

## Chapter 39

# Opportunities and Challenges of Visualization and Open Data in Food Security Analysis

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### ABSTRACT

*Statistical literacy presents many aspects about food security in the world. It highlights weaknesses, it creates awareness of threats in current situations, helps overcome challenges and creates opportunities for the future. Statistical data analysis enables existing food security interventions and programs to be reviewed and revised, and this better understanding of current situations enables more authoritative and relevant decision-making processes for the future. Statistical literacy involves skills and expertise in data description and interpretation (in words as well as in numbers) to name, explore and amend beliefs, opinions and suggestions. It helps decision-making processes about food security in a sub-nation, nation and region, as well as the world. This chapter will demonstrate the importance of open data and visualization, including its challenges and opportunities, in the food security context at national and global level to make decision-makers aware of the need to enhance their capacity for and investment in statistical literacy.*

### INTRODUCTION

In this era of information, communication and technological innovations, data dissemination systems and the diverse varieties of data present a number of technical challenges for various kinds of research and analysis. Private sector data and information service providers have been expanding their business by obtaining open data sets released by government and the public sector and offering them for sale. It greatly helps researchers and scientists to access open data for the analysis, modelling and visualization of their particular research topic or area. The realistic research outcomes they produce may challenge

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our beliefs and suggest actions for the future. The Open Knowledge Foundation describes open data as data that can be freely used, re-used and redistributed by anyone without legal, technical or social restrictions (Tammisto & Lindman, 2012, p. 298).

Accessing open dataset supports and applying them to the decision-making process could improve the lives of all people. Technological challenges have been encountered, however, due to insufficient metadata, because it is disseminated increasingly by different data organizations worldwide. For this reason, the food security situation in some developing countries goes unrecognized, mainly due to weak data analysis and visualization. A country's government or agencies and departments are always under pressure to release their big data for open access. They often cannot release the big data if they don't have permission, as is the case of isolated countries like Myanmar. In addition, profit-making data suppliers focus more on income generation from their data streams and networks than on making big data freely available.

In terms of the world's development agenda, solving the issues of food insecurity and poverty will be critical to improving rural livelihoods as well as developing very country's economy, from individual household up to the national level. However, the level of food insecurity varies from one country to another, even between regions in the same country because of different factors, causes and consequences (Joachim Von Braun, 1992). In the analysis of food security, it is hard to find major causes and provide appropriate suggestions to decision-makers, due to the limitations of data availability, accessibility and government support to re-use data.

Since data visualization has become very popular in the multisector research area, various visualization tools to process datasets have been developed and applied in the areas of agriculture and food security. In this respect, statistical analysis initially requires data visualization to give a basic understanding on which to base decisions that can reduce the stress of food insecurity. The availability and accessibility of data are therefore crucial, even though there are many reasons for insufficient data, such as weaknesses in transparency, integrity and accountability, to convey the key message that freely available open data offers great social, economic and good governance benefits to every country (Organization for Economic Cooperation and Development [OECD], 2016). Given open data availability and accessibility in the public sector, many potential research tools can give a basic understanding of food security with a model that shows multiple inter-related causes through visualized graphs, tables, charts. Open data from various sources can be applied to validate and refine these visualized food security causal models which in turn could be used to identify solutions to food insecurity.

## **OBJECTIVE**

Without statistical literacy of data interpretation and visualization, it is not easy to explore the strength and weakness of any industry. However, when statistical literacy is applied to agriculture, which is the focus of this chapter, it can give a complete picture in order to address a situation of food insecurity, including looming risks and potential solutions. For this reason, open data and big data statistical literacy are integral both to supply of and demand for data and information.

The statistical tools used will differ, depending on data availability and accessibility as well as differences in terms of research themes and the mandate of the organizations, institutions and governments involved. Nevertheless, statistical tools will support the use of visualization for data interpretation, bringing more resources or skills to address the situation than just reading a text. To understand a food

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