

# **A Community-based Participatory Approach to Vulnerability Analysis with Adaptation Planning for Pelagic Sargassum Influxes in the Eastern Caribbean: a Saint Lucia Case Study**

## **Un enfoque participativo basado en la comunidad para el análisis de vulnerabilidad con planificación de adaptación para los afluentes de sargazo pelágico en el Caribe oriental: un estudio de caso de Santa Lucía**

### **Une approche participative communautaire de l'analyse de la vulnérabilité avec une planification de l'adaptation pour les afflux de sargasses pélagiques dans les Caraïbes orientales : une étude de cas de Sainte-Lucie.**

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#### **EXTENDED ABSTRACT**

In the last decade, the shores of the Caribbean have been inundated with anomalous amounts of pelagic sargassum. Large mass strandings of pelagic sargassum were first reported in the Caribbean region in 2011 and have continued almost yearly until the present (Hinds et al. 2016; Oxenford et al. 2016; Djakourè et al. 2017; Brooks et al. 2018). High influxes were experienced in 2011, 2014 and 2015 but reached unprecedented amounts in 2018. The record-breaking beaching events of 2018 demonstrated that greater quantities of pelagic sargassum are affecting the Caribbean region with greater frequency and over longer periods of time than previously observed (UNEP 2018; CRFM 2019).

The impacts of the usual influxes of pelagic sargassum are locally specific (Louime, Fortune and Gervais 2017) as every country has its unique realities and associated challenges (Mortier 2019). However, while adaptive planning and management options must be context-specific, this does not mean that Small Island Developing States (SIDS) cannot learn from the experiences and best practice of others. It is against this backdrop that this research focused on Saint Lucia as a case study, to examine vulnerabilities to pelagic sargassum influxes between and within communities and to determine how this can inform adaptive planning.

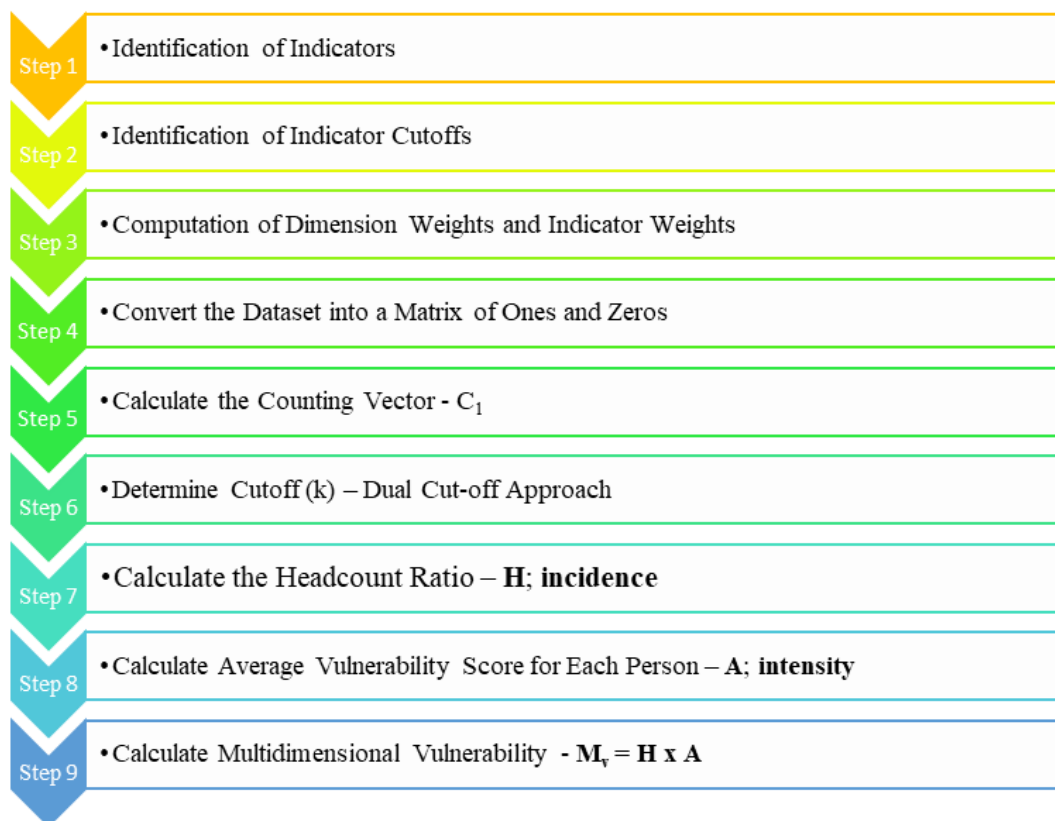
Saint Lucia was selected for this study as it lies at the forefront of receiving sargassum influxes, which has been plaguing the island from 2011. By engaging in the first in-depth study in community-level vulnerabilities and responsiveness (adaptability) to pelagic sargassum influxes, it is anticipated that the scientific community will better understand sargassum strandings as a natural hazard, be able to make useful comparisons between similar situations in the Caribbean region, learn from best practices and draw meaningful conclusions.

The literature abounds with different definitions for vulnerability, despite several efforts to develop a universally accepted one (Beroya-Eitner 2016). Ahmed and Kelman (2018) have defined vulnerability as the characteristics and conditions of a community that make it susceptible to the negative effects of a hazard and the socio-political circumstances that contribute to the creation and perpetuation of these conditions. Vulnerability to natural hazards is increasingly regarded as a condition that encompasses the elements of exposure, sensitivity and capacity to adapt (Miller et al. 2010). In this definition, the components of exposure and sensitivity, create potential impacts and increase vulnerability, while adaptive capacity decreases it (Islam 2013)

This research endeavoured to evaluate the vulnerability of three rural, fishing communities in Saint Lucia, namely, Dennery, Micoud and Praslin, to extraordinary pelagic sargassum influxes. This study employed community-based participatory approaches to develop 18 appropriate indicators of the 3 components of vulnerability, namely exposure, sensitivity and adaptive capacity. The indicators were aggregated to form a combined indicator or vulnerability index for each community. This facilitated the identification and understanding of variations in the vulnerability of the three communities to pelagic sargassum and guided the adaptive planning process.

This research employed a mixed method approach for data collection utilising both quantitative and qualitative techniques. Each method provided different types of data and focused on a specific target group. The key advantage of using the mixed methods approach is that it allows for the synthesis of quantitative data with experiential data, which is not numerically quantifiable. The qualitative data help 'tell the story' behind the numerical values obtained and thus help create a more complete picture of the situation. The methods included: households surveys and census data which were used to compute the composite index, as well as focus group meetings with fisherfolk, key informant interviews and community meetings (the Voice of the Invisible). The Voice of the Invisible is a unique feature of this research, which specifically targeted the poor, disabled, women and minority groups who may have been excluded from previous data collection. As a result, it allows for their voices to be heard and their views captured.

The approach chosen for the creation of the composite index is an adaptation of the Multidimensional Poverty Index (MPI), henceforth referred to as Multidimensional Vulnerability Index (MVI). Poverty lies at the heart of vulnerability and while the two terms are not synonymous, they are strongly linked and caused by similar factors and processes. The MPI is a useful tool which measures the proportion of people in a given population who experience multiple deprivations (or vulnerabilities in our case) i.e. incidence (H) as well as the intensity of the deprivations (A). The specific method chosen is



**Figure 1.** Steps used to Compute the Composite Vulnerability Index

the Alkire-Foster (AF) method, which calculates the MPI as a product of  $H$  and  $A$  (Alkire et al. 2015). The steps utilized to calculate the composite index are depicted in Figure 1.

Because this research is in its incipient stages, only preliminary results for the community of Praslin have been produced. The MVI for Praslin was 53% and summarised information on multiple vulnerabilities across the 3 components of vulnerability into a single number/percentage. 21% of the population displayed vulnerability in 8 out of the 18 indicators. ‘No knowledge of the National Sargassum Management Plan’ and ‘No income generation from alternative uses of sargassum’ are the most popular indicators, affecting 97% and 98% of the population respectively. From the community meetings, the residents have developed their problem and solution trees, which they will use as the basis to develop their participatory video to tell their story in their voice. Fishermen continue to try different strategies to effectively deal with sargassum but are open to new strategies including the use of booms, forecasting and further research.

The community of Praslin though affected by pelagic sargassum influxes shows a high level of resilience due to their diversification into seamoss farming, as demonstrated by their MVI. Additionally, the community members and fishermen appear well-informed about sargassum and are interested in public education and awareness activities. They continue to lament the corrosion of their electrical appliances by the hydrogen sulphide gas emitted from the

decaying sargassum and are concerned about the possible health effects. The MVIs obtained will be dissected to show the composition of multidimensional vulnerability between and within the communities.

**KEYWORDS:** sargassum, participatory approach, vulnerability, community-based, adaptive planning

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