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INSECURITY AND FOOD SECURITY IN NIGERIA: THE PLACE OF DIGITAL TECHNOLOGY

Malachy Chuma Ochie, Ph.D & Juliet Chidiogo Owen-Hampo, M.Sc.
General Studies Unit, Maduka University, Ekwegbe-Nsukka.
+2347037238338

Abstract
Insecurity in Nigeria has significantly disrupted agricultural activities, leading to a decline in food production, increased food prices and growing food insecurity across the country. The persistence of violent conflicts, banditry and insurgency has undermined the ability of farmers to cultivate land, access markets and secure livelihoods. This paper explores the relationship between insecurity and food security in Nigeria and highlighted the transformative potential of digital technology in addressing these challenges. The study examined how digital solutions, such as mobile platforms, satellite technology and drones, precision agriculture and data analytics can improve agricultural productivity, enhance market access and foster resilience in the face of conflict. The paper also discussed the role of digital technology in facilitating communication and coordination between stakeholders, ensuring better monitoring of food systems, and enhancing food distribution networks, especially in conflict-affected areas. By analysing case studies and ongoing technological innovations, the study emphasized the importance of integrating digital tools into national strategies to ensure sustainable food security despite the challenges posed by insecurity. This paper adopted multiple theoretical frameworks including Social Ecological Theory, Technology Acceptance Model (TAM), and the Human Security Framework. While relying on secondary sources of data, the paper adopted descriptive and exploratory research method and made use of content analysis as its method of analysis. The findings indicate that digital technology, when effectively harnessed, could be a key enabler in mitigating the adverse impacts of insecurity on food systems in Nigeria.

Keywords: Conflict, Digital Technology, Food Security, Mobile Platforms, Insecurity

Introduction
Insecurity has emerged as one of the most critical challenges confronting Nigeria, particularly over the past two decades. The country has witnessed escalating violence in various forms, including insurgency in the Northeast, banditry in the Northwest and persistent farmer-herder conflicts in the Middle-Belt. These security threats have had profound implications for Nigeria's agricultural sector, which remains the cornerstone of national food production and security. As Africa's most populous nation and one with a predominantly agrarian economy, Nigeria's food security has been significantly undermined by the pervasive and protracted insecurity in the country (Oluwaseun & Oloruntoba, 2020).

Agriculture, which provides employment for over 70% of the Nigerian workforce, has been severely disrupted by the inability of farmers to safely access farmlands, the displacement of rural farming communities and the growing insecurity surrounding the transportation of agricultural commodities to market centers. These conditions

have contributed to widespread disruptions in food production, resulting in acute food shortages, surging food prices, and heightened levels of poverty and malnutrition, particularly in rural areas where food insecurity is most deeply experienced (FAO, 2021).

The nexus between insecurity and food security is complex and multi-factorial. Insecurity impedes access to productive land and resources; thereby constraining agricultural productivity and disrupting the broader food supply chain. Farmers operating in conflict-affected regions in Nigeria frequently abandon agricultural activities due to threats posed by armed groups. This has led to reduced yields, loss of livestock, and also diminished food system resilience (Akinola, 2021).

Although Nigeria has begun to explore the integration of digital technologies in agricultural practice; the adoption of such innovations remains limited, particularly within the context of insecurity. Yet, it has been suggested that digital tools hold considerable promise for enhancing the resilience of food system by facilitating remote monitoring of farms, enabling early warning systems, supporting virtual markets and improving access to agricultural inputs and advisory services. In the light of these realities, this paper sought to critically examine the relationship between insecurity and food security in Nigeria and to assess the potential of digital technology as a mitigating tool capable of sustaining agricultural productivity, strengthening food systems and enhancing food security amid several security challenges.

Conceptual Clarifications

To effectively explore the intersection of insecurity, food security and digital technology in Nigeria, it is essential to clarify these key concepts that underpin this paper. Insecurity in this context refers to the condition of vulnerability to risks or threats that may result in harm to individuals, communities or the state. In Nigeria, insecurity manifests in various forms; including insurgency, terrorism, banditry, herder-farmer conflicts and ethno-religious violence.

These forms of conflict have led to the displacement of hundreds of thousands of people, extensive loss of life, and the destruction of infrastructure essential for rural livelihoods (Oluwaseun & Oloruntoba, 2020). The intensification of violence, especially in rural areas has severely constrained access to farmland, diminished productivity, and obstructed the movement of goods to the market (Nwankwo, 2022). These disruptions have exacerbated food insecurity nationally and pose grave implications for regional and global food systems.

Food Security, as defined by the Food and Agriculture Organization (FAO, 2021), exists when all people, at all times, have physical, social, and economic access to sufficient, safe and nutritious food. In Nigeria, food security is multifaceted; involving availability, access, utilization and stability. It is influenced not only by agricultural

productivity but also by socio-economic variables; such as household income, market functionality and nutritional awareness.

Persistent insecurity has disrupted farming cycles, limited mobility, and raised transaction costs, thereby weakening both food supply and market systems. As the World Bank (2020) notes, Nigeria's dependence on agriculture, coupled with mounting insecurity, puts the nation at high risk of food shortages, malnutrition and increased rural vulnerability. Declining domestic food production and growing reliance on imports threaten national food security and deepen structural fragility.

Digital Technology offers innovative solutions to agricultural and food system challenges, especially in conflict-affected areas. This includes**;** tools such as mobile applications, satellite imagery, Geographic Information Systems (GIS), drones, remote sensing and data analytics. These technologies enhance productivity, monitor crop health and improve connectivity between farmers and markets. In Nigeria, where infrastructure is often undermined by insecurity, digital platforms have emerged as vital tools for accessing real-time data on weather, market prices and local security alerts (Igbokwe, 2021).

Satellite and drone technologies enable remote monitoring of agricultural land and supporting decision-making where physical access is limited (Akinmoladun, 2020). Furthermore, digital platforms offer access to financial services, extension advice and e-commerce opportunities—critical for maintaining food system continuity amid disruptions.

Mobile Platforms, in particular, have proven essential in delivering agricultural knowledge and facilitating transactions. Applications like *FarmCrowdy* and *i-Farm* provide farmers with weather updates, crop management information and market access even in remote or insecure regions (Akinola, 2021). Mobile money services further enable financial inclusion by facilitating payments and credit access, and helping farmers remain economically active despite adversity.

Conflict on the other hand refers to sustained violent disagreement resulting in social, political and economic instability. In Nigeria, conflicts stem from resource competition, ethnic divisions and the proliferation of armed actors (Bello, 2020). These conflicts severely undermine food production through displacement, restrictions to land access and destruction of agricultural assets. They also disrupt supply chains and drive up food prices; creating a feedback loop where food insecurity fuels further unrest and vice versa (Oluwaseun & Oloruntoba, 2020).

Literature Review

The relationship between insecurity, agricultural productivity and the emergence of digital technologies in Nigeria has received increasing scholarly attention and reflected the complexity and urgency of addressing food security within the country's

fragile socio-political environment. A review of the literature reveals a dynamic interplay between persistent violence, declining agricultural performance and the transformative potential of digital tools.

Insecurity in Nigeria manifests in multiple and interrelated forms; ranging from insurgency in the Northeast and banditry in the Northwest to herder-farmer conflicts in the Middle Belt and widespread incidents of kidnapping and armed robbery. These threats are often driven by socio-economic and political factors, including competition over land and natural resources, high levels of poverty, ethnic and religious tensions and the failure of state institutions to provide effective governance and security (Oluwaseun & Oloruntoba, 2020; Bello, 2020).

In many rural communities, insecurity has become a defining feature of daily life, displacing populations, weakening local economies and disrupting critical infrastructure. The intensification of violence has had a direct and devastating impact on agricultural systems, which are the cornerstone of Nigeria's food supply and rural livelihood.

The consequences of insecurity for agriculture are both immediate and long-term. Displacement of farming populations, abandonment of cultivable land and destruction of farming tools and facilities have all contributed to a decline in agricultural output. This has led to significant disruptions in food supply chains, with many farmers unable to access markets or sell their produce due to security risks. Congruently, Akinola (2021) notes that the cyclical nature of attacks on farming communities discourages agricultural investment and leads to reduced food production, especially in areas previously known for high crop yields.

The Food and Agriculture Organization (FAO, 2021) highlights that these challenges exacerbate food scarcity, push prices to unaffordable levels and heighten malnutrition, especially among vulnerable populations. The World Bank (2020) further warns that Nigeria's dependency on agriculture, coupled with ongoing insecurity, places the country at heightened risk of chronic food shortages and increased rural impoverishment.

Amid these challenges, digital technologies have emerged globally as a powerful tool to support agricultural development, particularly in fragile and conflict-prone settings. The adoption of innovations such as Geographic Information Systems (GIS), drones, remote sensing (the science and technology of obtaining information about objects, areas, or phenomena on the earth's surface without making direct physical contact with them), mobile applications and digital finance platforms has improved agricultural planning, monitoring and resilience in various parts of the world.

These technologies facilitate the collection of real-time data on weather conditions, crop health, soil quality and market trends; enabling farmers to make informed

decisions despite physical or logistical constraints (Akinmoladun, 2020). In Nigeria, digital agriculture platforms such as *FarmCrowdy*, *Hello Tractor* and *Thrive Agric* have gained traction, offering services that include access to credit, mechanized equipment, extension advice**,** and digital marketplaces (Igbokwe, 2021). These tools are especially crucial in conflict zones, where traditional extension services and physical infrastructure are often inaccessible or compromised.

However, despite these promising developments, the literature also reveals several gaps. There is a paucity of empirical studies that explicitly examine the link between digital technology adoption and food security outcomes in conflict-affected regions of Nigeria. While much of the existing work outlines the theoretical potential of digital tools, fewer studies measure their actual impact on farmers' resilience and productivity under conditions of insecurity.

Furthermore, most analyses treat food security, insecurity and digital innovation as separate silos rather than components of a unified system that requires integrated intervention. The socio-political dimensions of insecurity, particularly how they intersect with access to technology and market structures, are often underexplored. Finally, the perspectives and lived experiences of smallholder farmers who constitute the bulk of Nigeria's agricultural workforce remain insufficiently represented in academic and policy discourse.

In summary, the existing literature provides a robust foundation for understanding the challenges posed by insecurity to food systems in Nigeria and the potential role of digital technology in mitigating these challenges. Yet, there remains a critical need for integrative and context-sensitive research that bridges these domains and examines how digital innovations can be systematically leveraged to strengthen food security in environments marked by violence and instability. This paper contributes to filling that gap by synthesizing available knowledge and highlighting practical pathways for policy and technological action.

Theoretical Framework

In examining the interplay between insecurity and food security in Nigeria, particularly through the perspective of digital technology, this paper adopted a theoretically grounded approach that draws from two interrelated perspectives, namely: Human Security Theory and the Sustainable Livelihoods Framework (SLF). These frameworks collectively offer a multi-dimensional angle for analyzing how insecurity affects food systems and how digital tools can serve as resilience-enhancing interventions.

Human Security Theory, as articulated by the United Nations Development Programme (UNDP, 1994), expands the traditional notion of security beyond state-centric concerns of territorial defense to encompass the protection of individuals from chronic threats and sudden disruptions. It emphasizes seven core dimensions

of security, including food, economic, personal, environmental and political security. Within this paradigm, food security is not just a function of agricultural productivity but a critical component of human welfare, particularly in contexts of persistent insecurity.

In Nigeria, where insurgency, terrorism, banditry and farmer-herder clashes have become endemic, the relevance of this theory is profound. These forms of violence have led to mass displacement, destruction of farmland and infrastructure, and the breakdown of rural livelihoods, all of which have undermined the capacity of farming communities to produce, access and distribute food (Oluwaseun & Oloruntoba, 2020). By highlighting the existential threats posed by insecurity, Human Security Theory underscores the urgency of addressing food insecurity not merely as an economic or agricultural issue but as a matter of survival and dignity.

Complementing this approach is the Sustainable Livelihoods Framework (SLF), developed by the UK's Department for International Development (DFID, 1999). The SLF offers a practical and holistic model for understanding how individuals and households utilize various forms of capital to pursue livelihood strategies and cope with vulnerabilities. This framework is particularly relevant to the Nigerian context, where rural populations rely heavily on agriculture, but face repeated shocks from violence and instability.

Within the SLF, digital technology can be viewed both as a form of physical capital and as an enabling factor that influences institutional processes and outcomes. For example, mobile phones and applications provide farmers with real-time access to market prices, weather forecasts, agricultural extension services and security alerts, allowing them to make informed decisions and mitigate risk even in insecure environments (Igbokwe, 2021). Satellite and drone technologies further enhance the ability to monitor crop health and manage land use, supporting data-driven interventions where traditional support structures have failed due to conflict and poor infrastructure (Akinmoladun, 2020).

Together, these theoretical perspectives enabled a comprehensive analysis of the pathways through which insecurity disrupts agricultural productivity and food availability, while also illuminating how digital innovation can foster resilience. The Human Security perspective foregrounds the human consequences of violence, showing how threats to safety translate into food insecurity.

Meanwhile, the Sustainable Livelihoods Framework provides analytical tools for understanding how digital platforms help rural communities adapt to and recover from conflict-induced disruptions. These platforms enable farmers to access financial services, connect to broader markets and receive timely agronomic support, thereby strengthening the stability and continuity of food systems.

By integrating Human Security Theory and the Sustainable Livelihoods Framework, this study positions digital technology as a strategic tool in Nigeria's quest to safeguard food security in the face of escalating insecurity. The dual framework not only elucidates the structural and immediate drivers of food insecurity but also highlighted the transformative potential of digital tools in mitigating risks, improving livelihoods and enhancing human welfare in conflict-affected regions.

Methodology

This study employed a qualitative research design to examine the intricate relationship between insecurity, food security and the role of digital technology in Nigeria. A qualitative approach was deemed appropriate due to the complex and context-specific nature of these issues. It allowed for a nuanced exploration of the socio-political, economic and technological factors influencing agricultural resilience and access to food in areas affected by insecurity. The study aimed to understand the perceptions, experiences and interpretations surrounding the impact of insecurity on food systems and the ways in which digital technologies were being or could be, harnessed to improve food security in vulnerable communities.

The research adopted a descriptive and exploratory design, grounded in the principles of inductive reasoning. Rather than testing specific hypotheses, the study sought to uncover patterns, themes and insights through a careful analysis of secondary data. This approach facilitated a comprehensive understanding of the dynamics shaping the insecurity-food security nexus in Nigeria, with particular emphasis on the potential of digital technologies to mitigate related risks and challenges.

Data for the study were obtained exclusively from secondary sources. A wide array of credible academic, institutional and policy-based materials were consulted, including peer-reviewed journal articles, books, government publications, reports from international organizations such as the Food and Agriculture Organization (FAO), the World Bank, and the United Nations Development Programme (UNDP), as well as reliable online resources. Thematic content analysis was used to analyze the collected data. This process involved systematically coding the textual data to identify recurring themes, patterns and conceptual linkages related to insecurity, food security, and digital technology. The analysis was iterative and interpretive, allowing for the continual refinement of thematic categories as new insights emerged.

Analysis and Discussion: Insecurity and its Impact on Food Security in Nigeria

To submit that insecurity has become a defining characteristic of Nigeria's socio-political landscape, with far-reaching implications for food security is stating the obvious. The nexus between persistent violence and agricultural decline is particularly acute in rural areas, where the bulk of food production takes place. Insecurity has systematically undermined farming activities and disrupted the entire agricultural value chain (Oluwaseun & Oloruntoba, 2020; Nwankwo, 2022).

One of the most direct impacts of insecurity on food security is the displacement of farming communities. Some of the affected farming communities include: Tse-Tsee, Ukohol, Yogbo, Daudu, Ayilamo, Tombo, Turan and Agatu all in Benue State. In Enugu State, farming communities such as Nimbo, Eha-Amufu, Awgu and Affa have been affected by insecurity. Violent conflicts have forced thousands of farmers to abandon their lands, homes and livelihoods. There is no gainsaying the fact that displacement of local communities by violence and instability interrupts planting and harvesting cycles and leads to a reduction in cultivated land while contributing to sharp declines in agricultural output.

In states such as Enugu, Borno, Benue and Zamfara, farmers have been unable to access their farms due to threats posed by armed groups such as Boko Haram, Fulani Herdsmen (Bello, 2020; World Bank, 2020). This phenomenon has not only reduced food production but has also increased dependency on humanitarian aid and further weakening of food sovereignty (FAO, 2021).

Market disruption is another major consequence of insecurity. The fear of attacks discourages transporters and traders from moving goods across regions, especially from rural to urban markets. This has fragmented food supply chains, created artificial scarcities and driven up food prices (Akinmoladun, 2020). Perishable goods often spoil before they reach consumers due to insecurity-induced logistical delays. Moreover, rural markets have either become dysfunctional or disappeared entirely in some conflict-affected areas (Oluwaseun & Oloruntoba, 2020).

The cumulative effect of these factors is reduced productivity across the agricultural sector. Farmers are unable to invest in their farms due to uncertain conditions, and extension services are severely hampered in their outreach (Nwankwo, 2022). The World Bank in 2020 warned that declining agricultural productivity on account of insecurity deepens food insecurity, which in turn results in malnutrition, widespread hunger, and social instability, with women and children disproportionately affected (World Bank, 2020).

Against this backdrop, digital technology presents a promising avenue for mitigating the effects of insecurity on food systems. Innovations such as mobile platforms, Geographic Information Systems (GIS), remote sensing and drones have been deployed to support agricultural resilience, particularly in regions where traditional infrastructure is lacking or compromised (Igbokwe, 2021).

Mobile platforms like *FarmCrowdy* and *i-Farm* have enabled farmers to access market information, extension services and financial support without the need for physical movement. These platforms facilitate real-time communication about market prices, weather forecasts and security alerts, allowing farmers to make better-informed decisions in uncertain environments (Akinola, 2021).

GIS and drone technologies have also enhanced agricultural planning by enabling remote monitoring of land use, crop health, and environmental conditions. These tools are particularly valuable in insecure regions where on-the-ground assessments are risky or impossible. For instance, drone-based surveillance has been used to detect early signs of pest infestation or drought, allowing for timely intervention. Satellite imaging similarly supports policymakers and humanitarian organizations in identifying areas most affected by food scarcity or conflict, enabling better-targeted aid and interventions (Akinmoladun, 2020).

Despite the clear potential of digital technologies, several challenges hinder their widespread adoption. A key barrier is the digital divide, particularly between urban and rural populations. Many rural farmers lack access to smartphones, stable internet connectivity, or the digital literacy required to use these platforms effectively (FAO, 2021; Igbokwe, 2021). Infrastructure deficits such as erratic power supply and poor network coverage further limit the reach of digital innovations. Additionally, the cost of acquiring and maintaining digital tools can be prohibitive for small-holder farmers, many of whom operate on narrow margins (Akinola, 2021).

Conclusion and Recommendations

This study examined the intricate relationship between insecurity and food security in Nigeria, with particular focus on the role of digital technology in mitigating the adverse effects of conflict on agricultural productivity and distribution. The findings revealed that insecurity has significantly disrupted food production systems, displaced farming populations and weakened market access. These disruptions have led to a decline in domestic agricultural output, heightened food prices and deepened the vulnerability of rural communities. The study also found that digital technologies hold transformative potential for building agricultural resilience and enhancing food security in insecure environments.

The integration of digital tools has shown promising results in enabling farmers to access real-time information, financial services, agricultural extension support and market linkages, even in areas with limited physical access. Initiatives such as *FarmCrowdy* and *i-Farm* have demonstrated the feasibility and impact of technology-enabled farming in Nigeria. However, the adoption of these innovations is constrained by several factors, including the digital divide, limited digital literacy, inadequate infrastructure and the high cost of technological solutions.

Based on these findings, several policy recommendations were suggested in this paper:

a) First, there is a critical need for the Nigerian government and its partners to invest in strengthening digital infrastructure across rural and conflict-affected regions. Expanding internet access, improving mobile connectivity and subsidizing the cost of digital tools can create an enabling environment for digital agriculture.

b) Second, targeted support should be provided to small-holder farmers to equip them with the necessary digital skills and tools required to navigate and benefit from emerging technologies. This includes promoting digital literacy programs, offering training on the use of agricultural applications and ensuring access to affordable digital devices.
c) Third, digital agriculture should be integrated into Nigeria's national food policy and development strategies. By embedding technological innovation into food security planning, the government can create a more adaptive and resilient agricultural system that can withstand the shocks of insecurity and climate change.
d) Finally, partnerships between the public sector, private technology firms, and development agencies should be strengthened to scale up successful digital agriculture initiatives and ensure sustainable impact.

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