TUDelft

Delft University of Technology

Comparing hierarchical and inductive methods to characterize social vulnerability. – A Burkina Faso case study

Savelberg, Lotte; Homberg, Marc van den; Salazar, Jazmin Zatarain; Casali, Ylenia; Comes, Tina

Important note
To cite this publication, please use the final published version (if applicable).
Please check the document version above.

Comparing hierarchical and inductive methods to characterize social vulnerability. – A Burkina Faso case study

Lotte Savelberg[1], Marc van den Homberg[1], Jazmin Zatarain Salazar[2], Ylenia Casali[2], and Tina Comes[2]

[1]510 An initiative of the Netherlands Red Cross, Anna van Saksenlaan 50, 2593 HT The Hague, The Netherlands
[2]Faculty of Technology, Policy and Management, TU Delft, Jaffalaan 5, 2628BX Delft, The Netherlands

Social vulnerability is a key concept that guides the design, evaluation, and targeting of humanitarian and development programs worldwide. However, vulnerability remains an abstract concept, and many methodologies and assessment tools exist to characterize vulnerability. What is missing is a standardized framework to determine which method is most useful to assess social vulnerability and to determine the sensitivity of different methodologies.

In this paper, we make a headway in addressing this gap by comparing two methods for assessing social vulnerability and their sensitivity in a case study for Burkina Faso: 1) the inductive principal component approach (SoVI) and 2) the hierarchical equal weighting approach (INFORM). Our hypothesis is that the spatio-temporal characterization of social vulnerability is highly sensitive to different methods and the quality of the input data.

To test the impact of the different methods, this paper presents a case study of Burkina Faso. Burkina Faso, is one of the most vulnerable countries in the world ranking 161th on the ND-Gain Index, highly vulnerable to natural hazards and man-made disasters. While many vulnerability assessment methods focus on natural hazards, our case study assesses a combination of conflicts and floods by calculating the social vulnerability for all 351 communes of Burkina Faso. Given the limited availability of data with high spatial and temporal resolution, we rely on a variety of data from mostly open global data repositories. We focus on characterizing the spatial characteristics for one year (2020).

Our results show a considerable difference in the spatial social vulnerability rankings of communes for the different methods. The hierarchical approach shows a larger standard deviation within the social vulnerability scores, and at least 50% of the communes have a rank differentiation of 50 positions compared to the inductive approach.

When comparing the performance of the methods with the challenges present in the quantification of social vulnerability, we argue that equal weighting approaches perform better in data scare areas. However, the inductive approach provides better insights in temporal dynamics and the relations between different indicators that are represented by the index.

The substantial differences in outcomes of the methods, implies that different methodologies may lead to different policy decisions in humanitarian and development programs. It is therefore crucial to better understand the methodological differences and to understand which methodologies can quantify social vulnerability both spatially and temporally when facing a lack of high-quality data. This study is a call for action to be very careful in relying entirely on one method and the need to develop a deeper understanding of the different methods available and which characteristics are required to satisfy the needs of humanitarian and development programs.