

A CONCEPTUAL FRAMEWORK FOR A (RE-)ASSESSMENT OF SMALL-SCALE FISHERMEN VULNERABILITY

Samsinar, K. N.^{1*}, Firdaus, R. B. R.², & Akmal, S. M.³

^{1,2}School of Social Sciences, Universiti Sains Malaysia (USM), Malaysia

¹Faculty of Business and Management, Universiti Teknologi MARA (UiTM), Tapah
Campus, Perak, Malaysia

³Faculty of Agriculture, Universiti Putra Malaysia (UPM), Malaysia

*E-mail: norsa837@uitm.edu.my

1. INTRODUCTION

In Malaysia and elsewhere, vulnerability and poverty among small-scale fishermen are important issues. In a reality check, there are still many of them earn income range between RM300 to RM2000 ((Lili Maisara et al., 2019; Ramli et al., 2019; Solaymani & Kari, 2014). Even after the poverty line income (PLI) was revisited in 2019, the average income for the small-scale fishermen is still fell below the national PLI of RM2,208.00 (DOSM, 2020). Nonetheless, vulnerability can be assessed in any setting that corresponds to a particular scale or community. Notably, the national inflation rate of foods from 2018 to 2019 across selected food subgroups increased substantially (DOSM, 2019). According to Maslow's hierarchy, the degree of severity increases when a household is unable to meet basic needs. In the context of food security, vulnerability is frequently described in terms of a consequence such as hunger, food insecurity, or famine. According to the Food and Agriculture Organization's (FAO) food security concept framework, the vulnerability will be quantified in this study by identifying loci and domains of food security that are susceptible to damage when exposed to various hazards or shocks. The notion of adaptive capacity (livelihood assets) about exposure (natural risk, environmental risk, social risk, and health risk) and sensitivity (food availability, food accessibility, food usage, and food stability) is used to analyse the vulnerability of small-scale fishers. By conducting a comprehensive examination of the food security concepts that operate within the vulnerability framework, this study can shed light on the vulnerability condition affecting small-scale fishing households.

From a large body of literature on fishermen socioeconomics, (Béné, 2004), divided fishermen condition into two paradoxes: i) they are fishermen because they are poor (as a last resort); and ii) they are poor because they are fishermen (competing in a common-pool resource that is impacted by adverse exogenous factors - the nature of their working environments, which are exposed to multiple stressors) (Malakar et al., 2018). Degradation of the common-pool resource has posed a danger to fisheries production, hence reducing food availability (Cissé et al., 2015). Due to their reliance on natural resources, small-scale fishermen's poverty resulted in food accessibility challenges, which had a harmful influence on food stability and proper nutrient usage (Webb & Rogers, 2003).

The overall purpose of this study is to determine the vulnerability of small-scale fishermen through the following specific objectives:

- a) To conduct a causal analysis of the consequences of multi-stressor vulnerability on the domains of food security.
- b) To ascertain the adaptation capacity of small-scale fishermen.
- c) To develop a vulnerability index for small-scale fishermen.

2. METHODOLOGY

Two fundamental concepts underpin this research are vulnerability and food security. The study studied the vulnerability and food security literature to identify and integrate themes and connections between vulnerability and food security among disadvantaged fishers. The conceptual framework was developed by analyzing related publications and attempting to connect any found relationships between stressors and their effects on socioeconomic elements of small-scale fishers. The review of literature began with a search of bibliographic databases using Internet search engines and the University of Science Malaysia's library catalog as primary access points. Relevant publications were retrieved from the search engines Scopus, Web of Science (WOS), Jstor, Google Scholar (GS) as well as from grey literature found via an internet search. In the field of social sciences, the important concept was scoped using keywords and Boolean operator search, as shown in Table 1.

Table 1: Literature Search Results

Keywords and Boolean Operators	Databases				
	Scopus	WOS	Jstor	GS	Total
TITLE ("VULNERABILITY") AND (LIMIT-TO (SUBJAREA, "SOCI"))	8508	708	31956	1000	42172
TITLE ("VULNERABILITY") AND (exposure, AND sensitivity, AND adaptive AND capacity) AND (LIMIT-TO (SUBJAREA, "SOCI"))	359	8	224	830	1421
TITLE-ABS-KEY (*fishermen*) AND (*vulnerability*) AND (LIMIT-TO (SUBJAREA, "SOCI"))	140	187	444	29	800
TITLE ("food security") AND ("framework")) AND (LIMIT-TO (SUBJAREA, "SOCI"))	1033	76	16924	441	18474
(TITLE (" food security") AND ("framework")) AND (food AND availability, AND food AND accessibility, AND food AND utilization, AND food AND stability) AND (LIMIT-TO (SUBJAREA, "SOCI"))	5	1	51	108	165
First screening	(1421 + 800 + 165 = 2386 publications)				

Even though these efforts resulted in the discovery of 2386 articles, only 152 were chosen for the second step of the screening process. Vulnerable fishermen were covered in 36% of the publications, whereas vulnerable food producers in general and food security assessment were discussed in the remaining publications. 11 papers were recognized as primary sources for constructing the theoretical foundation for this study, while the rest articles give supplementary material for the current topic. Many conceptualizations and approaches to vulnerability concerning food security drove this research to operationalize vulnerability in a way that applies to small-scale fisherman communities.

3. CONCEPTUAL MODEL DEVELOPMENT

The primary objective of this project is to provide a rigorous approach to vulnerability analysis in the context of food security that combines the systematic details incorporated into the framework of the Intergovernmental Panel on Climate Change (IPCC) (vulnerability as a

function of three elements: exposure, sensitivity, and adaptive capacity). Apart from that, this study recognised, integrated, and mapped the consistency of the assessment indicators used in the Sustainable Livelihood Framework (SLF) by the Department for International Development (DFID) that based on (Chambers & Conway, 1992) work and food security frameworks by United States Agency for International Development (USAID), Webb & Rogers, (2003), Løvendal & Knowles (2008) and (Jones et al., 2013).

Based on Figure 1, this study defines fishermen's susceptibility to food insecurity as the proclivity to be adversely influenced (sensitivity) by variability in some processes as a function of Exposure (E), tainted by adaptive capacity (AC). Social risk (i.e., political, government, and policy institutions), natural hazards (i.e., climate change, monsoon, overfishing), environmental problems (i.e., spatiotemporal nature, pollution, and coastal development), and health risk (i.e., illness, injured and life cycle-related risks) are all characteristics of household exposures. While the sensitivity includes food security domains whose availability, accessibility, stability, and utilisation are dependent on a shared resource pool. For example, food availability is vulnerable to exposures such as biophysical changes caused by climate change and societal risks such as fishing control. Then, food access is heavily dependent on income and purchasing power. The interaction of exposure (E) and sensitivity (S) or (E x S) results in the potential impact (PI). This theory stated that increased risk (exposures) results in increased sensitivity, which results in increased impact.

The potential impact is tolerated by the household's adaptive capability, defined as its resources and capacity to modify, or respond to change. Five major capitals or assets serve as a representation of adaptive capacity. The adaptive capacity variables function because of their interaction with one another. For example, different fishing methods with varying output effects involve interaction between human, physical, and natural capital i.e., fishermen's talent, which is influenced by education, training, and experience, is contingent on their physical and financial resources, as well as their background and environmental conditions (Coglan & Pascoe, 2007).

Additionally, it demonstrates that they are not only highly related but that each capital is predicated on a complex interaction with the governance system and policy institution (social capital). These interactions have the potential to be both enlightening and destructive. When financial capital investments have a detrimental effect on environmental and social quality (excess subsidies or financial incentives resulted in overfishing), or when financial capital is produced in ways that undermine social capital (e.g., by fostering growing anomie or violence because of unequal distribution), weakening the social networks through which people communicate. In this sense, the distinction between inputs and outputs of a livelihood strategy is purely artificial: the environment that an income-generating strategy contributes to the building (or destroying) and the social networks that it contributes to creating (or weakening) affect subsequent income-generating activities (Bebbington, 1999). Thus, it is critical to distinguish between positive and negative indicators within each capital by permitting connections between those capitals to focus attention and prescribe the functional form of indicators' influence.

To assess the vulnerability of small-scale fishermen, the exposure, sensitivity, and adaptive capacity values will be translated into an index and combined. The following is a mathematical expression of vulnerability status:

- $(E \times S) - AC \leq 0$, such household is vulnerable
- $(E \times S) - AC \geq 0$, such household is not vulnerable

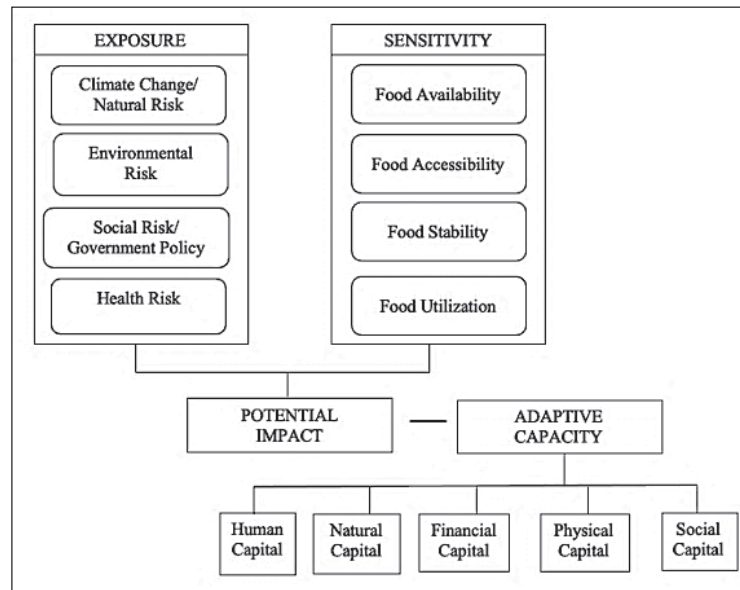


Figure 1: Conceptual Framework for Assessing the Vulnerability of Small-Scale Fishermen

4. CONCLUSION

The notion of vulnerability in the context of food security remains semantic in terms of its functioning on a cause-and-effect basis or a consequence-based basis. The purpose of this study is to demonstrate that any exposure that may impair sensitiveness (food availability, accessibility, stability, and utilisation) may contribute to the susceptibility that results in an outcome (food insecurity). Integrating systematic indications from identifying aspects of exposures, sensitivity, and fishermen's adaptive ability will provide an alternate strategy that operates within the constraints of a specific community. Thus, this study will examine vulnerability assessment through the lens of food security by analysing and evaluating the vulnerability and food security of small-scale fishermen using vulnerability typology.

The proposed methodology also can be used to estimate the likelihood of a fishermen's household or a community falling below a critical food security threshold. By understanding these elements, this study was able to identify which risks (types of exposures) impacted the food security domains to provide effective management strategies in reducing the likelihood of the occurrence of food insecurity or the severity of its consequences. This can aid in determining the nature and magnitude of the threat, identifying the primary source of vulnerability, and identifying actions to help reduce or deal with the threat under each element.

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