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# Unmaking Malnutrition-Related Attritional Deaths In Covid-19 Regime: Does Digital Extension And Youth Nexus Count In Africa?

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## Abstract

The implementation of COVID-19 pandemic regime has created barriers between extension agents and farm families as well as between input suppliers and farmers. Farm families that hitherto relied on face-to-face extension education to make crucial nutrition-related decisions and navigate Africa's unstable food system are apparently constrained by lockdown and physical distancing arising from the pandemic regime. Malnutrition crises, including installment death from hunger, have besieged many households. Experts are, however, suggesting the nexus between youth and digital extension as a game changer in the quest to address Africa's nutrition insecurity. This paper, therefore, uses thematic analysis of relevant data to assess potentials, possibilities and limits of this emerging nexus to alter the continent's grim nutritional landscape. The paper argues that the nexus has the potential not only to overcome the pandemic-induced malnutrition challenges but also prepare the continent for the present and future pandemics.

**Keywords:** Covid-19; Digital Extension; Youth; Africa; Nutrition; Food Security

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## Introduction

The arrival of COVID-19 pandemic on the African shore caught the continent unprepared. From Cape Town to Cairo, Africa is in the throes of both primary and secondary impacts of the pandemic. The number of dead bodies directly linked to the virus in Africa may be less than the global average. However, the morbidity and mortality associated with the secondary impact of the pandemic in the continent may be significantly higher than the world average. The continent's pre-pandemic structural conditions are amplifying the impact of the disease. As in climate change, Africa is apparently bearing the brunt of the pandemic, although the virus originated in another continent.

The amplified burden of the disease is felt in every facet of the continent, including its food and nutritional system. The pandemic has not only worsened the already precariously fragile healthcare system in Africa. It also has exacerbated food and nutrition insecurity of the continent. The morbidity and mortality arising from the secondary impact of the pandemic on food and nutrition system are probably higher than the current estimates [1,2]. This is because food and nutrition system are a social total fact 2022. Covid-19 pandemic disturbances within the system may not only reinforce and exacerbate the conditions of people living with diabetics and HIV. It also may take a life of its own - trigger depression and suicide among farmers weighed down by farm losses due to the pandemic regime.

Many analysts, commentators, scholars and epistemic

communities are busy with COVID-19-related infection and deaths while the surging rate of attritional death by hunger prompted by the pandemic regime is less discussed. This regime, marked by lockdown and physical restrictions, met smallholder farmers at different farming cycles. The advent of the disease in the continent and the implementation of the pandemic regime coincided with planting and harvesting periods of farmers in Nigeria and South Africa, respectively. For Africa continent, whose dominant food producers depended wholly on rainfed agriculture, the outbreak of the disease and the consequent pandemic regime have caused unquantifiable catastrophe. The regime's lockdown rippled through the continent's food system, resulting in barricades in multiple spaces and places as well as unquantifiable losses in farm, factory and family levels [3].

Restrictions of movement impinge on activities of input and services providers. They create barriers between agricultural extension agents and farm families, between home and farm, between factory and farm, between market and kitchen, between market and farm. The barriers, thus, turn many foodscapes and waterscapes into food deserts and dry cisterns [3]. Ultimately, they exacerbate nutrition insecurity of many households, especially those of daily income earners and smallholder farmers. This category of households is now a dungeon marked by exceptional suffering and attritional death [2,3]. Children, aged and nursing mothers in such a household are grappling with hunger-induced installment death. The pandemic food security index relative to that of the pre-pandemic has significantly

declined in the continent. Palliatives meant to assist the continent's have-nots are grossly inadequate, due to limited resources and the extralegal activities of some actors. Africa's pandemic consumer price index has risen significantly. The implication is that most households can no longer feed themselves. Some people are mentally ill because of their inability to feed themselves and dependents [4]. A story about attempted and completed suicide in agrarian communities is becoming more frequent than they were in pre-pandemic era.

There is, however, growing evidence that the application of a digital extension service delivery may be a game changer, especially among smallholder farmers, grappling with the new normal of COVID-19 regime [5]. Digital extension is gaining popularity among agricultural extension practitioners as a pandemic-proof strategy for extension service delivery in any context of uncertainty. This rising popularity may be linked to the emergent revolution within the global information economy. Hand-held devices are replacing traditional radio and television use; online blogs and e-bulletins are taking the place of daily newspapers; people across the rural-urban divide now engage each other via social media. These changes have given rise to an increase in the rate of utilisation of digital extension service.

The benefits of digital extension are inestimable, especially in the context of the global emergent information economy. The feasibility of its implementation in African context is yet to be adequately theorised and properly documented. An assessment of the feasibility of this extension model in Africa still requires more studies. Information on enabling and disabling factors such as human resources and the condition of supporting infrastructure is required to inform and enlarge relevant scholarly and policy debates in Africa. This paper, therefore, using thematic analysis of relevant data interrogates the potential, possibilities, and limits of digital extension model in changing Africa's nutritional landscape. The paper pays attention to youth as a prime mover in the utilisations of digital extension model to halt Africa's malnutrition-related attritional death in this pandemic regime. It argues that digital extension has the potential not only to overcome COVID-19 related agricultural extension education challenges but those of future pandemics. The paper disaggregates the use of digital service by some social categories, and indicates how popularising the emergent extension model among youth farmers will influence gender inequality issues in Africa's quest for food and nutrition security. Ultimately, it argues that the extension method does not only mark the beginning of the much-awaited paradigm shift in agricultural extension-'extension beyond the T&V' [6]. It is also a watershed in Africa's quest to leverage information economy to create new job opportunities for its teeming youths and to prepare for future pandemic

The methodological approach is basically an assemblage of secondary data from relevant publications, including grey literature. Relevant concepts were typed into various search engines and the results were screened according to the set objectives and organized into five sections. This introductory

section is followed by a conceptual clarification. The third section is the narration of Africa's experiences with malnutrition. The fourth is the opportunities and challenges in the digital extension youth nexus and the fifth is the conclusion and recommendations.

## Conceptual Clarifications

The concept of nutrition is relatively old. Both in coinage and popularity, nutrition is older than agricultural extension education. The concept, although not so named, existed since immemorial. As of 400 BC, Hippocrates, the father of medicine, stated the importance of food and nutrition. He said let thy food be thy medicine and thy medicine thy food. By the 1700s, the discovery of Antoine Lavoisier, the "Father of Nutrition and Chemistry", marked a watershed in the crystallization of the concept - nutrition and its linkage to health. However, the evolution of modern agricultural extension education never started until the 1800s. These two concepts are, thus, many years apart. It is even logical to argue that the need to ensure food and nutrition security among members in agrarian contexts partly informed the coinage and implementation of agricultural extension.

Nutrition security is seen by many scholars as an integral of food security whereas some analysts tended to view them as disparate concepts. The separatists noted that food security is the availability and the access of food to all people while nutrition security demands the intake of a wide range of foods which provides the essential needed nutrients [7]. It emphasises securing stable access to an aptly healthy diet, with all necessary and sufficient nutrients and water, coupled with a sanitary environment and adequate health services and care to ensure a healthy and active life for all household or society members [8]. The integrationists insisted that nutrition security is overtly and covertly embedded in food security. They argued that the Food and Agricultural Organization's earlier definition and compartmentalization of food security sufficiently capture nutrition security. For FAO, food security implies that all people, at all times, have sufficient, safe and nutritious food for an active and healthy life, and the security is based on the following pillars availability, affordability, accessibility, utilization and stability [8]. The integrationists viewed nutrition as being inherent utilization component, which relates with metabolism of the food in the biological body.

While there are nuances in these definitions, the concepts of food and nutrition security are inseparable. Their relationship is like that of a fire and its heat. The said differences between the concepts best exist at heuristic and theoretical level, and they are promoted mainly by the proponents of medicalization of hunger. The differences somewhat reflect two dominant approaches achieving nutrition security, namely, hunger medicalization and food-based. The former favors the use of food supplements, including synthetics whereas the latter promotes diversification of household food production, recognizes the contribution of forest foods to healthy diets, and include the fortification and biofortification of staple foods.

Either one or a combination of the approaches is used, agricultural extension is pivotal to achieving food and nutrition security, especially in an agrarian context. In a non-agrarian setting, if the favored approach is medicalization of hunger, community health extension workers may play the role of agricultural extension agents. Both forms of extension are meant to effectively relay information on food and nutrition challenges and solutions between researchers and end-users.

Information about changes in food and nutrition related innovations, policies and environmental conditions are important to achieving food nutritional security. Agricultural extension education fills these gaps in knowledge and skills in a context, where households produce and consume partly or wholly their own food. The extension is a two-process whereby extension agents take information on production and consumption needs of a people and/or household to research stations and take solutions back to the end-users in order to improve their means of livelihoods and standard of living [9]. Challenges of malnutrition, namely, undernutrition, micronutrient deficiencies, and overweight/obesity are partly the reason for the existence of agricultural extension, especially in agrarian context.

In Africa, over 70% of the population lives and ekes out a living in agrarian setting, with varying degrees of food and nutrition challenges. Dominant agricultural extension models addressing the challenges have used group and individual methods, which are defined by house, office and farm visits. These methods are apparently ineffective given COVID-19 pandemic outbreak. The visits, with the upsurge in COVID-19 infection and the consequent implementation of control measures, are strongly linked with the spread of the disease. They are dangerous to both farm families and change agents. As a result, experts are contemplating digital extension as a complement, if not a replacement of the office, farm and home visits of the Training and Visit extension approach.

Unlike other approach and methods of extension, digital extension offers opportunity for wider scope and coverage. This extension method leverages transdisciplinary to address topical and timely issues within agriculture, food systems, health, marketing and entrepreneurship. It speeds up the dissemination of innovations in every aspect of human endeavors across genders and geographies. Experts speculate that digital extension method is highly appropriate for both farmers and extension agents. It has the ability to deliver timely information synchronously and asynchronously to end-users across value-chains of various crops and livestock. In doing so, it allows both extension agents and farmers to respectively facilitate learning and learn at their most convenient times. Therefore, digital extension packages have potential to address many limitations of traditional extension. It represents an extension method beyond the World Bank-promoted training and visit model [3]. Granting smallholder farmers access to digital extension would invariably boost production, processing, marketing and preservation across the value-chains of various staple crops and livestock. These impacts will ripple through Africa's economy as job creation along the value-chains

of selected crops and animals, conserved foreign reserves and increased Gross Domestic Product resilient nutrition landscape.

## Africa's Landscape of Malnutrition

Prior to COVID-19 regime, the landscape of malnutrition in Africa was already frightening. The foodscapes and waterscapes in the continent were highly unstable due to political crises and corruption. Progress with respect to issues of food affordability, availability, and quality in the continent has been and is still advancing at a pace that inspires no hope. Worse still, by 2021, the absence of agricultural extension among others factors caused by the impact of COVID-19 have made the statistics gloomier. For instance, in the Global Food Security Index ranking, where 113 countries of the world were compared and ranked based on affordability, availability, and quality of food, the best and the worst countries of the African continent occupied 48th and 112th positions, respectively in 2019. These countries were South Africa and Burundi. The countries have however fell to 70th and 113th positions, respectively in 2021. In pre-pandemic era, Egypt was ranked 55th nonetheless its position in this pandemic era is 62nd; and this country has the best GFSI rank in African continent (The Economist 2021). This implies that the best country in the pre-pandemic Africa occupied 48th position whereas the best country in this pandemic era in the continent occupied 62nd position.

GFSIs for other African countries such as Ghana and Nigeria are downward trend partly due impact of COVID-19 on extension service delivery. The extension staff to farmer ratio in Ghana in pre-pandemic era was 1 extension agent to 1300 farmers while the country's GFSI and its intensity of food deprivation were 59th and 50 kcal/person/day and 5.5%, respectively. The pandemic era with virtually no extension service delivery on nutrition the GFSI rank fell to 82 and the undernourishment prevalence increased from 5.5% to 6.1% (The Economist 2021). Nigeria had extension ratio of one extension agent to 2,500 to 10,000 farmers ranked 94th on GSFI while its intensity of food deprivation and prevalence of undernourishment were 48 kcal/person/day and 13.4%, respectively, in pre-pandemic era (The Economist, 2019). By 2021, the absence of agricultural extension among others factors caused by the impact of COVID-19 have worsening the statistics. Nigeria moved from 94th to 97th while prevalence of undernourishment increased from 13.4% to 14.6 %.

Africa was the hotbed of double burden of malnutrition and the consequent attritional death before the advent of the pandemic. For instance, in South Africa, the national prevalence of under-five stunting was 27.4%, just as its under-five wasting prevalence was 2.5%. About 25.8% of women of reproductive age have anaemia, and 12.6% of adult women have diabetes, compared to 9.7% of men while 39.6% and 15.4% of women and men have obesity, respectively (The Global Nutrition Report 2020). The statistics are no less gloomy in Nigeria. The National Population Commission and ICF International (2014) report that 37 percent of children under 5 years are stunted in Nigeria just as the prevalence of undernutrition and overweight are 11 percent and

25 percent respectively. Rural populations, especially women, adolescent girls and children, are most affected by the problem of hidden hunger. The WHO report (2019) indicates that sub-Saharan Africa remains the region with the highest under-5 mortality rate in the world, with 1 child in 13 dying before his or her fifth birthday, and malnutrition accounting for 45% of the deaths. Lack of essential nutrients leads to irreversible physical and mental damage during development, which have short and long-term impacts on human welfare and economic development [10,11]. Worse still, the double burden of malnutrition previously thought by experts to exist in different households now co-exhibits under the same roof in Africa. That is, people eating from the same pot now experience two extreme forms of malnutrition, namely, over nutrition and undernutrition.

Before the outbreak COVID-19, Africa had been a net importer of food. AFDB (2018) estimates that the continent spends over \$35 billion to import food. The Bank projected that the amount will increase to \$110 billion by 2025. The annual food importation of Nigeria is \$22 billion [12]. The precariousness of food and nutritional conditions has been worsened by the advent of COVID-19 regime. The pandemic is altering both the current and projected estimates at both country and continent levels. The impact of the pandemic on value-chains of various sources of food and nutrition is highly substantial. Prices of imported inputs in the continent have changed due various COVID-19 regime restrictions, including increase in the cost of transportation among various Africa's trading partners. The restrictions distort global trade and agreements causing late arrival of imported inputs. The delay in the arrival of inputs implies that the farmers may not be able to ensure timeliness of operation which improves quality and quantity across agro-value chain. The same delay also affects the arrival of imported food. Such late arrival leads to food fraud, including but are not limited to adulteration, substitution, dilution, tampering, simulation, counterfeiting, misrepresentation and changing the expiring dates (The EU n.d). These practices pose greater problems to nutrition and health of the people. They collectively lead to the replacement of hunger with disease [6,9].

Moreover, the distortion affects farmers' export. Coco farmers, for instance, face bleakness. The closure of restaurants, hotels, and schools of various categories implies a decline in the demand for coco-related food stuffs. The closure of these public places also affected the demand of other food and marked the loss of income to farmers. One of the implications of the decline is that the affected farmers who took loans may not be able to repay. There is a high tendency for such farmers to become credit unworthy.

Additionally, financial institutions due to the lockdown are tightening their credit facilities to avoid bad debts. Availability of labour is also threatened because the restriction prevents the movement of labour, including farm labour. These factors collectively contribute to the reduction in smallholder farmers' contribution to the quality and quantity of food available for the populace. The supply of some of the staple crops is dwindling while demands for some are increasing. The consumer price index

is on the increase. These economic dynamics shape and structure the inability of most consumers to make healthy food choices, required to eschew attritional death.

These stark statistics however vary across social identities such as migration status, gender and residential area, with urban slum and rural dwellers being the worst-hit. Four broad sub-forms of undernutrition: wasting, stunting, underweight, and deficiencies in vitamins and minerals are reported to be most common among lower income categories; less educated group, smallholder farmers as well as female headed households. This is because drivers of undernutrition and over nutrition include poor food and nutrition choices. One of the determinants of quality of food choice is contact with extension agents [13]. The opportunities and challenges inherent in digital extension as a way to increase the needed role extension agents in daily food choices of families and individuals are discussed in the next session.

### **Digital Extension Youth Nexus in Africa's Foodscape and Nutritionscapes: Limits and Possibilities**

The application of digital technologies to agricultural extension service delivery in Africa has both opportunities and challenges. The infrastructure to anchor digital extension is rapidly expanding in the continent. This expansion presents immense opportunities to reposition the foodscapes and nutritionscapes of African countries, through effective extension service delivery. Internet facilities and mobile phones are making strong and steady inroads into the continent. Over 80% of the 800 million people in Sub-Saharan Africa have a mobile device while over 650million use the internet in 2020 [14,15].

The 650 million mobile users in Africa are greater than the number of users in the United States or Europe. The rising trend is due to increasing awareness among the public about the immense benefits of Over-the-top media services and mobile banking. The critical force behind the rising trend is the youths of the continent. This category of individuals constitutes a prime mover in the consumption of smartphone and internet services across the global and particularly in Africa. Majority of social media users are younger than 35 years. There is a fair gender equality and equity in the consumption of internet services, social media and smartphones in Africa. In South Africa for instance, equal percentage of girls (12.3%) and boys (12.3%) within the age bracket of 18 and 24 years use social media. Similarly, women and men in the age group of 25 to 34 years accounted for 17.2 percent of social media users, apiece. Female teenagers aged 13 to 17 years accounted for 5.6 percent of social media audiences just as their male counterparts accounted for 4.3 percent in South Africa (NapoleonCat.com 2020). Overall, 69.2 percent of individuals who use social media in February 2020 in South Africa were younger than 35 years (NapoleonCat.com 2020). Similarly, Sambira (2013) says that the sight of mushrooms selling teenagers using mobile phones is a commonplace phenomenon in rural Namibia.

The rising rapidity of youths' consumption of mobile phones, social media and internet in equitable and egalitarian ways, makes digital extension the most viable ways of addressing issues of food and nutrition security in the context of COVID-19 pandemic and beyond in Africa. Globally, individuals below the age of 45 are seen by experts as dot.com kids [16]. Driven by the quest to be information competent, this category of individuals now possesses uncanny dexterity and knowledge for manipulating, animating and reanimating online community and its activities. The quantum of online creative accomplishments and monstrous crimes in every realm of human existence attributed to the dot.com generation are many evidence of their affinity for the digitalized world. This category of individuals is everywhere in Africa.

Both in online skills and knowledge, youths in African continent are not lagging behind their counterparts in other continents. The abundance of Africa's youths who are skillful, artful and knowledgeable in digital technologies implies that promoting food and nutrition innovations through digital extension would likely command popularity in the continent. Studies have shown that youths in Africa are crucial forces shaping the nutrition choices across the globe. They have a relatively low risk aversion. Additionally, with the advent of various youth programmes and youth-friendly research organisations, like Children and Youth in-Agricultural Research Networks, children and youth are strongly emerging as important audiences in agricultural extension service delivery. Given that youths are the bridge between the present and future of any society, nutrition and food innovations targeting the youths via digitalised world, would easily be transferred to next generation.

The relative gender equity and equality in the distribution and consumption of digital technologies makes digital extension highly useful in addressing food and nutrition challenges of this pandemic era. The gender equality implies that digital extension has the potential that may reduce, if not eliminate, nutrition information asymmetries between male- and female-headed households. Even in contexts where nutrition choices of a given household is the exclusive responsibility of the female gender, the extension's potential would still be effective. This potential, thus, makes the digital extension a better replacement for the face-to-face traditional extension, which is highly limited in a context marked by purdah system. The extension would also remove geography-bias that always limits the number of households that receives nutrition information in a typical face-to-face traditional extension. It breaks both gender and geography barriers that limit access to information on nutrition and food choices.

Basic forms in which food and nutrition information in digital extension may be represented and related between extension agents and end-users are text, visual, and audio. Digital technologies have a lot of modes of the transmitting information. Modes of communication consist of private message and discussion among large number of relatively public forum in textual, audio, or visual forms (Hine 2005). The mode encompasses electronic mail (email), the World Wide Web

(WWW), Usenet newsgroups, bulletin boards, Internet Relay Chat (IRC), Multi-User Domains (MUDs) (Hine 2000). Digital technologies provide for multiple combinations of these forms. So digital extension information may be related as a text, visual-audio, text-visual-audio-based, text-visual, and text-audio, depending on extension agents' and end-users' predilections.

This potential would enrich teaching learning experiences in digital extension. It also would ensure a wider coverage, which would increase extension-farmer ratio, which is associated with better food and nutrition choices and outcomes. Some experiments for the use of digital extension to improve production decisions and outcomes have been conducted in many parts of Africa and other parts of the world before the pandemic. listed over ten of such experiments [17].

The Growth Enhancement Scheme (GESS) funded by the Nigerian government between 2012 and 2015 is one such experiment. The aim of the project was to address the inability of resource poor farmers to access subsidised inputs. Given that the farmers sell only the produce left after household consumption, GESS targeted increasing production they would have enough both to eat and sell. To achieve these dual objectives, GESS devices a new method to ensure that subsidised farm inputs such as fertilisers, improved seed and agro-chemicals are timely delivered to targeted farmers, without compromising the quality and quantity of farm inputs. In operationalizing the scheme, farmers were registered and handed Electronic Wallets (E-wallet). Subsidized inputs were loaded on the E-wallet and farmers were notified through text messages to collect inputs from suppliers located within their farming communities. When farmers collect the inputs, they would reply 'yes' using their mobile phones to the ministry of agriculture. Observed that GESS caused an increase from  $30,950.89 \pm 31,133.48 \text{kg}$  to  $106,116.88 \pm 96,926.01 \text{kg}$  and  $5,649.2 \pm 3835.3 \text{kg/Acre}$  to  $9,143.6 \pm 8799$  [18].  $1 \text{ kg/Acre}$  before and after participating in the scheme in Oyo state, Nigeria. A similar experiment was conducted in Botswana and Nigeria with fund from the Association of African Universities and the Department for International Development, the United Kingdom. Its aim was how to use youth and ICT nexus to improve food and nutrition security of smallholder farmers. So, basic training and digital technologies were given to some selected youths. The youths then went home to train their parents on how to access food and nutrition information through digital extension. The project led to significant improvements in nutrition, farm income, knowledge and skill of the participants [4,19].

While the potentials of digital extension to improve nutrition, income and social status of the farmers can never be overemphasized, there are challenges associated with the extension service delivery. The technologies augment the possibilities for restructuring social relationships across time and space; albeit they create arena where doubt is cast over authenticity, fabricated, representation, and reality. Such doubts will result in limited acceptance of information as authentic. Noted that language barriers often make it impossible for all stakeholders to use the extension model for production,

consumption, marketing, preservation, processing information [20]. Thus, the information asymmetry and the removal of middlemen, which the model seeks to address are often partially completed. Maintenance of facilities such as mobile phone, power-charging batteries among others are major challenges in the use of digital extension. Cybercrime is also another important challenge to use digital extension. The increasing spate of identity theft and hacking constitutes a major challenge to the full exploration of the immense benefits of digital extension. This problem is festering because of the weak institutional regulatory framework in most African countries.

## Institutionalization of Digital Extension

To operationalise the digital extension governments need accurate documentation of smallholder farmers. The biographies must be detailed to issue types of crops, animals, and roles and responsibilities of the farmers across the value-chains of the enterprises. Comprehensive documentation will ensure that nobody is left behind. African countries should seek partnership internet service providers to ensure the farmers are given subsidised access. Such subsidised access may be incorporated into the taxation and corporate social responsibilities arrangements of the service providers. The human and nonhuman resources of the extant agricultural extension service delivery model should be repositioned to become digital extension compliant. Such modification and repositioning may include but are not limited to in-service training for personnel, training of farm youths and other farmers. Each government should inaugurate a pilot test before full implementation. Pilot-testing will enable the inclusion of relevant peculiarities in the regulatory framework that will underpin the modus-operandi of the system. In multi-ethnic nations such as Nigeria, South Africa and Ghana, there is a need for multi-sited pilot testing to ensure that place-specific factors are adequately incorporated into the configuration of the extension model. The pilot-testing will also reveal the quality of network service of various geographical locations of each country. Finally, the content must be enriched to guarantee its continual relevance to the present and future pandemic contexts. Critical issues to be fitted into the model are food and nutrition choices, dietary diversity, amongst others.

## Conclusion

This paper highlighted and underscored ways in which digital extension constitutes a growing opportunity for various African countries to address issues of food and nutrition, thereby reducing malnutrition-related attritional death associated with COVID-19 regime. The paper shows how the advent of the of COVID-19 pandemic in the country is exerting a negative impact on every sector of the African economies. It suggests that the number of individuals in the throes of hunger induced-attritional death in the continent is perhaps more than the number of people infected with the virus. That is, the secondary impact of the pandemic has perhaps claimed more lives and unleashed more social suffering

on the continent than the primary impact of the disease. The paper argues that digital extension may be a game-changer for the present and future pandemics in the contexts of reduction of food and nutrition insecurity among the vulnerable segment of the populace. It demonstrates the need for a multi-sectoral approach in the planning, implementation and evaluation processes of digital extension. Ministries of agriculture, health and education must work synergistically with service providers to ensure the farmers gain access to sustainable services. The paper also advocates a multi-sited pilot-testing to enable the inclusion of relevant peculiarities in the regulatory framework that will underpin the modus-operandi of the system. It indicates that in multi-ethnic and geographic nations such as Nigeria and South Africa, the multi-sited pilot testing would ensure that place-specific factors and geographical dynamics are adequately incorporated into the configuration of the extension model as well as into the regulatory framework that governs it.

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