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### Agricultural advisory service (AAS) in responding pandemic: A global review and reflection

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#### Abstract

One of the significant aspects of human life adversely affected by the novel coronavirus pandemic is agriculture. Various preventive measures have been put in place by the governments of various countries to curb the spread of the disease. Despite the positive impact of these precautionary measures, in its execution, the production of food and other agricultural products has been affected.

This situation, therefore, has called for the mobilization of all physical and institutional resources in the agricultural sector to avert the impending famine, which will be the result of a continued reduction in the production of food.

The importance of the agricultural advisory service in helping the agricultural sector wade through difficult times has been tremendous over the years. To enable the advisory service to continue this beneficial role during this pandemic, the need for digital agricultural advisory services to be intensified and continued is imminent.

A detailed review of the literature bordering on the topic was carried out to review the application and effectiveness of the digital agricultural advisory services during the pandemic. It was discovered that the application of digital agricultural advisory services predates the pandemic era. The use of the digitalized form of advisory services for the agriculture sector has yielded great results for the sector before the pandemic. The continued adoption during the pandemic era will also boost food and other essential agricultural products during this pandemic.

**Keywords:** Agricultural advisory, agricultural extension, COVID-19, and pandemic

#### Introduction

The agricultural sector stakeholders have identified the function of the Agricultural Advisory Services as an important factor in boosting the profitability of the farming business and forming a link between updated research findings, agricultural education, and farmers (Faure *et al.*, 2012) <sup>[10-12]</sup>. Agricultural advisory services are expected to work hand-in-hand with farmers and other key players in the agricultural sector to solve problems that might inhibit the growth and development of the farming business, thereby increasing food production and availability (Liebenberg, 2015) <sup>[22]</sup>. The advisory service staff is supposed to provide information and educate farmers on how to overcome any prevailing circumstances or minimize its effect on their business and farming activity.

Despite the great import attributed to Agricultural Advisory services, there have recently been questions about the effectiveness of the service in dealing with diverse and unprecedented issues that might be facing farmers and affecting the production of food and farm produce under these circumstances. The appraisal of the effectiveness of the services stems from the fact that the government of many countries is gradually withdrawing financial and human resources support for the agricultural advisory services when in essence, this is the time when increased effort should be geared into providing advisory and mentoring services for farmers and key players in the agricultural sector (Faure *et al.*, 2011) <sup>[10-12]</sup>.

As the world reels from the devastating effect of the current Covid-19 pandemic ravaging through countries of the

world, many measures are put in place by the government of these countries to ensure the safety of their citizens and residents. These measures include total lockdown, restricting the movement of people and opening of businesses, social distancing, and curfew imposition (Açikgöz & Günay, 2020) <sup>[1]</sup>. While all these actions are essential to curb the spread of the contagious disease, they also hold adverse effects for people and businesses. A significant aspect of human life that is affected by the imposition of these measures is agriculture.

Farmers and others in the agro-allied business have also been affected by these measures, having to stay back at home. To this end, there has been a wide range of problems caused by the compliance to the stay-home directive, including a shortage of food as predicted by the researchers (Nicola *et al.*, 2020) <sup>[27]</sup>.

The preceding points indicate that the need for renewed and revised methods of agricultural advisory services is imminent. While some recent studies have identified the pluralism of the agricultural advisory services in Europe (Knierim *et al.*, 2017) <sup>[20]</sup>, some focused on the challenges precipitating the current development in the advisory services (Christoplos, 2008) <sup>[17]</sup>. However, none of these researches have worked on an overview of the agricultural advisory services in responding to a pandemic on a global scale.

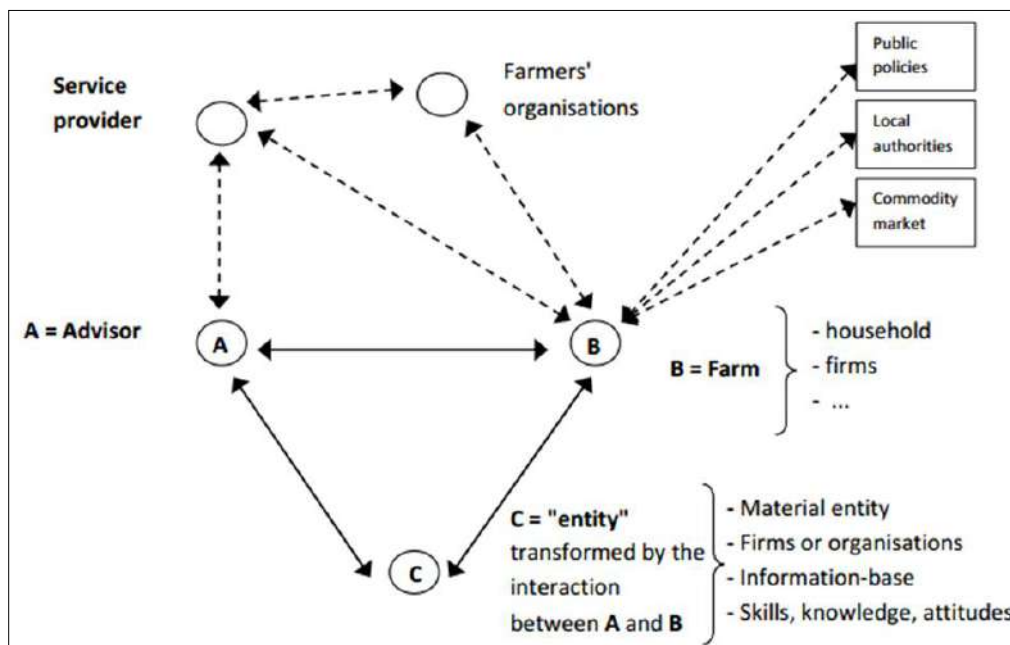
In this paper, we will examine the extent to which the Agricultural advisory services have helped stakeholders in the agricultural sector the world overcome the challenges in this pandemic period. Thus, the adoption and suitability of

the digital agricultural advisory services in responding to the pandemic will also be reviewed.

**Agricultural advisory services**

This is also synonymous with agricultural extension. It was defined by Anderson, (2008) and (Christoplos, 2008) [3, 17] as a system that aids the availability of relevant and recent knowledge, information and innovation to the major

stakeholders in agriculture business, orchestrates the synergy between these stakeholders and relevant research and business institutions and help them develop the skillset and techniques needed for the growth of their business. While the difference between the term extension and advisory services is not profound, extension refers to a system of knowledge transfers alone, an activity that the advisory services transcend.



**Fig 1:** A depiction of the institutional setting of the conventional agricultural advisory service (Adapted from Gadrey, 1994; Faure *et al.*, 2011; Labarthe, 2009) [10-12, 14, 18, 20, 21]

The figure 1 above shows the framework for the conventional advisory service for stakeholders in the agricultural sector. In the framework, the relationship between the farmers, the staff of the advisory services and other important determinants are established, a definition and understanding of which will help us appreciate the system of production of the agricultural advisory service and map out the population of agricultural service providers that are considered in this study.

The two major actors in this framework are the service providers and the farmers. By virtue of its status, means of finance and synergy between the other participants in the sector, the service providers may possess varying institutional features (Labarthe, 2009; Klerkx & Proctor, 2013) [18, 20, 21].

On the other hand, the activities of the farmer are affected by a number of governmental policies and numerous organizations. Other determinants of the advisory relationship include:

- a. An institutional setup responsible for the drafting of the national policy on agricultural advisory service, identifying the groups and stakeholders in need of the service (Labarthe, 2009) [18, 20, 21].
- b. Adequate infrastructure setting by the service provider. The Agricultural advisory service provider consists of two fronts, the front and back office. While the front office see to the interaction between the service providers and stakeholders, the back office helps the service providers appreciate the multidimensional

nature of their job and help foster an appropriate plan for tackling the problems on the field (Klerkx & Proctor, 2013) [18, 19].

- c. Governmental agencies who are responsible for coordinating and overseeing the intervention process between providers and farmers.

**Importance of agricultural advisory services**

It has been established that agriculture is an essential aspect of human life. Apart from the production of food, jobs, and other means of livelihood, many countries' economies are based on it. It either is the main basis of an economy or a supporting source of foreign exchange. Either way, agriculture plays a major role in the development of the world and its economy.

Despite its established importance, research discoveries and recent innovations are not readily made available to most of the key stakeholders in the sector. This can be attributed to the fact that they are usually located in rural areas where access to information as at when due is largely restricted (FAO, 2017) [7-9]. This is where agricultural advisory services come in. The advisory services, as espoused by Hameed & Sawicka, (2016) [16], play a pivotal role in rural communities. This they do by disseminating relevant information to farmers using study groups and practical teaching. They also strengthen the link between the farmers and agricultural, commercial institutions, amongst other things.

**Digital agricultural advisory services**

The use of Information Communication Technologies in the dissemination of information is no longer novel around the world. The widespread use of this method of information and knowledge transfer has found its way to the agricultural advisory services. According to Qiang *et al.*, (2011) [30], the use of digital means of agricultural advisory services holds many benefits for the development of the agricultural sector around the world. This development is made evident through improved decision-making, fast and easy access to information by stakeholders, and precise automation and mechanization of the learning and application process (Zscheischler & Rogga, 2015) [32]. The application of digital advisory services for the agricultural sector has been adopted in many countries around the world (Deichmann *et al.*, 2016) [6]. This method has improved the delivery of agricultural advisory and extension services in countries, adopting them with little disadvantages noticed (Klerkx *et al.*, 2019) [18, 19].

**Objectives**

This paper seeks to understand how digital agricultural services can be adopted by stakeholders in the agricultural sector to partner and facilitate the synergy between the key players and the relevant research bodies and institutions during this period when every aspect of human life is greatly affected by the ravaging pandemic. This is especially important in this situation where physical contact is both harmful and prohibited because of the pandemic.

**Methods**

This paper takes a dual approach to determine the use of digital agricultural advisory services in responding to the pandemic currently prevalent around the world. These approaches provide information regarding the use and suitability of the digital agricultural advisory services. These approaches include:

1. A literature review of the effects of the digitalization of the agricultural extension services pre-pandemic era
2. A more detailed review of the application and suitability of the digital agricultural advisory services during the pandemic period.

The first approach entailed a review of the literature bordering on the topic of digitalization of the agricultural advisory services. About 105 articles, journals, and papers

addressing this topic were listed and identified on Google Scholar. The rationale behind this approach was to ensure that adequate information was obtained on the use of digital agricultural advisory services before the outbreak of the pandemic. After reading the abstract and introductory part of these journals, 36 were found to be fully compatible with the keywords of this paper. With help from various innovation management literature review methodologies succinct and detailed information was derived from the review and analysis of this literature.

**Findings**

After explaining the methods employed in sourcing for information for this paper, this section will present the result and findings gotten from the application of the methods espoused in the preceding section.

Firstly, the application of the digitalized form of agricultural advisory services has largely been in use before the current pandemic outbreak (Bowen, *et al.*, 2010; Medema *et al.*, 2014) [4, 24]. In most European and North American countries, there has been an upsurge in the application of ICT in transferring knowledge and information to stakeholders in the agricultural sector (Klerkx *et al.*, 2019) [18, 19]. With the generation of data increasing exponentially around the world, there is more access to the predictive information that can help farmers and players in the agro-allied business make better decisions using ICT (Saiz-Rubio & Rovira-Más, 2020) [31]. An example of the application of ICT in predicting and disseminating relevant data for the use of agriculture is Climate Corporation. This million-dollar data analytic company focused on using predictive data for the use of the agricultural sector. The company produced two software, Climate Basic and Climate Pro. This software helps with the prediction of optimal weather and climate conditions for various farming activities (Carroll, 2020) [5]. There are also ICT tools like drones, GPS, and satellites that are used in passing useful agricultural information to stakeholders (Oliver *et al.*, 2010) [28]. Even in third world countries, the use of the digital advisory service is also adopted, as it has been shown to save time and cost of providing extension services, and it is adjudged to be effective (Aker, 2010) [2].

Summarily, the effect of the use of digital agricultural advisory services on the agriculture sector in third world countries is given in Table 1 below.

**Table 1:** Effects of digital agricultural advisory services on the agricultural sector in third world countries

Main finding	Location; product; technology; study
<b>Improve market transparency</b>	
Greater arbitrage opportunities, reduction in spatial price dispersion, lower wastage, increase in both consumer and producer welfare	* Kerala, India; Fisheries; Mobile phone coverage; Jensen (2007) * Uganda; Range of Crops; Radio; Svensson and Yanagizawa (2008) * Niger; Grain; Mobile phone coverage; Aker (2010) [2]
Increases in farm-gate prices from improvements in bargaining power with middlemen, greater market participation in remote areas through more efficient coordination	* Uganda; Maize and Banana; Mobile phone coverage; Muto and Yamano (2009) * Madhya Pradesh, India; Soybeans; Internet Kiosks; Goyal (2010) [6, 15] * Gujarat, India; Range of Crops; SMS; Mitchell (2014)
Context specific factors and various marketing and institutional constraints can blunt benefits	* Rwanda; Range of Crops; Mobile phone adoption; Futch and McIntosh (2009) * India; Range of Crops; SMS; Fachamps and Minten (2012) * Ethiopia; Cereals; Mobile phone coverage; Tadesse and Bahiigwa (2015)
<b>Enhance farm productivity</b>	

Facilitates adoption of improved inputs by providing extension advice and weather forecasts at a lower cost and encouraging agricultural investment decisions	* Ethiopia; Range of Crops; Videos; Gandhi <i>et al.</i> (2009) * Gujarat, India; Cotton; Hotline voice service; Cole and Fernando (2012) * Ghana; Range of Crops; Mobile phone coverage; Al-Hassan, Egyir, and Abakah (2013)
Improvements in rural households' food security, income, value of assets through enhanced management practices	* Philippines; Ranges of Crops; Mobile phone adoption; Labonne and Chase (2009) * Sri Lanka; Fruit and Vegetables; SMS; Lokanathan and de Silva (2010) * Peru; Range of Crops; Mobile phone coverage; Beuermann <i>et al.</i> (2012)
Success of digital technology interventions depend on broader institutional support such as political empowerment, human capital, and income inequality.	* Cross country data; Range of Crops; ICT; Lio and Liu (2006) * Morocco; Range of Crops; Mobile phone adoption; Ilahiane and Sherry (2012) * Kenya; SMS; Ogutu <i>et al.</i> (2014)
<b>Enable efficient logistics</b>	
Optimize supply chain management, enhance coordination of transportation, delivery of products, and improving capacity utilization	* South Africa; web based systems; Van Rensburg (2004) * Zambia; SMS based service; Dixie and Jayaraman (2011)
Ensures food safety in global agriculture product chains, tracing from point of origin to consumers	* Namibia; Beef; RFID; Cabrera <i>et al.</i> (2010) * Colombia; Coffee; Karippacheril <i>et al.</i> (2011) * Mali; Mangoes mobile phone platforms; (Annerose 2010)
Facilitates secure payments, allows fast and safe transfer of funds to pay for products and inputs, agricultural subsidies, or remittances	* Nigeria; e-wallet; Grossman and Tarazi (2014) * Kenya; Mobile money; Jack and Suri (2014); Mbiti and Weil (2015)

(Adapted from Deichmann, Goyal, & Mishra, 2016) [6, 15]

Secondly, the outbreak of the coronavirus pandemic has prevented the provision of advisory services for farmers due to the restrictions placed on movement and personal contact (Mitiku *et al.*, 2020) [25]. The conventional and non-digital method of providing the advisory services to farmers have suffered greatly due to the pandemic outbreak. The use of digital advisory services has been used to solve the problem of advisory service provision to farmers and stakeholders alike (Fielke *et al.*, 2020) [13]. According to the study, countries in sub-Saharan Africa are already making use of this digitalized services. There is Farm IT in Kenya, providing agriculture stakeholders with economic information and market synergy. This is in tandem with the Food Administration Organization (FAO, 2020) [7-9] submission that during this pandemic, transitioning to a digitalized form of advisory service can bolster the production rate of agricultural products, especially in rural areas.

**The role of agricultural advisory services during COVID-19 pandemic to ensure food security**

The rural areas are in a challenging position because of the outbreak of the coronavirus pandemic. Primarily, they are at a very disadvantaged place due to the absence of adequate

health facilities, lack of access to necessary information, and poor financial condition. Also, these people must work on the farm to ensure food production for the continued existence of their immediate community, country, and the whole world (FAO, 2020) [7-9].

Stakeholders and key players in the agricultural advisory services have been at the frontline of assisting residents of these rural communities before the outbreak of the pandemic. These activities have not stopped during the pandemic. As a matter of fact, the need for advisory services has risen higher. This is because farmers and residents of rural areas are in need of more information than ever before. This information is not needed only with regard to the farming business. The staff of the agricultural advisory services can also assist in raising awareness about the spread and symptoms of Covid-19, which serves as a link between the government and the residents of the rural areas in the provision of health facilities (FAO, 2020) [7-9].

Cumulatively, all these actions in Table 2 below, if carried out by the stakeholders in the advisory service, will help ensure the safety of the rural areas and the continued production of food to ensure food security for communities and the world in general.

**Table 2:** Recommendation for EAS actors in response to COVID-19 pandemic

<b>1. Recommendations for immediate response during the COVID-19 pandemic</b>
<b>Adaptation of EAS delivery mechanisms</b>
• Coordinate actions among EAS actors including public, private, NGOs, POs etc. Crises such as COVID-19 require timely provision of a wide range of services, and the concentrated action of different types of EAS is key.
• Go digital: digital tools and technologies enable information flow in spite of physical distancing and mobility constraints. Explore simple, available and accessible, and easy-to implement Information and Communication Technologies (ICT) solutions such as short message service (SMS), Interactive Voice Response (IVR), radio and TV, drones, online marketing, e-extension platforms, social media, etc.
• Take advantage of existing formal and informal contacts, mechanisms and local networks, such as cooperatives, producer organizations, community and farmer leaders, self-help and religious groups. These are crucial to ensuring timely and widespread information and advice when measures constraining mobility are in place.
• Provide timely preparation of EAS providers as necessary. Raise awareness and inform frontline providers on most urgent topics such as prevention measures, ICT use, conflict management and effective communication as they deal with the context under high stress.



<ul style="list-style-type: none"> <li>Join forces with emergency response actors at national and local level: health authorities, civil protection, early warning, and others in the frontline. Regularly update the government on the situation in the field and challenges facing farmers, and implement the response in partnership with private sectors and other agencies on the ground.</li> </ul>
<p><b>EAS service provisions to reduce COVID-19 impact</b></p>
<ul style="list-style-type: none"> <li>Carry out a timely assessment of COVID-19 impacts in rural areas and identify the specific challenges and needs of farmers and rural communities to inform governments and enable other agencies to respond                     <ul style="list-style-type: none"> <li>Provide locally appropriate advice and services on access to inputs, market information, easily implementable ways of storage and processing, use of labour-saving practices, collective action to facilitate smart transport arrangements and matching of supply and demand, especially for perishable produce, to reduce post-harvest loss. These are key as the COVID-19 pandemic is not business-as-usual: disruptions such as lack of markets and inputs, increased food loss, limited labour, and lack of transportation require locally appropriate and innovative solutions.</li> </ul> </li> </ul>
<ul style="list-style-type: none"> <li>Raise awareness through timely and accurate information about relevant government measures, social protection schemes, credits and other preventive measures such as physical distancing and hygiene, as well as the distribution of masks and sanitary products.</li> </ul>
<ul style="list-style-type: none"> <li>Facilitate access to locally available agricultural inputs; promote community and household level seed banks and other mechanisms to avoid contacts in groups. This can be achieved in collaboration with local input suppliers, as they are also struggling to keep their distribution lines open with farmers.</li> </ul>
<ul style="list-style-type: none"> <li>Facilitate matchmaking between labour demand and supply such as providing labour banks and logistical support. Uptake of these new services by EAS actors is key as harvest and other labour-intensive agricultural activities are at risk due to work force shortages related to constraint mobility of occasional and migrant labourers.</li> </ul>
<ul style="list-style-type: none"> <li>Facilitate conflict resolution: the crisis puts the population under huge stress while the fear of contagion may disrupt social relationships. EAS workers need to be able to manage intra and inter-community conflicts, as well as have adequate soft skills to communicate with distressed populations.</li> </ul>
<ul style="list-style-type: none"> <li>Promote local and homegrown food to ensure household food security and facilitate local value chains, informal markets, ICT based food orders and distributions, to overcome disrupted formal food supply chains are needed.</li> </ul>
<p><b>2. Recommendations for medium-to long-term post-pandemic response</b></p>
<p><b>Service provision to help increase resilience and rebuild the livelihoods of rural people</b></p>
<ul style="list-style-type: none"> <li>Facilitate linkages with social protection and insurance schemes, including the promotion of self-help and community-saving groups. Also advise on alternative income-generating opportunities, as many people may have lost their jobs, income, livelihood assets, or breadwinners.                     <ul style="list-style-type: none"> <li>Promote locally and homegrown produce including underutilized, neglected and nutritious varieties and species, as well as the establishment of shorter value chains and local markets, to contribute to local food security in times of disrupted markets and unstable prices.</li> </ul> </li> </ul>
<ul style="list-style-type: none"> <li>Strengthen the capacity of youth and women on issues related to farming as a business both technically and functionally/managerially. As a consequence of the pandemic, many young people and women need to be empowered to lead farming as heads of their households.</li> </ul>
<ul style="list-style-type: none"> <li>Enable access to credit and inputs such as seeds and fertilizers by collaborating with private sector companies, input suppliers, buyers, and contract farming, by offering flexible solutions for producers, such as pre-buying at fixed prices etc.</li> </ul>
<ul style="list-style-type: none"> <li>Facilitate the rebuilding of social relationships and conflict management, as socio-economic distress continues. Support to organizational processes of producers and grass root organizations is key to helping communities become cohesive and resilient.</li> </ul>
<p><b>Strengthening the capacities of EAS to respond to the post-pandemic crisis</b></p>
<ul style="list-style-type: none"> <li>Establish EAS response mechanisms to tackle the urgent matters caused by COVID-19 and post-pandemic crisis. It should strengthen the coordination and joint planning of EAS actors at local and national level, and help adapt EAS activities to new crisis-related policies and governmental measures.</li> </ul>
<ul style="list-style-type: none"> <li>Ensure funding of EAS activities: resources will become scarcer than before and traditional funding sources may be at risk (public funding, donors) as priorities may switch to other sectors like health or formal markets.</li> </ul>
<ul style="list-style-type: none"> <li>Increase efficient use of available resources and look for alternatives: collaborating with private sector, funding for emergency response and recovery, advocate with the government and donors to show relevance of EAS, etc.</li> </ul>
<ul style="list-style-type: none"> <li>Strengthen infrastructure, institutional set-ups and individual capacity to make use of digital information and services.</li> </ul>

(Adapted from FAO, 2020) [7-9]

**Conclusion, Implications, and Recommendations**

Conclusively, it has been established that the application of digital agricultural advisory services has been widely used in the agricultural sector all over the world before the outbreak of the coronavirus pandemic (Goyal, 2010) [6, 15]. This method has thus contributed massively to the growth and development of the agricultural sector in most of these countries (Maru *et al.*, 2018) [23]. However, some factors are mitigating against the total success of the advisory method (Prager *et al.*, 2017) [20, 29].

The coronavirus pandemic ravaging the world has resulted in a substantial reduction in agricultural products production all over the world (Mulugeta, 2020) [26]. This effect is so much that the United Nations have warned of a forthcoming famine if something is not done to salvage the situation. According to FAO, 2020 [7-9], the continued and intensified adoption of digital agricultural services holds some hopes for the bolstering of food and agricultural product production during this pandemic period.

Because of the previous discussions and conclusions, the

following recommendations are thus made.

1. There should be an increased effort to adopt digital agricultural advisory services for stakeholders in the agricultural sector.
2. The government of countries around the world should see to it that enough support, financially and infrastructural facilities, is provided for the advisory services staff to enable them to carry out their responsibilities during these demanding times.

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