Research and Validation
Linking Relief Rehabilitation Development and Community Protection
Approach

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Evaluation of the First Version of the Integrated Protection System of Indicators designed by We World – GVC

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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.

We World – GVC has implemented a 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). 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 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. Objective and criteria of evaluation

The evaluation of the IPSI by We World – GVC refers to the criteria of relevance, consistency and applicability.

Following the literature, we adopted these three pillars as follows:

- *Relevance* – We used the criterion of relevance to assess the importance of the IPSI in the context of the Humanitarian-Development Nexus. Through the analysis of the objectives, target population, and theoretical approach and assumptions, we determined whether the IPSI has been able to fill a gap in the Protection theory and Humanitarian action field. An essential aspect of the analysis of relevance

was to highlight the new elements that We World – GVC has implemented in the creation of this unique methodology.

- *Consistency* – We evaluated the consistency of the IPSI with the methodological process chosen for its construction. 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). We assessed the soundness and appropriateness of the methodology for the creation of the indicators through the analysis of data sources, variable selection, imputation of missing data, multivariate analysis, normalization, weighting, robustness and sensitivity.

- *Applicability* – We analyzed the understandability of the IPSI by interested parties and potential users (von Schirnding, 2002). We also considered the degree of applicability of the IPSI in terms 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 IPSI's limitations, presentation and dissemination, we highlighted the usefulness for comparability and transferability of the indicators.

3. Methodology

We referred to different handbooks on the construction of composite indicators by international organizations to design the methodology used for the critical analysis of the IPSI. Therefore, we analyzed the IPSI 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 (ECHO). We integrated this body of literature with the most relevant academic papers on the construction and validation of composite indicators. These papers are especially focused on different statistical techniques in the construction of composite indicators. In this way, our methodology also reflects the major elements of the current debate on the Humanitarian-Development Nexus.

The official documents provided by We World – GVC helped establishing a solid literature review, complementing the international organizations documents previously mentioned. The We World – GVC literature reviewed for this research project consist on the Community Protection Approach Handbook: Guidelines, as well as individual documents concerning Safety and Dignity Framework, as well as the preliminary Technical Guidelines on the Integrated Protection System of Indicators (IPSI). We critically analyzed both academic and international organization literature, to develop a

solid and robust analysis of critical aspects of the indicators. This was complemented by the practical assessment done in the missions of Palestine and Lebanon, to understand the practical application of the IPSI within the CPA framework.

For further analysis and understanding of the IPSI, several meetings were held with the experts and creator of the methodology. A mission by We World – GVC was conducted in the University of Pavia for one week, in order to transfer the knowledge and the necessary tools for a deep understanding of the composite indicator. After this mission, held in November 2018, several follow-up meetings were conducted as the analysis of the IPSI was being developed.

It is important to highlight that the IPSI version evaluated in this document is only a first version of the methodology, and there is ongoing process, development and reviews for further improvement by We World – GVC.

The dataset, containing 704 observations for all indicators and raw data, as well as the files with Grounded and Normalized Indicators, Sub-indexes and Index and the Final Weights were thoroughly explored and analyzed in order to fit the techniques within the international standards for the creation of composite indicators.

Table 1 summarizes the methodological framework adopted in our 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, we made especially reference to the Handbook on Constructing Composite Indicators by the OECD and JRC of the European Commission (2008); it compiles the most well-established techniques and procedures in the creation of composite indicators.

We evaluated each element of our framework for the IPSI and in comparison, with a set of indicators used in the field of humanitarian crisis and disasters, and resilience and livelihood measurement. We selected these indicators based on the literature and after several meeting with We World – GVC, we agreed to include in the comparison the following:

- Integrated Protection System of Indicators (IPSI)
- 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

This final report highlights the new elements that IPSI brings to the Humanitarian-Development Nexus debate. We also addressed the limitations of the methodology proposed by We World – GVC while suggesting important recommendations to overcome these shortcomings.

The critical analysis derived from the results of the semi-structured questionnaire is considered for the final recommendations established at the end of the document. The meetings with different stakeholders, both internal and external, involved in the CPA methodology proved extremely valuable to describe possible recommendations for improvement of the IPSI methodology. It was especially useful in understanding the replicability aspects of the methodology, and the characteristics to be generalized in a global and regional context.

3.1 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 and programming for interventions (We World – GVC, in press).

3.2 Target Population

We World – GVC works with different populations across the globe. The CPA methodology mainstreams gender, age, diversity and persons with disabilities (PWD). There are specific target groups with bigger representativeness, but it is relative and depends on the context and characteristics of the communities where it is applied. The main population groups targeted in Lebanon are Syrian refugees, mainstreaming age, gender and diversity. We World - GVC 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).

3.3 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 Standing 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, threats 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 threats[1]" (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 the main dimensions of humanitarian intervention[2]. 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 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).

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[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)

3.4 Practical assumptions

The IPSI is designed to describe the situation of Protection Risk in developing communities, mainstreaming age, gender and diversity, with the possibility to target specific groups such as refugees, IDPs, migrants among others. In the case of Lebanon, Syrian refugees were the main target. 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 (2018) 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., 2018, 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).

3.5 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

(threats), 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 through structural sampling (or systematic non-probabilistic sampling), where participants are selected to comply with a series of characteristics, representing specific profiles (Prieto & March, 2002)[3]. In the case of the multi-sector questionnaire, there are at least 6 profiles required: 1 male and 1 female between 18 and 24 years of age, 1 male and 1 female older than 24 years of age, 1 caregiver of children under the age of 15 and 1 caregiver of a PWD or 1 PWD if available.

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.

3.6 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.

3.7 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 ¼ 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.

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[3] Prieto, M. A., & March, J. C. (2002). Paso a paso en el diseño de un estudio mediante grupos focales. Atencion Primaria, 29(6), 366–373. Retrieved from: https://core.ac.uk/download/pdf/82496721.pdf

The main problem with missing data is the creation of a gap of measurement in the theoretical framework. Moreover, a high number of DK answers makes certain questions not relevant. The lack of information in protection risk analysis context can provide powerful information, specifically in the are of coping capacities, but it is left for individual analysis of every indicator whereas lack of information is providing necessary inputs on risks, or is simply not a relevant question of the overall context analysis.

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.

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.

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.

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).

3.8 Multivariate analysis

The most commonly used 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* (in the case of Lebanon). 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 the 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).

3.9 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 the 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.

3.10 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) suggest 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 the 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 state 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.

3.11 Robustness and sensitivity

Sensitivity analysis provides an understanding of 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 the 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 a difficult interpretation and applicability for policy advocacy. Reducing the number of indicators in the ones that present less severity and a higher percentage of missing data could provide a comprehensive method to measure the 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 a 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).


3.12 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
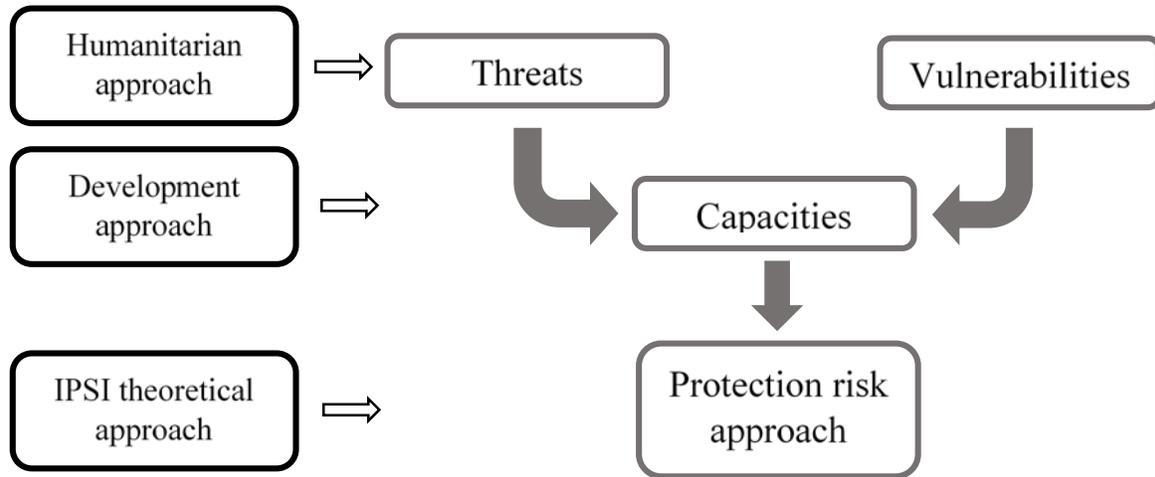
Source: Own elaboration

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 the attainment of proper collective outcomes.

3.13 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 the 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 the 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.

3.14 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.

4. 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, we 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 outcomes 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 of 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 a 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 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 is 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 an assessment of the 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 centre, 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 the intervention of humanitarian action. Achieving seamless communication between both indicators could provide better community targeting for policy advocacy.

Trend analysis through historical data proves 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.

5. Recommendations

Based on the findings and limitations on the IPSI methodology, below there is a series of recommendations on how to address possible shortcomings:

a. One of the biggest concerns in the implementation of the CPA in Palestine is the PVI. The fear of losing the ability for trend analysis with existing data from 2015 if there is a shift to the IPSI is not methodologically relevant. The PVI indicators used in Palestine should go through a revision work to match with the existing indicators of IPSI, to properly overcome the main concerns of stakeholders: number of indicators, interpretability of data, consistent, robust and scientifically strong methodology. Whenever changes are applied to composite indicators, especially techniques like weighting, aggregation and multivariate analysis, these techniques can be applied to data from previous years, with the objective of not losing data. This is already done in indicators used by ECHO and JRC (INFORM Index) in the context of risk analysis

b. The importance of understanding the IPSI, what it does and how it works is important for transferability (Anonymous 2019): the IPSI is one of the ways that could be used for advocacy and scale the CPA up to the international level. In order to replicate the methodology through an effective strategy, it would be recommended to initiate the analysis of protection by introducing vigorously the IPSI which has the potential to be shared ad advocate for the CPA within the humanitarian system on a bigger scale. The CPA has to be contextualized and it is certainly creating lots of discussion, battles and contradictions but has the potential to have a solid base for starting the CPA in another region.

c. Composite indicators present complex realities into simple numbers, which need to be easily interpreted by interested parties using the information. The INFORM index, created by the Joint Research Center of the European Commission, adopted a hierarchical clustering model with the idea to cluster information based on the 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 a natural criterion of similarity (Estivill-Castro, 2002), in this case, Ward's minimum variance criterion 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.

d. The implementation of the platform for public access will play an essential role to cover one of the main concerns by stakeholders and donors in the use of the IPSI. Often encountered as data difficult to use and interpret, the platform creates an easy to use tool to extract the most essential information, mainly for advocacy and communication purposes. Having such a rich dataset with

disaggregated information is one of the main strengths of the IPSI, and overall, of the CPA methodology. Finding the most valuable way to use this information will help establish the CPA and the IPSI as an essential tool in risk assessment and helping create the community's profiles.

e. Uncertainty analysis helps understand how changes in different steps of the methodology can affect the final values of the indicators. Literature suggests different approaches, but the most commonly used are the following:

   a. Inclusion and exclusion of individual indicators.
   b. Using different aggregation systems.

f. For the normalization process of the IPSI, 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). One of the main goals of the IPSI is to be replicable in different contexts, and this involves a process of standardization of the techniques and methodology. The introduction of possible new minimum and maximum values for individual indicators in different settings 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 and regions.

g. During the evaluation missions, it was highlighted the concern about the high proportion of missing data. Missing data can highly influence real values and representativeness of communities, and bias the results, possibly misleading to incorrect policy targets or interventions. The use of Cold Deck imputation as a solution for missing values would replace them with a constant value from an external source (Nardo et al., 2005), such as official statistics. Due to the lack of official statistics in protracted crisis scenarios, the most recommended solution would be the use of Hot Deck imputation. This technique 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. This would allow to take values from communities with similar characteristics and assign them to the indicators with the high proportion of missing values. It could represent an exhaustive and long process, but it proves to be effective in settings where clusterization techniques are already implemented.

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 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	DK answers are categorized as neutral/middle category, taking a value of 0.5 on a scale from 0 to 1	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 and guidance of program interventions 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	Lack of multivariate analysis for a more credible weighting scheme. Bias in some	Implicit marginal rate of substitution across dimensions. Mixing input and output	Lack of data in the long term to understand long-lasting effects of	Data collection must be improved. No multivariate analysis. Lack of continuation

	ranking. Transferability to other contexts	dimensions. Lack of analysis between dimensions	factors. Weakness in practical assumptions about missing data	shocks. Sole focus on food security	
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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