



CAN THE ICT-BASED EXTENSION APPROACH BE AN ALTERNATIVE TO CONVENTIONAL EXTENSION METHODS?

Emile Sobhy Mikhaiel

Agricultural Extension Programs Research Department (AEPR), Agricultural Extension and Rural
Development Research Institute (AERDRI), Agricultural Research Center (ARC), Egypt

* Corresponding author
Emile S. Mikhaiel



Received: 14/10/2023

Revised: 01/11/2023

Accepted: 06/11/2023

Published: 06/11/2023



©2023 by the authors.

Licensee NVJAS,

Egypt. This article is an

open access article

distributed under the

terms and conditions

of the Creative

Commons Attribution

(CC BY) license

<http://creativecommons.org/licenses/by/4.0/>

<https://creativecommons.org/licenses/by/4.0/>

ABSTRACT

Agricultural extension is the backbone of rural development and enhancing farmers' livelihood through improving crop productivity and raising food security level, most farmers and smallholders live in developing areas and are in most sites and cases deprived of modern agricultural techniques and practices, extension services, and other important supplementary agricultural services required to achieve rural sustainable development goals. Agricultural extension workers are seeking to make rural communities a better place by providing them with related information at a suitable time by using many tools, applications of communications, and extension teaching methods to influence farmers' behaviors and make a positive impact by listening, interest, and being aware, to creating the need to change and having a clear vision to adopt new technologies. Extension services will remain the main gateway to help smallholder farmers, who represent the cornerstone of sustainable agricultural development in such developing areas. Many extension approaches have been adopted and implemented over the last decades, some described as traditional and others as modern like the ICT apps-based extension approach known as an electronic extension. Extension teaching activities should depend on multimedia to effectively guide technological and social change processes to achieve development purposes. However, not all approaches are suitable for all nations, communities, situations, purposes, technologies, changes, users, stages of decision-making, and adoption. An argument has been noted about the capability of the ICTs-based extension approach to replace the other conventional methods completely. The current paper discusses that to answer the asked question.

Keywords: e-extension / ICT-based extension approach.

1. INTRODUCTION

There is no doubt that agricultural extension is considered the main approach to agricultural and rural development all over the world. Although a lot of efforts, attempts, and investments have been made to promote and improve agricultural research areas, extension, and rural services through the last decades, the extension systems in most developing countries are still weak and face many problems like a low-funded and poor relationship with both research institutions and educational systems (Buehren, *et al.*, 2017, p.2).

Useful technologies, technical recommendations, and practices concerning advanced farming, marketing, and related information sources are available; but do not reach farmers and other rural people efficiently to change them according to the planned and desired directions. Which indicates the need to strengthen the extension organizations in such communities to become more effective (Buehren, *et al.*, 2017, p.4), (Sharma, 2003, pp.2,3).

Recently, Information has become the most indispensable factor and input for any work and production system for its vital role in the decision-making process. Thus, there is an urgent need for farmers for the right timed, and detailed information to achieve sustainability purposes.

The transformation from the traditional extension methods to e-extension comes as a result of the accelerated and continuous improvement in information communication technology applications and their use which will accelerate and facilitate the delivery of the right information to enable farmers to make the right decisions at the right time and place during all stages from planting decision, through production and marketing plans.

Therefore, there is a tangible and necessary need for using extension mechanisms supported by ICT applications.

However, the agricultural extension alone cannot bring hundreds of millions of

Rural people around the world out of ignorance, poverty, and disease without planned and advanced coordination of policies, practices, technologies, and available opportunities for the market (James & Raj 2021, slides30,31).

2. MATERIALS and METHODS

Potential Advantages of Using ICT Applications in Agricultural Extension:

Information and communication technologies (ICTs), and their applications offer many features and strengths compared with the traditional extension methods in the diffusion of information and recommendations among farmers as follows:

-Savings Time, Money, and Effort: Online communication eliminates several steps from the conventional extension steps. Where information can be posted directly on the web, and become easily available to both farmers and extension workers at different levels without any distortion, which saves money and time.

- Rich and Interactive information: It attracts aspirant extension workers and advanced farmers and gives them a chance to search for what they looking for and need from the information.

- Fast and Decisive Access: The electronic extension (e-extension) will overcome the obstacles of time and distance that prevent quickly knowing updated information about any issue in the world.

- Continuity of Availability: The main advantage of e-extension lies in its availability all the time over the years.

- Precise and Better Control by Users: Through e-extension, the users will have a better chance and greater ability to control than the known traditional information channels (James & Raj 2021, slides 13,33), (Khalid & Sherzad,2019, pp.6-14).

ICTs-Based Information Extension (e-extension):

ICTs-based extension, digitalized extension, Cyber extension, or Agricultural e-extension is another name for agricultural

advisory services /agricultural extension done electronically by replacing costed physical and direct interaction between extension workers and farmers with virtual interaction eliminating costs associated with physical meetings and other traditional activities.

There are three important components in e-extension: Agriculture, Livestock, Poultry, and Fish, as well as Thematic information (Francis & Addom, 2014, pp.1-3), (Phand, 2021, pp. 1-3).

Preparing, processing, and formulating the right and suitable messages for the farmers, overcoming illiteracy, and enabling farmers to use ICT applications can result in a high rate of diffusion and adoption of new ideas and technical recommendations.

e-extension Purposes:

- First, we should emphasize that e-extension supplements traditional extension methods not replacing them completely.

- Many extension workers have been using online applications since before the COVID-19 pandemic, for they are very useful under conditions where physical distancing prevents effective interaction through direct confrontation (James & Raj 2021, slide 17).

e-extension Functions:

e-extension depends on the use of a wide range of techniques and applications of information and communication (ICT apps) that can achieve the following purposes:

- Create, convey, store, diffuse, retrieve, and manage information for agricultural purposes.
- Exciting attention, increasing awareness, arousing aspiration, providing specialized information, as well as conducting entertainment activities.
- Transferring innovations, conducting training, and expanding educational activities.
- Improving farming skills, administrative practices, and increasing innovativeness rate.
- Creating and formatting farmers' associations and other rural development stakeholders' links (James & Raj 2021, slides 7,8), (Phand, 2021, pp. 5,6).

Extension Teaching Methods (ETMs):

The main objective of using the extension methods is to attract attention and interest, and arouse enthusiasm within the farmers so that they can develop their skills and knowledge to an extent to lead to sustainable living. It has been classified into four main types, these are, expository, discovery, participatory, and application methods, there are multiple classifications of extension methods according to many considerations (Nature of Contact/use, Function, Form, the innovation-decision process, the Learning process, the Learning objectives, and the Adopters categories). But the most common classification that remains according to the nature of contact/use is individual, group, and mass contact methods (Khalid, & Sherzad, 2019, pp.9-15).

Selection of the extension methods:

Selection depends on the farmer's characteristics, area of subject matter, type of desired change, theories of learning, the purpose of use, methods availability, need, and time factors, (Kapur, 2018, pp.7,8), (Khalid, & Sherzad, 2019, pp.5-15).

When an extension worker selects appropriate extension tools, he should pay attention and consider the farmers' background, problems, needs, interests, and other situational factors.

For example, the farmers will learn better by seeing, doing, and practicing through the demonstrations rather than verbal/spoken methods, therefore there is a need to pay more interest to the use of demonstration-teaching methods (Kapur, 2018, pp.8,9).

Thus, it is clear from the above-mentioned, that the one extension teaching method is not suitable for communicating with all farmers/stakeholders in any extension education situation, we also need many methods to use either in series or in parallel to access and affect them, especially through the different steps/stages of adoption and decision making.

Although the extension methods and tools are static, but enable extension agents to

add and use new methods to existing ones. Extension services and activities should depend on the use of many extension methods and media to push the change process and development effectively. Briefly, there is no technology that is appropriate for all conditions, cases, situations, individuals, and countries.

Restrictions of Using Traditional Methods and Tools of Information Diffusion:

There are many known shortcomings in the traditional extension methods whether written, Audio, or visual such as publications, newspapers, magazines, bulletins, radio, and television programs, used in disseminating information for they do not satisfy farmers' expectations due to many reasons including lacking to the ability or attractiveness to effect on excite farmers' senses towards learning and then failing to arouse their interest for effective participation.

The information in most cases is of general forms depending on the felt needs and perceived problems of the farmers, while these general types of information may not meet the special needs and specific interests of all farmers.

-Poor ability of communication: weak and limited methods create difficulty for most extension workers, subject matter specialists (SMS), and other technical staff to be in easy touch with the agricultural research stations, universities, farmers' associations, stakeholder groups, and suppliers of production inputs, and marketing channels.

This is also due to the limited use of modern communication techniques and applications, such as:

a) Expanding the use of mass contact methods (media) to excite farmer attention and awareness of innovations, b) Regularity in the use of printed publications such as a periodical bulletin to keep the field members updated on work technical and administrative developments and changes, and c) Expanding the use of ICT applications effectively to get feedback quickly and easily, and for more of

technical support and relationship between researchers and extension workers, and also to facilitate administrative communications at the different levels of organization (Phand,2021,p.4).

Thus, ICT applications can help extension personnel achieve their role concerning innovation diffusion more efficiently and effectively.

- Expensive: Producing and distributing extension publications costs a lot of money.

- Time-Consuming: the process of passing an extension message from research stations and/or universities to farmers and rural people consumes a long time and great effort, to give All participants the chance to understand and convey the message to the next member of staff across the levels.

- Distortion: Some evaluation studies showed that the extension message quality gets exciting distorted and eroded until it reaches the farmers or end users. Accordingly, there is a positive relationship between the increasing degree of distortion and both the increasing number and levels of actors and channels of the communication process (Sharma,2003, pp.58-62), (Phand,2021, pp.4,5).

Agricultural Extension Approaches:

Agricultural Extension Services and advisory come in different Shapes, Sizes, Models, and Approaches. That means more possibilities and opportunities available for the planners, and the policy- and decision-makers at the highest level to make comparisons among them and select according to their communities' conditions (Axinn, B.1988, p.1).

An extension approach could be defined as a style of work of an extension organization that embodies and reflects its philosophy, through which can identify the direction of the system and its various aspects, such as teaching methods, techniques, resources, structure, staff, leadership, programs, and nature of linkages with other organizations. It is more than just a method of extension; it is a style of action.

No one extension approach fits all the conditions or communities. The successful approaches are also confined to the specific boundary. Over the years and decades, many extension approaches were developed and investigated by agricultural organizations for working with people in rural communities (Davis & Place, 2003, pp.746-748), (Axinn, A.1988, p.3,4), (Axinn, B.1988, p.1).

Several extension approaches were defined by scientists. Nagel for instance, classified them as follows (Nagel,1997, p.not shown) Public and private, government and nongovernment, general and sector, bureaucratic (top-down) and participatory (bottom-up) which is equivalent to centralization and decentralization, profit and nonprofit, Free and cost-recovery multipurpose and single purpose, and technology-driven approach versus need oriented.

The World Bank also differentiates between profit-oriented versus public extension services, and multipurpose versus specialized (Abdel-Maksoud, 2019, p.2), (Axinn, B1988, p.3)

Swanson and Rajalahti also classified the different extension approach and models into four types, as follows: Transfer of Technology, models of extension, participatory approach, market-oriented approach, and non-formal educational approach (Swanson& Rajalahti,2010, pp. 13-24).

The approaches of Public /general /governmental extension (Centralized), Farmer Participatory (Decentralized), Farmer Field Schools (FFSs), Farmer to the farmer (F2F), Educational institutions / universities (Centralized), Training, and visits, Commodity-based (commodity approach), Sharing of costs, Farming systems, Land grant

(US), and Project are the most known and common extension approaches during last decades (Bell, et al.,2015, PP.1,2).

It seems that the approaches involving farmer groups and their associations (participatory) will be the most promising, and where the extension worker role is just more advisory, to facilitate opportunities at the local community level through co-coordinating networks of relationships between scientists, experts, researchers, markets, other partners, also providing strong coordination at the regional level, in addition, to help of farmer to diagnose, identified and arrange their needs according to its priority for transferring to research stations and universities. (Francis & Addom, 2014, pp.1-3).

From the reality of tracking the path of agricultural extension services in Egypt over the past decades in the light of many changes and challenges such as rapid population growth, economic decline, environmental pollution, degradation of soil fertility, climate changes, shortage of the extensionists number, and a declining budget, evolved extension thinking, etc. The extension that was first introduced through the public extension approach was greatly affected.

The recent concepts, methods, and approaches of agricultural extension give more attention to important concepts and operations such as partnerships, participation, facilitation, and sustainability, and pay more interest to farmers' needs, interests, and problems. so, we should concentrate on the new approaches through the expansion of the use of ICT apps without completely abandoning some traditional methods whose effectiveness has been proven under our local conditions like demonstrations, and farm field schools (FFSs).

Table (1): shows examples of how to transect from the traditional extension meetings to other online substitutes by using different levels of Technology

Traditional extension meeting	Online first-level substitute (Less advanced)	Online second-level substitute (More advanced)	Notes And Comments
A face-to-face meeting with the farmer to acquire his confidence.	Contact the farmer through a mobile phone, and hear each other in real-time (Audio chat).	Contact the farmer through a smartphone or computer, and see each other's faces (Video chat).	Personal telephone calls are necessary to build close relationships with farmers and talk to them regularly.
Meet with a farmer to determine the problem of a disease or a pest on his farm.	1. The farmer sends a photo of the problem. 2. You visit the determined site for a reality check. 3. You call the farmer to discuss the problem directly from the site or your office.	The farmer contacts you through video chat, to show you the problem in the field. You can ask some questions for more clarification	Farmers may need technical training to accurately diagnose their problem by photographing it.
Organize a meeting with about 15 farmers as happens in field school for example (a workshop)	Hold an online conference with the farmers at their own fields or ranches. if you want, you can also deliver the related bulletins to them early.	Prepare and hold a web meeting with the farmers using some programs like Zoom at their own fields or homes. If necessary, you can communicate the related brochures to them early by email.	By minimizing the data sharing when participants keep their webcams and mics off (when they are not needed), the online meeting can be more interactive and attractive. also, you can record the meeting for those who cannot attend live.

(James & Raj, 2021, slides 9-12)

3. RESULTS

Answer to the question: The title of this working research paper is the need to use both old traditional and online updated methods will remain to exist side by side at least for many coming decades.

4. DISSUSSION

The current working research paper discusses the future of agricultural extension(e-extension) under Egyptian conditions from the researcher's viewpoint method of compiling, summarizing, and analyzing existing viewpoints, writings, and experiences of experts and scientists in the field of agriculture extension for a more comprehensive about how much possibility of the expansion of the use of information and communication technology applications as a modern extension approach to replace completely to traditional extension methods through the coming decades within the framework of digital transformation policies

5. CONCLUSIONS

Agricultural extension services provision has shifted in a direction that enhances the value of participation and interaction among many partners and beneficiaries, from "push-based approaches", where the information flow from researchers to government extension officers, workers, and specialists to farmers and problems from farmers to researchers in the reverse direction, to "pull-based approaches" which give the priority to farmer interests and needs, to "innovation systems approaches" where links and associations (like farmer/producers groups, associations, societies, and co-operatives) are formed to work as mediators and facilitators among farmers, buyers, market and input suppliers, extension workers, researchers, and other complementary services. This shifting requires maximizing the use of extension and communication methods and developing extension approaches.

Extension teaching and communication methods are static and don't change, but accept

improvement by adding the use of ICT applications named "e-extension" without creating a new derived type.

Some are afraid that the ICT-based extension approach will completely replace the need for a human element (extension worker staff), and conventional extension methods and approaches. That is not expected or favorable to happen at least for many coming decades. The extension agent as a change agent is considered the main and vital element in the whole extension process with its activities and services. so, if the extension agent is not well qualified and technically trained to be able to respond to a real situation effectively, there is no need to imagine how the extension methods and approaches are, or to what extent the supplies of inputs, budgets, and the other resources.

For example, an extension worker needs a one-on-one physical meeting (directly without a temporal-spatial interval) to build a confident relationship with the farmer as mentioned above, and later he can use another online tech like a mobile phone for talking or video chat which effectively provides and facilitate a lot of direct support required to build trust, and establish a strong relationship.

Also, according to one of the most important principles of extension teaching" learning by seeing and doing/practicing" the method and result demonstrations as extension traditional methods will remain carried out on Farms, ranches, and houses.

Thus, the need to use both old traditional and online updated methods will remain to exist side by side at least for many coming decades.

6- REFERENCE

Abdel-Maksoud, Bahgat M. (2019). The Effective Agricultural Extension Approach, *Asian Journal of Advanced Research and Reports*, 4(3): 1-8. Article no. AJARR.49359 pp.1-3. Available at: [https://www.aun.edu.eg/agriculture/sites/default/files/researches/The%20Effective%](https://www.aun.edu.eg/agriculture/sites/default/files/researches/The%20Effective%20Agricultural%20Extension%20Approach_3.pdf)

[20Agricultural%20Extension%20Approach_3.pdf](https://www.aun.edu.eg/agriculture/sites/default/files/researches/The%20Effective%20Agricultural%20Extension%20Approach_3.pdf). (Accessed 2 March 2023).

Axinn, Gh. (A1988). *Guide on alternative extension approaches*. Food and Agriculture Organization (FAO) of the United Nations, Agricultural Education and Extension Services (ESHE) Human Resources Institutions and Agrarian Reform Division Rome. Italy.

Axinn, Gh. (B1988) Definition of several extension approaches in FAO. Available at:

<https://www.fao.org/3/v9122e/v9122e02d.htm> (Accessed 1 March 2023).

Bell, Mark; Crump, Amada; Peach-Fine; Elana & Santibanez, Maria Paz (2015). *Agricultural Extension Methods – A comparison*, Fact sheet, College of Agricultural and Environment Sciences, International Programs. 2015 © UC Davis IPO. Available at:

https://epakag.ucdavis.edu/vocational_training/factsheets/fs-ext-methods-comparison.pdf (Accessed 5 March 2023).

Buehren, N.; Goldstein, M.; Molina, E. & Vaillant, J. (2017). *The impact of strengthening agricultural extension services evidence from, Ethiopia* (Policy Research Working Paper 8169), World Bank Group. Available at;

<https://documents1.worldbank.org/curated/en/874841503060841531/pdf/WPS8169.pdf> (Accessed 20 March 2023)

Davis, K. & Place, N. (2003). *Current Concepts and Approaches in Agricultural Extension in Kenya*, Proceedings of the 19th Annual Conference, Raleigh, North Carolina, USA 745. Available at: https://www.researchgate.net/publication/228837526_Current_Concepts_and_Approaches_in_Agricultural_Extension_in_Kenya (Accessed 2 March 2023).

Francis, J. & Addom, B.K. (2014). *Modern, ICTs and rural extension: Have we reached the tipping point?* Rural21 publication. Frankfurt, Germany, 3 November. Available at;

- <https://www.rural21.com/english/archive-2005-2011-1/index-2014.html>(accessed 11 January 2022).
- James, John & Raj, Saravanan. (2021).** e-Extension for Extension Professionals, Global Forum for Rural Advisory Services (GFRAS), Part of the New Extensionist Learning Kit (NELK) e-Extension - *PPT Presentation*, GFRAS This module was made possible through the support of the Swiss Development Confederation (SDC) & through the support of the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) and United States Agency for International Development (USAID). Available at: <https://www.g-fras.org/en/knowledge/new-extensionist-learning-kit-nelk.html> (Accessed 2 March 2023).
- Kapur, Radhika (2018).** *Extension Teaching Methods (ETMs)*, University of Delhi, March 2018. Available at: https://www.researchgate.net/publication/323725781_Extension_Teaching_Methods (Accessed 2 March 2023).
- Khalid, S. M. N & Sherzad, Shukrullah. (2019).** AGRICULTURAL EXTENSION MANUAL FOR EXTENSION WORKERS, FAO funded project - TCP/MIC/3601 “*Strengthening the capacity of Farmers Associations to increase production and marketing of root crops, fruits, and vegetables in FSM*”, Sub Regional Office for the Pacific (SAP) Food and Agriculture Organization of the United Nations (FAO), Apia.available at: <https://www.fao.org/3/ca5007en/ca5007en.pdf>(Accessed 9 March 2023).
- Nagel, Uwe Jens (1997).** *Alternative approaches to organizing extension*, Chapter 2: Improving agricultural extension. A reference manual, edited by Swanson BE, Bentz RP, Sofranko AJ., Food and Agriculture Organization (FAO) of the United Nations. Rome. Available at:
- <http://www.fao.org/3/W5830E/w5830e04.htm#chapter2> (Accessed 9 March 2023).
- Phand, Shahaji (2021).** *ICT-BASED EXTENSION APPROACH FOR ANIMAL HUSBANDRY*" Sustainable Information Resource Centre, Centre for Extension in Agri-allied Sector, National Institute of Agricultural Extension Management (MANAGE), Hyderabad, Telangana, India. Chapter 16 in a book: *Innovations in Agricultural Extension*. available at:https://www.canr.msu.edu/extensioninternational/Innovations-in-Agricultural-Extension/files/Ch16-Phand_SIRC-Animal%20Husbandry_2021-01-13aa.pdf (Accessed 2 March 2023).
- Sharma, V. P. (2003).** *Enhancement of extension systems in agriculture* (Report of the APO Seminar on Enhancement of Extension Systems in Agriculture, Pakistan, December 15–20, 2003). Asian Productivity Organization. Available at; <https://www.apo-tokyo.org/wp-content/uploads/2014/07/agr-16-ees.pdf>(Accessed 20 March 2023).
- Swanson, Burton E.& Rajalathi, R. (2010).** *Strengthening agricultural extension and Advisory Systems: Procedures for assessing, transforming, and evaluating Extension systems*. ARD (AGRICULTURE AND RURAL DEVELOPMENT) ,The International Bank for Reconstruction and Development / the World Bank; 2010.Available at: <https://documents1.worldbank.org/curated/ru/873411468159312382/pdf/565870NWPOARD0110Strenlcombinedlweb.pdf>(Accessed 15 March 2023).