Chapter 10
Unlocking the Power of Spatial Big Data for Sustainable Development:
From Capacity Building to Food Security and Food Traceability

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ABSTRACT

Food security is a fundamental human right. Enhancing agricultural practices, lowering food waste, and ensuring equitable resource allocation are among the actions taken to ensure food security. VGI has developed into a helpful tool for data collection, assisting in tracking resource availability, monitoring price fluctuations, mapping community food assets, and assisting with land management. VGI encourages fair pricing, capacity building, access to nutritious food, decision-making, locating food storage, and capacity building. VGI helps to address food waste, map crop production, compile production techniques, crowdsource food quality data, and track supply chains. Advanced technologies can be integrated with VGI to improve analysis and decision-making. Enhancing VGI programs and inclusivity can help people better understand and address issues related to food security.

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INTRODUCTION

Food security, a vital concept, pertains to ensuring access to adequate, affordable, and nutritious food for all individuals. Achieving food security is not only a matter of human well-being but also a fundamental human right. Efforts to promote food security involve improving agricultural practices, minimizing food waste, and ensuring equitable distribution of food resources. By enhancing food safety measures, preventing fraudulent activities, and providing consumers with comprehensive information about the history of food products, food traceability strengthens consumer confidence.

VGI has gained widespread recognition as an effective method for data collection (Ahmad et al., 2022; Ahmad & Khiyal, 2023). For example, it has become widely accepted as a data collection technique for tracking the environment, and resources (Rollason et al., 2018). Similarly, Stream Tracker employs sensors, satellite data, and community volunteers to monitor the locations and flow patterns of streams (Stream Tracker, 2023). Furthermore, CrowdWater, a citizen science effort, aims to supplement existing observations by collecting independent and reliable data for flood and drought modeling (CrowdWater, 2023). Additionally, mobile applications have been utilized to gather comprehensive crowdsourced data for real-time monitoring of pricing changes in the food system (Adewopo et al., 2021; Arbia et al., 2023a). Another study showcased the development of an open framework called facilitated VGI, which merged local knowledge with expert guidance to collect data related to urban farming in Philadelphia (Quinn & Yapa, 2016). Members of the local food community were involved in the study (Fast & Rinner, 2018) to map the community food assets using VGI.

Addressing inequalities in land tenure is vital as they can undermine tenure security, limit land utilization, and jeopardize food security for those dependent on the land (Nara et al., 2020). Ensuring land rights and equitable access to resources is crucial for safeguarding food security. Participatory land administration, incorporating mobile applications and satellite imagery, has been utilized in data collection efforts focused on farms (Asiama et al., 2017).

Roughly half of the indicators associated with the Sustainable Development Goals (SDGs) are linked to population dynamics and geographical distribution. A fundamental principle of the SDGs is to ensure that no one is left behind, necessitating attention not only to population counts within administrative units but also to the specific locations where individuals reside. This underscores the importance of considering both the quantity and spatial aspects of human settlements when striving to achieve the SDGs (Qiu et al., 2022).

VGI is essential in advancing food security. It supports efforts to manage land and assists in tracking environmental resources, tracking price changes, mapping community food assets, and monitoring price fluctuations. It can improve our understanding, decision-making, and actions toward reaching food security goals by utilizing the potential of VGI. In addition, It can contribute to the larger agenda of sustainable development and the SDGs.