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Perceived potential of web2.0 technologies in agriculture among agricultural students in tertiary institutions of Osun State, Nigeria

Potencial percibido de las tecnologías web2.0 en agricultura entre estudiantes agrícolas en instituciones terciarias del estado de Osun, Nigeria

Ojo, Toyin Femi*; Opayinka, Aanuoluwapo Oladipupo; Durojaiye, Olufemi Damilola; & Farinde, Akinloye Jimoh.

Department of Agricultural Extension and Rural Development, Faculty of Agriculture, Obafemi Awolowo University, Ile-Ife, 220282, Nigeria

*Corresponding author: toyinfemiojo@yahoo.com; 08064876802

ABSTRACT

Web2.0 has put together viable ICT tools via internet operation for the development of Agriculture with little or no documentation of its potential uses. This study assessed the perceived potential of Web2.0 technologies in agriculture among agricultural students in tertiary institutions of Osun State, Nigeria. Multi-stage sampling procedure was adopted to select 360 agricultural students for the study. Data were collected using questionnaire and analyzed using appropriate descriptive statistics. The results revealed that over 50 percent of the respondents used Facebook, Whatsapp, YouTube, BBM, Google plus, Instagram, Twitter and Blogs. In addition, (many 67.5%) had high knowledge level of Web2.0 technologies. Furthermore, over 50 percent of the respondents perceived at least three of Facebook, Whatsapp, YouTube, BBM, Google plus, Instagram, Twitter, Blogs and skype as having potentials for dissemination of agricultural innovations to farmers; connect farmers with market for their produce; advertise agricultural produce; receive feedbacks from farmers; boost social interactions among stakeholders; teach agriculture to the children; and organize online meetings among agricultural stakeholders. It was concluded that the agricultural students, being future experts in agriculture, were conversant with the use of Web2.0 technologies as potential tools to further develop agriculture in Nigeria.

Keywords: Perceived potential, Web2.0, Agricultural Students, Farmers

RESUMEN

Web2.0 ha reunido herramientas TIC viables a través de la operación de Internet para el desarrollo de la agricultura con poca o ninguna documentación de sus usos potenciales. Este estudio evaluó el potencial percibido de las tecnologías Web2.0 en agricultura entre estudiantes de agricultura en instituciones terciarias del estado de Osun, Nigeria. Se adoptó un procedimiento de muestreo de etapas múltiples para seleccionar a 360 estudiantes agrícolas para el estudio. Los datos se recopilaron mediante un cuestionario y se analizaron mediante estadísticas descriptivas adecuadas. Los resultados revelan que más del 50 por ciento de los encuestados usaba Facebook, Whatsapp, YouTube, BBM, Google plus, Instagram, Twitter y Blogs. Además, (muchos 67,5%) tenían un alto nivel de conocimiento de las tecnologías Web2.0. Además, más del 50 por ciento de los encuestados percibieron que al menos tres de Facebook, Whatsapp, YouTube, BBM, Google plus, Instagram, Twitter, Blogs y skype tienen potencial para la difusión de innovaciones agrícolas a los agricultores; conectar a los agricultores con el mercado de sus productos; publicitar productos agrícolas; recibir comentarios de los agricultores; impulsar las interacciones sociales entre las partes interesadas; enseñar agricultura a los niños; y organizar reuniones en línea entre las partes interesadas agrícolas. Se concluyó que los estudiantes, futuros expertos en agricultura, estaban familiarizados con el uso de tecnologías Web2.0 como herramientas potenciales para desarrollar aún más la agricultura en Nigeria.

Palabras clave: potencial percibido, Web2.0, estudiantes agrícolas, agricultores

INTRODUCTION

Collence (2012) noted that, "As the world advances towards a global knowledge economy, access to modern Information and Communication Technology (ICTs) and its effective utilization to improve and sustain agricultural production throughout the world has become critical". Traditionally, communication for innovation was conceptualized as a process of linear knowledge and information dissemination sent from a central point out to client's decision-making processes (Röling, 2009). Implicit to new ways of understanding and doing extension are the use of digital and mobile technologies to access, store and analyze data and information to ensure timely and efficient translation of knowledge into productive use. As well, a range of media and communication technologies converge to "support interactions that co-produce knowledge and build networks of innovating people, institutions and systems" (Chowdhury and Hambly, 2013).

Agricultural information dissemination is an important function carried out in agricultural extension with a view to connecting agricultural stakeholders with latest technologies needed for optimum performance that would result in the development of the community at large. Information and Communication Technologies (ICT's) have revolutionized every aspect of life thus making it easier to overcome time and distance impediments in the dissemination of agricultural information (Collence, 2012). Worthy of note among the communication technologies used for agricultural information dissemination purposes are the Web2.0 technologies. According to O'Reilly (2005), Web 2.0 technologies refers to a perceived second generation of the "World Wide Web" technology and web design that aims at enhancing creativity, information sharing, and, most notably, collaboration among users. Sometimes referred to as the "read and write web", the Web 2.0 technologies have led to the development and evolution of web-based communities, hosted services, and applications.

Various organizations have utilized the Web2.0 technologies in training, seminars and conferences aimed at introducing and sustaining agricultural and rural development globally. Ashley, Corbett, Garside, Jones and Rambaldi, (2009) noted that Web2forDev was "a term used at the Web2forDev International Conference organized by the Technical Centre for Agricultural and Rural Cooperation (CTA) and other development partners in Rome at the Food and Agricultural Organization in September 2007." The CTA is a joint international institution of the African, Caribbean and Pacific (ACP) Group of States and the European Union (EU) whose mission is to advance food and nutritional security, increase prosperity and encourage sound natural resource management in ACP countries. It facilitates access to information and knowledge; supports evidence-based, multi-stakeholder development of agricultural policies and strategies; promotes inclusive value chain development and use of ICTs and strengthens the capacities of agricultural and rural development institutions and communities (Technical Centre for Agricultural and Rural Cooperation (CTA), 2014). Web2forDev is about encouraging the active use of these tools in development (Ashley et al., 2009).

Abubakar (2011) posits that Web2.0 technologies, which include blogs (political Blog), Social networks (Facebook, Twitter, WhatsApp, etc.), video sharing (YouTube), audio sharing (Podcast), mobile sites (2go, WhatsApp), image or picture sharing (flicker), Voice over Internet Protocols (VoIP services) among others, "have the capacity of boosting participation because of their open, conversational nature, connectedness and textual and audio-visual characteristic appeals". Due to this fact, a lot people are changing the outlets where they

search for news, information, business and entertainment. These technologies are emerging as platforms to enable or encourage users to be collaboratively creating and sharing their own insights into current and emerging themes within their environment. With the use of Web 2.0, people no longer access the Web only for specific actions, such as accessing the content; instead, they access and create collective knowledge through social interactions. Now, the use of Web 2.0 technologies enables people to connect different pieces of information and create new information that could be shared with others (Maloney, 2007).

As purpose of the study, there is dwindling extension agent-to-farmers ratio in most States in Nigeria. This calls for more efficient means of reaching stakeholders with agricultural information. The potentials of Web 2.0 technologies for facilitating knowledge creation, sharing and collaboration among various users globally is able to proffer solution to the extension agents-to-farmers ratio challenge in Nigeria. In South Africa and Tanzania, farmers are increasingly adopting and making use of the Web 2.0 technologies for obtaining and sending information on the various pre-planting, planting and post-planting farm activities. A survey by Collence (2012) revealed that Zimbabwean farmers are utilizing social media to share information on cultivation of potato, soyabean farming and aquaculture activities. Furthermore, he noted that the use of such technologies has also been embraced by educational and research institutions such as Universities, Colleges, Research Centres and Meteorological services.

Despite these promising potentials of Web 2.0 technologies for facilitating knowledge creation, sharing and collaboration among various users globally, little fact is known about their potentials for agricultural information dissemination among agricultural students in Nigeria. Also, the dwindling extension agent-to-farmers ratio in Osun State calls for more efficient means of reaching stakeholders with agricultural information. This study is therefore interested in assessing the perceived potentials of Web2.0 technologies in agriculture among agricultural students in tertiary institutions of Osun State, Nigeria.

In order to accurately assess this situation, this study will be guided by the following research questions: 1) What are the Web 2.0 technologies used by agricultural students of tertiary institutions in Osun State; 2) What are knowledge levels of respondents of the Web2.0 users in the study area? And 3) What are the perceived potentials of Web2.0 technologies in agriculture by respondents in the study area?

As objectives of the study, the main objective of this study is to examine perceived potentials of Web2.0 technologies in agriculture by agricultural students in tertiary institutions in Osun State, Nigeria. The specific objectives of the study are to 1) identify types of Web2.0

technologies used by respondents; 2) determine knowledge level of respondents about Web2.0; and 3) identify the perceived potentials of Web2.0 technologies in agriculture by respondents in the study area.

MATERIAL AND METHODS

The study was carried out in Osun State, Nigeria because it has high concentration of higher educational institutions, comprising Federal Government, State Government and Private Universities, Polytechnics as well as Colleges of Education. Osun State is an inland State, situated in the southwest region of Nigeria. It lies within latitude 7^0 30^{I} 0^{II} North and longitude 4^0 30^{I} 0^{II} East, latitude 8^0 02^{I} on the North-South pole and 5^0 04^{I} on the East-West pole. It shares boundaries with five States. It is bounded in the North and South by Kwara and Ogun States respectively, in the West by Oyo State, with Ondo and Ekiti States in the East. The State covers a land area of approximately 14, 875 square kilometers and has a population of 3,423,535 (National Population Census, 2006). Osun State was created on the 27^{th} of August, 1991 from the old Oyo State, deriving its name from the river Osun, a natural spring in the State that is believed to be the manifestation of the Yoruba goddess, Osun. The capital of Osun State is Osogbo.

A multi-stage sampling procedure was adopted for the study. At the first stage, one Federal University (Obafemi Awolowo University, Ile-Ife), one State University (Osun State University, Ejigbo), one private University (Joseph Ayo Babalola University, Ikeji-Arakeji), and one State College of Education (Osun State College of Education, Ilesa) were purposively selected based on the availability of agricultural students in these institutions. At the second stage, the number of all the agricultural students in the selected institutions was obtained (3559) which formed the population of the study. At the third stage, proportionate random sampling technique was used to obtain the sample size for each of the institutions based on their numerical strength, hence, 185 respondents were interviewed in Obafemi Awolowo University, 152 in Osun State University, 13 in Joseph Ayo Babalola University, and 10 in Osun State College of Education, Ilesa. Thus, 360 agricultural students were selected for the study from a total of 3,559 agricultural students in the four institutions. Data collected were analysed using descriptive statistical tools such as frequency counts, percentages, means, and standard deviation.

Measurement of variables: Perceived potential of Web2.0 in agriculture: The respondents were asked their perceived potentials of the Web 2.0 technologies in agriculture

by selecting from the list provided and indicate other potentials not in the list. List of declarative statements on perceived potentials were provided against the 14 Web 2.0 tools. The maximum score was 14 Web 2.0 tools multiplied by 17 perceptional statements, to give a total of 238 responses. The minimum score was zero (0) when no potential is seen by the respondent. The mean score and standard deviation for the respondents were calculated for each of the Web 2.0 tools. They were ranked in the order of their scores, starting with the tool having the highest potential.

Knowledge Level: This was measured by asking the respondents to answer questions on the characteristics and general attributes of each of the Web 2.0 tools presented to them, to the best of their knowledge. These questions were prepared from the literature of the study. Such questions were "Twitter can be used to post agricultural information as: text, video, image; "Instagram encourages: sharing images of farm inputs and products, sharing information as videos, drawing images of farm tools; "YouTube can be used to share agricultural: video messages, audio messages among others. The highest obtainable aggregate score was 46 while the lowest score was 0. The aggregate score of the respondents were grouped using equal interval into poor knowledge level (≤ 12.67), average level of knowledge (12.68 – 25.34) and high knowledge level (≥ 25.35).

RESULTS AND DISCUSSION

Web 2.0 technologies used by respondents: The results in Figure 1 showed the types of Web 2.0 technologies used by the respondents. It was revealed that 98.8 percent of the respondents used Facebook, 97.2 percent used WhatsApp, 85.3 percent used YouTube, 78.9 percent used BBM, 75 percent used Google plus, 71.1 percent used Instagram, 58.3 percent used Twitter 54.4 percent used Blogs, 47.2 percent used Skype, 35.8 percent used Wikis, 27.5 percent used Google Sheet, 15.3 percent used Dropbox, 12.2 percent used Research gate, while 5.6 percent used Soundation. These findings indicate that more than half of the respondents used Facebook, WhatsApp, YouTube, BBM, Google plus, Instagram, Twitter, and Blogs. This result agrees with the findings of Ward et al. (2009), Mohammad (2011) and Baro et al., (2013) which indicated that students of higher educational institutions make use of social networking tools such as Facebook, YouTube and Twitter more than other Web 2.0 technologies. The implication of this result is that these Web 2.0 technologies used could be due to the fact that these tools meet the need for their day-to-day communication and provided platforms for getting information. Hence, agricultural information can be disseminated via these commonly used Web 2.0 technologies.

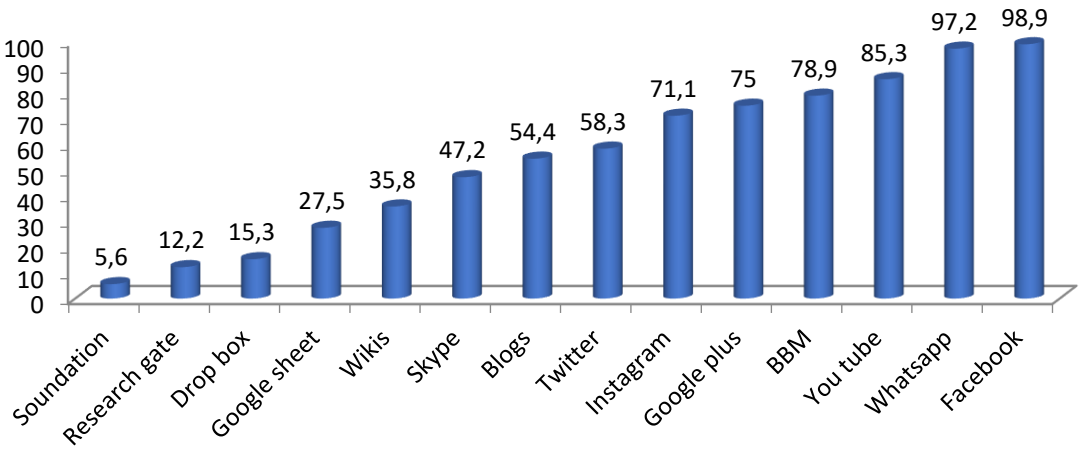
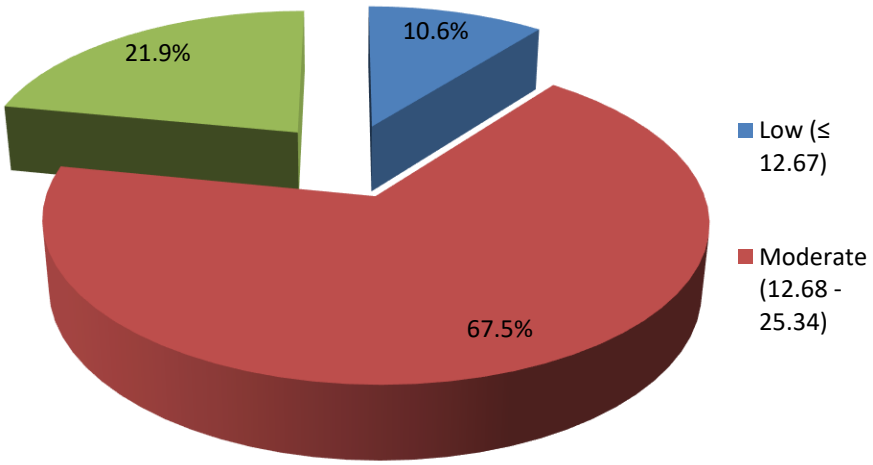


Figure 1. Types of Web 2.0 technologies used by respondents.
Source: Field survey, 2017

Knowledge level of respondents about Web 2.0 technologies: Results in Figure 2 showed that most (67.5%) of the respondents had moderate knowledge, 21.9 percent had high knowledge while the rest (10.6%) had low knowledge about the Web 2.0 technologies. The aggregate mean score was 20.74± 6.23 (Figure 2). The study showed a greater proportion (67.5%) of the respondents had moderate knowledge about the Web 2.0 technologies. It was also observed that the respondents had more knowledge about the Web 2.0 technologies that had social relevance to them. This is in line with the findings of Ward et al., (2009) which indicated that students demonstrated high knowledge and engagement in the use of Web 2.0 technologies, especially for social use.



Mean = 20.74 ± 6.23

Figure 2. Level of Knowledge of respondents on the *Web 2.0* technologies

Source: Field survey, 2017.

The implication of these findings is that more advocacy and awareness can be put in place aimed at increasing the knowledge of agricultural students about the use of Web 2.0 technologies for agricultural information dissemination. It was observed that agricultural information which are processed, prepared and disseminated using the Web 2.0 technologies that have social inclination are likely to be more appealing to the agricultural students. This might also be due to the popularity and general acceptability of these tools among the agricultural students who interact and share information via these Web 2.0 technologies.

Perceived potentials of Web 2.0 technologies: The results in Table 1 showed that agricultural students perceived that disseminating innovations to farmers can be carried out using WhatsApp (92.5%), YouTube (78.6%), Facebook (73.1%), Blogs (72.5%), Google plus (65.6%), BBM (63.6%), Twitter (62.5%) and Instagram (50%) while buyers and sellers of agricultural products can be connected using WhatsApp (91.9%), Blogs (76.4%), Facebook (75%), BBM (64.7%), Twitter (56.9%), YouTube (54.7%), and Google plus (53.6%). Available agricultural product can be advertised using WhatsApp (88.9%), Twitter (82.5%), Instagram (77.2%), Facebook (72.2%), BBM (69.7%), Blogs (58.9%), and YouTube (57.5%); feedbacks can be sent from farmers to extension agents using WhatsApp (87.2%), BBM (61.1%), Blogs (60.8%), Google plus (60.6%), Facebook (56.7%), and Twitter (50.3%); social interactions among agricultural stakeholders can be boosted using WhatsApp (83.6%), Facebook (79.7%), Twitter (69.4%), Instagram (66.4%) and BBM (66.4%) while agricultural students can be taught using Google plus (83.1%), YouTube (57.2%), and Skype (55.3%).

The results also indicated that online meetings for agricultural stakeholders can be organized using WhatsApp (81.9%), Blogs (70.3%), Google plus (56.7%), and Skype (55.8%); information about available agricultural input can be obtained using WhatsApp (79.4%), Google pus (62.6%), Blogs (60.8%), BBM (57.8%), Facebook (53.3%), YouTube (50.8%), and Twitter (50.3%); training can be conducted for farmers using Web 2.0 tools such as YouTube (76.7%), Google plus (68.3%), Blogs (53.6%), and Skype (53.3%) while online extension services can be delivered using WhatsApp (74.4%), Blogs (65.3%) and Google plus (63.1%).Agricultural stakeholders can be involved in the decision making process using Google plus (68.1%), Skype (64.2%), WhatsApp (60.8%), and Bogs (53.9%); agricultural research information can be presented using WhatsApp (67.8%), Google plus (56.9%), YouTube (56.4%), and Blogs (55.3%); agricultural research data can be collected using Google plus (66.7%), WhatsApp (56.4%), and Blogs (53.6%) while agricultural extension programme plans can be prepared using Google plus (61.4%) only. Furthermore,

the result showed that agricultural information and data can be documented for future use by making use Google plus (53.3%) only.

Table 1: Perceived potentials of Web 2.0 technologies

Perceived Potentials	Percentage (%)							
1. Disseminating new innovation to farmers	WhatsApp (92.5)	You Tube (78.6)	Facebook (73.1)	Blogs (72.5)	Google plus (65.6)	BBM (63.6)	Twitter (62.5)	Instagram (50.0)
2. Connecting farmers with market for their produce	WhatsApp (91.9)	Blogs (76.4)	Facebook (75.0)	BBM (64.7)	Twitter (56.9)	YouTube (54.7)	Google plus (53.6)	Instagram (40.0)
3. Advertisement of agricultural produce for sale	WhatsApp (88.9)	Twitter (82.5)	Instagram (77.2)	Facebook (72.2)	BBM (69.7)	Blogs (58.9)	YouTube (57.5)	Google plus (42.5)
4. receiving feedbacks from farmers	WhatsApp (87.2)	BBM (61.1)	Blogs (60.8)	Google plus (60.6)	Facebook (56.7)	Twitter (50.3)	Skype (37.5)	Instagram (35.0)
5. Boosting social interactions among stakeholders	WhatsApp (83.6)	Facebook (79.7)	Twitter (69.4)	Instagram (66.4)	BBM (66.4)	Blogs (44.2)	Google plus (33.3)	Skype (27.2)
6. Teaching agriculture	Google plus (83.1)	YouTube (57.2)	Skype (55.3)	Blogs (48.9)	WhatsApp (43.6)	Facebook (31.9)	BBM (25.6)	Twitter (24.2)
7. Organizing Online meetings among agricultural stakeholders	WhatsApp (81.9)	Blogs (70.3)	Google plus (56.7)	Skype (55.8)	Facebook (45.3)	BBM (33.3)	Twitter (27.5)	YouTube (24.4)
8. Obtaining information on availability of Agricultural inputs	WhatsApp (79.4)	Google plus (62.8)	Blogs (60.8)	BBM (57.8)	Facebook (53.3)	YouTube (50.8)	Twitter (50.3)	Instagram (38.1)
9. Conducting training for farmers	YouTube (76.7)	Google plus (68.3)	Blogs (53.6)	Skype (53.3)	WhatsApp (47.5)	Facebook (25.6)	Twitter (19.7)	Instagram (19.4)
10 Rendering online extension advisory services	WhatsApp (74.4)	Blogs (65.3)	Google plus (63.1)	Skype (52.5)	Facebook (37.2)	You Tube (32.8)	BBM (24.4)	Twitter (21.1)
11 Involving Agricultural stakeholders in decision making process	Google plus (68.1)	Skype (64.2)	WhatsApp (60.8	Blogs (53.9)	Facebook (36.9)	BBM (20.8)	Twitter (20.8)	YouTube (16.9)
12 Presenting agricultural research information	WhatsApp (67.8)	Google plus (56.9)	YouTube (56.4)	Blogs (55.3)	Facebook (42.2)	Twitter (40.0)	Skype (38.6)	Instagram (33.9)
13 Collecting agricultural research data	Google plus (66.7)	WhatsApp (56.4)	Blogs (53.6)	Facebook (24.4)	BBM (18.6)	You Tube (12.5)	Skype (11.9)	Twitter (11.4)
14 Preparing Agricultural extension programme plan	Google plus (61.4)	Blogs (41.1)	WhatsApp (34.4)	YouTube (32.5)	Facebook (32.5)	Skype (30.0)	Twitter (26.9)	Instagram (24.7)
15 Documenting agricultural information and data for future use	Google plus (53.3)	WhatsApp (38	YouTube (36.1)	Blogs (33.6)	Facebook (33.1)	Twitter (21.4)	Instagram (19.2)	BBM (14.7)

Source: Field survey, 2017

It can be inferred from this result that perceived potentials of Web 2.0 technologies include dissemination of innovations to farmers, collection of agricultural research data, analysis of agricultural research data, presentation of agricultural research information, documentation of agricultural information and data for future use, rendition of online extension advisory services, conducting training for farmers, obtaining information on agricultural inputs, organisation of online meetings among agricultural stakeholders, sending of feedbacks from farmers to extension agent, teaching of agricultural students, boosting of social interactions among agricultural students, preparation of agricultural extension programme plans, involving of agricultural stakeholders in decision making process, advertisement of agricultural products for sale and connection of buyers and sellers of agricultural products.

These findings corroborate the result of O'Reilly (2005), Freeman and Loo (2009) and John (2013) which noted that Web 2.0 technologies allow interaction and collaboration among extension experts in Australia, and can be used to provide online information and extension services. The results also validated the claims of Huang et al. (2007) that Web 2.0 technologies can be used for instructional or teaching and learning purposes, communication purpose, content sharing purpose and social networking purpose. Web2.0 technology therefore is capable of revolutionising agriculture and bridging the gap in time and space among agricultural stakeholders.

As conclusion, the study concluded that more than half of the web2.0 tools including Facebook, WhatsApp, YouTube, BBM, Google plus, Instagram, Twitter and Blogs were used by more than half of the respondents. Not less than three of web2.0 tools were perceived as being capable of being used to disseminate agricultural innovations to farmers; connect farmers with market for their produce; advertise agricultural produce; receive feedbacks from farmers; boost social interactions among stakeholders; teach agriculture to the children; and organize online meetings among agricultural stakeholders. Also, these tools have the capability to obtain information on availability of agricultural inputs; conducts training for farmers; render online extension advisory services; involve agricultural stakeholders in decision making process; present agricultural research information; and collect agricultural research data.

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