

Palacký University Olomouc
University of Clermont Auvergne
University of Pavia

MASTER THESIS

Critical Analysis of Humanitarian Development Nexus Indicators

Pedro Enrique Arriaza Aldana

Supervisor: Maria Sassi

GLODEP 2019



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I declare in lieu of oath, that I wrote this thesis myself. All information derived from the work of others has been acknowledged in the text and the list of references is provided in the document.

Pedro Enrique Arriaza Aldana
31.05.2019

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Zásady pro vypracování

Humanitarian assistance provision over the last fifteen years has increased dramatically in the developing world, both in volume and duration. This trend has given rise to the global need for linking humanitarian assistance projects with development programs, while keeping focus on both achieving Sustainable Development Goals and reducing risk and vulnerabilities in targeted populations. While this approach has been in the Development field for decades, there have been limited efforts to obtain quantifiable and measurable data on the results of these projects.

This research project aims to critically analyze different efforts by international organizations to measure results of Humanitarian Development Nexus projects through composite indicators. The framework for the critical analysis to be carried out in this document will be on different handbooks on the creation of composite indicators, by international organizations like the Organization for Economic Cooperation and Development (OECD), the European Civil Protection and Humanitarian Aid Operations (ECHO), among others; also considering the methodological reports by each indicator.

With the analysis of the genesis of these indicators, theoretical approach, methodologies (multivariate analysis, normalization, weighting, among other elements) and limitations, this research project is aiming to understand whether the organizations using these indicators are able to capture and correctly measure the objectives and end results of a properly Humanitarian Development Nexus designed process.

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Abstract

Humanitarian assistance provision over the last fifteen years has increased dramatically in the developing world, both in volume and duration. This trend has given rise to the global need for linking humanitarian assistance projects with development programs, while keeping focus on both achieving Sustainable Development Goals and reducing risk and vulnerabilities in targeted populations. While this approach has been in the Development field for decades, there have been limited efforts to obtain quantifiable and measurable data on the results of these projects. This research project aims to critically analyze different efforts by international organizations to measure results of Humanitarian Development Nexus projects through composite indicators. The framework for the critical analysis is based on handbooks on the creation of composite indicators, by international organizations, mainly the Organisation for Economic Cooperation and Development (OECD), the European Civil Protection and Humanitarian Aid Operations (ECHO), among others. While presenting some limitations in consistency and robustness of methodologies, many organizations are fitting into the narrative through the composite indicators, filling an important gap in the evaluation of the nexus, covering cross-cutting sectors and working towards contextualization in the different humanitarian and development setups.

Keywords: Composite indicators, Humanitarian Development Nexus, Relevance, Consistency, Applicability

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Finally, I would like to thank my family and friends, for all the support and believing in me since little. To know that they have my back, is enough to help me keep pushing forward. Thank you, mom, without you, none of the achievements in my life would be possible.

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Abbreviations

ACS	Adaptive Cluster Sampling
CPA	Community Protection Approach
CRC	Convention of the Rights of the Child
DG ECHO	Directorate-General for European Civil Protection and Humanitarian Aid Operations
DHS	Demographic and Health Surveys
DK	Don't Know
FA	Factor Analysis
FAO	Food and Agriculture Organization of the United Nations
FCA	Forgotten Crisis Assessment
HDI	Human Development Index
IASC	Inter-Agency Standing Committee
IDP	Internally Displaces Person
INFORM	Index for Risk Management
IPSI	Integrated Protection System of Indicators
JRC	Junior Research Centre of the European Commission
KMO	Kaiser-Meyer-Olkin
LSMS	Living Standards Measurement Studies
MICS	Multiple Indicators Cluster Survey
MIMIC	Multiple Indicators Multiple Causes
MPI	Multidimensional Poverty Index
NA	Not Available
OCHA	United Nations Office for the Coordination of Humanitarian Affairs
OECD	Organisation for Economic Co-operation and Development
OPHI	Oxford Poverty and Human Development Initiative
PAPFAM	Pan Arab Project for Family Health
PAR	Pressure and Release
PCA	Principal Component Analysis
PVI	Prevalent Vulnerability Index
PWSN	People With Special Needs
RCI	Resilience Capacity Index
RIMA-II	Resilience index measurement and analysis—II
RSM	Resilience Structure Matrix
SA	Sensitivity Analysis
SDG	Sustainable Development Goal
SEM	Structural Equation Model
UA	Uncertainty Analysis
UNDP	United Nations Development Programme
UNHCR	United Nations High Commissioner for Refugees
UNICEF	United Nations Children's Fund
WASH	Water, Sanitation and Hygiene
WHS	World Humanitarian Summit

Introduction

Humanitarian and development efforts too often fail to improve the conditions of communities in vulnerable contexts. According to the United Nations High Commissioner for Refugees, there are more than 68.5 million forcibly displaced people as a result of conflict and resolution, and not having their basic needs covered. And millions of this people become dependent on aid, that fails to properly cover their needs to ensure their safety and dignity.

During the World Humanitarian Summit (WHS) 2016 in Turkey, humanitarian and development actors came together and agreed on a New Way of Working, where cooperation between these two types of interventions would aim at achieving collective outcomes. People were once again put back in the center of any intervention or project, with the objective of leaving no one behind.

The idea of joint collaboration between these two sectors is not new. In the 1980 decade, during the deep food crisis in Africa, international organizations and academics found a gap between activities of relief (humanitarian assistance) and development. Humanitarian assistance was conceived as a process to support recovery and long-term development, considering development as a linear sequence to follow relief efforts. This new process, known as Linking Relief, Rehabilitation and Development (LRRD) was addressed by the European Commission for the first time in 1996, as an efficient and cohesive process towards development efforts.

Throughout the next two decades, the approach suffered many changes, due to the nature of increasing number of protracted crises around the world, and how a dynamic setup was needed to face the challenges of an ever-changing context. The biggest challenge for the implementation of LRRD came from the different natures and goals of humanitarian aid and development cooperation.

Later, the efforts during the WHS would bring donors, crisis-affected states and international organizations to agree on overcoming the long-standing humanitarian-development divide, and work together towards collective outcomes. The main objectives were to reduce risk and vulnerabilities, and help build up capacity in developing countries, while achieving safety, dignity and equality (WHS, 2016; OCHA, 2017).

As stated by the Humanitarian, Development and Peace Nexus Advisor of the United Nations Development Programme, Jahal de Meritens, for the achievement of collective outcomes,

joint planning, programming and analysis must be properly coordinated. The lack of communication, what he calls the ‘missing link’, is not comprehensive or implemented. While collection of information is crucial for decision making, there is a big challenge in contexts of protracted crises, and humanitarian actors may not have the necessary tools to properly assess the situation. De Meritens goes further as to suggest objectives in the information and knowledge management. Among the most important, is the transformation of data into easily interpreted results and products, while ensuring an open source for public access to any interested actor.

Composite indicator may play a key role in addressing this gap. As Nardo et al. (2005) and OECD (2008) define, composite indicators help simplify a complex reality into easily interpreted numbers and figures. What this research project seeks to achieve is to understand how well composite indicators, developed by international organizations, fit into the Humanitarian Development Nexus narrative, as an effort to be the missing link. Therefore, a thorough analysis will be conducted to understand the relevance, consistency and replicability of the different indicators’ methodologies within the framework of humanitarian protracted crises and vulnerable communities.

From sections 2 to 7, we will analyze the methodologies for 6 composite indicators: Integrated Protection System of Indicators (IPSI), Index for Risk Management (INFORM), Multidimensional Poverty Index (MPI), Resilience Measurement Index and Analysis II (RIMA-II), Child Protection Index and Community Preparedness Index. This analysis will be based on the handbook of best practices on the construction of composite indicators by the Organisation for Economic Co-operation and Development (OECD) and the European Commission. We will be highlighting innovative elements as well as the core components of each indicator, while bringing to light how each indicator fits into the nexus narrative. In the final section, a comparative analysis of all the indicators will be presented in such a way that the strengths and weaknesses of the methodologies will be evaluated, and opportunities to complement each other will be emphasized.

1. Methodology for the evaluation of indicators

This section presents the methodology chosen for the critical analysis of Humanitarian Development Nexus indicators, providing a background on the project and the source material for the assessment.

1.1 Project background

Humanitarian assistance provision over the last fifteen years has increased dramatically in the developing world, both in volume and duration (DG ECHO, 2016). This trend has given rise to the global need for linking humanitarian assistance and peacekeeping projects with development programs while keeping the focus on both achieving Sustainable Development Goals and reducing risk and vulnerabilities in targeted populations (OCHA, 2017). While this approach has been in the Development field for decades, there have been limited efforts to obtain quantifiable and measurable data on the results of these projects.

The Italian organization We World – GVC has created and implemented an innovative Community Protection Approach (CPA) as a context-specific process to determine patterns of risk in developing communities. This approach has supported the analysis of resilience in these communities (We World – GVC, in press, p. 2). The CPA provides the necessary tools for data analysis, as well as facilitating decision-making (We World – GVC, in press, p. 3). As a step in the validation of the methodology, We World – GVC has approached University of Pavia to conduct an evaluation of both the quantitative and qualitative aspects of the CPA. As part of the analysis of the quantitative elements, I have taken the responsibility of developing a methodological framework for the analysis of this participatory approach.

One of the most important steps comprising the CPA is the Multi-Sector Questionnaire, which collects all the relevant and necessary data for the creation of the Integrated Protection System of Indicators (IPSI). This composite indicator measures the Humanitarian-Development Nexus combining the Protection theory (DG ECHO, 2016) with the principal dimensions of humanitarian action according to Steets et al. (2010). The IPSI aims at becoming a set of indicators that will allow to identify and monitor the degree of protection of communities, combining quantitative and qualitative data. This composite indicator is “further aggregated for the construction of a series of composite indexes aiming at synthesizing the information and provide a single measurement” (We World – GVC, in press,

p.2) for the Humanitarian Development Nexus phenomenon. The IPSI is directed towards obtaining reliable, relevant and timely information, with important goals such as allowing comparability among communities and providing useful information for advocacy purposes (We World – GVC, in press).

1.2 Objective and criteria of evaluation

The evaluation of the Humanitarian Development Nexus indicators presented in this research project follow the criteria of relevance, consistency and applicability. Following the literature, the three criteria refer to:

- *Relevance* – This criterion will assess the importance of the composite indicators in the context of the Humanitarian-Development Nexus. Through the analysis of the objectives, target population, and theoretical approach and assumptions, it will be determined whether the indicators have been able to fill a gap in the Humanitarian assistance and development aid fields. An essential aspect of the analysis of relevance will be to highlight the new elements that these indicators have implemented in their methodology.

- *Consistency* – The consistency with the methodological process chosen for the construction of the indicators will be evaluated. According to von Schirnding (2002), a consistent indicator “should be unaffected by small differences in measurement techniques that may occur in the various contexts and settings in which information is collected” (von Schirnding, 2002, p. 48). The main characteristics to be assessed are soundness, coherence (structured methodology that sets a clear and meaningful path of work) and appropriateness of the methodology for the creation of the indicators through the analysis of data sources, variable selection, as well as processes like normalization, weighting, aggregation and robustness.

- *Applicability* – The aim is to assess understandability of the indicators by interested parties and potential users (von Schirnding, 2002). It considers the degree of applicability of the composite indicators in terms of degree of transferability. Transferability refers to the degree to which the results of qualitative research can be generalized or transferred to other contexts or settings (Web Center for Social Research Methods, 2008). Through the analysis of the limitations, presentation and dissemination, I will try to highlight the usefulness for comparability and applicability of the indicators.

1.3 Methodology

The methodological framework developed in the present work is based on handbooks on the construction of composite indicators by international organizations to design the methodology. Therefore, I will analyze the indicators based on internationally accepted standards such as those introduced by the Organization for Economic Cooperation and Development (OECD) and the European Civil Protection and Humanitarian Aid Operations (DG ECHO). I integrated this body of literature with the most relevant academic papers on the construction and validation of composite indicators. In this way, the methodology also reflects the major elements of the current debate on the Humanitarian-Development Nexus. Table 1 summarizes the methodological framework adopted in the evaluation. It refers to the main elements of the construction of a composite indicator (OECD, 2008; Nardo et al., 2005) organized by the evaluation criterion. For the definition of the methodology in Table 1, there is specific reference to the Handbook on Constructing Composite Indicators by the OECD and Junior Research Centre of the European Commission (2008); it compiles the most solid and well-established techniques and procedures in the creation of composite indicators. Every indicator will be evaluated by their unique methodology, and later compared and contrasted with other indicators used in the field of humanitarian crisis and disasters, and resilience and livelihood measurement. The selection of indicators is based on the literature and after several meeting with We World – GVC we agreed to include in the comparison:

- Integrated Protection System of Indicators (IPSI) by We World – GVC
- Index for Risk Management (INFORM)
 - o Crisis Assessment
 - o Forgotten Crisis Assessment
- Multidimensional Poverty Index
- Resilience Index Measurement and Analysis – II
- Child Protection Index
- Community Preparedness Index

Table 1. Methodological Framework

Elements for the Construction of Composite Indicators	Analysis Criteria
Objective	Relevance
Target population	Relevance
Theoretical approach	Relevance/ Consistency
Practical assumptions	Consistency
Data sources	Consistency
Variable selection approach	Consistency
Imputation of missing data	Consistency
Multivariate analysis (PCA, FA...)	Consistency
Normalization	Consistency
Weighting and aggregation	Consistency
Robustness and sensitivity	Consistency
Humanitarian Development Perspective	Applicability
Limitations	Applicability
Presentation and dissemination (accessibility)	Applicability

Source: Own elaboration

The final section will assess the new elements that each indicator brings to the Humanitarian Development Nexus field, as well as limitations, compared with the other indicators, with the sole objective to recommend possible solutions and adopt best practices in the improvement of the methodologies.

2. Integrated Protection System of Indicators - IPSI

2.1 Objective

The IPSI measures the Humanitarian-Development Nexus combining Protection theory (DG ECHO, 2016) with the principal dimensions of humanitarian action according to Steets et al. (2010). These dimensions are: Access, Livelihood, Access to Services, Location, Demography, Protection, Education, Stakeholders, Energy, Shelter, Gender, Transportation, Health and Water, Sanitation and Hygiene (WASH). The IPSI aims at becoming a set of indicators that will allow obtaining reliable, relevant and timely information with multiple objectives. Among these objectives is the description of Protection Risk situation in communities, while allowing comparability among these communities. An important goal for this system of indicators is to provide useful and reliable information for policy advocacy purposes (We World – GVC, in press).

2.2 Target Population

The main groups of population targeted by We World – GVC are refugees, internally displaced persons (IDPs), migrants, children and adults with disabilities, specific age groups and specific gender and diversity groups. They created the Integrated Protection Approach for the “enablement of more effective and lasting strategies to reduce aid dependence, by placing the affected population’s self-reliance at its core” (We World – GVC, in press, p.14). Through this territorial approach, the methodology aims to ensure causal factors underpinning a population’s needs and problems. This design allows the representation of age, gender and diversity, while helping to identify the situation of specific groups (e.g. refugees or migrants). (We World – GVC, in press).

2.3 Theoretical approach

The IPSI is based on a dual theoretical framework, consisting of Protection risk analysis, as defined by the Directorate-General for European Civil Protection and Humanitarian Aid Operations (DG ECHO), and the cluster approach introduced by the Inter-Agency Steering Committee (IASC) on 2005 (Steets et al., 2010). The result is an ambitious and solid methodology that overcomes one of the several challenges that have hindered the capacity of the international community to find an approach to present a multi-sector assessment of the links between Humanitarian and Development programs. This lack of transmission and

linking mechanisms between the international humanitarian community and development programs has led We World – GVC to create a multidimensional approach to assess populations’ vulnerabilities, risks and capacities.

The Protection Risk approach has become one of the standard methodologies in context analysis since 2004 in the humanitarian field, where protection needs are “determined by assessing the threats faced, and the vulnerabilities and capacities possessed in relation to those threats¹” (DG ECHO, 2016, p.9). These three concepts become essential in the construction of the IPSI, since they become the three main dimensions in which the indicators are classified in. As suggested by DG ECHO (2008), risk analysis “must always be context-specific”, and any form of intervention and project should have the affected population in the center, ensuring their participation in analysis and decision-making. One of the most important characteristics of the CPA (which lays the groundwork for the collection of data for the development of the IPSI) is placing the affected population’s self-reliance at its core. Nonetheless, the protection risk analysis lacks the capacity to be applicable for policy advocacy and context specificity in the humanitarian intervention field. Cluster approach (introduced by IASC) was considered by We World – GVC for solving this limitation, to determine of the main dimensions of humanitarian intervention². The cluster approach objective is to “strengthen system-wide preparedness and technical capacity to respond to humanitarian emergencies” (Steets et al., 2010, p.24).

This solid theoretical background, based on the guidelines by DG ECHO (2016), and adopted by the international community is essential to lay the foundations for the construction of a credible composite indicator. The process to select and construct indicators followed by We World – GVC ties with the suggestion by OECD (2008) for the development of a theoretical

¹ According to DG ECHO (2016), threats, vulnerabilities and capacities are defined as followed:

Threats: “Violence, coercion, deprivation, abuse or neglect against the affected population/individual. It is committed by an actor (note that perpetrators and duty-bearers are sometimes the same actor).”

Vulnerabilities: “Life circumstances (e.g. poverty, education) and/or discrimination based on physical or social characteristics (sex, disability, age, ethnicity, religion, sexual orientation, etc.) reducing the ability of primary stakeholders (for example, individuals/households/community) to withstand adverse impact from external stressors. Vulnerability is not a fixed criterion attached to specific categories of people, and no one is born vulnerable *per se*.”

Capacities: “Experiences, knowledge and networks of primary stakeholders (e.g. individuals, households, communities) that strengthen their ability to withstand adverse impact from external stressors. Capacities represent the opposite of vulnerabilities.”

² Access, Livelihood, Access to Services, Location, Demography, Protection, Education, Stakeholders, Energy, Shelter, Gender, Transportation, Health and Water, Sanitation and Hygiene (WASH)

framework, in which the process should “ideally be based on what is desirable to measure and not on which indicators are available” (OECD, 2008, p.22)

2.4 Practical assumptions

The IPSI is designed to describe the situation of Protection Risk in developing communities, mainly composed by refugees, internally displaced persons (IDPs), migrants, children and adults with disabilities, specific age groups and specific gender and diversity groups. The definition of community used by We World – GVC (in press):

“Community represents a group of people that may be exposed to similar physical, psychological, and/or social impacts from multiple coercive factors and/or share the same resources, often, but not exclusively, related by place.”

The definition of community is key for the data collection and sampling techniques applied in the targeted population, and will directly influence the quality of data. We World – GVC has chosen three methods for sampling: purposive sampling, clusterization and segmentation techniques. The chosen sampling methodology will depend on the size of the community to be interviewed. The combination of different sampling strategies is consistent with recent development in quantitative and qualitative methods in social sciences research (Palinkas et al., 2015). Below, some strengths of each of the sampling techniques are described, to further support the use of combined methods in qualitative and quantitative research:

- Purposeful sampling is a non-probabilistic sampling method used in information-rich contexts, where the willingness to participate from the sample is of high importance. (Palinkas et al., 2015).
- Clusterization method is used by We World – GVC when the communities in a rural context are spread out and only when these communities present homogenous characteristics. Qureshi et al (2017) suggest that an Adaptive Cluster Sampling (ACS) design can provide meaningful results in data collection and “yields for better inference than that provided by the comparable non-adaptive sampling designs” (Qureshi et al., 2015, p.2761) that come from only using one sampling methodology.
- Segmentation allows to divide a big community into smaller groups (maintaining homogenous characteristics within the smaller segments), and better fits into urban contexts (We World – GVC, in press).

2.5 Data sources

The strength of the data directly affects the quality of the composite indicators. The collection of data for the IPSI is completed through a multi-sector questionnaire (one of the steps of the CPA approach created by We World – GVC). The main objective of the questionnaire is to identify specific vulnerabilities and capacities that the population possess, and risk factors that communities face, through a set of questions which include the main humanitarian sectors, in a risk-analysis context (We World – GVC, in press). To ensure that the data is collected in the most comprehensive way, the questionnaire is conducted by two interviewers to a group of community representatives (one man and one woman younger than 30 years old, and one man and one woman older than 30 years old; of this group, there should be at least one mother; one of the members should be the community leader). The strength of this methodology is the availability of mainly primary data for the construction of this composite indicator.

After data is collected, the results are processed and classified into 102 indicators, total composition of the IPSI.

2.6 Variable selection approach

The first step in the selection of indicators is to classify them based on the capacity to represent one of the three dimensions of Protection risk approach (Threats, Vulnerabilities or Capacities). These same indicators are later selected and classified to represent one of the 12 dimensions of humanitarian action.

The overlapping of the two approaches (protection risk and sectors of humanitarian action) create a system of indicators which can represent Threats, Vulnerabilities and Capacities in 1 of the 12 humanitarian fields of action (We World – GVC, in press). While one indicator cannot be classified at the same time in one of the three dimensions of protection risk, it can be present in one or more sectors of humanitarian intervention.

2.7 Imputation of missing data

Missing data is very common in datasets for the construction of composite indicators. Through the analysis of some indicators composing the IPSI, we have found several items that present a high number of “Don’t Know” (DK) and “Not Applicable” (NA) answers; they are $\frac{1}{4}$ of total indicators. Table 2 presents these indicators together with the percentage of

DK and NA answers in the whole sample, and a total of the percentage of the DK and NA data on the indicator.

The main problem with missing data is the reduction of representativeness of the sample. Moreover, a high number of DK answers makes a question not relevant.

Different authors have a different rule of thumbs for an acceptable percentage of missing data:

- University of Geneva (2018) indicates that 20 to 40% of missing data represent a problematic case due to possible distortion in inferences about the population.
- Lebovic (2015) suggests deleting observations when less than 5% of the data is missing. When missing data accounts for more than 5%, he suggests the procedures of simple (mean, median or mode) or multiple imputations. However, the literature suggests following this approach if missing data is less than 20% of total responses.
- Bennett (2001) asserted that when more than 10% of data are missing, statistical analysis is likely to be biased.

Imputing missing data (during the process to complete the dataset for the construction of a composite indicator) can lead to an underestimation of the variance.

According to Nardo et al. (2005) and OECD (2008), missing data can be at random and non-random fashion. By the nature of the missing data in the dataset by We World – GVC, we can say it is missing in a non-random fashion. A non-random missing data case depends on the variable itself, and its value is difficult to predict by available information from the same variable (Nardo et al., 2005).

Both Nardo et al. (2005) and OECD (2008) suggest that, when facing a non-random missing pattern, this pattern should be discussed and explained in the presentation of results. Facing a non-random missing data “could imply ad hoc assumptions that are likely to influence the result of the entire exercise” (Nardo et al., p.10).

Young (2012) presents possible solutions in the field of sociology and demography. We World - GVC has employed the method called Neutral/Middle category coding, in which a DK answered is coded in the middle of the scale. In this sense, data is arbitrary and not empirical. We recommend giving specific attention to the conceptual and/or empirical sense of combining a DK answer with a response that indicates an opinion.

Table 2. Don't Know and Not Applicable Answers in Indicators

Indicator	Percentage of DK	Percentage of NA	Total Percentage of DK and NA
Checkpoint Severity of Movement Restriction	2.70	65.20	67.9
Percentage of Persons With Specific Needs	26.28		26.28
Percentage of Single Female-Headed Households	34.80		34.80
Percentage of Children Headed Households	78.69		78.69
Percentage of Elderly Headed Households	49.72		49.72
Percentage of Persons Without Legal Residency	54.83		54.83
Curfew Severity of Movement Restriction	1.56	78.13	79.69
Percentage of Children Diagnosed with Acute Undernutrition	83.38	1.14	84.52
Employment of PWSN	39.63	10.23	49.86
Percentage of Unaccompanied Separated Children	75.00		75.00
Mechanism for the Resolution of Internal Conflicts	10.23	87.36	97.59
Number of Basic Services Within Walking Distance	89.35		89.35
Percentage of Persons Who Have been Arrested*	99.43		99.43
Number of Vulnerable Population Groups Not Using the Safest Transportation Mean Available	14.35	26.85	41.2
Number of Population Groups Covered By Assistance		27.41	27.41
Agricultural Productive Assets Index	20.03	13.35	33.38
Average Percentage of House Rent Payment Over Total Income	1.42	88.21	89.63
Estimated Average Percentage of Children Vaccinated	28.13		28.13
Fishing Productive Assets Index*	0.14	99.86	100
Herder Productive Assets Index	1.42	96.59	98.01
Percentage of Shelters Connected to the Electricity Grid	42.90		42.90
Number of Sectors not Covered by any Stakeholder		27.41	27.41
Unaccompanied Separated Children Situation	1.85	73.44	75.29
Safe Access to Energy Sources	76.70		79.70

*We World - GVC has indicated that these two indicators are out of the calculation for the first version of the IPSI because they are not appropriate for the context of Palestine/Lebanon.

According to Young (2012, p. 57), since the respondents neither agree nor disagree, the responses are considered “indicators of neutrality or ambivalence”. The author cautions the

reader of the low scrutiny this method has been given, even though it is commonly used in cases of missing data.

For the validation of the method used by We World –GVC, we recommend the use of alternative methods for imputing missing data. Among them, there are the Cold Deck and Hot Deck imputation methods. With the Cold Deck imputation, the missing values are replaced with a constant value from an external source (Nardo et al., 2005), such as official statistics. The Hot Deck imputation consists of filling missing data with similar respondents in the dataset. The researcher is the one to decide which set of variables (known as decks) will be sorted to determine similar respondents to those of the ones presenting missing data. For this procedure, Myers (2011) suggests three characteristics of the chosen set of variables:

- a. Little to no missing data
- b. Discrete values rather than continuous
- c. Related to the variable being imputed

Hot-deck imputation “has the effect of assigning a response to nonresponses by random sampling [...] to that question from other respondents with the same set of values on the deck variables as the respondent” (Myers, 2011, p. 12).

2.8 Multivariate analysis

The most commonly methodologies for analyzing data sets with more than one variable are Principal Component Analysis (PCA), Factor Analysis (FA) and Cronbach Coefficient Alpha (c-alpha) (OECD, 2008; Nardo et al., 2005). The focus on this analysis will be the advantages and limitations that PCA present, as it's the selected methodology for weighting the IPSI.

PCA's main objective is to explain the variance of the dataset, through a small number of variables (principal components) that cause most of the data's variation (OECD, 2008). An advantage in the use of PCA is that it can “summarize a set of individual indicators while preserving the maximum possible proportion of the total variation in the original data set” (OECD, 2008, p.26). Another strength in the use of PCA is the intuitive interpretation that its results bare. Each variable's coefficient relates to how much variability it contributes for other variables (Moser and Felton, 2007). Certain assumptions need to be considered when applying PCA to a dataset:

- The IPSI satisfies the condition of *sufficient number of cases*. Gorsuch (1983) states that there need to be up to 200 cases to apply PCA. Many other authors present smaller

requirement for cases: Bryant and Yarnold (1995) suggests that the cases-to-variables ratio should be no lower than 5 (IPSI has at least 700 cases and around 100 indicators); Hutcheson and Sofroniou (1999) recommend between 150 and 300 cases; Lawley and Maxwell (1971) suggest a *significance rule* in which there should be 51 more cases than number of variables.

- Strong intercorrelations are not a necessary condition for applying component analysis, but the presence of low intercorrelation raises the need of using as many factors as original variables, presenting a technical difficulty for the process of PCA (which requires a lower number of factors than that of variables) (Nardo et al., 2005). The Kaiser-Meyer-Olkin (KMO) measure helps compare the observed correlation coefficients to partial correlation coefficients. It is a measure of sampling adequacy, and it should be overall 0.60 or higher to proceed with PCA (OECD, 2008).

The Cronbach Coefficient Alpha is an essential step in multivariate analysis. It could represent a methodology to understand which individual indicators could be eliminated from the IPSI. A high c-alpha is a measure of reliability of an individual indicator to measure the desired phenomenon. The general rule of thumb for c-alpha is that it should present a higher value than 0.70 (OECD, 2008; Nardo et al., 2005; Nunnally, 1978).

2.9 Normalization

Scale transformation and Min-Max methodologies were implemented in the process for normalization of the dataset. Due to the nature of the indicators, some of them were subtracted from zero in the normalized values, to ensure that theoretical direction of risk is aligned with the empirical value. This proves especially useful in the dimension of Capacities, where a higher value of capacities should represent a lower risk (value closer to zero).

We World – GVC needs to take caution in the use of Min-Max methodology for future iterations of the IPSI. “This transformation is not stable when data for a new time point becomes available” (OECD, 2008, p.85). The introduction of possible new minimum and maximum values for individual indicators may affect the comparability between existing and new data. Therefore, the composite indicator should be re-calculated considering the time factor, or there should be a decision to establish absolute maximum and absolute minimum values across countries.

2.10 Weighting and aggregation

Weighting

The need to combine indicators and dimensions in a meaningful way is central for the construction of a composite indicator (Nardo et al., 2005). The innovative approach that We World – GVC chose for the weighting of the IPSI proves the effective combination of statistical and theoretical models to produce robust results.

The weighting of the IPSI indicators is obtained from the average of a theoretical model and a statistical model. The theoretical method consisted on weights assigned by 3 experts based on “severity” criteria, scaling from 1 (less severe) to 5 (more severe), which was later rescaled into 0 to 1. The statistical model consisted on the weights obtained through Principal Component Analysis, conducted separately by grouping the indicators on the three dimensions of the Protection Risk theory: threats, vulnerability and capacities.

When approaching weighting through a theoretical model, Greco et al. (2018) suggests that the ideal setup is the combination of stakeholders, policymakers and expert analysts in an open debate. The authors caution that this approach “could result in an endless debate and disagreement between the participants” (Greco et al, 2018, p.67) when the number of indicators is very large, which is the case of IPSI.

After the average of the weights from the two methods is obtained, these weights are standardized with the objective of building a trade-off mechanism by which an indicator gains importance (i.e. $w > 1$) while other lose importance (i.e. $w < 1$). This method keeps the assumption that the sum of all weights should be equal to the number of indicators, as if all indicators would have equal weights (1).

An important limitation to highlight on the weighting methodology of the IPSI is the weak correlation structure of the indicators for the Vulnerability and Capacities Index (We World – GVC, in press, 2019). The PCA approach for weighting cannot be used when the correlation is weak between indicators (OECD, 2008). We World – GVC has highlighted the importance of working on the correlation structure for the creation of “a more relevant and coherent structure [...] and thus, reliable index” (We World – GVC, 2018, p.8).

Aggregation

The aggregation of the IPSI indicators into the indexes (Protection risk theory and dimensions for humanitarian action) is obtained through a weighted arithmetic mean (We – World –

GVC, in press, 2019). The use of linear aggregation yields meaningful composite indicators when data is expressed on a partially comparable interval scale (Ebert and Welsch, 2004). As described in the previous section, through the normalization process, the IPSI expresses every indicator on a same scale of risk values ranging from 0 (no risk) to 1 (highest risk). The use of this methodology demonstrates a consistent and interlinked process by We World – GVC in the construction of this composite indicator.

Whereas the use of a linear aggregation method is correctly applied, we recommend considering the use of weighted geometric aggregation. Nardo et al. (2005) correctly states that the use of linear aggregation implies full compensability across dimensions, such as poor performance by some indicators can be totally compensated by better performance/highest values in other indicators.

2.11 Robustness and sensitivity

Sensitivity analysis provides an understanding on how variation in the different steps of creating a composite indicator can lead to different outputs (OECD, 2008).

Two suggested methods for the evaluation of robustness of the composite indicator are:

1. Inclusion and exclusion of individual indicators. The current number of indicators included in the IPSI is a high number and can lead to difficult in interpretation and applicability for policy advocacy. Reducing the number of indicators in the ones that present less severity and higher percentage of missing data could provide a comprehensive method to measure robustness of these composite indicators.
2. Using different aggregation systems. As previously suggested, the aggregation method through weighted geometric mean is an important exercise, to not allow for compensability across dimensions (Nardo et al., 2005).

As an additional method, OECD (2008) and Nardo et al. (2005) suggest the use of different values for weights. These weights could be obtained from applying PCA with loadings to different factors to the ones already applied. In the specific context of the IPSI, it is also suggested to apply the weights, without carrying out the standardization process.

In the case of the methodology expanded to other countries, we recommend considering the Monte Carlo methodology as possible approach for Uncertainty Analysis (UA) and Sensitivity Analysis (SA). One of the key aspects in this methodology is the availability of

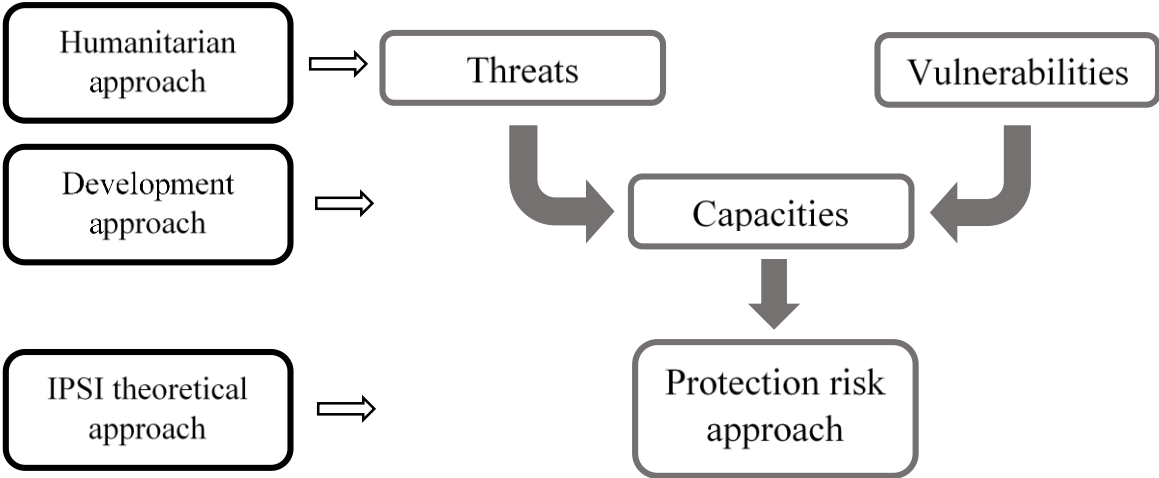
country rankings, to account for uncertainty factors and the changes it produces in the final composite indicator (Saisana, Saltelli and Tarantola, 2005).

2.12 Humanitarian Development Perspective

When the New Way of Working was established, one of the defined characteristics of the approach was the need for context-specific analysis (OCHA, 2017). Through the CPA and the multi-questionnaire for data collection for the IPSI, We World – GVC is aligned with the Humanitarian Development Nexus perspective, through the specificity of the context of each community being evaluated. The inclusion of the main dimensions of humanitarian action, within a context-specific approach can only “increase coherence between development and humanitarian efforts” (OCHA, 2017, p.5).

The collective outcomes (main objective of Humanitarian Development Nexus efforts) require the involvement of different actors for the attainment of specific goals. Humanitarian actors, through critical programming, need to reduce risk (threats) and vulnerability. Development actors, among other objectives, seek to strengthen institutions and capacities (OCHA, 2017). The combination of these 2 actors and their goals, result in the basis for the theoretical background of the IPSI: protection risk approach. Figure 1 summarizes this relationship and interlinks the main objective of the IPSI with critical aspects of collective outcomes (within the New Way of Working context):

Figure 1: Connection between IPSI and Humanitarian Development Nexus



Source: Own elaboration

The IPSI is an important step forward in understanding the connection between humanitarian and development interventions, providing an essential approach to initiate joint efforts across different actors with a common goal: people in need. Through an adequate and intuitive presentation of results, the IPSI can prove to be a guiding light towards attainment of proper collective outcomes.

2.13 Limitations

Although specific limitations have been highlighted in previous steps of the construction of the IPSI, there is an underlying factor to be considered in every step: interpretability of the data and results. Nardo et al. (2005) and OECD (2008) note that among the advantage of composite indicators, two essential ones are the facilitation of communication with general public and enabling users to compare complex dimensions effectively. To properly comply with these characteristics, the data and results of the IPSI should be easily interpreted and accessible, especially when the target audience is the general public.

At the same time, to allow for comparison of complex dimensions across different realities (global, regional and local), it is suggested to create thresholds for the interpretation of the IPSI. The final values of the indicators and the indices (Threats, Vulnerabilities and Capacities; and Humanitarian dimensions) are between 0 and 1. For easy access to interpretation of these values, it is suggested to establish thresholds and explanation of the scale value to be able to categorize the countries or communities within a certain risk group. It is recognized that the individual values of indicators work as the trigger mechanism for identification of critical cases for individual and community interventions (We World – GVC, 2018), but it would prove valuable the establishment of overall index thresholds, to allow for comparability and interpretability of results.

2.14 Presentation and dissemination

Von Schirnding (2002) highlights one of the most important characteristics of a composite indicator, that of transferability. A composite indicator has to be comparable and applicable to different contexts, other than the one where it was originated. When the methodology is to be expanded to other countries, We World – GVC needs to take caution in several aspects that will allow for further comparability and applicability of the IPSI, specifically in the steps of normalization (min-max methodology, while assigning absolute maximums and absolute

minimums across countries) and weights and aggregation (deciding whether maintain absolute weights across countries or relative for each context).

Obtaining a parsimonious result for the IPSI involves the removal of unnecessary information, including indicators that are not relevant for global, regional or local contexts. Any composite indicator needs to be easily understandable by current and potential stakeholders. As von Schirnding (2002) assesses, the results should be simple to disaggregate, with the purpose of targeting specific groups or actions. This is especially useful at the level of disaggregation of the dimensions of humanitarian intervention, which can help policy advocates and stakeholders to better distribute and assign specific actions and projects, aiming for collective outcomes.

3. Index for Risk Management and Related Indexes

The Index for Risk Management (INFORM) is considered by the JRC and the Inter-Agency Standing Committee Task Team (IASC) to be the first “global, open-source, continuously updated, transparent and reliable tool for understanding risk of humanitarian crises and disasters” (Marin-Ferrer, Vernaccini and Poljansek, 2017, p.6). With the purpose of assessing the needs in specific countries, ECHO has developed two methodologies that extract information from INFORM to ensure that priorities are correctly identified within humanitarian crises contexts. Crisis Assessment Index “identifies countries suffering from a natural disaster and/or conflict and/or hosting a large number of uprooted people” (DG ECHO, 2017). Forgotten Crisis Assessment (FCA) identifies affected populations, within conflict contexts, not receiving enough international aid or even none, due to low media coverage or lack of donor interest. The first section on this chapter will analyze the methodology of INFORM, with the subsequent sections covering details on the Crisis Assessment Index and the FCA.

3.1 INFORM Methodology

In this subchapter, we will analyze the main steps in the construction of the indicator, considering the relevance and consistency of its methodology, while highlighting its limitations and main advantages. The ‘Index for Risk Management, Concept and Methodology Report – Version 2017’, will be referenced, playing a crucial role in informing the process of creation of this composite indicator.

3.1.1 Objective

As described by Marin-Ferrer, Vernaccini and Poljansek (2017), INFORM seeks to provide a transparent, flexible and evidence-based outlook at humanitarian crises risk on three different levels: global, regional and national. INFORM seeks to rank countries and allow the identification of need of international assistance in the near future. In the policy context, the INFORM report in the past five years, has been used to provide scientific support in over 14 European Union policy initiatives that support decisions about prevention and preparedness to humanitarian crises.

3.1.2 Target Population

The core INFORM is calculated currently for 191 countries, considering one of the main questions the methodology is trying to answer: “Which countries are at risk of crisis that will require humanitarian assistance in response to disasters” (Marin-Ferrer et al., 2017, p.10). One of the defining characteristics of INFORM is the transferability to subnational levels, with JRC conducting projects in Latin America, South Africa and Central Asia regions. While selecting the indicators to compose INFORM, the capacity of disaggregation was selected as criteria; and when only national level indicators are available, the ratio or fraction of population for subnational units is applied (De Groeve, Poljanšek and Vernaccini, 2014).

3.1.3 Theoretical approach

Two conceptual framework of disaster risk are the strongest influence for the development of INFORM: features of the pressure and release model (PAR model) and Cardona’s framework on vulnerability and risk.

The pressure and release model (PAR) considers risk as the result of hazard and vulnerability that involve “global root causes, regional pressures and local vulnerable conditions” (Füssel, 2007). The model goes further to indicate how cumulative pressures of hazard and vulnerability originate from root causes, such as local geography and social differentiation (Adger, 2006).

In the context of Latin America, Cardona (2011) created a series of indicators to measure disaster risk management. In doing so, he created the Prevalent Vulnerability Index (PVI), defining vulnerability in three aspects: physical exposure in prone areas, socioeconomic fragility and lack of resilience to recover from disasters (Cardona, 2011, p.35). These three aspects were adapted to INFORM in the form of two dimensions: Vulnerability and Lack of coping capacity.

The combination of these two frameworks allowed JRC to develop three main dimensions or risk, which later shape the basic INFORM structure: Hazards and exposure, Vulnerability and Lack of coping capacity.

3.1.4 Data sources

INFORM bases its construction in secondary data, collected and created by international organizations and academic institutes (e.g. United Nations Development Programme, Oxford Institute, Food and Agriculture Organization, among others). Using secondary information

provides INFORM with data that is “potentially scalable from national to local level, from yearly to seasonal scale” (Marin-Ferrer, Vernaccini and Poljansek, 2017, p.12).

3.1.5 Variable selection approach

As evidenced by Table 3, the multilayer structure of 54 indicators composing INFORM, is divided in 3 dimensions with 2 categories each, which represent a group of individual indicators. The criteria for selection of indicators were relevance, representativeness and robustness.

Table 3: INFORM model

Risk	INFORM																
Dimensions	Hazard & Exposure					Vulnerability				Lack of coping capacity							
Categories	Natural				Human	Socio-Economic		Vulnerable groups		Institutional	Infrastructure						
Components	Earthquake	Tsunami	Flood	Tropical cyclone	Drought	Current conflict intensity	Projected conflict intensity	Development deprivation	Inequality	Aid dependency	Uprooted people	Other vulnerable groups	Disaster Risk Response	Governance	Communication	Physical infrastructure	Access to health system

Source: Adapted from ‘INFORM Index for Risk Management. Concept and Methodology Report – Version 2017’ by Marin-Ferrer, M., Vernaccini, L., Poljansek, K. (2017) JRC Science for Policy Report. EUR 28655 EN, doi:10.2760/094023, p.12

Due to the main purpose of INFORM to be used as a tool for identification of potential risks at different levels, one of the essential characteristics for the selection of indicators was the capacity to be disaggregated into subnational values. Individual indicators may also have the characteristic to be indexes by themselves (e.g. Human Development Index (HDI), Multi-dimensional Poverty Index (MPI), Gender Inequality Index, among others).

3.1.6 Imputation of missing data

As recognized by the creators of INFORM, missing data can greatly distort the value of an indicator, which is one of the main reasons it is clearly stated for each individual indicator, the amount of countries that are missing this information. JRC goes one step further and creates the INFORM Lack of Reliability Index, which in a scale of 0 to 10, assigns a value

of reliability to every country about the value of the index and individual indicators. It is based on three dimensions: missing data, out of date data and conflict status. Data collection in contexts of conflict and severe humanitarian crises can prove challenging, therefore affecting the reliability of indicators based on this information (Lin et al, 2017; United Nations Population Fund, 2010).

To account for missing values, the methodology applies a systematic imputation using data from the most recent available year, on a span of 5 years maximum. When there is no available data, new similar indicators are used as proxy to try to measure the same phenomenon.

3.1.7 Normalization

INFORM values are presented on a scale from 0 to 10, where a higher value represents a worse situation for the assessed country. JRC establishes an absolute minimum and maximum value for every indicator with the objective of making individual transformations of indicators stable through time series. An inversion may also be applied in the case of individual indicators where a higher value represents a better scenario.

3.1.8 Weighting and aggregation

Through the three dimensions and six categories, four different aggregation techniques are implemented in the creation of INFORM: minimum (best indicator is used), maximum (worst indicator is used), arithmetic average and geometric average. As an example, where the maximum value is used, the components of Current conflict intensity and Projected conflict intensity, only the maximum value is applied, to reflect the highest possible risk that the country may face. As Nardo et al. (2005) and OECD (2008), choosing between geometric and arithmetic mean will depend on the degree of compensability that the creator of the composite indicator wants to assign between categories and/or dimensions. There seems to be a lack of consistency regarding the chosen techniques of aggregation, as some categories make use of geometric mean while other of arithmetic mean, and even in some cases, weighted arithmetic mean. In many cases, when equal weighting is applied during the construction of composite indicators, an element of double counting can be unintentionally introduced in the dataset. To avoid this potential problem, a correlation analysis could be applied between individual components, categories and dimensions (Nardo et al., 2005; OECD, 2008).

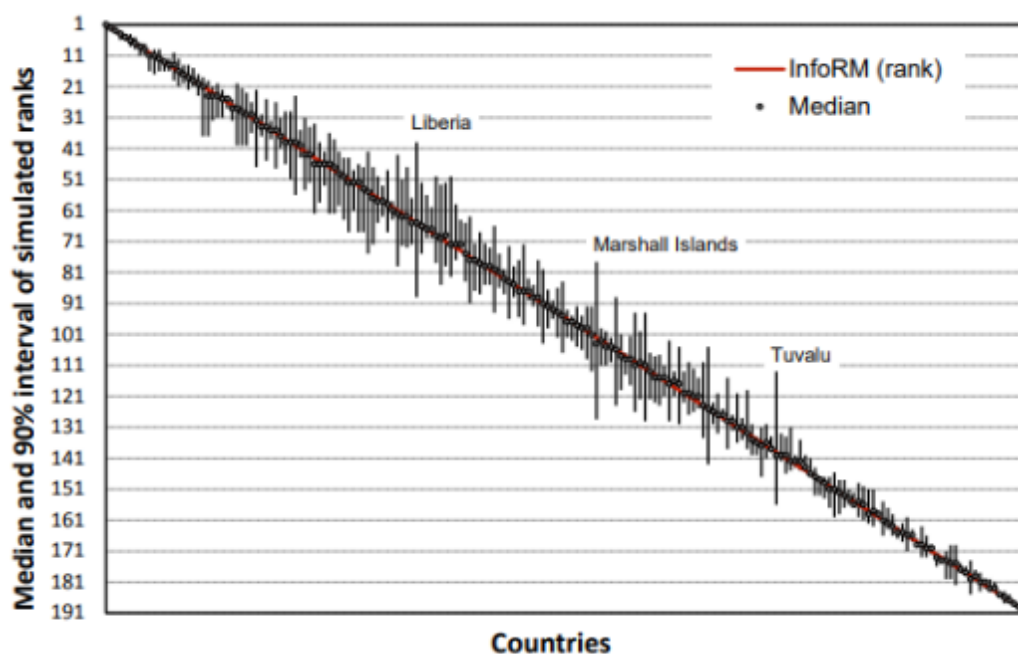
The final INFORM score corresponds to the use of the following formula:

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

3.1.9 Robustness and sensitivity

In previous iterations of the INFORM, the methodology for sensitivity analysis used by JRC was the selection of different plausible values for the weights across dimensions, as suggested by Nardo et al. (2005) and OECD (2008). The results indicated that the median rank in all scenarios is practically identical to the baseline, which helps with the conclusion that the risk classification is representative across different weighting schemes (De Groeve et al., 2014). The results can be seen for INFORM 2014 in Figure 2, below.

Figure 2: Uncertainty analysis of INFORM 2014 ranking



Source: Adapted from ‘INFORM Index for Risk Management. Concept and Methodology Report – Version 2014’ by De Groeve, T., Poljanšek, K. and Vernaccini, L. (2014) JRC Science for Policy Report. EUR 26528 EN, doi: 10.2788/78658, p.56

3.1.10 Humanitarian Development Perspective

In the New Way of Working, introduced by OCHA (2017), it is established that the goal of the Sustainable Development Goals (SDGs) is not only to meet needs, but to reduce risk and

vulnerability of population in need. The application of INFORM in humanitarian crises context can support decisions in 14 of the 17 goals, especially goals 1, 3 and 16³ (IASC & JRC, 2017). The level of disaggregation for individual indicators in INFORM allows the users to select specific indicators to create personalized composite indicators, through an arithmetic mean aggregation method. The example put forward in the INFORM Results of 2018 for SDG 1 was the selection of the four indicators of the Vulnerability Dimension: HDI, MPI, Gender Inequality Index and Gini Index. The results show the countries with most distance from achievement of that SDG. The results are shown in Table 4. Therefore, not only does INFORM support in the identification of humanitarian crises and risk contexts, it also allows the monitoring in the progress of achievement of the UN Agenda for 2030. The link between these two aspects becomes essential for any organization, decision takers and policy makers, to assess the length of the impact of a project on the achievement of an overall outcome, where the center should always be the people (community) where it wants to create and impact.

Table 4: Countries with most distance from achievement

1	Somalia	10.0	7	Burkina Faso	7.6
2	South Sudan	8.7	8	Niger	7.6
3	Eritrea	8.6	9	Korea DPR	7.4
4	Central African Republic	8.5	10	Mozambique	7.2
5	Guinea-Bissau	8.2	11	Congo DR	7.1
6	Chad	8.2	12	Haiti	7.1

Source: Adapted from ‘INFORM Global Risk Index Results’ by Inter-Agency Standing Committee & Junior Research Centre (2017) European Commission, p.23

Another important characteristic in the field of humanitarian development nexus is the transferability of methodologies to a highly context-specific approach (OCHA, 2017). Since the conception of INFORM, one of the most important characteristics for the use of individual indicators and components is the capacity of indicators for disaggregation to subnational levels, empowered through the leadership of local organizations.

³ Goal 1: No Poverty. Goal 3: Good Health and Well-being. Goal 16: Peace, justice and strong institutions

3.1.11 Limitations

INFORM highlights its main limitations in the methodological report. They classify the limitations in three categories:

1. Methodological limitations. The use of composite indicators to simplify a complex reality can invite politicians to simplistic views. It also emphasizes on its lack of analysis between dimensions and categories.
2. Data limitations. Certain hazardous events limited to a specific area are not considered, which may considerably underestimate the risk at subnational level of specific groups (e.g. landslides, volcanic eruptions, forest fires). It cautions the user on how missing data can distort the real value of the composite indicator. It also indicates that in case of countries facing internal conflicts, the reliability in data is low.
3. Ranking of countries. While the result of INFORM is a simple mathematical function, which can help classify countries into certain categories, the complex reality of humanitarian crises need to be further considered and qualitatively analyzed.

Although created by the same organization that wrote the Handbook on Constructing Composite Indicators (Joint Research Centre of the European Commission), the INFORM methodology is lacking an essential step in understanding the individual components of this index: multivariate analysis. Something as simple as correlation analysis can help understand and identify potential problems of double counting for one phenomenon,

The institutional category, within the dimension of Lack of coping capacity may present a bias, because of the use of an indicator based on a self-assessment for countries: Hyogo Framework for Action, on the field of Disaster Risk Reduction. The use of a self-assessment tool as an indicator “has a risk of being perceived as a process of presenting inflated grades” (Marin-Ferrer et al., 2017, p.42).

While new elements in the methodology are presented, the integration in the process is not reflected into the results, especially after the remark on the importance of maternal mortality rate as an effective indicator for overall population vulnerability.

3.1.12 Presentation and dissemination

INFORM is responsible of presenting a clear and understandable picture of humanitarian crises risk across the globe, while providing relevant information for policy makers and as scientific support to a diverse number of European Union policy initiatives. As a composite

indicator, it needs to convey a complete picture of the phenomenon in a simple, but comprehensive fashion (OECD, 2008). The creators of INFORM adopted a hierarchical clustering model with the idea to cluster information based on distance between objects in the data space (Marin-Ferrer et al., 2017, p. 52). This methodology, also known as connectivity, based clustering allows finding groups in the data set with natural criterion of similarity (Estivill-Castro, 2002), in this case, Ward's minimum variance criterion⁴ was applied. The 191 countries measured by INFORM were classified in a hierarchical scale (Very Low, Low, Medium, High and Very High) that would allow, across time, to identify risk in a consistent manner.

As described by OECD (2008) and Nardo et al. (2005), trend analysis can be represented when there are at least two points in time in which a composite indicator is measured. INFORM presents a comparative advantage in measuring risk globally: it has data available for at least 5 years. And it goes even one step further: any methodological change in the most recent version is adjusted to historical data to allow for comparability.

3.2 Crisis Assessment

Communities exposed to crisis conditions are in dire need of objective and prompt evaluations, for international donor agencies and organizations to target the specific basic needs to be covered. According to Redmond (2005), communities face crisis conditions when national states and its institutions cannot provide the minimum services in the wake of sudden conflicts or natural disasters. DG ECHO has developed the Crisis Assessment Index based on three indicators of the INFORM: Uprooted people, Natural disasters and Conflict index. The countries are ranked based on their scores of each INFORM indicator, and the values are normalized to scores between 0 and 3. The countries in the top quartile score a value of 3 (worst conditions); countries in the bottom quartile, score a value of 1; and the countries in the two middle quartiles, score a value of 2.

After the values for each indicator have been assigned, the aggregation method is that of maximum value. The Crisis Assessment Index takes the maximum value of the three indicators, as a way to reflect the worst possible scenario for a country in need of immediate humanitarian assistance.

⁴ Ward's method tries to minimize the increase in total within-cluster sum of squared errors

In the latest report, published in 2018, this assessment has identified 38 countries (Crisis Assessment Index value of 3) suffering from natural disaster and/or violent conflict and/or have a large number of refugees and internally displaced persons (European Commission, 2018, p.14).

INFORM Crisis Severity Initiative

In the last 3 years, a multi-stakeholder initiative between humanitarian and development organizations (OCHA, DG ECHO, UNHCR, JRC, among others) have created a working group for the creation of a Crisis Severity Assessment within the INFORM framework. The main three objectives are: (1) covering globally all crises with constant updates to allow integration in the main policy mechanisms; (2) establish the assessment as open source, with clear methodology and exposing its limitations; and (3) measure crisis severity based on effect on people rather than humanitarian sectors (JRC, 2017).

The Crisis Severity model will include around 30 indicators divided in three main dimensions: Impact of the crisis, conditions of the affected people and complexity of the crisis. The main differentiation with INFORM is that it takes away the dimensions of Vulnerability (as it is considered a de-facto condition) and Capacities (because it doesn't have an immediate effect on the severity of the ongoing crisis).

3.3 Forgotten Crisis Assessment (FCA)

A forgotten crisis, as defined by DG ECHO is a “severe, protracted humanitarian crisis situation where affected populations are receiving no or insufficient international aid and where there is no political commitment to solve the crisis” (European Commission, 2008). The particular characteristics of forgotten crises are the low media coverage they receive, and the possible combination of one of two factors: continuous effects of natural disasters and/or protracted conflict situations⁵. Due to the neglected conditions for these communities, reliable data is hard to come by. A multi-stakeholder approach, with organizations like OCHA, JRC, UNHCR, has developed the Forgotten Crisis Assessment (FCA) as an effort to capture and bring to light these forgotten crises.

⁵ A few examples of these forgotten crises: Sahrawi refugees in Algeria, affected populations by internal conflict in Colombia, continuous exposure to violence in Central America, food and nutrition crisis in the Sahel. (JRC, 2018)

Table 5 describes the four indicators composing the FCA, based on secondary data by JRC and DG ECHO. The countries to which FCA is carried out are those that in the past 2 years have scored 3 in the Crisis Assessment.

Table 5: Forgotten Crisis Assessment (FCA) Indicators

INFORM Index	Media coverage	Public aid per capita	Qualitative assessment
It considers the three dimensions of the index: Hazard & exposure, Vulnerability and Lack of coping capacity	JRC conducts a counting of articles pertaining four key elements of crises: conflict, security, humanitarian crisis, food security. A ratio is created by number of articles in said country divided by average number of articles per country.	Aggregate of public development aid (source of data: OECD Development Assistance Committee) and humanitarian aid (source of data: OCHA Financial Tracking System)	DG ECHO desk experts carry a qualitative assessment that cover lack of response to humanitarian crises in events reported by the Crisis Assessment in the past two years.

Source: Own creation with information from ‘Methodology for the Identification of Priority Countries for the European Commission Humanitarian Aid, ‘GNA and FCA’’ (2008) by European Commission Directorate General for Humanitarian Aid – ECHO, p.12

The scoring system works similar to that of the Crisis Assessment, where the countries are ranked, and the top quartile (25%) score a value of 3, representing the worst conditions; the countries in the two middle quartiles score a value of 2; and the countries in the bottom score a value of 1. These values are added to result in a maximum score of 12. The FCA for 2018 has identified 15 forgotten crises⁶.

Although widely used by the European Commission to assign funds to these forgotten crises (around 15% of total aid funds), there needs to be consideration about media coverage as an effective indicator about international attention to humanitarian crisis. As expressed by Olsen

⁶ The list can be found in https://ec.europa.eu/echo/sites/echo-site/files/annex_4_fca_2019.pdf

et al. (2003), there is no substantial evidence showing a link between political action and media coverage on a context of a crisis. The authors suggest that it is politicians using media for their own purposes rather than media catching the attention towards specific situations. A final comment on the methodology is the limitation of qualitative assessments by experts that can always lead to biased results, if experts have a certain tendency towards specific humanitarian crises setting.

4. Multidimensional Poverty Index

The multidimensional approach to understand poverty and deprivation highlights the aspects of how income is not the only measure of well-being and dignity of a person. As proposed by Anand and Sen (1997), income-based poverty capture deprivation in one dimension, and does not fully capture the depth of deprivation in other basic services like education and health. The Multidimensional Poverty Index (MPI), created by the United Nations Development Programme (UNDP) and the Oxford Poverty and Human Development Initiative (OPHI) in 2010, intends to cover the gap in measuring multidimensional deprivation, on a global scale, using household level data. In the following sections, the methodology for the creation of the MPI will be explained⁷, while highlighting innovative elements as well as the role within the Humanitarian Development Nexus field of study.

4.1 Objective

The MPI seeks to compare global poverty levels across countries and different times, in order to assess the attainment of the SDG's, while breaking down the information to understand both incidence and intensity, and dimensional poverty. While incidence refers to the proportion of people who are poor, intensity refers to the deprivations that the people experience, in other words, how poor people really are. The dimensional composition refers to the MPI characteristic of breaking down the deprivations in different indicators, as a direct measure of how each variable contributes to poverty.

4.2 Target population

The latest Global MPI has been calculated for 105 countries. The criteria for selection of these countries is the complete availability of information through household level surveys, explained later in the section dedicated to Data Sources. When the MPI wants to be disaggregated at national and subnational level, there are some specific criteria defined by Alkire et al. (2018), regarding representativeness: the national sample size must be 85% of the original sample after treating data, and the subnational regions must be at least 75% of the original subsample size.

⁷ The methodological notes by UNDP and OPHI will be referenced throughout the following sections, as they are the official source for information about the MPI.

4.3 Theoretical approach

Drawn from the affirmation by Anand and Sen (1997) of the inadequacy of income-based poverty measures to fully capture deprivation, the MPI draws strength from a multidimensional approach. Sen (1987) and Nussbaum (2000) criticize previous ways of understanding well-being on a theoretical grounding by placing the capabilities⁸ approach back into the center of their scientific enquiry. They also developed the concept of functionings, which are the capabilities, or a set of capabilities that people choose to participate in. That is what the MPI precisely refers as a poverty, “people living under conditions where they do not reach the minimum internationally agreed standards of indicators of basic functionings” (Alkire et al., 2018, p.4).

4.4 Data sources

The MPI approach requires disaggregate data at the household level, heavily relying on two main sources of information: Demographic and Health Surveys (DHS) and Multiple Indicators Cluster Survey (MICS). For countries where these surveys are not available, a high-quality survey created by OPHI and UNDP was carried out (e.g. Brazil, Mexico, South Africa, among others). For other three countries, the Pan Arab Project for Family Health (PAPFAM) Surveys are utilized.

4.5 Variable selection approach

Table 6 presents the composition of the MPI, where 10 indicators are classified in three dimensions: Health, Education and Living Standards. “The indicators of the MPI were selected after a thorough consultation process involving experts in all three dimensions” (Alkire et al., 2018, p.7).

⁸ “[c]apabilities are the abilities to do certain things or to achieve desired states of being. They are empowerment, the power to obtain what you desire, utilize what you obtain in the way that you desire, and be who you want to be. Goods, on the other hand, are merely things that you possess. Capabilities allow you to use goods in ways that are meaningful to you.” (Stanton, 2007: 11)

Table 6: Composition of the MPI

Multidimensional Poverty Index	Health	Nutrition
		Child mortality
	Education	Years of schooling
		School attendance
	Living Standards	Cooking fuel
		Sanitation
		Drinking water
		Electricity
		Housing
		Assets

Source: Adapted from ‘The Global Multidimensional Poverty Index (MPI) 2018 Revision: Methodological Notes’ by Alkire, S., Kanagaratnam, U., Suppa, N. (2018). OPHI, p.8

4.6 Imputation of missing data

Nardo et al. (2005) and OECD (2008) correctly assess that missing data may deter a robust composite indicator. Based on the three possible methodologies proposed by these authors, MPI follows the methodology of case deletion, also known as complete case analysis. When analyzing the dataset provided by the surveys, households present missing data, the household is simply dropped. In the case of indicators, as established by Alkire et al. (2018), when an indicator is missing from the dataset, it is dropped and the weights within the MPI are adjusted to the new structure.

4.7 Normalization

The normalization method chosen by MPI refers to the distance to a reference point (Nardo et al, 2005; OECD, 2008). Each of the 10 indicators have a different reference point. For example, a household will be considered deprived in Nutrition if one of the members is undernourished. A household will also be considered non-deprived in Education, if at least one of the members over the age of 10 has completed six years of education. Combining this normalization method, with the aggregation method of choosing the minimum value available (or maximum in some cases, e.g. Years of attendance in Education), result in the unique deprivation system of the MPI.

4.8 Weighting and aggregation

Alkire & Foster (2007) suggest for the MPI a nested weight structure, in which each indicator bears the same weight within the dimension, and each dimension bears the same weight (1/3) for the final value of the MPI.

Ferreira & Lugo (2013) highlight one of the most critical limitations in the methodology of weighting a multidimensional index: the use of relative weights, somewhat arbitrary by the creators of the composite indicators. This subjectivity can lead to disagreements among policymakers and can also imply problems about trade-off across dimensions. Nardo et al. (2005) and OECD (2008) state that equal weighting among dimensions sometimes is understood as absence of a statistical basis (such as the use of factor analysis methodologies).

4.9 Robustness and sensitivity

One of the critical sources of uncertainty in the MPI is the equal weighting system across dimensions, and across indicators within dimensions. As suggested by Nardo et al. (2005) and OECD (2008), the creators of the MPI conduct a robustness analysis, by using different weighting schemes. Alkire et al. (2010) conducted a study to present three different schemes of weighting for the three dimensions of the MPI, and later verifying the changes these weights caused in the countries' rankings.

- Health, 50%; Education, 25%; Living Standards, 25%
- Health, 25%; Education, 50%; Living Standards, 25%
- Health, 25%; Education, 25%; Living Standards, 50%

Although changing the weights produces changes in the levels of multidimensional poverty, the rankings stay quite stable (Alkier et al., 2010, p.2). Correlations coefficients were calculated for each pair of rankings (original weights with modified weights), and the lowest correlation coefficient obtained was 0.903 with health kept at 50%. The authors caution that, of course, weights are not the only critical aspect to measure robustness. They go further into changing the poverty cutoff (33% of deprivation in the current methodology) to a 20% and 40% cutoff. The results show that in 95.5% of countries pairings, the countries maintain the same rankings. Hence, the poverty cutoff is not a constraint, and the weighting and normalization methodologies are robust enough.

4.10 Humanitarian Development Perspective

The MPI fits within the Humanitarian Development Nexus mainly as a tracking tool for progress towards achievement of the SDG's. In itself, reducing poverty in all its dimensions is one of the main goals, while keeping in mind one of the most important principles in both development and humanitarian action (WHS, 2016): Leave no one behind.

The application of the MPI as a tool for guiding policies towards eradicating poverty, has helped national governments to adapt their strategies towards creation of specific projects and programs. As defined by OCHA (2017), context specific analysis is required in order to understand the roles of stakeholders aiming at collective outcomes, and the MPI can effectively pinpoint how and where people are poor, targeting resources and specific contexts in need of interventions.

One of the most powerful advantages of the MPI as a tool is the availability of information and knowledge as a system. As Jahal de Meritens explains, the identification and transferability of information provides a significant tool to accelerate the success of projects, and gives incentives for social innovation and operation efficiency, within the development world.

4.11 Limitations

The increasing interest in the multidimensional approach to measure poverty and development has brought much criticism, as well as alternative options to fully capture the phenomenon. On his book 'On Multidimensional Indices of Poverty', Ravallion (2011) expresses his main concern on the aggregation of the indicators into a single number, which can be misleading because of implicit marginal rate of substitution across dimensions. His main concern is based on the dimension of Living Standards, arguing that its six indicators are a simple subset of income-based poverty measure, where its main component of analysis is consumption (Lustig, 2011).

As a solution to the main issue of aggregation of dimensions into a single number, Ravallion (2011) proposes a dashboard approach, in which poverty is measured through multiple indices rather than a multidimensional index.

Nardo et al. (2005) and OECD (2008) state that too often, composite indicators mix input and output factors, while the nature of the indicators should stay the same. For example, in the case of the MPI, the Education dimension measures both an input (school attendance)

and an output (years of attendance). The poverty in this framework is presented as an output, a result of several explicit factors, which in this case is a mix of both inputs (cooking fuel, school attendance, housing) and outputs (child mortality, nutrition).

A critical aspect to mention is that, although the MPI extracts its data from household surveys, it does not reveal intra-household disparities. This is revealed through the treatment and cleaning of data before processing. Indicators like Child mortality reveal a weakness in data collection, as the process states that when households do not have eligible women to be interviewed, the household is already considered non-deprived; no available information does not necessarily imply non-deprivation.

4.12 Presentation and dissemination

For the final presentation of the MPI scores, a person or a country, is classified as ‘poor’ when deprived in more than 33.33% of the indicators; ‘vulnerable to poverty’ when it is deprived from 20 to 33.33% of the weighted indicators; while it is classified as in ‘severe poverty’ when deprived in 50% or more of the dimensions.

The flexible methodology created by Alkire and Foster (2007), which serves as the basis for the Global MPI, has allowed the creation of National MPIs, that better address and fit to national and regional contexts. Countries like Colombia and Mexico are using national and regional MPI’s as guiding tools for the implementation of national wide policies, to effectively target the dimensions of poverty (OPHI, 2015).

5. Resilience Measurement Index and Analysis II

The concept of resilience has been streamlined into programs and projects as a way to understand how households cope with adverse effects of climate change, economic forces and social conditions. The following sections explore the methodology proposed by the FAO to measure resilience, proposed in two ways: direct and indirect. The main document to be referenced is the ‘RIMA-II. Resilience index measurement and analysis—II’ guide, developed by FAO to describe this indicator methodology.

5.1 Objective

Measuring resilience requires the flexibility of a dynamic conceptual framework, where positive and negative shocks on well-being, and the capacities to withstand long-term negative effects are thoroughly captured (Sassi, 2017, p.45).

5.2 Target population

RIMA-II was developed to measure resilience within the food system, therefore, the unit of measure for this composite indicator is the household, which FAO describes as a system with “interacting components, operating together for a common purpose, capable of reacting as a whole to external stimuli” (FAO, 2016, p.17). An important consideration for the household as the unit of measurement is that when a shock enters a system, the first unit to absorb this shock is the household: the place where risk management decisions are taken.

5.3 Theoretical approach

The dynamic nature of the concept of resilience requires a dynamic framework. FAO elaborates on several authors, from classic psychometric theories (Crocker and Algina, 1986; Cronbach and Meehl, 1955), to modern measurement of resilience (Preacher et al., 2013), and a conceptual development by Alinovi et al. (2008). The framework summarizes how a series of coping strategies (consumption smoothing, assets smoothing and adoption of new livelihood strategies) is activated when a shock occurs as an attempt to go back to the initial state of well-being. The shocks can affect the resilience of household and/or communities that present characteristics like access to basic services, assets, social safety nets and adaptive capacity. The final state of the household can limit the response in case of future shocks (FAO, 2016, p.7)

5.4 Data sources

The main sources of information for processing the RIMA-II are multidimensional household surveys, at the national level, including aspects such as: income generating activities, access to basic services, productive and non-productive assets, social networks, assets, food security indicators, among others. To meet the goal of a dynamic analysis established by RIMA-II, panel data is required, which results from applying the same survey/questionnaire on the same populations at different points in time. FAO uses mainly the World Bank Living Standards Measurement Studies (LSMS) from different countries around the world.

5.5 Variable selection approach

RIMA-II results in three different products, presented for each country, and covers different goals:

1. Resilience Capacity Index (RCI) consist on the direct approach to measure resilience, and can support in policy targeting and rankings.
2. Resilience Structure Matrix (RSM) describes the contribution of each indicator to the final value of the RCI.
3. Resilience Main Determinants is the indirect approach to resilience. They are basically the three most important variables that determine household resilience for each dataset.

The four pillars of resilience measurement, according to FAO, are: access to basic services, productive and non-productive assets, social safety nets, adaptive capacity and sensitivity. They were adopted for practical and analytical purposes into the framework of RIMA-II (Sassi, 2017, p.46). Table 7 describes four of the five pillars ultimately chosen to calculate this composite indicator, as well as the individual indicators composing each dimension.

Table 7: Dimensions of RIMA-II

Dimension	Description	Indicators
Access to basic services	This dimension refers to both access to the service as well as quality of the services. Essential aspects of resilience are related to access to markets, health centers, water, electricity, and other basic services.	Distance to management, distance to market, distance to health services, distance to pharmacy, distance to veterinary services and infrastructure index
Assets	Considering assets when analyzing the effects of shocks on behavior of households can help understand the long-term effect of shocks	Tropical livestock units, land owned, wealth index, agricultural assets.
Social Safety Nets	Access to transfers, cash or in-kind, has a direct effect on poverty alleviation and allows household to better respond to shocks from markets.	Cash transfers and other transfers
Adaptive Capacity	According to Berkets et al. (2002), adaptive capacity in a social system is connected to institutions which ensure transferability of knowledge and capacity building in communities, allowing households to adapt to shocks more efficiently.	Participation index, dependency ratio, household head education

Source: Adapted from ‘RIMA-II. Resilience index measurement and analysis—II’ by FAO (2017), p.21.

5.6 Multivariate analysis

Structural Equation Model (SEM) techniques allow researchers to use a big number of variables to model complex phenomenon, while including latent and observed variables to help determine unobserved patterns in the interaction between endogenous and exogenous determinants. (Schumacker & Lomax, 2004). RIMA-II chooses SEM over Factor analysis because SEM allows for correlation between residual errors, while FA assumes these are

uncorrelated. RIMA-II assumes the four dimensions of the indicator to be the observed variables, causing, and at the same time being affected by, resilience.

5.7 Weighting and aggregation

Following the methodology proposed by Alkire & Foster (2007) in the measurement of multidimensional poverty analysis, weights are assigned for each dimension by the creators of the composite indicator. Nonetheless, due to the dynamic nature of resilience and the constant shocks to which communities are prone to, weights are estimated and changed every time a new resilience analysis is carried out.

RIMA-II has introduced a possible solution to the constant iterations of weighting. The use of Multiple Indicators Multiple Causes (MIMIC) models allows the identification of composite variables (a group of correlated indicators) and the causal relationship towards the latent variable (resilience). Nonetheless, literature suggests not to follow MIMIC models as they can “foster fuzzy conceptualizations of variables, particularly since it can erroneously encourage the view that a single focal variable is measured with formative and reflective⁹ indicators” (Lee et al., 2013, p.4).

5.8 Humanitarian Development Perspective

The New Way of Working, as described by OCHA (2017), aims to achieve collective outcomes by humanitarian and development actors, and bridge the gap between emergency assistance to cover for basic needs and long-term interventions. Resilience plays a key role in understanding the dynamics and effects of interventions in the long run, as well as immediate effects on households (food for work projects, transfer mechanisms). A shock that may affect a community in the short term, can also bear long lasting consequences on livelihood (productive and non-productive assets for consumption smoothing) (FAO, 2016). Hence the importance of understanding the dynamic role of resilience in a humanitarian and development setup.

RIMA-II presents an ideal opportunity to directly measure resilience, with the aim of specific targeting. It allows the identification of determinants of resilience in communities and household level, providing policymakers sufficient information to target programs and projects toward achievement of collective outcomes. Context specificity is a key

⁹ Reflective measurement models are constructs where the causality flows from the latent component (in this case resilience) towards the indicators. In the case of formative measurement models, more commonly used in economics and sociology, the causality flows from indicator to the construct (Coltman et al., 2008)

characteristic of the new way of working, as it increases coherence between development and humanitarian efforts.

5.9 Limitations

As previously described, resilience is a dynamic concept that requires a vast amount of information, in a time series fashion. The limitation of data in a long term hinders the analysis of permanent or long-lasting effects of a shock on household and communities. As described by FAO, “valid datasets are needed to study these aspects that are currently ignored” (FAO, 2016, p.6).

An important limitation of RIMA-II in the field of humanitarian development nexus is the focus on food insecurity determinants. The indicators in the four dimensions are targeted towards understanding the factors making a community vulnerable, through indicator closely related to food insecurity determinants. Although the concept of a dynamic analysis of resilience could be applied to other fields of humanitarian action.

6. Child Protection Index

6.1 Objective

ChildPact and World Vision International created the Child Protection Index, in 2016, as an effort to understand and measure governments' actions and policies towards child protection. This composite indicator was created as a tool for the identification of areas of opportunity for improvement for stakeholders (governments, civil society, international and local organizations) participation (Child Protection Index, 2016).

Through the measurement of over 600 indicators, the Child Protection Index seeks to enable regional cooperation for child protection in 9 countries of South East Europe and South Caucasus.

As described by the creators of the index (Jocelyn Penner Hall and Andy Guth), among the purposes for this system-wide diagnosis is to “find a common ground from which to influence and apply pressure on government” (Child Protection Index, 2016, p.6).

6.2 Target population

The Child Protection Index seeks to measure governments' actions towards achieving child protection. The main four areas which the index covers are: child vulnerability, governance environment, efforts to end and prevent violence of children and social work capacity. Although this composite indicator aims at creating a diagnosis of government's actions, the ultimate target is child population in the South Caucasus and Balkans region (Child Protection Index, 2016)

6.3 Theoretical approach

The Child Protection Index was created within the systems approach, as guided by the Convention of the Rights of the Child (CRC). This new approach, increasingly used by organizations like Save the Children, United Nations Children's Fund (UNICEF) and the United Nations High Commissioner for Refugees (UNHCR), helps understanding the underlying tensions and dynamics that allow stakeholders to define the role of child protection within specific contexts (Wulczyn et al, 2010).

The Implementation Handbook for the Convention on the Rights of the Child, by UNICEF, is the principal framework used by ChildPact and World Vision for the core indicators measuring governments performance on child protection. Through a series of checklists on

each article of the CRC, this handbook identifies laws, policies and practices that promote and protect children.

6.4 Data sources

The Child Protection Index has four sections of indicators, as previously described. Each of these dimensions have different sources to obtain the 626 indicators that compose this indicator. Table 8 describes the data source for each section of the indicator:

Table 8: Data source of Child Protection Index

Child vulnerability	Governance environment	UNCRC child protection	Social work
Quantitative data about child protection status in every country. The data collected is primary data collected by UNICEF's TransMoEE database.	Indicators obtained from the checklist on article 4 (Implementation of rights in the Convention) from the Implementation Handbook of CRC, by UNICEF.	Indicators obtained from checklist on articles 9, 19, 20, 21, 23, 25, 32, 33, 34, 35, 36, 38 and 39 ¹⁰ from the Implementation Handbook of CRC, by UNICEF.	Consultation on experts on government. It originates from the value on the status of social work mechanisms for protection of boys and girls.

Source: Adapted from 'Child Protection Index' (2016) by Save the Children

The first Child Protection Index, published in 2016, is based on data available up to December 2013 (Child Protection Index, 2016, p.5), producing a lag of 3 years between the publication and the data source. When creating a composite indicator, timeliness is an essential characteristic, which asserts that "length of time between their availability (of the data) and the event or phenomenon they describe" (OECD, 2008, p.47) must allow the results to be of value for the intended target audience.

¹⁰ Article 9: Separation from parents. Article 19: Child's right to protection from all forms of violence. Article 20: Children deprived of their family environment. Article 21: Adoption. Article 23: Rights of children with disabilities. Article 25: Periodic review of treatment. Article 32: Child labor. Article 33: Children and drug abuse. Article 34: Sexual exploitation of children. Article 35: Prevention of abduction, sale and trafficking. Article 36: Protection from other forms of exploitation. Article 38: Protection of children affected by armed conflict. Article 39: Rehabilitation of child victims.

6.5 Variable selection approach

As described by OECD (2008) and Nardo et al. (2005), the selection of data and variables may be subjective, and a final decision must be taken by the creator of any composite indicator; but the selection must be done based on the theoretical framework. The team in charge of creating the Child Protection Index consists of eight child protection experts per country analyzed. These experts are divided in four teams (each assigned one of the four dimensions). Together with the Index Data Manager, the two experts must convey and agree on the value of each indicator, supported by primary and secondary data (reports, studies, articles, interviews). Around 3 to 4 rounds of validations for values of indicator must be carried out, and a final revision by the country coordinator (Child Protection Index, 2016).

6.6 Normalization

The Child Protection Index is scored in a scale from 0 to 1, where 1 would be the highest and best score for actions aiming towards child protection. The checklists from the Implementation Handbook of CRC (main data source for indicators) allow for three possible values: “Yes”, “No” and “Partially-implemented”, concerning governments’ actions to end and prevent violence and aim toward child protection. These values were normalized to 1 (Yes), 0 (No) and 0.5 (Partially implemented). This last case presents the methodology of Neutral/Middle category coding (Young, 2012). As previously explained, the middle category coding raises caution, as it’s a method with low scrutiny about the consequences of its use, even though it is commonly used in missing data and qualitative data coding (Young, 2012, p.57).

When indicators are quantitative, the Min-Max methodology was used. (Child Protection Index, 2016, p.39) The creators of this index took caution in the warning made by Nardo et al. (2005) and OECD (2008) on the use of absolute minimum and absolute maximum values, to allow comparability between existing and potential new data, and across countries.

6.7 Weighting and aggregation

A simple average is created for three of the four dimensions: child vulnerability, governance environment and social work capacity. For each article on the Implementation Handbook of CRC, a simple average is created, and equally contributes to the final score. The final score of the CPI is an average of the first three dimensions and the scores for each CRC article (Child Protection Index, 2016, p.39). As Nardo et al. (2005) and OECD (2008) assert, the

use of additive aggregation methods implies full compensability between the dimensions and articles of the CPI. To better illustrate the process, Table 9 details the process for each dimension of the composite indicator.

Table 9: Child Protection Index – Calculation Process

Dimension	Scoring	Normalization	Aggregation
Child vulnerability	Quantitative indicators, mostly collected from UNICEF	Min-max methodology, with the following formula: $Y = \frac{X - X_{min}}{(X_{max} - X_{min})}$	Simple arithmetic average
Governance environment	Drawn from CRC's article 4, the indicator takes values of 0, 0.5 (no information available or partially implemented) or 1 (best possible option)	Already normalized to values from 0 to 1	Simple arithmetic average
UNCRC child protection	Drawn from CRC's articles, the indicator takes values of 0, 0.5 (no information available or partially implemented) or 1 (best possible option)	Already normalized to values from 0 to 1	Simple arithmetic average first of each article's subindicators. Later, simple arithmetic average of the 13 considered articles
Social work	Expert consultation on implementation and quality of social work, values from 0 to 1	Already normalized to values from 0 to 1	Simple arithmetic average

Source: Own elaboration with source material 'Regional Analysis: South East Europe & South Caucasus: Measuring government efforts to protect girls and boys' by Child Pact and World Vision International (2016).

6.8 Humanitarian Development Perspective

Through the system approach, the CPI intends to analyze the combined efforts of health, education, social protection and legal actors with the objective of child protection (Child Protection Index, 2016, p. 6). Through the analysis of actions that governments have taken

to comply with the CRC, the Child Protection Index helps to understand increasing vulnerabilities for children in the absence of family-based care (Child Protection Index, 2016).

An underlying aspect of the CPI, as explained by World Vision Regional Leader, Conny Lennberg, the index intends to “offer all governments a partnership built upon the belief that all children matter” (Child Protection Index, 2016, p.2). It intends to offer stakeholders to take action in order to attain the Sustainable Development Goal 16, which ensues ending abuse, exploitation, trafficking and all forms of violence against and torture of children.

Although the analysis of the CPI is not context specific (as an important characteristic of Humanitarian Development Nexus initiatives), and is related to government actions for child protection, an overall outcome is intended through partnerships between government, civil society and donors, seeking to identify potential areas of opportunity.

6.9 Limitations

The lack of use of multivariate analysis (PCA, FA) in the construction of the Child Protection Index sets a limitation in further understanding how the individual indicators variance can influence the final value of the CPI (Nardo et al. 2005; OECD, 2008). A simple analysis of correlation could also improve the understanding on the way the individual indicators and dimensions are moving.

As indicated in the CPI regional analysis, data collection must be improved. A methodology that can better track, among other phenomenon: prevalence of needs and various child vulnerabilities, must be implemented, to a level of disaggregation by region, gender, disability, among other factors (Child Protection Index, 2016, p.10). The level of specificity in indicators will prove useful in understanding the main actions that governments can implement to achieve the goal of ensuring an efficient partnership among different stakeholders in the child protection field.

One of the most critical limitations of the CPI is the lack of continuation in measuring this indicator. When data is not available for more than one year, it is not possible to comply with the goals proposed by this indicator. Seeking cooperation among countries and stakeholders to take action and protect children (Child Protection Index, 2016) could be efficiently measured and tracked if comparability among years was available for the region.

7. Community Preparedness Index

The Community Preparedness Index is “a community assessment tool for emergency preparedness” (Save the Children, 2014, p.3) created by Save the Children and the National Center for Disaster Preparedness from Columbia University. This self-assessment tool, shaped for the context of the United States, provides relevant information for stakeholders working in children safety during disaster management.

Although the process for the creation of this tool is similar to that of a composite indicator, it is considered by Save the Children rather as a process for a community to understand the current policies, leadership and response coordination to protect children in situation of emergencies (Save the Children, 2014). The needs for institutional improvement are obtained through an online survey completed by multi-stakeholder groups (government agencies, community organizations and services providers). The result of this survey, divided in nine sections¹¹, is a group of 9 individual values for every section, in the range from 0 to 100%, and an overall score of Community Preparedness (as a simple average of the nine sections). DuBois (2018) explains that by putting the beneficiary at the center of a system, through a shift in the power dynamics and final decision making, vulnerable people become more than mere users, but owners of the system (program). Community Preparedness Index proves to be a powerful tool where children are put at the center of the analysis, through agencies and stakeholders working for their protection.

A critical limitation in the implementation of this *composite indicator* in the humanitarian development nexus is the lack of transferability to other settings. The survey was designed in a context of disaster management for a specific country (Save the Children, 2014). Although the community level can be adapted to different contexts within a state of the country, it would prove difficult to transfer to more countries, specifically through institutional settings.

The results generated by the Community Preparedness Index may be used as a benchmark for future activities, in the setting of immediate humanitarian crises, for each specific

¹¹ Five sections on preparedness of facilities where children are likely to be located when a disaster occurs (public schools, private schools, child care centers, family child care homes and foster care), two section of locations where children are likely to be relocated after a disaster (hospitals and emergency shelters), one section on community issues and one final section on lead organizations working on child disaster management.

community. However, as OCHA (2017) suggests, to break down barriers to work toward collective outcomes and reducing vulnerability in specific target populations (e.g. children), a systems level collaboration must be incentivized. In the case of this assessment tool, results are not publicly shared, and there are no incentives for collaboration between communities working toward similar goals.

The possibility for multi-stakeholder partnerships across regions and communities presents a relevant opportunity for the Community Preparedness Index to become a relevant and transferable methodology for different settings working towards child protection.

8. Critical analysis and comparison

Constructing composite indicators may take different paths, depending on the objectives, theoretical frameworks, aggregation and weighting techniques, and even policy advocacy intentions. This process involves assumptions along the way, which need to be assessed carefully to avoid a “product of dubious analytic rigour” (Saltelli, 2007, p.66). In the following section, I intend to summarize commonalities and differences among the composite indicators presented in this research project, while highlighting the innovative elements that they bring to the field of social indicators and Humanitarian Development Nexus.

A strong theoretical framework is a common factor among the composite indicators in this research project, proving that the objectives of the organizations are clear in what they are seeking to achieve. “No matter how subjective and imprecise the theoretical framework is, it implies the recognition of the multidimensional nature of the phenomenon to be measured and the effort of specifying the single aspects and their interrelation” (Nardo et al., 2005, p.8) Consistency across methodologies in all indicators result in credible results for all organizations. Although some critical steps in the construction of composite indicators are missing in most of the indicators (multivariate analysis, robustness and sensitivity analysis), all indicators follow through a clearly established procedure to obtain the desired results. The first divergence of the group of indicators consist on Child Protection Index and Community Preparedness Index. Both of them are designed to be evaluated in a very specific context, South Caucasus and the Balkans, and the United States, respectively. And RIMA-II is specific to the food security and agricultural development context. As of now, IPSI is limited to a context of two countries, Lebanon and the Occupied Palestinian Territory (oPt), with the specific aim to be extended to different context. IPSI, INFORM and MPI are characterized to cover a multi-sector approach in their framework of analysis.

IPSI and INFORM present the most similarities across the composite indicators, based on the nature of what they are trying to measure and capture: risk, and how it is captured through their similar dimensions (Threats, Vulnerabilities and Capacities). If we go into cross-cutting issues in both indicators, we find the Age, Gender and Diversity Approach (AGD) as a consistent element across their methodologies, as a way to better assess the needs of

individuals and communities, and how to better support in overcoming them (We World-GVC, in press). Another important similarity that both indicators present is the IPSI and low correlation values between individual indicators, which suggest that their dimensions are capturing different phenomena, providing a robust measurement (De Groeve et al., 2014, p.52).

While interaction among dimensions are not considered in INFORM, IPSI takes a step further through the use of two theoretical frameworks (protection theory and dimensions of humanitarian action), allowing the interface among indicators, that can relate in more than just one dimension. For example, the Gross ratio of boys to girls attending school is both an indicator in the sectors of Education and Gender, within the dimension of Vulnerability.

An important lesson that IPSI can draw from INFORM is the risk classification through a hierarchical scale that allows the identification of risk, as a tool to better monitor, control and manage risk (Marin-Ferrer et al., 2017, p.53). This process is done through cluster analysis, fixing 5 risk classes, and helps with one of the main limitations presented by IPSI, an easy and intuitive method to present results to different target audiences.

We World – GVC creates an innovative approach in the weighting schemes of IPSI. While other indicators use equal weighting, IPSI uses a simple average between the theoretical weights (based on assessment of severity of indicator by experts on the field) and statistical weights (provided by the PCA methodology). This has a strong implication on the main critique in the academia and how IPSI overcomes this important limitation: the lack of use of a statistical basis for assigning weights to individual indicators. Another relevant characteristic within the creation of the IPSI, is the use of primary data for the creation of the indicator. While the other indicators in this research project rely solely on secondary sources, usually collected by organizations different than the one creating the composite indicators. The use of a participatory approach (CPA) proves a pure Humanitarian Development Nexus approach by IPSI, where they put the people at the center, as suggested by the New Way of Working (OCHA, 2017).

It is mentioned throughout this document the importance of context specificity within the Humanitarian Development Nexus. It is precisely there, that the nature of national MPIs could work as a complement to the effort achieved by the IPSI, in the level of disaggregation by community and sectors of intervention of humanitarian action. Achieving a seamless

communication between both indicators could provide better community targeting for policy advocacy.

Trend analysis through historical data prove a useful tool for indicators like INFORM, MPI and RIMA-II, which serves as a tool for evaluating the effectiveness of programs or projects in both the humanitarian and development aid fields. In the future, IPSI needs to consider the importance of trend analysis, by establishing a standard methodology to be applied in different contexts across the globe. Trend analysis can help improve long term policy targeting, especially due to the importance of capacity development, which suggested by UNEG (2018), is just a secondary priority for humanitarian agencies.

The final step for the construction of a composite indicator is to present an easy, intuitive and understandable result. Providing key messages and lessons to different target audiences, mainly with advocacy purposes is an essential aspect; especially, in the Humanitarian Development Nexus, with the purpose of achieving collective outcomes. The MPI, RIMA-II, INFORM and IPSI all have the essential characteristic of disaggregation of information into dimensions, sub indicators, and even regional and sectorial measures, allowing for the formulation projects and interventions that can better identify the correct approach in different settings.

Conclusions

The link of rehabilitation and relief efforts with development initiatives has lacked a proper communication system and information transfer. As de Meritens and Habouzit highlight, the need for sharing data between organizations need not only be of high quality, it needs to be through a process of ensuring language and products of easy interpretation and use for interested stakeholders.

Composite indicators are a great first step in solving the gap of information required to operationalize the Humanitarian Development Nexus. But the organizations using them in interventions in developing countries must be aware of the need of consistent, relevant and applicable methodologies that comply with the highest standards of information and knowledge management. This research project serves its objective of having a first approach in analyzing composite indicators within a framework of best practices established by organizations like the OECD and the JRC of the European Commission.

Academic efforts that result in indicators like INFORM, IPSI, RIMA-II and MPI can help bridge the gap on the required information to target specific policies, programming and projects, both in humanitarian settings as well as development efforts. And while these indicators rightfully serve their purpose in establishing a 'baseline' approach within a phenomenon, the need for the establishment of impact evaluation within the nexus will be essential to address and understand the results of interventions within humanitarian and development interventions.

As it is clearly established in the individual and joint analysis of the indicators, one of the crucial aspects to highlight in INFORM, IPSI, RIMA-II and MPI is the context specific analysis. Every humanitarian and protracted crisis, and emergency setting has a commonality: they have different factors that may influence the severity of the situation. Therefore, a proper evaluation of the context will be crucial to assess the specific needs of the affected populations.

As a final consideration, we need to go back to one of the main limitations of any composite indicators, and what is commonly addressed as a big challenge. A composite indicator is trying to address and simplify a complex reality into a single number or small set of indicators. Bearing in mind the complexity of humanitarian crises settings, and more so, the operationalization and transition into development settings, nexus indicators find themselves

a challenge in overcoming the possible misleading policy messages and simplistic policy conclusions, if a sound and robust methodology is not properly established. A firm groundwork in creating a strong theoretical framework, as well as a relevant and consistent methodology may ensure the success for users, stakeholders and interested parties in understanding and comparing multi-dimensional realities.

A big challenge remains in the nexus field, when humanitarian actors begin to share their data openly the data on affected communities, how could the misuse in armed conflict areas and protracted crisis contexts be addressed by these organizations? Systems of legal protection will still need to be developed to ensure one of the main principles within the protection mainstreaming approach: meaning no harm, while ensuring safety and dignity of the people.

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Appendix: Summary of Humanitarian Development Nexus Indicators

Elements for Construction of CI	IPSI	INFORM	MPI	RIMA-II	Child Protection Index
Objective	Description of protection risk in communities, providing reliable information for policy advocacy	Rank countries and identify need of international assistance, in regards of humanitarian crises	Comparing levels of poverty at global, regional and national level, to monitor progress towards SDGs	Understanding shocks affecting resilience of households and communities	Understand governments' actions and policies towards child protection
Target population	Refugees, IDPs, migrants, children and adults with disabilities and AGD approach	191 countries, at national and subnational level	105 countries, with specific cases of national MPI's (e.g. Mexico, Colombia)	Households and communities within a food system	Children in South Caucasus and Balkans
Theoretical approach	Protection theory and cluster approach of humanitarian field by IASC	Pressure and release model and Cardona's (2011) framework on vulnerability and risk	Multidimensionality of poverty by Sen (1987) and Nussbaum (2000)	Dynamic development of concept of resilience by several authors	UNICEF Convention of the Rights of the Child
Practical assumptions	Communities as unit of measurement, through 3 techniques: purposive sampling, clusterization and segmentation	-	Practical assumptions are related to each indicator (e.g. when a household does not have information, it is considered non-deprived)	-	-
Data sources	Primary data: multi-sector questionnaire developed by We World – GVC	Secondary data: UNDP, FAO, Oxford Institute, among others	Secondary data: DHS, MICS, with some UNDP surveys	Secondary data: multidimensional household surveys like LSMS by the WB	Secondary data: UNICEF, articles of the CRC and expert consultation
Variable selection approach	Indicators classified in 3 dimensions of protection: Threats, Vulnerability, Capacities. Also possible in 12 areas of humanitarian action	54 indicators divided in three dimensions, and 6 categories	10 indicators classified in three dimensions: Health, Education and Living Standards, consultation on experts	4 pillars of resilience: access to basic services, assets, social safety nets and adaptive capacity	Validation by experts on the four dimensions of indicator

Imputation of missing data	No treatment on missing data	Systematic and individual imputation from historic available data	Case deletion	-	-
Multivariate analysis	Principal Component Analysis and correlation analysis	-	-	Structural Equation Modeling	-
Normalization	Scale transformation and Min-Max	Min-max methodology, establishment of absolute minimums and maximums for coherence across time	Distance to a reference point	-	Through Min-Max and scoring, value of 0 to 1
Weighting and aggregation	Weighting: Average of theoretical weights and weights extracted from PCA Aggregation: Weighted arithmetic average	Weighting: Equal weighting Aggregation: minimum value, maximum value, arithmetic average and geometric average	Weighting: Nested weighted structure (equal weighting)	Equal weighting and MIMIC model	Weighting: Equal weighting Aggregation: Simple arithmetic average
Robustness and sensitivity	Changing weight schemes through PCA and FA	Changing weights and analysis variation in ranking of countries	Changing weights and analysis variation in ranking of countries	-	-
Humanitarian Development Perspective	Objective of policy advocacy in the humanitarian field. Putting the community in the center (leave no one behind). Multi-stakeholder approach. Monitoring of results	Identification of risk and vulnerability. Disaggregation for individual indicators. Monitoring of the SDGs 1, 3 and 16. Transferability to context-specific	Tracking tool for progress towards SDGs. Information and knowledge system as tool for guiding national policies	Understanding resilience as a result of long-term interventions. Specific targeting through identification of specific shocks affecting resilience	Understanding actions governments are taking to protect vulnerabilities of children. Related to SDG 16
Limitations	Interpretability of results. Identification of thresholds to allow for ranking. Transferability to other contexts	Lack of multivariate analysis for a more credible weighting scheme. Bias in some dimensions. Lack of analysis between dimensions	Implicit marginal rate of substitution across dimensions. Mixing input and output factors. Weakness in practical assumptions about missing data	Lack of data in the long term to understand long-lasting effects of shocks. Sole focus on food security	Data collection must be improved. No multivariate analysis. Lack of continuation

Presentation and dissemination	Public platform for identification of results on indicators	Hierarchical clustering model to identify risk. Trend analysis with historical data	Flexible methodology allowing ranking countries and creating national MPIs to guide national policies	-	-
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