Adopting Data Science and Citizen Science to Explore the Development of African Indigenous Agricultural Knowledge Platform

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Abstract : The goal of this study is to explore the potential of data science and citizen science approaches to develop an interactive, digital, open infrastructure that pulls together African indigenous agriculture and food systems data from multiple sources, making it accessible and reusable for policy, research and practice in modern food production efforts. The World Bank has recognised that African Indigenous Knowledge (AIK) is innovative and unique among local and subsistent smallholder farmers, and it is central to sustainable food production and enhancing biodiversity and natural resources in many poor, rural societies. AIK refers to tacit knowledge held in different languages, cultures and skills passed down from generation to generation by word of mouth. AIK is a key driver of food production, preservation, and consumption for more than 80% of citizens in Africa, and can therefore assist modern efforts of reducing food insecurity and hunger. However, the documentation and dissemination of AIK remain a big challenge confronting librarians and other information professionals in Africa, and there is a risk of losing AIK owing to urban migration, modernisation, land grabbing, and the emergence of relatively small-scale commercial farming businesses. There is also a clear disconnect between the AIK and scientific knowledge and modern efforts for sustainable food production. The study combines data science and citizen science approaches through active community participation to generate and share AIK for facilitating learning and promoting knowledge that is relevant for policy intervention and sustainable food production through a curated digital platform based on FAIR principles. The study adopts key informant interviews along with participatory photo and video elicitation approach, where farmers are given digital devices (mobile phones) to record and document their every practice involving agriculture, food production, processing, and consumption by traditional means. Data collected are analysed using the UK Science and Technology Facilities Council's proven methodology of citizen science (Zooniverse) and data science. Outcomes are presented in participatory stakeholder workshops, where the researchers outline plans for creating the platform and developing the knowledge sharing standard framework and copyrights agreement. Overall, the study shows that learning from AIK, by investigating what local communities know and have, can improve understanding of food production and consumption, in particular in times of stress or shocks affecting the food systems and communities. Thus, the platform can be useful for local populations, research, and policy-makers, and it could lead to transformative innovation in the food system, creating a fundamental shift in the way the North supports sustainable, modern food production efforts in Africa.

Keywords : Africa indigenous agriculture knowledge, citizen science, data science, sustainable food production, traditional food system

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