assessments of corruption, collected by a variety of reputable institutions.
	Relevance:	The indicator captures 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.
	Validity / Limitation of indicator:	

INDICATOR NOTES	Unit of Measure:	Index [0/100]			
	Indicator Creation Method:	The methodology follows 4 basic steps: selection of source data, rescaling source data, aggregating the rescaled data and then reporting a measure for uncertainty.			
	Additional notes:	Scale from 0 (highly corrupt) to 100 (very clean)			
	Pre-processing:	Transformation:	--	Min:	0
		Normalisation:	MAX-MIN	Max:	100

SOURCE	Variable:	Corruption Perception Index CPI
	Citation:	Transparency International
	Date of publication:	3/12/2013
	Reference time:	2013
	Periodicity:	Annual (December)
	URL:	http://www.transparency.org/research/cpi/
	Data Type:	Tabular (Excel)
	Country coverage:	172/191 (90%)

FIGURES		
	Distribution:	Histogram of the raw indicator dataset
	Ranked data:	Ranking of the raw indicator dataset
	Correlation with InfoRM index:	Correlation between the raw indicator dataset and InfoRM index
	World map:	Normalized indicator divided in quartiles



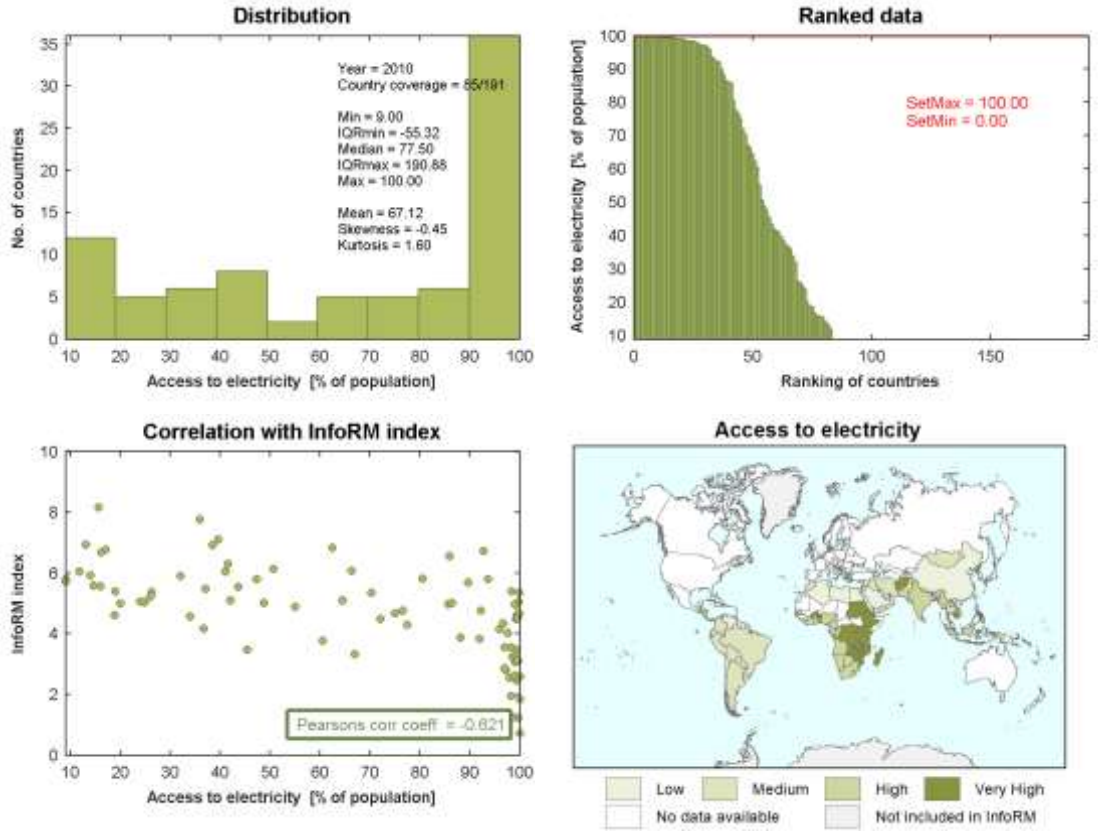
	Dimension:	**Lack of Coping Capacity**
	Category:	**Infrastructure**
	Component:	**Communication**

INDICATOR	Indicator:	**Access to Electricity**
	InfoRM Code:	CC.INF.COM.ELACCS
	Long Name:	Access to electricity (% of population)
	Description:	Access to electricity is the percentage of population with access to electricity. Electrification data are collected from industry, national surveys and international sources.
	Relevance:	The communication component aims to measure 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.
	Validity / Limitation of indicator:	

INDICATOR NOTES	Unit of Measure:	Percentage			
	Indicator Creation Method:	Data on access to electricity are collected by the IEA from industry, national surveys, and international sources.			
	Additional notes:	Where country data appeared contradictory, outdated or unreliable, the IEA Secretariat made estimates based on cross-country comparisons and earlier surveys.			
	Pre-processing:	Transformation:	--	Min:	0%
		Normalisation:	MAX-MIN	Max:	100%

SOURCE	Variable:	Access to electricity (% of population)
	Citation:	World Bank based on International Energy Agency, World Energy Outlook
	Date of publication:	21/12/2013
	Reference time:	2010
	Periodicity:	Annual
	URL:	http://data.worldbank.org/indicator/EG.ELC.ACCS.ZS
	Data Type:	Tabular (Excel)
	Country coverage:	85/191 (45%)

FIGURES		
	Distribution:	Histogram of the raw indicator dataset
	Ranked data:	Ranking of the raw indicator dataset
	Correlation with InfoRM index:	Correlation between the raw indicator dataset and InfoRM index
	World map:	Normalized indicator divided in quartiles



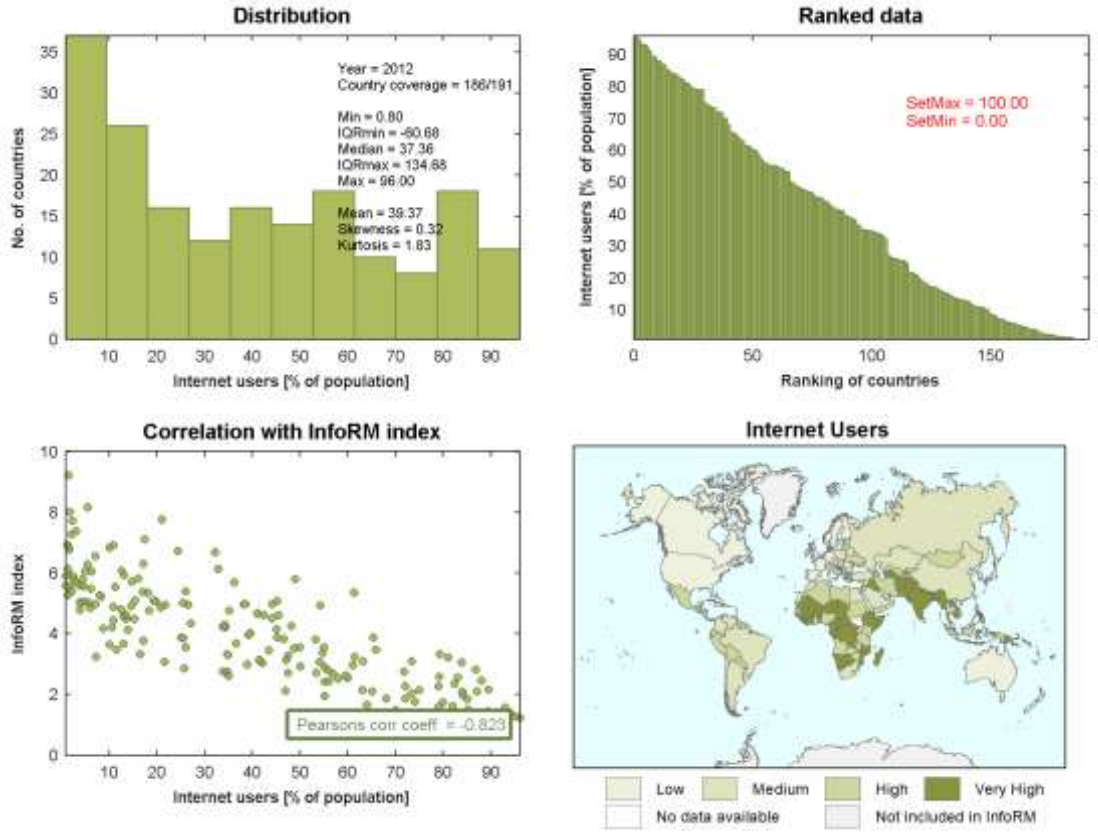
	Dimension:	**Lack of Coping Capacity**
	Category:	**Infrastructure**
	Component:	**Communication**

INDICATOR	Indicator:	**Internet Users**
	InfoRM Code:	CC.INF.COM.NETUS
	Long Name:	Internet Users (per 100 people)
	Description:	Internet users are people with access to the worldwide network.
	Relevance:	The communication component aims to measure 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.
	Validity / Limitation of indicator:	

INDICATOR NOTES	Unit of Measure:	Number of users per 100 people			
	Indicator Creation Method:				
	Additional notes:				
	Pre-processing:	Transformation:	--	Min:	0
		Normalisation:	MAX-MIN	Max:	1 0 0

SOURCE	Variable:	Internet Users (per 100 people)
	Citation:	World Bank based on International Telecommunication Union, World Telecommunication/ICT Development Report and database, and World Bank estimates.
	Date of publication:	21/12/2013
	Reference time:	2012
	Periodicity:	Annual
	URL:	http://data.worldbank.org/indicator/IT.NET.USER.P2
	Data Type:	Tabular (Excel)
	Country coverage:	186/191 (97%)

FIGURES		
	Distribution:	Histogram of the raw indicator dataset
	Ranked data:	Ranking of the raw indicator dataset
	Correlation with InfoRM index:	Correlation between the raw indicator dataset and InfoRM index
	World map:	Normalized indicator divided in quartiles



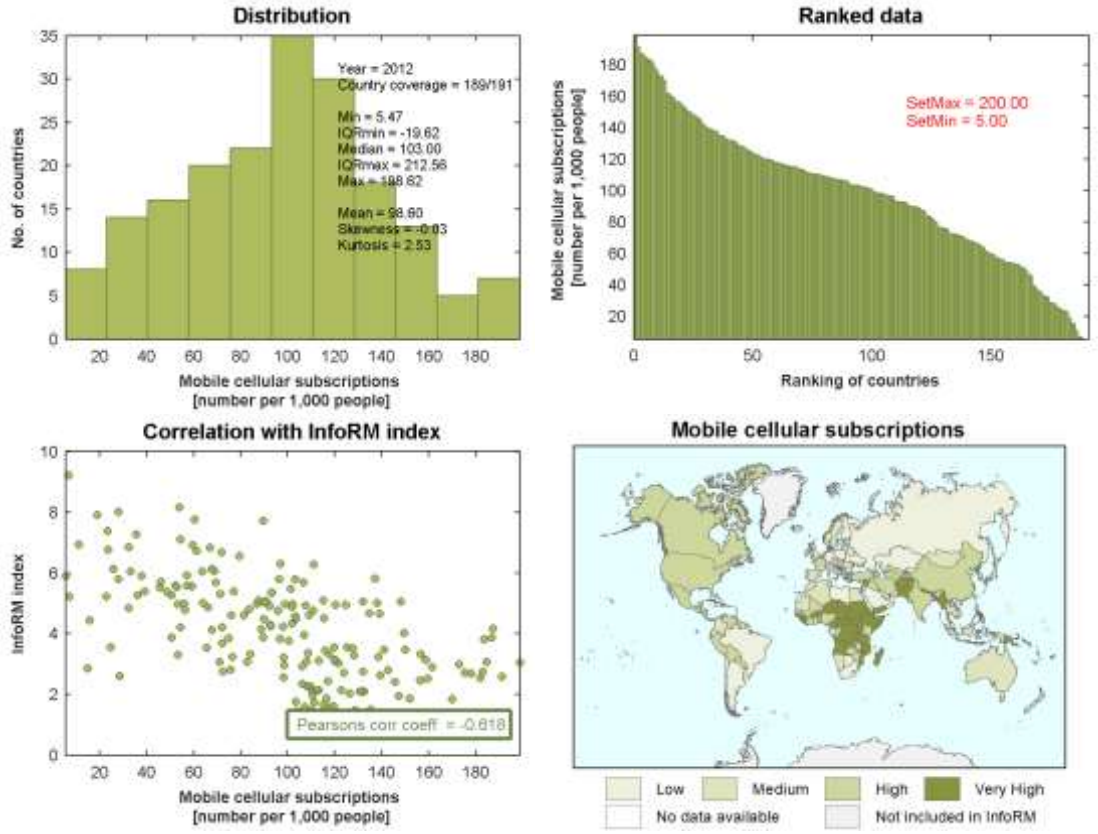
	Dimension:	**Lack of Coping Capacity**
	Category:	**Infrastructure**
	Component:	**Communication**

INDICATOR	Indicator:	**Mobile Cellular Subscriptions**
	InfoRM Code:	CC.INF.COM.CEL
	Long Name:	Mobile cellular subscriptions (per 100 people)
	Description:	Mobile cellular telephone subscriptions are subscriptions to a public mobile telephone service using cellular technology, which provide access to the public switched telephone network. Post-paid and prepaid subscriptions are included.
	Relevance:	The communication component aims to measure 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.
	Validity / Limitation of indicator:	

INDICATOR NOTES	Unit of Measure:	Number of subscription per 100 people			
	Indicator Creation Method:				
	Additional notes:				
	Pre-processing:	Transformation:	--	Min:	5
		Normalisation:	MAX-MIN	Max:	200

SOURCE	Variable:	Mobile cellular subscriptions (per 100 people)
	Citation:	World Bank based on International Telecommunication Union, World Telecommunication/ICT Development Report and database, and World Bank estimates.
	Date of publication:	21/12/2013
	Reference time:	2012
	Periodicity:	Annual
	URL:	http://data.worldbank.org/indicator/IT.CEL.SETS.P2
	Data Type:	Tabular (Excel)
	Country coverage:	189/191 (99%)

FIGURES		
	Distribution:	Histogram of the raw indicator dataset
	Ranked data:	Ranking of the raw indicator dataset
	Correlation with InfoRM index:	Correlation between the raw indicator dataset and InfoRM index
	World map:	Normalized indicator divided in quartiles



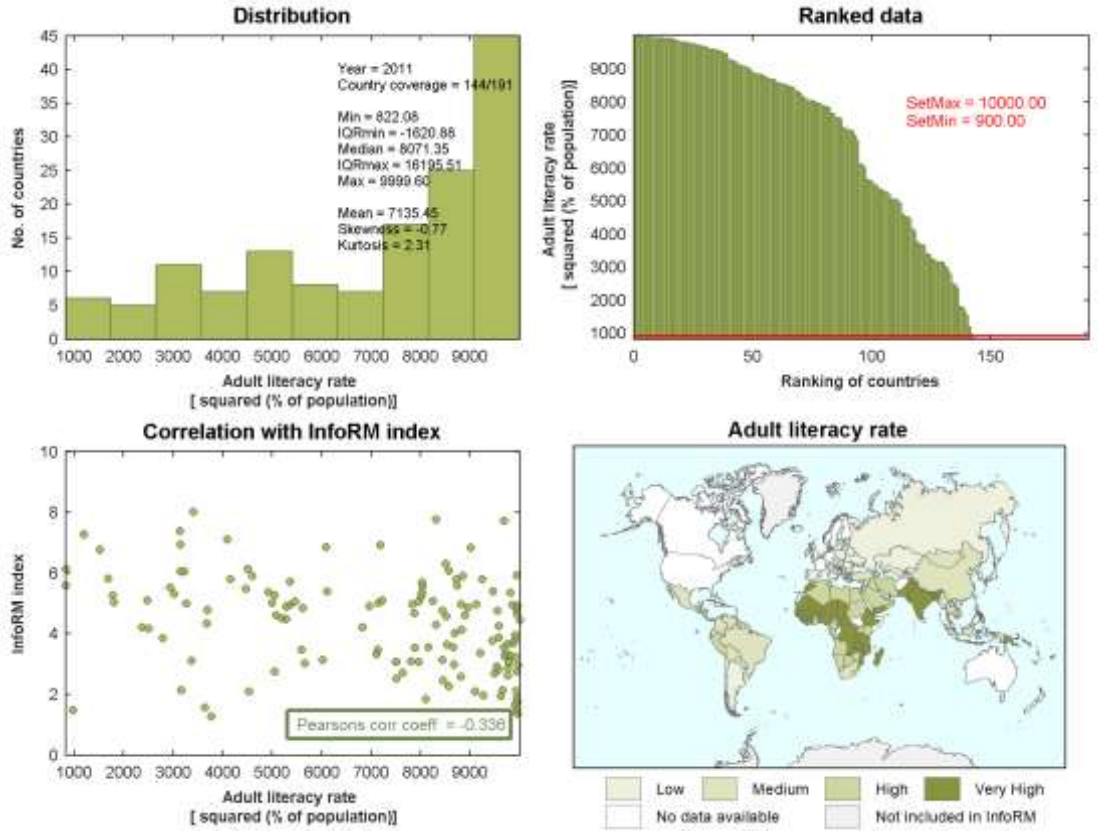
	Dimension:	**Lack of Coping Capacity**
	Category:	**Infrastructure**
	Component:	**Communication**

INDICATOR	Indicator:	**Adult Literacy Rate**
	InfoRM Code:	CC.INF.COM.LITR
	Long Name:	Literacy rate, adult total (% of people ages 15 and above)
	Description:	Total is the percentage of the population age 15 and above who can, with understanding, read and write a short, simple statement on their everyday life.
	Relevance:	The communication component aims to measure 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.
	Validity / Limitation of indicator:	

INDICATOR NOTES	Unit of Measure:	Percentage			
	Indicator Creation Method:	This indicator is calculated by dividing the number of literates aged 15 years and over by the corresponding age group population and multiplying the result by 100.			
	Additional notes:				
	Pre-processing:	Transformation:	Squared	Min:	900
		Normalisation:	MAX-MIN	Max:	10000

SOURCE	Variable:	Literacy rate, adult total (% of people ages 15 and above)
	Citation:	UNESCO Institute for Statistics
	Date of publication:	21/12/2013
	Reference time:	2005-2012
	Periodicity:	Annual
	URL:	http://stats.uis.unesco.org/unesco/ReportFolders/reportFolders.aspx
	Data Type:	Tabular (Excel)
	Country coverage:	144/191 (75%)

FIGURES		
	Distribution:	Histogram of the raw indicator dataset
	Ranked data:	Ranking of the raw indicator dataset
	Correlation with InfoRM index:	Correlation between the raw indicator dataset and InfoRM index
	World map:	Normalized indicator divided in quartiles



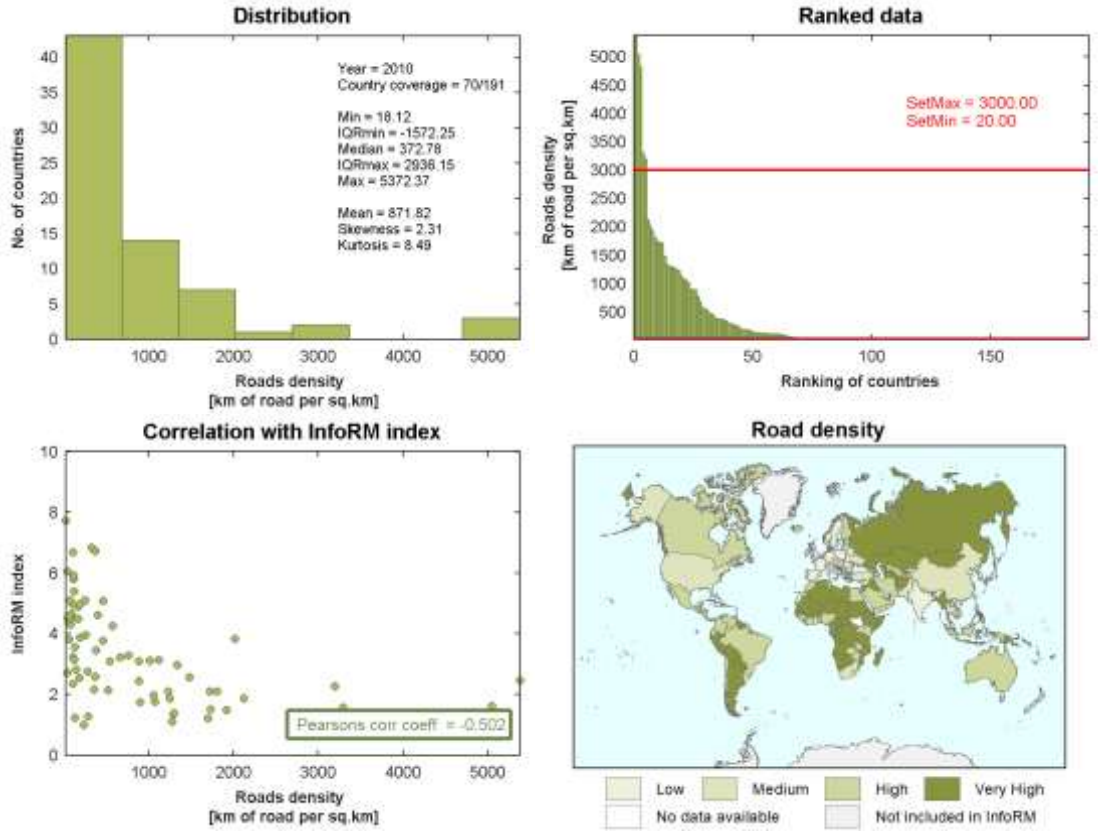
	Dimension:	**Lack of Coping Capacity**
	Category:	**Infrastructure**
	Component:	**Physical Infrastructures**

INDICATOR	Indicator:	**Road Density**
	InfoRM Code:	CC.INF.PHY.ROD
	Long Name:	Road density (km of road per 100 sq. km of land area)
	Description:	Road density is the ratio of the length of the country's total road network to the country's land area. The road network includes all roads in the country: motorways, highways, main or national roads, secondary or regional roads, and other urban and rural roads.
	Relevance:	The physical infrastructure component tries to assess the accessibility as well as the redundancy of the systems which are two crucial characteristics in a crisis situation.
	Validity / Limitation of indicator:	

INDICATOR NOTES	Unit of Measure:	km of road per 100 sq. km of land area			
	Indicator Creation Method:				
	Additional notes:				
	Pre-processing:	Transformation:	--	Min:	1
		Normalisation:	MAX-MIN	Max:	150

SOURCE	Variable:	Road density (km of road per 100 sq. km of land area)
	Citation:	World Bank
	Date of publication:	21/12/2013
	Reference time:	2010
	Periodicity:	Annual
	URL:	http://data.worldbank.org/indicator/IS.ROD.DNST.K2
	Data Type:	Tabular (Excel)
	Country coverage:	70/191 (37%)

FIGURES		
	Distribution:	Histogram of the raw indicator dataset
	Ranked data:	Ranking of the raw indicator dataset
	Correlation with InfoRM index:	Correlation between the raw indicator dataset and InfoRM index
	World map:	Normalized indicator divided in quartiles



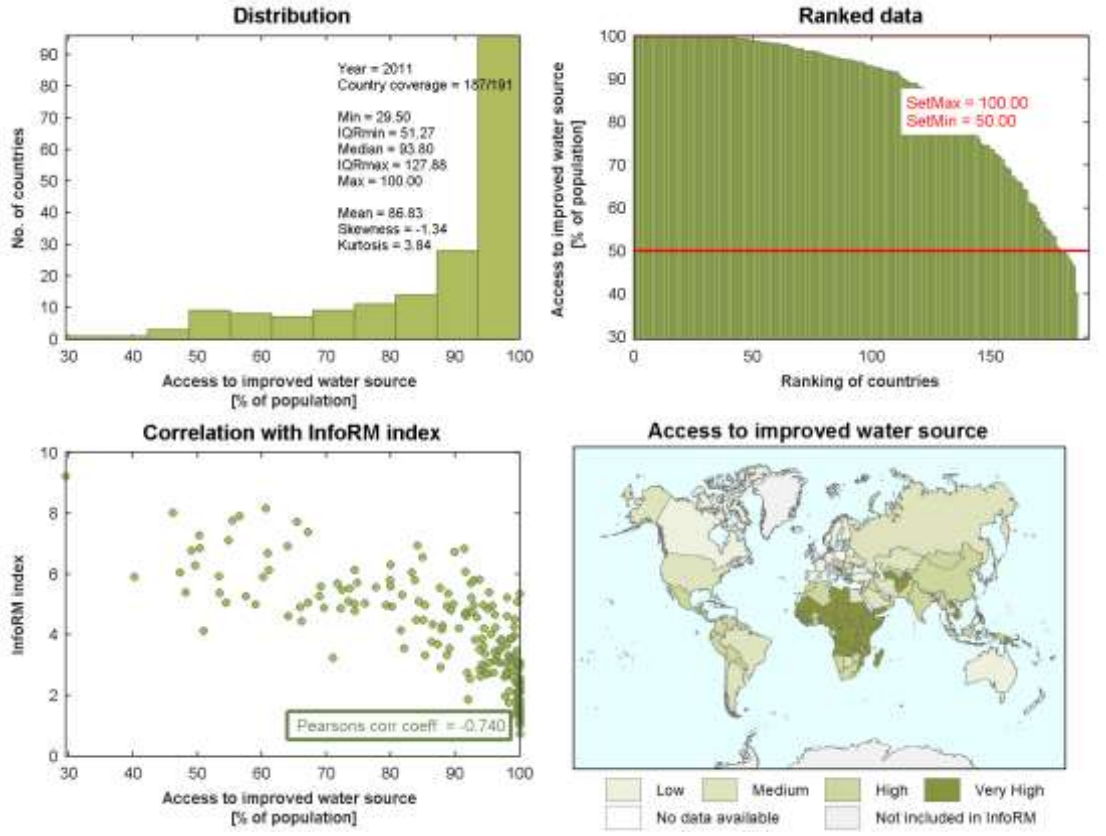
	Dimension:	**Lack of Coping Capacity**
	Category:	**Infrastructure**
	Component:	**Physical Infrastructures**

INDICATOR	Indicator:	**Access to Improved Water Source**
	InfoRM Code:	CC.INF.PHY.H2O
	Long Name:	Improved drinking-water source (% of population with access)
	Description:	The indicator defines the percentage of population with reasonable access (within one km) to an adequate amount of water (20 litres per person) through a household connection, public standpipe well or spring, or rain water system. An improved drinking-water source is defined as one that, by nature of its construction or through active intervention, is protected from outside contamination, in particular from contamination with faecal matter.
	Relevance:	The physical infrastructure component tries to assess the accessibility as well as the redundancy of the systems which are two crucial characteristics in a crisis situation. Use of an improved drinking water source is a proxy for access to safe drinking water. Improved drinking water sources are more likely to be protected from external contaminants than unimproved sources either by intervention or through their design and construction. People without improved water sources are vulnerable to diseases caused by unclean water and could become more vulnerable in the aftermath of a hazard, due to their existing ailments.
	Validity / Limitation of indicator:	Target 7.c of the Millennium development Goals is to "halve, by 2015, the proportion of the population without sustainable access to safe drinking water and basic sanitation". Indicator 7.8 is defined as "Proportion of population using an improved drinking water source".

INDICATOR NOTES	Unit of Measure:	Percentage of population without access			
	Indicator Creation Method:	Coverage estimates are based on data from nationally representative household surveys and national censuses, which in some cases are adjusted to improve comparability among data over time. For each country, survey and census data are plotted on a timescale from 1980 to the present. A linear trend line, based on the least-squares method, is drawn through these data points to provide estimates for all years between 1990 and 2011 (wherever possible). The total estimates are population weighted average of the urban and rural numbers.			
	Additional notes:	Countries with missing data are assigned regional averages when generating regional and global estimates.			
	Pre-processing:	Transformation:	--	Min:	50%
		Normalisation:	MAX-MIN	Max:	100%

SOURCE		
	Variable:	Improved drinking-water source (% of population with access)
	Citation:	WHO/UNICEF Joint Monitoring Programme (JMP) for Water supply and Sanitation
	Date of publication:	21/12/2013
	Reference time:	2005-2011
	Periodicity:	Annual
	URL:	http://www.wssinfo.org/data-estimates/table/
	Data Type:	Tabular (Excel)
	Country coverage:	187/191 (98%)

FIGURES		
	Distribution:	Histogram of the raw indicator dataset
	Ranked data:	Ranking of the raw indicator dataset
	Correlation with InfoRM index:	Correlation between the raw indicator dataset and InfoRM index
	World map:	Normalized indicator divided in quartiles



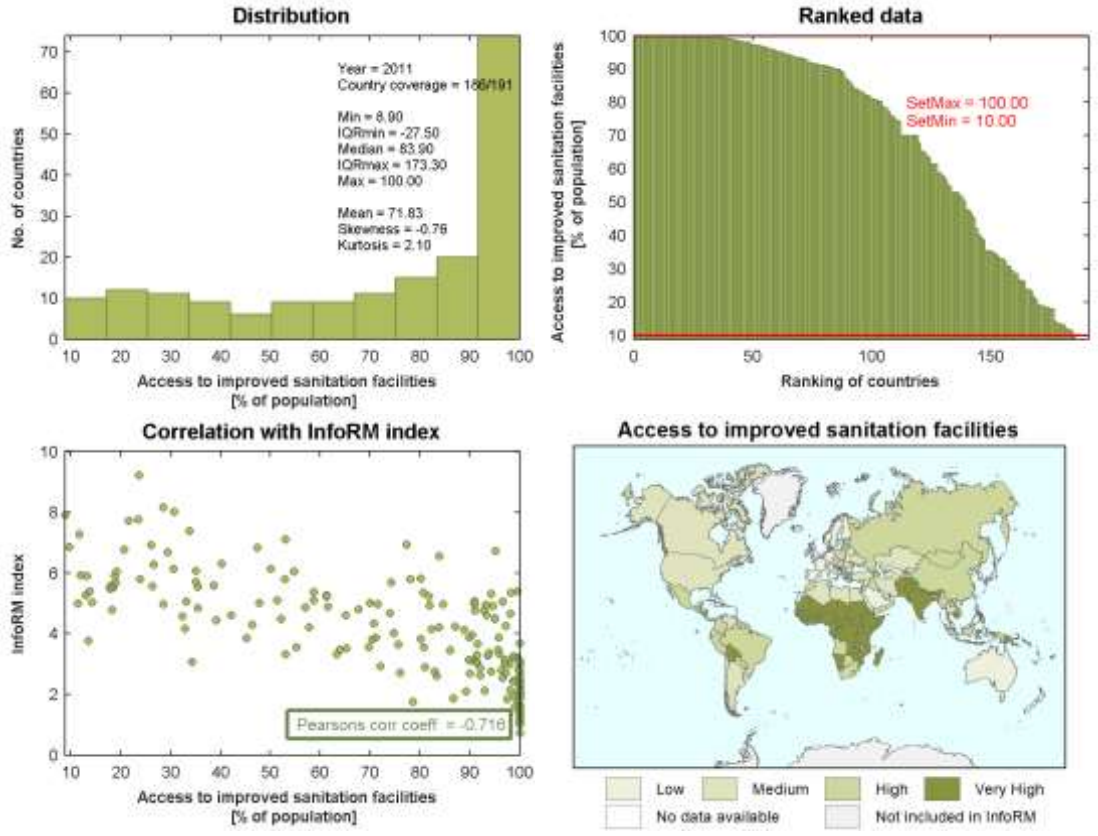
	Dimension:	**Lack of Coping Capacity**
	Category:	**Infrastructure**
	Component:	**Physical Infrastructures**

INDICATOR	Indicator:	**Access to Improved Sanitation Facilities**
	InfoRM Code:	CC.INF.PHY.STA
	Long Name:	Improved sanitation facilities (% of population with access)
	Description:	Access to improved sanitation facilities refers to the percentage of the population using improved sanitation facilities. The improved sanitation facilities include flush/pour flush (to piped sewer system, septic tank, pit latrine), ventilated improved pit (VIP) latrine, pit latrine with slab, and composting toilet.
	Relevance:	The physical infrastructure component tries to assess the accessibility as well as the redundancy of the systems which are two crucial characteristics in a crisis situation. For MDG monitoring, an improved sanitation facility is defined as one that hygienically separates human excreta from human contact. People without improved sanitation are susceptible to diseases and can become more vulnerable following a hazard.
	Validity / Limitation of indicator:	Target 7.c of the Millenium development Goals is to "halve, by 2015, the proportion of the population without sustainable access to safe drinking water and basic sanitation". Indicator 7.9 is defined as “Proportion of population using an improved sanitation facility".

INDICATOR NOTES	Unit of Measure:	Percentage of population without access			
	Indicator Creation Method:	Coverage estimates are based on data from nationally representative household surveys and national censuses, which in some cases are adjusted to improve comparability among data over time. For each country, survey and census data are plotted on a timescale from 1980 to the present. A linear trend line, based on the least-squares method, is drawn through these data points to provide estimates for all years between 1990 and 2011 (wherever possible). The total estimates are population weighted average of the urban and rural numbers.			
	Additional notes:	Countries with missing data are assigned regional averages when generating regional and global estimates.			
	Pre-processing:	Transformation:	--	Min:	10%
		Normalisation:	MAX-MIN	Max:	100%

SOURCE	Variable:	Improved sanitation facilities (% of population with access)
	Citation:	WHO/UNICEF Joint Monitoring Programme (JMP) for Water supply and Sanitation
	Date of publication:	21/12/2013
	Reference time:	2005-2011
	Periodicity:	Annual
	URL:	http://www.wssinfo.org/data-estimates/table/
	Data Type:	Tabular (Excel)
	Country coverage:	186/191 (97%)

FIGURES		
	Distribution:	Histogram of the raw indicator dataset
	Ranked data:	Ranking of the raw indicator dataset
	Correlation with InfoRM index:	Correlation between the raw indicator dataset and InfoRM index
	World map:	Normalized indicator divided in quartiles



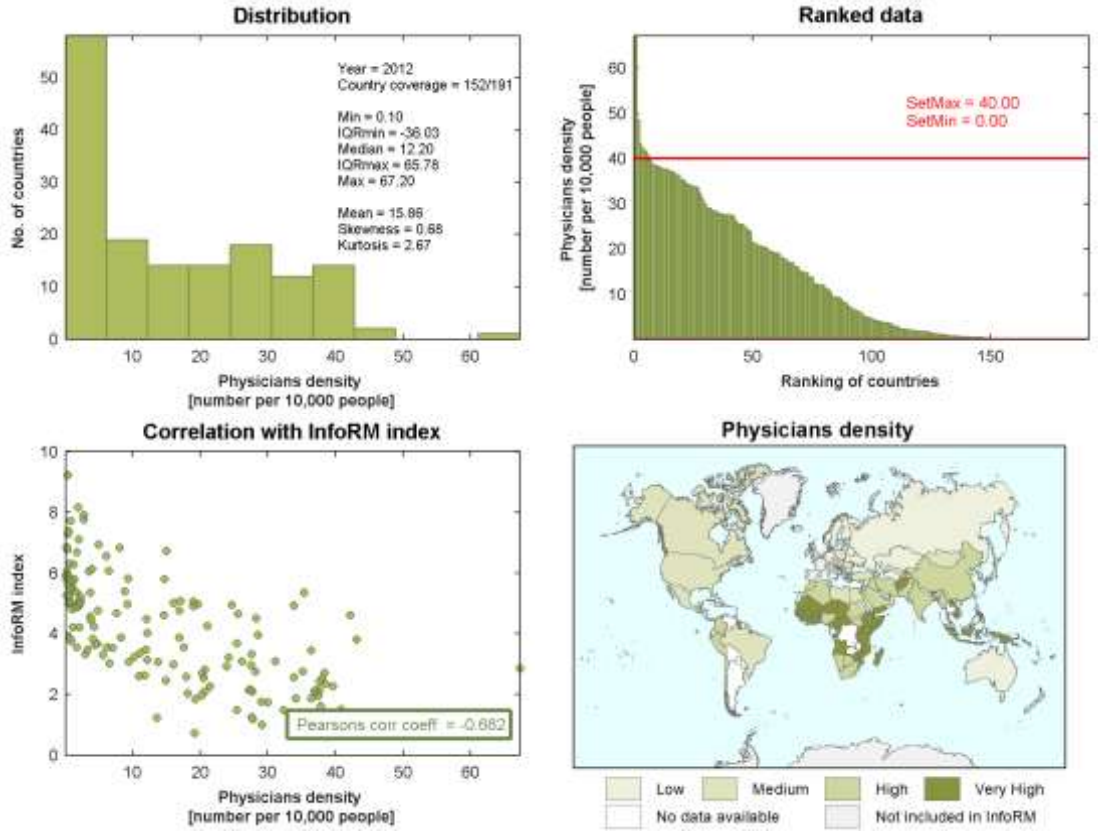
	Dimension:	**Lack of Coping Capacity**
	Category:	**Infrastructure**
	Component:	**Access to Health System**

INDICATOR	Indicator:	**Physicians Density**
	InfoRM Code:	CC.INF.AHC.PHYS
	Long Name:	Density of physicians (per 10,000 population)
	Description:	Number of medical doctors (physicians), including generalist and specialist medical practitioners, per 10,000 population.
	Relevance:	The physical infrastructure component tries to assess the accessibility as well as the redundancy of the systems which are two crucial characteristics in a crisis situation. Preparing the health workforce to work towards the attainment of a country's health objectives represents one of the most important challenges for its health system.
	Validity / Limitation of indicator:	

INDICATOR NOTES	Unit of Measure:	Persons per 10 000 population			
	Indicator Creation Method:	WHO compiles data on health workforce from four major sources: population censuses, labour force and employment surveys, health facility assessments and routine administrative information systems.			
	Additional notes:				
	Pre-processing:	Transformation:	--	Min:	0
		Normalisation:	MAX-MIN	Max:	40

SOURCE	Variable:	Density of physicians (per 10,000 population)
	Citation:	WHO Global Health Observatory Data Repository
	Date of publication:	01/07/2013
	Reference time:	2007-12
	Periodicity:	Annual
	URL:	http://apps.who.int/ghodata
	Data Type:	Tabular (Excel)
	Country coverage:	152/191 (80%)

FIGURES		
	Distribution:	Histogram of the raw indicator dataset
	Ranked data:	Ranking of the raw indicator dataset
	Correlation with InfoRM index:	Correlation between the raw indicator dataset and InfoRM index
	World map:	Normalized indicator divided in quartiles



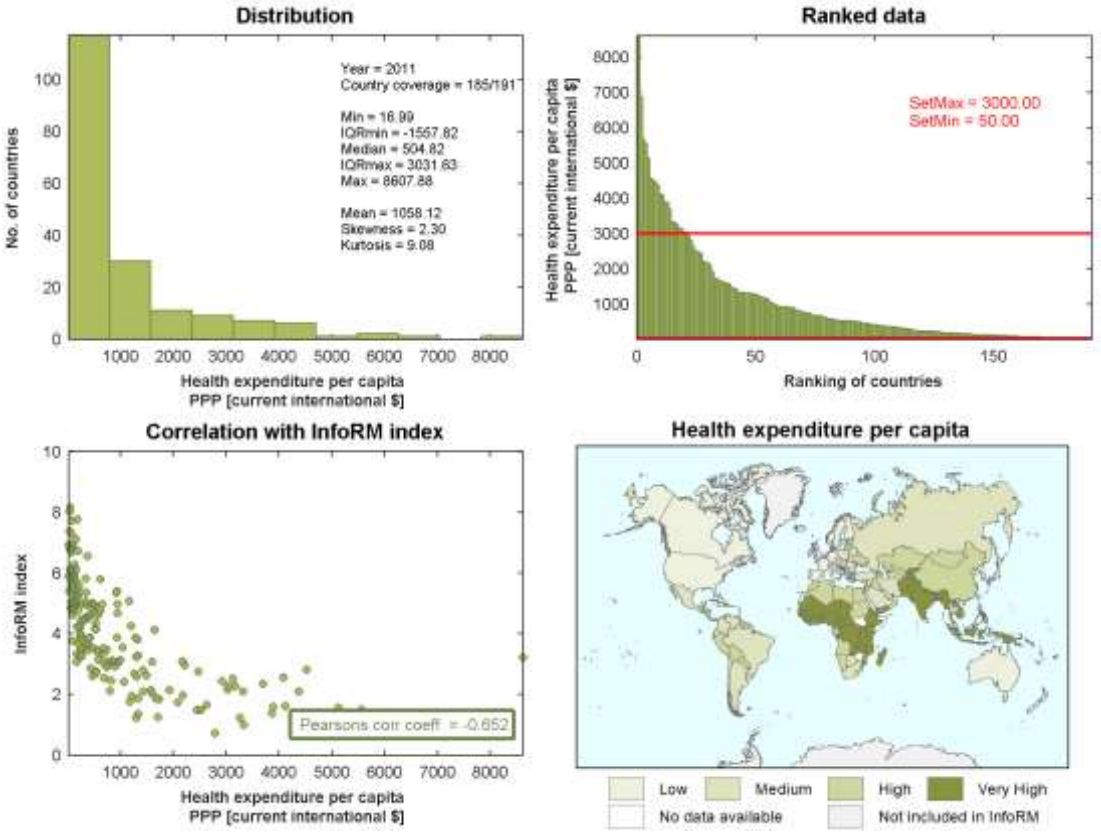
	Dimension:	**Lack of Coping Capacity**
	Category:	**Infrastructure**
	Component:	**Access to Health System**

INDICATOR	Indicator:	**Health Expenditure per capita**
	InfoRM Code:	CC.INF.AHC.HEALTH_EXP
	Long Name:	Per capita total expenditure on health (PPP int. USD)
	Description:	Per capita total expenditure on health (THE) expressed in Purchasing Power Parities (PPP) international dollar.
	Relevance:	The physical infrastructure component tries to assess the accessibility as well as the redundancy of the systems which are two crucial characteristics in a crisis situation.
	Validity / Limitation of indicator:	

INDICATOR NOTES	Unit of Measure:	PPP international dollar			
	Indicator Creation Method:				
	Additional notes:				
	Pre-processing:	Transformation:	--	Min:	50
		Normalisation:	MAX-MIN	Max:	3000

SOURCE	Variable:	Per capita total expenditure on health (PPP int. USD)
	Citation:	WHO Global Health Observatory Data Repository
	Date of publication:	01/07/2013
	Reference time:	2011
	Periodicity:	Annual
	URL:	http://apps.who.int/ghodata
	Data Type:	Tabular (Excel)
	Country coverage:	185/191 (97%)

FIGURES		
	Distribution:	Histogram of the raw indicator dataset
	Ranked data:	Ranking of the raw indicator dataset
	Correlation with InfoRM index:	Correlation between the raw indicator dataset and InfoRM index
	World map:	Normalized indicator divided in quartiles



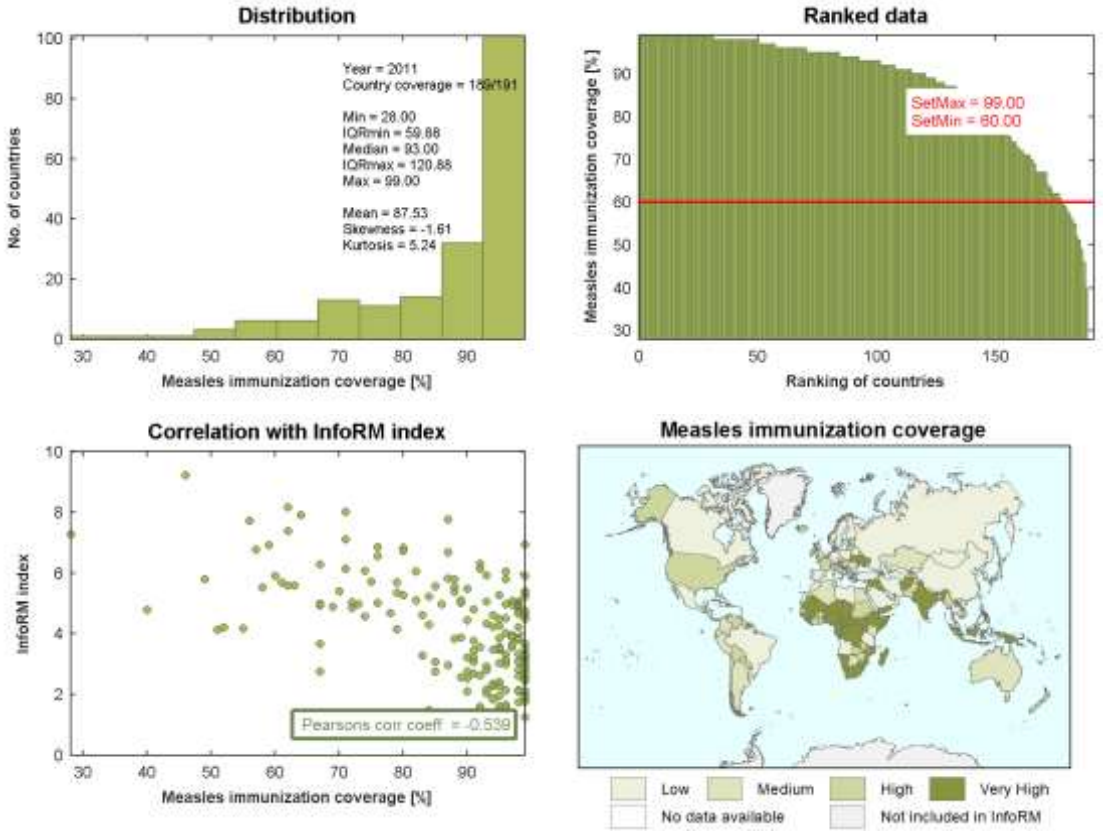
	Dimension:	**Lack of Coping Capacity**
	Category:	**Infrastructure**
	Component:	**Access to Health System**

INDICATOR	Indicator:	**Measles Immunization Coverage**
	InfoRM Code:	CC.INF.AHC.MEAS
	Long Name:	Measles (MCV) immunization coverage among 1-year-olds (%)
	Description:	The percentage of children under one year of age who have received at least one dose of measles-containing vaccine in a given year.
	Relevance:	The physical infrastructure component tries to assess the accessibility as well as the redundancy of the systems which are two crucial characteristics in a crisis situation. Measles immunization coverage is a good proxy of health system performance.
	Validity / Limitation of indicator:	

INDICATOR NOTES	Unit of Measure:	Percentage			
	Indicator Creation Method:	The estimate of immunization coverage is derived by dividing the total number of vaccinations given by the number of children in the target population, often based on census projections.			
	Additional notes:				
	Pre-processing:	Transformation:	--	Min:	60%
		Normalisation:	MAX-MIN	Max:	99%

SOURCE	Variable:	Measles (MCV) immunization coverage among 1-year-olds (%)
	Citation:	WHO Global Health Observatory Data Repository
	Date of publication:	01/07/2013
	Reference time:	2012
	Periodicity:	Annual
	URL:	http://apps.who.int/ghodata
	Data Type:	Tabular (Excel)
	Country coverage:	189/191 (99%)

FIGURES		
	Distribution:	Histogram of the raw indicator dataset
	Ranked data:	Ranking of the raw indicator dataset
	Correlation with InfoRM index:	Correlation between the raw indicator dataset and InfoRM index
	World map:	Normalized indicator divided in quartiles



ANNEX C: INFORM INDEX - COUNTRIES BY ALPHABETIC ORDER

COUNTRY	ISO3	Natural	Human	HAZARD & EXPOSURE	Socio-Economic Vulnerability	Vulnerable Groups	VULNERABILITY	Institutional	Infrastructure	LACK OF COPING CAPACITY	InfoRM	RANK
Afghanistan	AFG	6.3	9.9	8.7	8.2	6.5	7.4	7.9	8.5	8.2	8.1	2
Albania	ALB	5.7	2.2	4.2	2.4	1.2	1.8	6.2	3.7	5.1	3.4	114
Algeria	DZA	2.8	7.0	5.3	3.2	3.3	3.3	4.9	4.9	4.9	4.4	84
Angola	AGO	3.2	5.2	4.3	4.6	5.8	5.2	6.4	7.1	6.7	5.3	43
Antigua and Barbuda	ATG	5.8	1.7	4.0	3.4	0.7	2.2	4.7	1.6	3.3	3.1	126
Argentina	ARG	3.6	2.7	3.2	1.9	1.3	1.6	5.0	2.9	4.0	2.7	142
Armenia	ARM	4.4	4.2	4.3	2.6	3.1	2.8	6.7	3.7	5.4	4.0	94
Australia	AUS	5.3	1.1	3.5	0.5	2.9	1.8	2.0	2.3	2.2	2.4	153
Austria	AUT	2.4	0.9	1.7	0.7	0.2	0.5	2.2	1.4	1.8	1.1	189
Azerbaijan	AZE	3.5	5.0	4.3	2.0	6.8	4.8	6.9	4.4	5.8	4.9	62
Bahamas	BHS	3.2	4.2	3.7	2.3	1.3	1.8	2.9	3.4	3.1	2.8	139
Bahrain	BHR	0.2	5.4	3.2	2.0	0.8	1.4	4.1	1.9	3.1	2.4	151
Bangladesh	BGD	9.0	5.7	7.7	4.2	5.0	4.6	5.1	6.6	5.9	5.9	24
Barbados	BRB	2.9	2.1	2.5	2.1	0.6	1.4	2.5	2.5	2.5	2.1	164
Belarus	BLR	1.5	2.7	2.1	0.8	1.1	0.9	5.1	2.9	4.1	2.0	165
Belgium	BEL	1.6	1.4	1.5	0.8	2.4	1.7	2.2	1.1	1.7	1.6	174
Belize	BLZ	4.4	4.8	4.6	3.2	1.1	2.2	5.9	5.6	5.8	3.9	97
Benin	BEN	3.9	3.1	3.5	6.3	3.2	5.0	6.2	8.3	7.4	5.0	54
Bhutan	BTN	4.7	1.2	3.1	5.1	1.0	3.3	5.1	6.4	5.8	3.9	96
Bolivia (Plurinational State of)	BOL	4.3	4.8	4.6	3.9	2.0	3.0	5.9	5.5	5.7	4.3	85
Bosnia and Herzegovina	BIH	3.7	2.3	3.0	2.6	4.9	3.8	6.1	3.5	4.9	3.9	98
Botswana	BWA	1.9	2.6	2.3	4.4	3.4	4.0	4.3	5.3	4.8	3.5	111
Brazil	BRA	5.0	6.1	5.6	2.7	1.0	1.9	4.8	3.6	4.2	3.5	110
Brunei Darussalam	BRN	0.0	1.1	0.6	1.0	0.6	0.8	4.8	4.3	4.6	1.3	185
Bulgaria	BGR	2.8	1.6	2.2	1.8	1.4	1.6	4.6	2.8	3.7	2.4	154
Burkina Faso	BFA	3.6	4.0	3.8	7.2	6.0	6.6	4.7	8.0	6.7	5.5	39
Burundi	BDI	4.1	6.0	5.1	7.1	6.3	6.7	6.8	6.3	6.5	6.1	20
Cambodia	KHM	6.3	4.4	5.4	4.5	2.1	3.4	7.0	6.9	7.0	5.1	52
Cameroon	CMR	3.0	3.9	3.5	4.8	5.4	5.1	7.1	7.2	7.2	5.0	55
Canada	CAN	5.8	1.1	3.8	0.7	3.8	2.4	2.3	2.9	2.6	2.9	137
Cape Verde	CPV	0.9	2.4	1.7	6.8	0.9	4.5	4.2	5.5	4.9	3.3	118
Central African Republic	CAF	1.1	8.2	5.7	8.1	8.9	8.5	7.7	8.9	8.4	7.4	7
Chad	TCD	4.4	6.8	5.7	5.8	8.7	7.6	8.1	9.6	9.0	7.3	8

COUNTRY	ISO3	Natural	Human	HAZARD & EXPOSURE	Socio-Economic Vulnerability	Vulnerable Groups	VULNERABILITY	Institutional	Infrastructure	LACK OF COPING CAPACITY	InfoRM	RANK
Chile	CHL	7.2	4.0	5.8	2.5	1.2	1.9	3.0	3.4	3.2	3.3	119
China	CHN	8.4	4.8	7.0	2.1	4.1	3.2	3.9	4.2	4.1	4.5	80
Colombia	COL	6.2	8.0	7.2	2.9	7.9	5.9	4.3	4.2	4.3	5.7	34
Comoros	COM	1.7	3.4	2.6	7.6	4.2	6.2	7.8	6.5	7.2	4.8	67
Congo	COG	1.3	5.3	3.5	5.4	6.7	6.1	7.6	7.7	7.7	5.5	41
Costa Rica	CRI	4.8	2.3	3.7	2.8	3.0	2.9	3.0	2.9	2.9	3.2	123
Côte d'Ivoire	CIV	1.3	7.0	4.8	5.9	5.4	5.7	7.3	7.1	7.2	5.8	28
Croatia	HRV	3.0	2.1	2.6	1.3	0.9	1.1	3.6	2.7	3.2	2.1	163
Cuba	CUB	5.5	2.0	3.9	2.6	0.2	1.5	4.0	3.4	3.7	2.8	138
Cyprus	CYP	2.2	2.7	2.4	1.2	6.3	4.2	2.9	2.2	2.5	3.0	135
Czech Republic	CZE	1.8	1.0	1.5	0.8	3.7	2.4	3.7	1.6	2.7	2.1	161
Democratic People's Republic of Korea	PRK	4.8	3.9	4.4	4.8	4.7	4.7	9.0	3.2	7.0	5.2	47
Democratic Republic of the Congo	COD	3.2	9.6	7.7	7.5	8.4	8.0	8.1	8.6	8.4	8.0	3
Denmark	DNK	0.7	1.8	1.3	0.6	2.2	1.4	0.8	1.2	1.0	1.2	187
Djibouti	DJI	4.8	1.9	3.5	6.3	5.6	5.9	6.1	7.3	6.7	5.2	50
Dominica	DMA	2.2	3.4	2.8	4.4	0.3	2.6	3.9	2.7	3.4	2.9	136
Dominican Republic	DOM	7.2	4.4	6.0	2.8	1.5	2.2	5.7	4.9	5.3	4.1	93
Ecuador	ECU	7.2	5.2	6.3	2.5	4.4	3.5	4.6	4.1	4.3	4.6	77
Egypt	EGY	5.6	5.8	5.7	2.5	4.1	3.3	5.3	3.9	4.6	4.4	82
El Salvador	SLV	6.3	6.0	6.2	3.9	4.3	4.1	5.4	4.5	4.9	5.0	57
Equatorial Guinea	GNQ	0.8	3.9	2.5	4.6	2.8	3.7	8.2	6.6	7.5	4.1	92
Eritrea	ERI	4.8	4.2	4.5	6.9	4.9	6.0	7.9	7.4	7.7	5.9	25
Estonia	EST	0.6	1.9	1.3	1.1	0.6	0.9	2.9	1.7	2.3	1.4	182
Ethiopia	ETH	5.4	6.7	6.1	6.2	6.7	6.4	4.8	9.3	7.8	6.7	14
Fiji	FJI	7.3	3.3	5.7	3.6	0.7	2.3	6.1	5.2	5.7	4.2	89
Finland	FIN	0.0	1.0	0.5	0.6	2.1	1.4	1.7	1.7	1.7	1.1	190
France	FRA	2.9	3.7	3.3	0.7	3.7	2.3	2.8	1.6	2.2	2.6	148
Gabon	GAB	1.3	4.2	2.9	3.7	4.3	4.0	6.7	6.1	6.4	4.2	91
Gambia	GMB	2.4	2.8	2.6	6.7	6.1	6.4	6.8	6.3	6.6	4.8	72
Georgia	GEO	5.0	5.0	5.0	3.2	6.0	4.7	5.0	3.3	4.2	4.6	76
Germany	DEU	2.7	1.2	2.0	0.5	4.6	2.8	2.4	1.0	1.7	2.1	159
Ghana	GHA	1.4	3.3	2.4	4.5	3.1	3.8	4.4	6.5	5.6	3.7	102
Greece	GRC	4.2	4.5	4.4	1.2	1.0	1.1	3.7	1.6	2.7	2.3	155
Grenada	GRD	3.2	2.6	2.9	3.4	1.0	2.3	4.7	3.7	4.2	3.0	132
Guatemala	GTM	7.8	6.6	7.2	4.1	5.6	4.9	5.5	5.0	5.3	5.7	33

COUNTRY	ISO3	Natural	Human	HAZARD & EXPOSURE	Socio-Economic Vulnerability	Vulnerable Groups	VULNERABILITY	Institutional	Infrastructure	LACK OF COPING CAPACITY	InfoRM	RANK
Guinea	GIN	1.0	6.2	4.0	5.8	4.2	5.1	7.4	9.0	8.3	5.5	38
Guinea-Bissau	GNB	1.7	5.7	4.0	6.6	4.4	5.6	8.8	8.4	8.6	5.8	29
Guyana	GUY	4.9	3.9	4.4	4.7	0.8	2.9	6.3	5.3	5.8	4.2	87
Haiti	HTI	6.8	3.5	5.4	7.8	7.0	7.4	7.4	8.7	8.1	6.9	11
Honduras	HND	5.5	6.4	6.0	4.4	4.2	4.3	6.0	5.3	5.7	5.3	45
Hungary	HUN	2.4	1.5	2.0	1.2	1.6	1.4	2.5	1.5	2.0	1.8	171
Iceland	ISL	1.5	0.9	1.2	0.6	0.8	0.7	2.0	2.3	2.2	1.2	186
India	IND	8.6	8.7	8.7	4.0	5.1	4.6	4.6	5.9	5.3	6.0	22
Indonesia	IDN	7.9	4.9	6.6	3.0	4.0	3.5	5.0	5.9	5.4	5.0	56
Iran (Islamic Republic of)	IRN	7.8	5.6	6.8	2.9	5.6	4.4	5.6	4.2	4.9	5.3	44
Iraq	IRQ	3.2	9.4	7.5	3.3	6.8	5.3	7.9	6.0	7.1	6.6	17
Ireland	IRL	1.9	1.1	1.5	0.8	1.7	1.3	2.6	1.6	2.1	1.6	176
Israel	ISR	2.9	6.8	5.1	1.1	3.2	2.2	3.2	1.9	2.6	3.1	125
Italy	ITA	3.1	2.8	2.9	1.0	2.8	2.0	3.7	1.0	2.5	2.4	152
Jamaica	JAM	5.0	6.1	5.6	3.3	1.3	2.3	4.4	3.7	4.0	3.8	101
Japan	JPN	8.4	2.4	6.3	0.7	1.0	0.8	2.2	2.2	2.2	2.3	157
Jordan	JOR	3.4	4.8	4.1	3.5	7.7	6.0	5.6	3.4	4.6	4.9	66
Kazakhstan	KAZ	3.2	4.7	4.0	1.5	0.6	1.1	5.2	3.0	4.1	2.6	146
Kenya	KEN	6.1	7.0	6.6	5.4	7.7	6.7	5.7	7.3	6.6	6.6	15
Kiribati	KIR	3.1	1.6	2.4	6.6	3.5	5.3	6.7	7.3	7.0	4.5	81
Kuwait	KWT	1.6	4.1	2.9	2.1	0.8	1.5	5.2	2.4	4.0	2.6	149
Kyrgyzstan	KGZ	6.2	3.5	5.0	3.6	5.3	4.5	6.0	4.2	5.1	4.9	65
Lao People's Democratic Republic	LAO	4.9	4.3	4.6	4.6	2.9	3.8	5.7	7.0	6.4	4.8	71
Latvia	LVA	0.9	1.8	1.4	1.2	1.1	1.1	4.2	2.7	3.5	1.8	170
Lebanon	LBN	4.8	5.9	5.4	4.0	7.5	6.0	5.5	3.1	4.4	5.2	48
Lesotho	LSO	4.5	4.8	4.7	6.0	5.3	5.6	6.6	7.0	6.8	5.6	35
Liberia	LBR	0.8	3.1	2.0	8.2	6.0	7.2	6.8	7.9	7.4	4.8	73
Libya	LBY	4.3	7.3	6.0	2.4	4.1	3.3	8.0	4.8	6.7	5.1	51
Liechtenstein	LIE	1.9	1.1	1.5	0.7	1.1	0.9	1.5	3.0	2.3	1.4	180
Lithuania	LTU	1.1	1.9	1.5	1.7	1.2	1.5	3.9	2.1	3.0	1.9	168
Luxembourg	LUX	0.7	0.9	0.8	1.0	1.9	1.4	1.8	1.3	1.6	1.2	188
Madagascar	MDG	6.4	3.4	5.1	5.0	2.7	3.9	5.4	9.0	7.7	5.4	42
Malawi	MWI	5.5	5.1	5.3	6.6	4.4	5.6	5.3	7.3	6.4	5.7	30
Malaysia	MYS	3.5	4.3	3.9	2.5	3.6	3.1	3.3	3.3	3.3	3.4	113
Maldives	MDV	0.2	4.6	2.7	3.4	0.9	2.2	5.6	3.4	4.6	3.0	133

COUNTRY	ISO3	Natural	Human	HAZARD & EXPOSURE	Socio-Economic Vulnerability	Vulnerable Groups	VULNERABILITY	Institutional	Infrastructure	LACK OF COPING CAPACITY	InfoRM	RANK
Mali	MLI	3.8	9.5	7.7	7.5	7.6	7.6	6.2	8.9	7.8	7.7	4
Malta	MLT	0.0	1.0	0.5	1.6	3.0	2.3	3.5	1.5	2.6	1.5	178
Marshall Islands	MHL	0.7	1.4	1.1	7.6	5.8	6.8	7.4	6.2	6.9	3.7	103
Mauritania	MRT	4.6	5.2	4.9	6.4	7.2	6.8	5.9	8.3	7.3	6.2	19
Mauritius	MUS	5.6	1.4	3.8	3.6	0.8	2.3	3.7	2.8	3.3	3.1	128
Mexico	MEX	8.0	8.2	8.1	2.1	4.4	3.3	4.2	4.1	4.2	4.8	69
Micronesia (Federated States of)	FSM	1.8	1.0	1.4	7.1	1.5	4.9	6.3	6.6	6.5	3.6	108
Mongolia	MNG	3.3	2.4	2.9	3.2	1.6	2.4	6.1	4.6	5.4	3.3	116
Montenegro	MNE	2.4	1.7	2.0	1.9	3.1	2.6	4.4	3.0	3.7	2.7	144
Morocco	MAR	3.2	4.8	4.0	3.3	0.7	2.1	5.7	5.0	5.4	3.6	107
Mozambique	MOZ	6.4	1.8	4.5	7.9	4.7	6.5	4.5	8.8	7.2	6.0	23
Myanmar	MMR	9.1	8.5	8.8	5.0	5.5	5.3	7.6	6.4	7.1	6.9	10
Namibia	NAM	3.4	2.9	3.2	4.9	5.4	5.2	4.6	6.7	5.8	4.6	78
Nauru	NRU	1.1	2.0	1.6	6.7	0.5	4.3	7.1	6.5	6.8	3.6	106
Nepal	NPL	7.2	5.7	6.5	4.5	3.6	4.1	6.3	6.5	6.4	5.5	40
Netherlands	NLD	2.0	1.0	1.5	0.4	3.3	1.9	1.9	0.9	1.4	1.6	175
New Zealand	NZL	6.8	0.8	4.5	0.8	1.3	1.1	1.9	2.8	2.3	2.2	158
Nicaragua	NIC	5.8	4.5	5.2	4.4	1.2	3.0	5.9	5.2	5.6	4.4	83
Niger	NER	5.1	5.5	5.3	7.7	6.9	7.3	6.1	9.4	8.2	6.8	12
Nigeria	NGA	2.4	9.6	7.4	4.8	3.7	4.3	5.1	8.1	6.8	6.0	21
Norway	NOR	0.2	1.0	0.6	0.1	3.3	1.9	2.0	1.9	1.9	1.3	183
Oman	OMN	2.8	2.2	2.5	2.8	0.3	1.6	4.6	3.3	3.9	2.5	150
Pakistan	PAK	7.7	10.0	9.2	4.2	6.7	5.6	5.5	6.4	5.9	6.7	13
Palau	PLW	2.2	1.4	1.9	4.9	0.5	3.0	6.3	3.6	5.1	3.1	131
Palestine	PSE	2.2	7.6	5.5	4.4	8.4	6.8	6.3	3.4	5.0	5.7	31
Panama	PAN	3.4	5.3	4.4	3.2	3.0	3.1	4.9	3.2	4.1	3.8	99
Papua New Guinea	PNG	4.7	4.7	4.7	6.7	3.7	5.3	6.8	9.1	8.1	5.9	26
Paraguay	PRY	4.1	4.6	4.4	3.2	3.6	3.4	5.5	4.6	5.1	4.2	88
Peru	PER	8.1	5.2	6.9	2.5	4.3	3.5	4.8	4.9	4.8	4.9	63
Philippines	PHL	9.4	6.9	8.4	2.8	5.7	4.4	5.0	4.5	4.7	5.6	36
Poland	POL	2.2	1.1	1.7	1.5	2.0	1.7	4.2	2.4	3.3	2.1	160
Portugal	PRT	2.5	1.3	1.9	1.4	0.2	0.8	3.4	2.2	2.8	1.7	173
Qatar	QAT	0.2	1.0	0.6	2.3	0.3	1.3	3.2	1.8	2.5	1.3	184
Republic of Korea	KOR	4.2	3.1	3.7	0.8	0.7	0.8	2.5	2.3	2.4	1.9	167
Republic of Moldova	MDA	3.8	3.1	3.5	3.2	1.4	2.3	6.3	3.5	5.1	3.5	112

COUNTRY	ISO3	Natural	Human	HAZARD & EXPOSURE	Socio-Economic Vulnerability	Vulnerable Groups	VULNERABILITY	Institutional	Infrastructure	LACK OF COPING CAPACITY	InfoRM	RANK
Romania	ROU	4.3	4.2	4.3	1.9	1.0	1.4	4.4	4.0	4.2	3.0	134
Russian Federation	RUS	5.2	6.5	5.9	1.7	2.1	1.9	6.5	2.8	4.9	3.8	100
Rwanda	RWA	4.0	4.9	4.4	6.8	4.6	5.8	4.2	6.7	5.6	5.2	46
Saint Kitts and Nevis	KNA	5.3	4.3	4.8	4.0	0.5	2.4	4.0	2.3	3.2	3.4	115
Saint Lucia	LCA	5.1	3.8	4.5	4.2	0.7	2.7	4.2	3.6	3.9	3.6	105
Saint Vincent and the Grenadines	VCT	1.8	3.2	2.5	3.6	0.6	2.2	3.7	3.5	3.6	2.7	143
Samoa	WSM	2.3	3.3	2.8	5.9	0.7	3.7	4.9	4.5	4.7	3.7	104
Sao Tome and Principe	STP	0.0	2.0	1.1	6.5	1.6	4.5	6.2	5.9	6.1	3.1	127
Saudi Arabia	SAU	1.1	4.8	3.1	3.6	0.3	2.1	5.3	3.4	4.4	3.1	129
Senegal	SEN	3.2	4.4	3.8	6.1	5.0	5.6	4.8	7.1	6.1	5.0	53
Serbia	SRB	4.3	4.5	4.4	2.0	5.6	4.0	5.1	3.6	4.4	4.3	86
Seychelles	SYC	3.0	2.1	2.5	5.0	1.2	3.4	4.3	2.6	3.5	3.1	124
Sierra Leone	SLE	1.1	4.7	3.1	7.2	4.9	6.2	5.3	8.8	7.4	5.2	49
Singapore	SGP	0.0	1.4	0.7	0.8	0.2	0.5	1.1	1.3	1.2	0.7	191
Slovakia	SVK	2.5	1.3	1.9	0.8	0.9	0.8	4.3	2.2	3.3	1.7	172
Slovenia	SVN	2.6	1.8	2.2	0.6	0.8	0.7	2.2	1.6	1.9	1.4	181
Solomon Islands	SLB	4.3	1.9	3.2	7.6	1.3	5.3	6.8	7.7	7.3	5.0	59
Somalia	SOM	6.2	10.0	8.8	9.3	9.5	9.4	9.3	9.8	9.6	9.2	1
South Africa	ZAF	4.6	6.1	5.4	3.7	4.1	3.9	5.0	4.7	4.9	4.7	74
South Sudan	SSD	5.3	8.7	7.4	5.7	8.3	7.2	6.8	9.3	8.4	7.6	6
Spain	ESP	5.2	3.3	4.3	1.0	1.3	1.1	3.6	1.1	2.4	2.3	156
Sri Lanka	LKA	7.2	4.0	5.8	2.3	5.4	4.1	4.7	3.8	4.3	4.7	75
Sudan	SDN	5.3	9.8	8.3	6.0	8.4	7.4	6.6	7.8	7.2	7.6	5
Suriname	SUR	1.0	2.1	1.6	3.9	0.8	2.5	5.8	4.9	5.4	2.8	140
Swaziland	SWZ	4.3	4.5	4.4	4.5	3.5	4.0	7.2	6.4	6.8	4.9	61
Sweden	SWE	0.9	1.0	0.9	0.4	3.8	2.3	1.9	1.0	1.5	1.5	179
Switzerland	CHE	2.1	0.8	1.5	0.7	3.3	2.1	1.2	1.0	1.1	1.5	177
Syrian Arab Republic	SYR	5.1	10.0	8.5	3.0	7.8	5.9	5.9	5.5	5.7	6.6	16
Tajikistan	TJK	6.6	6.9	6.7	3.1	2.8	3.0	5.9	5.2	5.6	4.8	70
Thailand	THA	6.8	6.9	6.9	2.2	5.4	4.0	4.6	3.7	4.2	4.8	68
The former Yugoslav Republic of Macedonia	MKD	2.8	4.7	3.8	2.4	1.3	1.8	4.8	3.1	4.0	3.1	130
Timor-Leste	TLS	4.8	4.6	4.7	5.2	4.8	5.0	6.6	8.0	7.4	5.6	37
Togo	TGO	1.2	4.3	2.9	6.2	4.6	5.5	6.6	8.5	7.7	5.0	60
Tonga	TON	2.8	1.1	2.0	5.9	0.2	3.6	5.7	4.3	5.0	3.3	117
Trinidad and Tobago	TTO	2.3	4.5	3.4	1.9	0.8	1.3	4.9	2.6	3.8	2.6	147

COUNTRY	ISO3	Natural	Human	HAZARD & EXPOSURE	Socio-Economic Vulnerability	Vulnerable Groups	VULNERABILITY	Institutional	Infrastructure	LACK OF COPING CAPACITY	InfoRM	RANK
Tunisia	TUN	1.8	5.0	**3.6**	2.4	1.1	**1.8**	5.8	4.2	**5.1**	**3.2**	**122**
Turkey	TUR	6.5	8.7	**7.8**	2.3	5.9	**4.4**	3.7	3.6	**3.7**	**5.0**	**58**
Turkmenistan	TKM	3.5	1.9	**2.7**	2.7	0.9	**1.8**	8.2	5.0	**6.9**	**3.3**	**120**
Tuvalu	TUV	0.1	1.2	**0.7**	7.3	1.8	**5.2**	6.0	4.7	**5.4**	**2.6**	**145**
Uganda	UGA	4.1	4.6	**4.4**	6.0	6.0	**6.0**	6.7	7.5	**7.1**	**5.7**	**32**
Ukraine	UKR	2.8	2.2	**2.5**	1.6	1.4	**1.5**	7.0	3.8	**5.6**	**2.8**	**141**
United Arab Emirates	ARE	2.7	1.2	**2.0**	1.3	0.8	**1.1**	3.3	2.7	**3.0**	**1.9**	**169**
United Kingdom of Great Britain and Northern Ireland	GBR	2.1	2.3	**2.2**	1.3	3.5	**2.4**	2.1	1.3	**1.7**	**2.1**	**162**
United Republic of Tanzania	TZA	5.1	5.5	**5.3**	5.7	5.5	**5.6**	5.3	8.0	**6.9**	**5.9**	**27**
United States of America	USA	7.3	3.7	**5.8**	1.0	3.4	**2.3**	2.7	2.5	**2.6**	**3.2**	**121**
Uruguay	URY	1.6	1.8	**1.7**	2.0	1.0	**1.5**	3.6	2.3	**3.0**	**2.0**	**166**
Uzbekistan	UZB	6.0	3.8	**5.0**	2.1	1.7	**1.9**	5.0	4.2	**4.6**	**3.5**	**109**
Vanuatu	VUT	5.2	1.0	**3.4**	5.5	0.7	**3.4**	5.5	7.2	**6.4**	**4.2**	**90**
Venezuela (Bolivarian Republic of)	VEN	4.2	6.8	**5.6**	3.0	4.5	**3.8**	6.5	4.1	**5.4**	**4.9**	**64**
Viet Nam	VNM	8.2	4.0	**6.6**	2.8	1.2	**2.0**	5.3	3.9	**4.7**	**4.0**	**95**
Yemen	YEM	1.6	9.9	**7.8**	5.2	6.4	**5.8**	8.4	7.9	**8.1**	**7.2**	**9**
Zambia	ZMB	3.7	1.4	**2.6**	6.3	5.0	**5.7**	5.0	7.4	**6.3**	**4.5**	**79**
Zimbabwe	ZWE	4.6	5.1	**4.9**	6.1	8.2	**7.3**	8.0	6.1	**7.1**	**6.3**	**18**

ANNEX D: INFORM INDEX - COUNTRIES BY RANK

COUNTRY	ISO3	Natural	Human	HAZARD & EXPOSURE	Socio-Economic Vulnerability	Vulnerable Groups	VULNERABILITY	Institutional	Infrastructure	LACK OF COPING CAPACITY	InfoRM	RANK
Somalia	SOM	6.2	10.0	8.8	9.3	9.5	9.4	9.3	9.8	9.6	9.2	1
Afghanistan	AFG	6.3	9.9	8.7	8.2	6.5	7.4	7.9	8.5	8.2	8.1	2
Democratic Republic of the Congo	COD	3.2	9.6	7.7	7.5	8.4	8.0	8.1	8.6	8.4	8.0	3
Mali	MLI	3.8	9.5	7.7	7.5	7.6	7.6	6.2	8.9	7.8	7.7	4
Sudan	SDN	5.3	9.8	8.3	6.0	8.4	7.4	6.6	7.8	7.2	7.6	5
South Sudan	SSD	5.3	8.7	7.4	5.7	8.3	7.2	6.8	9.3	8.4	7.6	6
Central African Republic	CAF	1.1	8.2	5.7	8.1	8.9	8.5	7.7	8.9	8.4	7.4	7
Chad	TCD	4.4	6.8	5.7	5.8	8.7	7.6	8.1	9.6	9.0	7.3	8
Yemen	YEM	1.6	9.9	7.8	5.2	6.4	5.8	8.4	7.9	8.1	7.2	9
Myanmar	MMR	9.1	8.5	8.8	5.0	5.5	5.3	7.6	6.4	7.1	6.9	10
Haiti	HTI	6.8	3.5	5.4	7.8	7.0	7.4	7.4	8.7	8.1	6.9	11
Niger	NER	5.1	5.5	5.3	7.7	6.9	7.3	6.1	9.4	8.2	6.8	12
Pakistan	PAK	7.7	10.0	9.2	4.2	6.7	5.6	5.5	6.4	5.9	6.7	13
Ethiopia	ETH	5.4	6.7	6.1	6.2	6.7	6.4	4.8	9.3	7.8	6.7	14
Kenya	KEN	6.1	7.0	6.6	5.4	7.7	6.7	5.7	7.3	6.6	6.6	15
Syrian Arab Republic	SYR	5.1	10.0	8.5	3.0	7.8	5.9	5.9	5.5	5.7	6.6	16
Iraq	IRQ	3.2	9.4	7.5	3.3	6.8	5.3	7.9	6.0	7.1	6.6	17
Zimbabwe	ZWE	4.6	5.1	4.9	6.1	8.2	7.3	8.0	6.1	7.1	6.3	18
Mauritania	MRT	4.6	5.2	4.9	6.4	7.2	6.8	5.9	8.3	7.3	6.2	19
Burundi	BDI	4.1	6.0	5.1	7.1	6.3	6.7	6.8	6.3	6.5	6.1	20
Nigeria	NGA	2.4	9.6	7.4	4.8	3.7	4.3	5.1	8.1	6.8	6.0	21
India	IND	8.6	8.7	8.7	4.0	5.1	4.6	4.6	5.9	5.3	6.0	22
Mozambique	MOZ	6.4	1.8	4.5	7.9	4.7	6.5	4.5	8.8	7.2	6.0	23
Bangladesh	BGD	9.0	5.7	7.7	4.2	5.0	4.6	5.1	6.6	5.9	5.9	24
Eritrea	ERI	4.8	4.2	4.5	6.9	4.9	6.0	7.9	7.4	7.7	5.9	25
Papua New Guinea	PNG	4.7	4.7	4.7	6.7	3.7	5.3	6.8	9.1	8.1	5.9	26
United Republic of Tanzania	TZA	5.1	5.5	5.3	5.7	5.5	5.6	5.3	8.0	6.9	5.9	27
Côte d'Ivoire	CIV	1.3	7.0	4.8	5.9	5.4	5.7	7.3	7.1	7.2	5.8	28
Guinea-Bissau	GNB	1.7	5.7	4.0	6.6	4.4	5.6	8.8	8.4	8.6	5.8	29
Malawi	MWI	5.5	5.1	5.3	6.6	4.4	5.6	5.3	7.3	6.4	5.7	30
Palestine	PSE	2.2	7.6	5.5	4.4	8.4	6.8	6.3	3.4	5.0	5.7	31
Uganda	UGA	4.1	4.6	4.4	6.0	6.0	6.0	6.7	7.5	7.1	5.7	32

COUNTRY	ISO3	Natural	Human	HAZARD & EXPOSURE	Socio-Economic Vulnerability	Vulnerable Groups	VULNERABILITY	Institutional	Infrastructure	LACK OF COPING CAPACITY	InfoRM	RANK
Guatemala	GTM	7.8	6.6	7.2	4.1	5.6	4.9	5.5	5.0	5.3	5.7	33
Colombia	COL	6.2	8.0	7.2	2.9	7.9	5.9	4.3	4.2	4.3	5.7	34
Lesotho	LSO	4.5	4.8	4.7	6.0	5.3	5.6	6.6	7.0	6.8	5.6	35
Philippines	PHL	9.4	6.9	8.4	2.8	5.7	4.4	5.0	4.5	4.7	5.6	36
Timor-Leste	TLS	4.8	4.6	4.7	5.2	4.8	5.0	6.6	8.0	7.4	5.6	37
Guinea	GIN	1.0	6.2	4.0	5.8	4.2	5.1	7.4	9.0	8.3	5.5	38
Burkina Faso	BFA	3.6	4.0	3.8	7.2	6.0	6.6	4.7	8.0	6.7	5.5	39
Nepal	NPL	7.2	5.7	6.5	4.5	3.6	4.1	6.3	6.5	6.4	5.5	40
Congo	COG	1.3	5.3	3.5	5.4	6.7	6.1	7.6	7.7	7.7	5.5	41
Madagascar	MDG	6.4	3.4	5.1	5.0	2.7	3.9	5.4	9.0	7.7	5.4	42
Angola	AGO	3.2	5.2	4.3	4.6	5.8	5.2	6.4	7.1	6.7	5.3	43
Iran (Islamic Republic of)	IRN	7.8	5.6	6.8	2.9	5.6	4.4	5.6	4.2	4.9	5.3	44
Honduras	HND	5.5	6.4	6.0	4.4	4.2	4.3	6.0	5.3	5.7	5.3	45
Rwanda	RWA	4.0	4.9	4.4	6.8	4.6	5.8	4.2	6.7	5.6	5.2	46
Democratic People's Republic of Korea	PRK	4.8	3.9	4.4	4.8	4.7	4.7	9.0	3.2	7.0	5.2	47
Lebanon	LBN	4.8	5.9	5.4	4.0	7.5	6.0	5.5	3.1	4.4	5.2	48
Sierra Leone	SLE	1.1	4.7	3.1	7.2	4.9	6.2	5.3	8.8	7.4	5.2	49
Djibouti	DJI	4.8	1.9	3.5	6.3	5.6	5.9	6.1	7.3	6.7	5.2	50
Libya	LBY	4.3	7.3	6.0	2.4	4.1	3.3	8.0	4.8	6.7	5.1	51
Cambodia	KHM	6.3	4.4	5.4	4.5	2.1	3.4	7.0	6.9	7.0	5.1	52
Senegal	SEN	3.2	4.4	3.8	6.1	5.0	5.6	4.8	7.1	6.1	5.0	53
Benin	BEN	3.9	3.1	3.5	6.3	3.2	5.0	6.2	8.3	7.4	5.0	54
Cameroon	CMR	3.0	3.9	3.5	4.8	5.4	5.1	7.1	7.2	7.2	5.0	55
Indonesia	IDN	7.9	4.9	6.6	3.0	4.0	3.5	5.0	5.9	5.4	5.0	56
El Salvador	SLV	6.3	6.0	6.2	3.9	4.3	4.1	5.4	4.5	4.9	5.0	57
Turkey	TUR	6.5	8.7	7.8	2.3	5.9	4.4	3.7	3.6	3.7	5.0	58
Solomon Islands	SLB	4.3	1.9	3.2	7.6	1.3	5.3	6.8	7.7	7.3	5.0	59
Togo	TGO	1.2	4.3	2.9	6.2	4.6	5.5	6.6	8.5	7.7	5.0	60
Swaziland	SWZ	4.3	4.5	4.4	4.5	3.5	4.0	7.2	6.4	6.8	4.9	61
Azerbaijan	AZE	3.5	5.0	4.3	2.0	6.8	4.8	6.9	4.4	5.8	4.9	62
Peru	PER	8.1	5.2	6.9	2.5	4.3	3.5	4.8	4.9	4.8	4.9	63
Venezuela (Bolivarian Republic of)	VEN	4.2	6.8	5.6	3.0	4.5	3.8	6.5	4.1	5.4	4.9	64
Kyrgyzstan	KGZ	6.2	3.5	5.0	3.6	5.3	4.5	6.0	4.2	5.1	4.9	65
Jordan	JOR	3.4	4.8	4.1	3.5	7.7	6.0	5.6	3.4	4.6	4.9	66
Comoros	COM	1.7	3.4	2.6	7.6	4.2	6.2	7.8	6.5	7.2	4.8	67

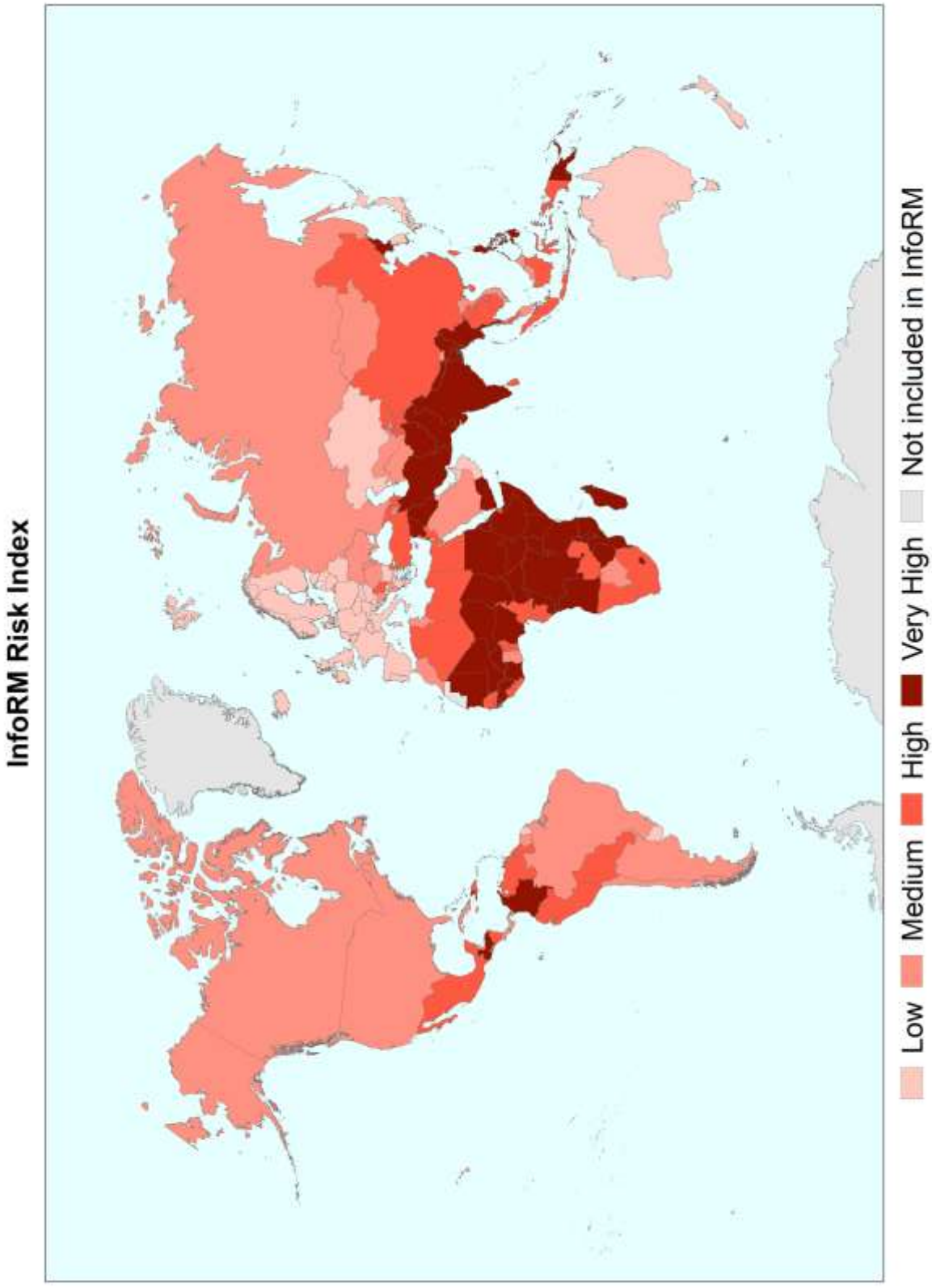
COUNTRY	ISO3	Natural	Human	HAZARD & EXPOSURE	Socio-Economic Vulnerability	Vulnerable Groups	VULNERABILITY	Institutional	Infrastructure	LACK OF COPING CAPACITY	InfoRM	RANK
Thailand	THA	6.8	6.9	6.9	2.2	5.4	4.0	4.6	3.7	4.2	4.8	68
Mexico	MEX	8.0	8.2	8.1	2.1	4.4	3.3	4.2	4.1	4.2	4.8	69
Tajikistan	TJK	6.6	6.9	6.7	3.1	2.8	3.0	5.9	5.2	5.6	4.8	70
Lao People's Democratic Republic	LAO	4.9	4.3	4.6	4.6	2.9	3.8	5.7	7.0	6.4	4.8	71
Gambia	GMB	2.4	2.8	2.6	6.7	6.1	6.4	6.8	6.3	6.6	4.8	72
Liberia	LBR	0.8	3.1	2.0	8.2	6.0	7.2	6.8	7.9	7.4	4.8	73
South Africa	ZAF	4.6	6.1	5.4	3.7	4.1	3.9	5.0	4.7	4.9	4.7	74
Sri Lanka	LKA	7.2	4.0	5.8	2.3	5.4	4.1	4.7	3.8	4.3	4.7	75
Georgia	GEO	5.0	5.0	5.0	3.2	6.0	4.7	5.0	3.3	4.2	4.6	76
Ecuador	ECU	7.2	5.2	6.3	2.5	4.4	3.5	4.6	4.1	4.3	4.6	77
Namibia	NAM	3.4	2.9	3.2	4.9	5.4	5.2	4.6	6.7	5.8	4.6	78
Zambia	ZMB	3.7	1.4	2.6	6.3	5.0	5.7	5.0	7.4	6.3	4.5	79
China	CHN	8.4	4.8	7.0	2.1	4.1	3.2	3.9	4.2	4.1	4.5	80
Kiribati	KIR	3.1	1.6	2.4	6.6	3.5	5.3	6.7	7.3	7.0	4.5	81
Egypt	EGY	5.6	5.8	5.7	2.5	4.1	3.3	5.3	3.9	4.6	4.4	82
Nicaragua	NIC	5.8	4.5	5.2	4.4	1.2	3.0	5.9	5.2	5.6	4.4	83
Algeria	DZA	2.8	7.0	5.3	3.2	3.3	3.3	4.9	4.9	4.9	4.4	84
Bolivia (Plurinational State of)	BOL	4.3	4.8	4.6	3.9	2.0	3.0	5.9	5.5	5.7	4.3	85
Serbia	SRB	4.3	4.5	4.4	2.0	5.6	4.0	5.1	3.6	4.4	4.3	86
Guyana	GUY	4.9	3.9	4.4	4.7	0.8	2.9	6.3	5.3	5.8	4.2	87
Paraguay	PRY	4.1	4.6	4.4	3.2	3.6	3.4	5.5	4.6	5.1	4.2	88
Fiji	FJI	7.3	3.3	5.7	3.6	0.7	2.3	6.1	5.2	5.7	4.2	89
Vanuatu	VUT	5.2	1.0	3.4	5.5	0.7	3.4	5.5	7.2	6.4	4.2	90
Gabon	GAB	1.3	4.2	2.9	3.7	4.3	4.0	6.7	6.1	6.4	4.2	91
Equatorial Guinea	GNQ	0.8	3.9	2.5	4.6	2.8	3.7	8.2	6.6	7.5	4.1	92
Dominican Republic	DOM	7.2	4.4	6.0	2.8	1.5	2.2	5.7	4.9	5.3	4.1	93
Armenia	ARM	4.4	4.2	4.3	2.6	3.1	2.8	6.7	3.7	5.4	4.0	94
Viet Nam	VNM	8.2	4.0	6.6	2.8	1.2	2.0	5.3	3.9	4.7	4.0	95
Bhutan	BTN	4.7	1.2	3.1	5.1	1.0	3.3	5.1	6.4	5.8	3.9	96
Belize	BLZ	4.4	4.8	4.6	3.2	1.1	2.2	5.9	5.6	5.8	3.9	97
Bosnia and Herzegovina	BIH	3.7	2.3	3.0	2.6	4.9	3.8	6.1	3.5	4.9	3.9	98
Panama	PAN	3.4	5.3	4.4	3.2	3.0	3.1	4.9	3.2	4.1	3.8	99
Russian Federation	RUS	5.2	6.5	5.9	1.7	2.1	1.9	6.5	2.8	4.9	3.8	100
Jamaica	JAM	5.0	6.1	5.6	3.3	1.3	2.3	4.4	3.7	4.0	3.8	101
Ghana	GHA	1.4	3.3	2.4	4.5	3.1	3.8	4.4	6.5	5.6	3.7	102

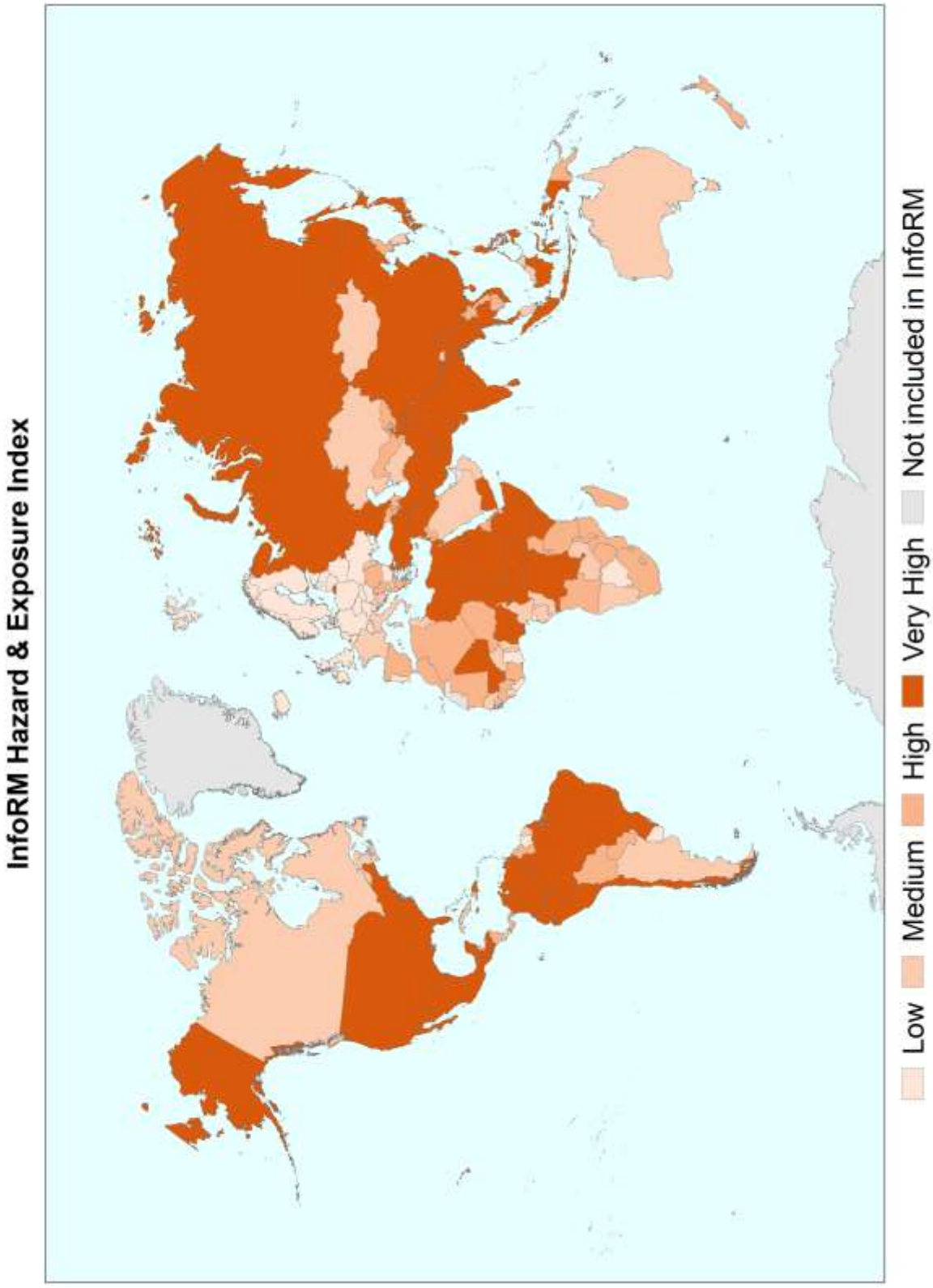
COUNTRY	ISO3	Natural	Human	HAZARD & EXPOSURE	Socio-Economic Vulnerability	Vulnerable Groups	VULNERABILITY	Institutional	Infrastructure	LACK OF COPING CAPACITY	InfoRM	RANK
Marshall Islands	MHL	0.7	1.4	1.1	7.6	5.8	6.8	7.4	6.2	6.9	3.7	103
Samoa	WSM	2.3	3.3	2.8	5.9	0.7	3.7	4.9	4.5	4.7	3.7	104
Saint Lucia	LCA	5.1	3.8	4.5	4.2	0.7	2.7	4.2	3.6	3.9	3.6	105
Nauru	NRU	1.1	2.0	1.6	6.7	0.5	4.3	7.1	6.5	6.8	3.6	106
Morocco	MAR	3.2	4.8	4.0	3.3	0.7	2.1	5.7	5.0	5.4	3.6	107
Micronesia (Federated States of)	FSM	1.8	1.0	1.4	7.1	1.5	4.9	6.3	6.6	6.5	3.6	108
Uzbekistan	UZB	6.0	3.8	5.0	2.1	1.7	1.9	5.0	4.2	4.6	3.5	109
Brazil	BRA	5.0	6.1	5.6	2.7	1.0	1.9	4.8	3.6	4.2	3.5	110
Botswana	BWA	1.9	2.6	2.3	4.4	3.4	4.0	4.3	5.3	4.8	3.5	111
Republic of Moldova	MDA	3.8	3.1	3.5	3.2	1.4	2.3	6.3	3.5	5.1	3.5	112
Malaysia	MYS	3.5	4.3	3.9	2.5	3.6	3.1	3.3	3.3	3.3	3.4	113
Albania	ALB	5.7	2.2	4.2	2.4	1.2	1.8	6.2	3.7	5.1	3.4	114
Saint Kitts and Nevis	KNA	5.3	4.3	4.8	4.0	0.5	2.4	4.0	2.3	3.2	3.4	115
Mongolia	MNG	3.3	2.4	2.9	3.2	1.6	2.4	6.1	4.6	5.4	3.3	116
Tonga	TON	2.8	1.1	2.0	5.9	0.2	3.6	5.7	4.3	5.0	3.3	117
Cape Verde	CPV	0.9	2.4	1.7	6.8	0.9	4.5	4.2	5.5	4.9	3.3	118
Chile	CHL	7.2	4.0	5.8	2.5	1.2	1.9	3.0	3.4	3.2	3.3	119
Turkmenistan	TKM	3.5	1.9	2.7	2.7	0.9	1.8	8.2	5.0	6.9	3.3	120
United States of America	USA	7.3	3.7	5.8	1.0	3.4	2.3	2.7	2.5	2.6	3.2	121
Tunisia	TUN	1.8	5.0	3.6	2.4	1.1	1.8	5.8	4.2	5.1	3.2	122
Costa Rica	CRI	4.8	2.3	3.7	2.8	3.0	2.9	3.0	2.9	2.9	3.2	123
Seychelles	SYC	3.0	2.1	2.5	5.0	1.2	3.4	4.3	2.6	3.5	3.1	124
Israel	ISR	2.9	6.8	5.1	1.1	3.2	2.2	3.2	1.9	2.6	3.1	125
Antigua and Barbuda	ATG	5.8	1.7	4.0	3.4	0.7	2.2	4.7	1.6	3.3	3.1	126
Sao Tome and Principe	STP	0.0	2.0	1.1	6.5	1.6	4.5	6.2	5.9	6.1	3.1	127
Mauritius	MUS	5.6	1.4	3.8	3.6	0.8	2.3	3.7	2.8	3.3	3.1	128
Saudi Arabia	SAU	1.1	4.8	3.1	3.6	0.3	2.1	5.3	3.4	4.4	3.1	129
The former Yugoslav Republic of Macedonia	MKD	2.8	4.7	3.8	2.4	1.3	1.8	4.8	3.1	4.0	3.1	130
Palau	PLW	2.2	1.4	1.9	4.9	0.5	3.0	6.3	3.6	5.1	3.1	131
Grenada	GRD	3.2	2.6	2.9	3.4	1.0	2.3	4.7	3.7	4.2	3.0	132
Maldives	MDV	0.2	4.6	2.7	3.4	0.9	2.2	5.6	3.4	4.6	3.0	133
Romania	ROU	4.3	4.2	4.3	1.9	1.0	1.4	4.4	4.0	4.2	3.0	134
Cyprus	CYP	2.2	2.7	2.4	1.2	6.3	4.2	2.9	2.2	2.5	3.0	135
Dominica	DMA	2.2	3.4	2.8	4.4	0.3	2.6	3.9	2.7	3.4	2.9	136
Canada	CAN	5.8	1.1	3.8	0.7	3.8	2.4	2.3	2.9	2.6	2.9	137

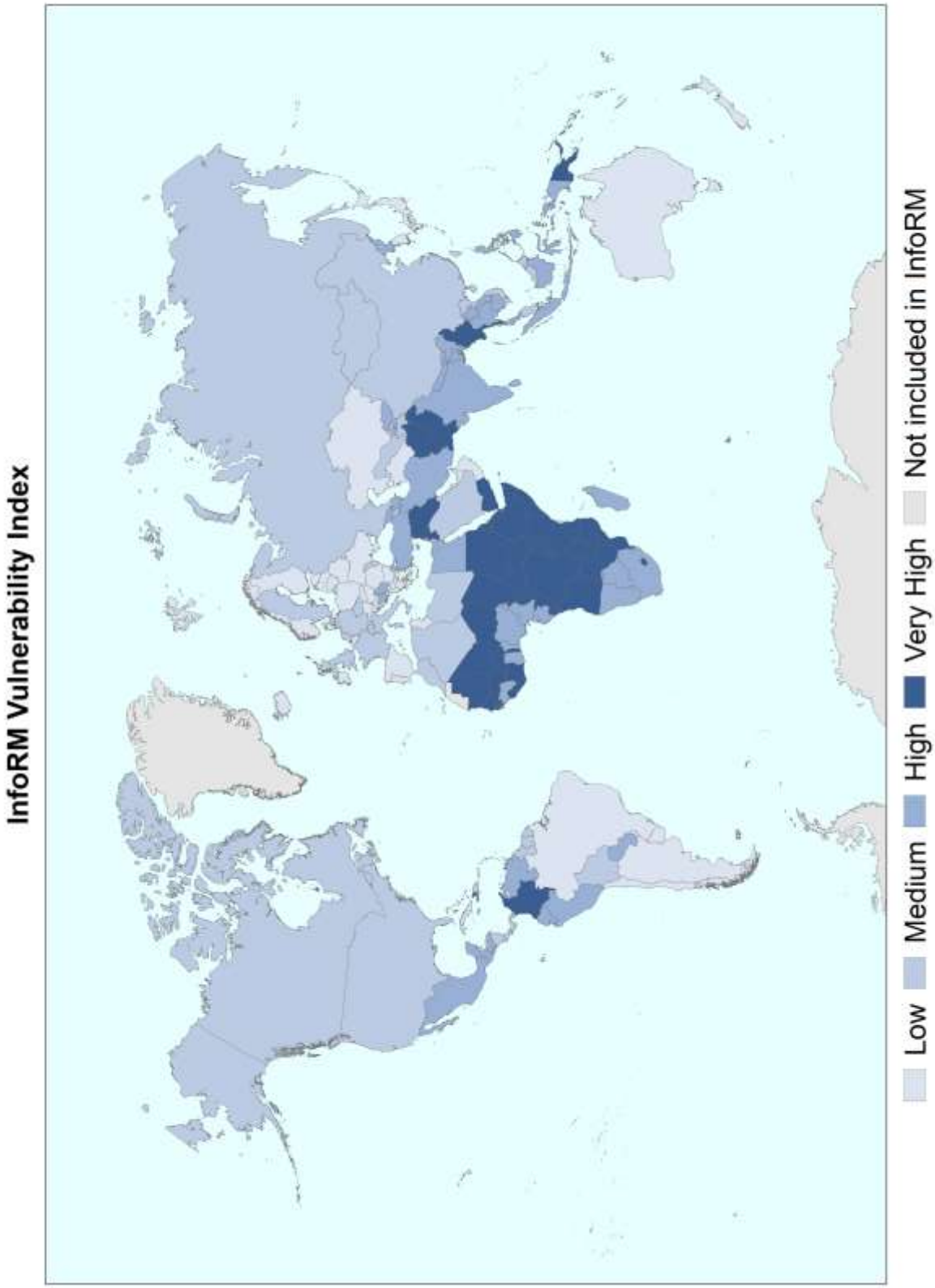
COUNTRY	ISO3	Natural	Human	HAZARD & EXPOSURE	Socio-Economic Vulnerability	Vulnerable Groups	VULNERABILITY	Institutional	Infrastructure	LACK OF COPING CAPACITY	InfoRM	RANK
Cuba	CUB	5.5	2.0	3.9	2.6	0.2	1.5	4.0	3.4	3.7	2.8	138
Bahamas	BHS	3.2	4.2	3.7	2.3	1.3	1.8	2.9	3.4	3.1	2.8	139
Suriname	SUR	1.0	2.1	1.6	3.9	0.8	2.5	5.8	4.9	5.4	2.8	140
Ukraine	UKR	2.8	2.2	2.5	1.6	1.4	1.5	7.0	3.8	5.6	2.8	141
Argentina	ARG	3.6	2.7	3.2	1.9	1.3	1.6	5.0	2.9	4.0	2.7	142
Saint Vincent and the Grenadines	VCT	1.8	3.2	2.5	3.6	0.6	2.2	3.7	3.5	3.6	2.7	143
Montenegro	MNE	2.4	1.7	2.0	1.9	3.1	2.6	4.4	3.0	3.7	2.7	144
Tuvalu	TUV	0.1	1.2	0.7	7.3	1.8	5.2	6.0	4.7	5.4	2.6	145
Kazakhstan	KAZ	3.2	4.7	4.0	1.5	0.6	1.1	5.2	3.0	4.1	2.6	146
Trinidad and Tobago	TTO	2.3	4.5	3.4	1.9	0.8	1.3	4.9	2.6	3.8	2.6	147
France	FRA	2.9	3.7	3.3	0.7	3.7	2.3	2.8	1.6	2.2	2.6	148
Kuwait	KWT	1.6	4.1	2.9	2.1	0.8	1.5	5.2	2.4	4.0	2.6	149
Oman	OMN	2.8	2.2	2.5	2.8	0.3	1.6	4.6	3.3	3.9	2.5	150
Bahrain	BHR	0.2	5.4	3.2	2.0	0.8	1.4	4.1	1.9	3.1	2.4	151
Italy	ITA	3.1	2.8	2.9	1.0	2.8	2.0	3.7	1.0	2.5	2.4	152
Australia	AUS	5.3	1.1	3.5	0.5	2.9	1.8	2.0	2.3	2.2	2.4	153
Bulgaria	BGR	2.8	1.6	2.2	1.8	1.4	1.6	4.6	2.8	3.7	2.4	154
Greece	GRC	4.2	4.5	4.4	1.2	1.0	1.1	3.7	1.6	2.7	2.3	155
Spain	ESP	5.2	3.3	4.3	1.0	1.3	1.1	3.6	1.1	2.4	2.3	156
Japan	JPN	8.4	2.4	6.3	0.7	1.0	0.8	2.2	2.2	2.2	2.3	157
New Zealand	NZL	6.8	0.8	4.5	0.8	1.3	1.1	1.9	2.8	2.3	2.2	158
Germany	DEU	2.7	1.2	2.0	0.5	4.6	2.8	2.4	1.0	1.7	2.1	159
Poland	POL	2.2	1.1	1.7	1.5	2.0	1.7	4.2	2.4	3.3	2.1	160
Czech Republic	CZE	1.8	1.0	1.5	0.8	3.7	2.4	3.7	1.6	2.7	2.1	161
United Kingdom of Great Britain and Northern Ireland	GBR	2.1	2.3	2.2	1.3	3.5	2.4	2.1	1.3	1.7	2.1	162
Croatia	HRV	3.0	2.1	2.6	1.3	0.9	1.1	3.6	2.7	3.2	2.1	163
Barbados	BRB	2.9	2.1	2.5	2.1	0.6	1.4	2.5	2.5	2.5	2.1	164
Belarus	BLR	1.5	2.7	2.1	0.8	1.1	0.9	5.1	2.9	4.1	2.0	165
Uruguay	URY	1.6	1.8	1.7	2.0	1.0	1.5	3.6	2.3	3.0	2.0	166
Republic of Korea	KOR	4.2	3.1	3.7	0.8	0.7	0.8	2.5	2.3	2.4	1.9	167
Lithuania	LTU	1.1	1.9	1.5	1.7	1.2	1.5	3.9	2.1	3.0	1.9	168
United Arab Emirates	ARE	2.7	1.2	2.0	1.3	0.8	1.1	3.3	2.7	3.0	1.9	169
Latvia	LVA	0.9	1.8	1.4	1.2	1.1	1.1	4.2	2.7	3.5	1.8	170
Hungary	HUN	2.4	1.5	2.0	1.2	1.6	1.4	2.5	1.5	2.0	1.8	171

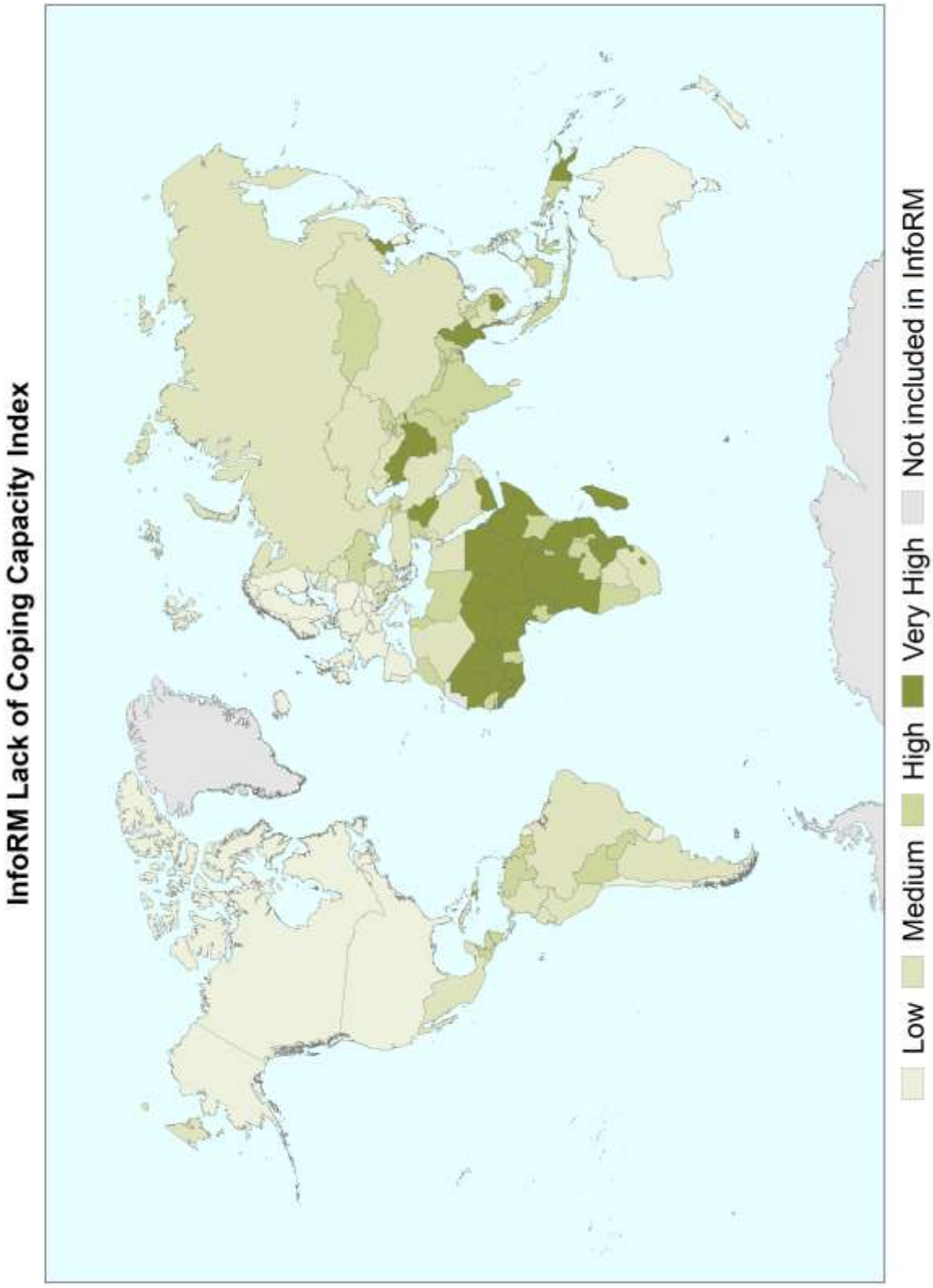
COUNTRY	ISO3	Natural	Human	HAZARD & EXPOSURE	Socio-Economic Vulnerability	Vulnerable Groups	VULNERABILITY	Institutional	Infrastructure	LACK OF COPING CAPACITY	INFORM	RANK
Slovakia	SVK	2.5	1.3	**1.9**	0.8	0.9	**0.8**	4.3	2.2	**3.3**	**1.7**	**172**
Portugal	PRT	2.5	1.3	**1.9**	1.4	0.2	**0.8**	3.4	2.2	**2.8**	**1.7**	**173**
Belgium	BEL	1.6	1.4	**1.5**	0.8	2.4	**1.7**	2.2	1.1	**1.7**	**1.6**	**174**
Netherlands	NLD	2.0	1.0	**1.5**	0.4	3.3	**1.9**	1.9	0.9	**1.4**	**1.6**	**175**
Ireland	IRL	1.9	1.1	**1.5**	0.8	1.7	**1.3**	2.6	1.6	**2.1**	**1.6**	**176**
Switzerland	CHE	2.1	0.8	**1.5**	0.7	3.3	**2.1**	1.2	1.0	**1.1**	**1.5**	**177**
Malta	MLT	0.0	1.0	**0.5**	1.6	3.0	**2.3**	3.5	1.5	**2.6**	**1.5**	**178**
Sweden	SWE	0.9	1.0	**0.9**	0.4	3.8	**2.3**	1.9	1.0	**1.5**	**1.5**	**179**
Liechtenstein	LIE	1.9	1.1	**1.5**	0.7	1.1	**0.9**	1.5	3.0	**2.3**	**1.4**	**180**
Slovenia	SVN	2.6	1.8	**2.2**	0.6	0.8	**0.7**	2.2	1.6	**1.9**	**1.4**	**181**
Estonia	EST	0.6	1.9	**1.3**	1.1	0.6	**0.9**	2.9	1.7	**2.3**	**1.4**	**182**
Norway	NOR	0.2	1.0	**0.6**	0.1	3.3	**1.9**	2.0	1.9	**1.9**	**1.3**	**183**
Qatar	QAT	0.2	1.0	**0.6**	2.3	0.3	**1.3**	3.2	1.8	**2.5**	**1.3**	**184**
Brunei Darussalam	BRN	0.0	1.1	**0.6**	1.0	0.6	**0.8**	4.8	4.3	**4.6**	**1.3**	**185**
Iceland	ISL	1.5	0.9	**1.2**	0.6	0.8	**0.7**	2.0	2.3	**2.2**	**1.2**	**186**
Denmark	DNK	0.7	1.8	**1.3**	0.6	2.2	**1.4**	0.8	1.2	**1.0**	**1.2**	**187**
Luxembourg	LUX	0.7	0.9	**0.8**	1.0	1.9	**1.4**	1.8	1.3	**1.6**	**1.2**	**188**
Austria	AUT	2.4	0.9	**1.7**	0.7	0.2	**0.5**	2.2	1.4	**1.8**	**1.1**	**189**
Finland	FIN	0.0	1.0	**0.5**	0.6	2.1	**1.4**	1.7	1.7	**1.7**	**1.1**	**190**
Singapore	SGP	0.0	1.4	**0.7**	0.8	0.2	**0.5**	1.1	1.3	**1.2**	**0.7**	**191**

ANNEX E: MAPS OF INDEXES




InfoRM Hazard & Exposure Index
Low
Medium
High
Very High
Not included in InfoRM


InfoRM Vulnerability Index
Low
Medium
High
Very High
Not included in InfoRM


InfoRM Lack of Coping Capacity Index
Low
Medium
High
Very High
Not included in InfoRM

European Commission
EUR 26528 EN - Joint Research Centre - Institute for the Protection and the Security of the Citizen

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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 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.

LB-NA-26528-EN-N

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