



## Agricultural Economics and Social Science

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# THE IMPORTANCE OF AGRICULTURAL EXTENSION PROGRAM IN TECHNOLOGY TRANSFER FOR RURAL FARMERS: A REVIEW

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**ABSTRACT:** Extension programs management is the most effective section in the field of agricultural extension, to modify and facilitate the extension programs which is designed to improve the rural farmer's production and standard of living utilizing new agricultural information and technology. To approve that, some different research has been conducted related to agricultural technology transfer for farmers influenced by agricultural extension programs management. Besides, the extension agents have a vital role in technology transfer to the rural farmers, they optimize their best to persuade the farmers to adopt using technologies in their farming practice. Undoubtedly, managing the effective programs for technology transfer of farmers is seen as the most influential implement to improve farmers to work hard and intelligently, while it is a causal effect to improve the farmers' income which leads to boost the national income. The extension programs have a massive impact on farmers' production as a result of utilizing agricultural technologies related to their work. Nonetheless, some constraints associated with extension work for technology transfer should be identified in most countries in the whole world and some applicable strategies should be developed with extension to make the extension work effective and efficient. One of the most significant issues confronting the mission of agricultural extension is the lack of proper knowledge about the new technologies from farmers toward applying information and technology, therefore, agricultural extension staff must think critically and logically for establishing an effective extension program and work on it well to inform and educate the farmers.

**Keywords:** Agricultural extension, extension programs management, farmers, technology transfer, agricultural technology.

## INTRODUCTION

Agriculture extension is one of the most crucial firms in rural development, and it is one of the most significant agencies for rural development, moreover, one of its operations is aimed at promoting development, social and economic transformation, and laying the groundwork for future development (Al-Doski and HamaSalih, 2017). Although the term "extension" is often connected with agricultural and rural development, it is a nonformal educational role that applies in various institutions and disseminates information and guidance to enhance knowledge, attitudes, skills, and aspirations (Alex, Zijp and Byerlee, 2001).

Agricultural extension is an efficient and systematic process that helps rural farmers to help themselves by informing them and improving their knowledge and skills on how to increase their production in terms of applying useful information and technology in their farming practices. Moreover, Extension agents work with farmers to persuade them to adopt the technology through a managed extension program. Unfortunately, due to numerous technical impediments and other new challenges that have evolved in recent years, the agricultural sector is producing is preferred considerably below its potential. The agricultural rural extension has played a key part in achieving increased crop yields in Asia

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throughout the green revolution area (**Baig and Aldosari, 2013**). The agricultural extension program is known to offer technical guidance, provide information, transfer new technology, help farmers determine their problems, and unify themselves into farmers' groups (**Baig and Aldosari, 2013**). Technology change, as well as the knowledge system that supports it, is a causal component in development (**World Bank, 2003a**). Furthermore, extension access helps farmers accept new technologies by exposing them to new technology and teaching them the best farming and management practices (**Anderson and Feder, 2007**). Agricultural extension organization management has been identified as a fundamental difficulty in the delivery of extension services, and maintaining effective management of agricultural extension services is critical to the agricultural industry's success (**Lopokoyit et al., 2013**). Management occupies such a critical place, because it is a vital segment of economic life, and also in the modern world which is an organized group activity, and management affords leadership to a business enterprise (**Aquinas, 2007**). Extension service access encourages the use of advanced agricultural technologies by reducing supply-side constraints caused by inefficient information markets (**Wossen et al., 2015**). The objectives of the study are to determine the importance of agricultural extension programs in technology transfer for rural farmers to find out its effects, to determine the way that the management of the program increase farmers' productivity, and to identify the points of view of the previous researchers toward the role of extension management in facilitating the transfer of technology for rural farmers. This research was conducted to answer the following questions; What is the effect of agricultural extension programs management on technology transfer? How can agricultural extension program management increase farmers' productivity? How can extension program management facilitate the transfer of technology for rural farmers?

### Theoretical Literature

Agriculture and rural development, cooperative extension, advisory services, technology transfer, as well as the transfer and sharing of practical information, are all examples of extension (**Godad, 2010**). Farmers should be provided with assistance to overcome such difficulties or

adapt to circumstances, and extension services have become very important in providing farmers with the development of information to solve widespread agricultural problems such as outbreaks of crop disease and adverse economic conditions affecting levels of production (**Godad, 2010**). Agricultural extension services are critical in the development of rural knowledge and innovative farming practices, these systems are critical for informing and influencing rural family decisions, particularly in developing nations, which have a greater need for such resources (**Alex and Zijp, 2002**). Agricultural extension is an important agrarian-and-political strategy used by governments to encourage the growth of agricultural production (**Qamar, 2005**). Agricultural extension systems must be structured to help farmers improve their agricultural abilities, train them on how to connect effectively with producers and encourage them to learn new things (**Qamar, 2005**).

Extension agents' job is to teach farmers how to use new technologies, gain new knowledge, and apply extension education concepts, they also assist farmers in assessing their requirements, restrictions, priorities, and opportunities, and they also assist farmers in learning the importance of enhanced agriculture, selecting appropriate crops, encouraging the use of relevant technologies, and assessing farmers' reactions and attitudes toward development programs (**Altalb et al., 2015**). Extension agents also play an important role in encouraging farmers to participate in project identification, planning, execution, and assessment, as well as supporting viable development programs, and their roles in agricultural technology transfer are raising awareness of extension agents' innovation, something new or perceived to be unknown to his clients, persuasion of the new technologies' usefulness or importance, reinforcement of continued use of the technology that has been formulated, and interest in continuing to practice the new idea that has been introduced through supporting services such as input, an intermediary between farmers and researchers (**AREMU et al., 2015**). Extension agents stabilize change, and new behavior and attempt to prevent discontinuance by directing and supporting messages to those clients who have adopted innovation (**AREMU et al., 2015**).

To be a good manager, you must be able to make balanced judgments, which are necessary for making rational decisions, management also includes maintaining interpersonal relationships with subordinates, peers, other sectors, sections, organizations, and superiors, which can be accomplished by using man-management techniques (Akeredolu, 2016).

There is a broad scope in the management sector, which includes all aspects of production, marketing, financing, and personnel: Management of production is responsible for directing, organizing, planning, and controlling all production functions within an organization; management of marketing is responsible for determining consumer needs and then putting everything in place so that the items and services that will meet the needs can be delivered; and management of finance is responsible for determining consumer needs and then putting everything in place so that the items and services that will satisfy those needs can be delivered. It entails market research, advertising, and selecting the appropriate channel of distribution; salespeople will report to marketing management; financial management, which is responsible for ensuring that an organization has sufficient financial resources available for operation; they are responsible for calculating project costs and then selecting the appropriate sources of funding to suit a specific project; and legal management, which is responsible for ensuring that an organization has sufficient legal resources available for operation, human resources manages employee recruitment, selection, training, and development, as well as compensation, promotions, transfers, and employee welfare services, they also store personnel records in the enterprise (Akeredolu, 2016). Small-scale farmers' management may be effective in producing; however, they typically lack the skills needed to run their farm as a business, and farmers need extension and training support to help them build their management skills and competencies, furthermore, farm management extension is concerned with the development of management methods and skills among farmers to improve resource decision-making and connect farmers to markets, farmers' decisions are becoming more complicated as farming becomes more

market-oriented; to compete, farms must be run as businesses, and the extension services for management provide farmers with business and marketing knowledge and skills to help them make their farms more profitable and competitive, currently, only a small number of farmers directly benefit from farm business management advice; these farmers are more profit-minded and market-oriented and are skilled at managing production and marketing systematically (Kahan, 2013).

## LITERATURE REVIEW

LAFTA (2009) this research was conducted to identify obstacles to the transfer of agricultural techniques from the perspective of extension farmers, as well as limitations on the order of each area of agricultural technique transfer from the perspective of farmers, and to determine impediments to the arrangement of the areas of agricultural technique transfer according to their importance from the perspective of farmers. And aimed to identify constraints to agricultural technology transfer from the perspective of farmers themselves. The participants in this study were all farmers in Baghdad's Tarmiya region. A random sample of 5% of the population which amounts to 150 farmers was chosen, and also a questionnaire was created and sent to all of the participants in the study. The findings show that the following limitations were prioritized: economic, technical, organizational, and social restrictions. The study concludes that all farmers should be supported, and also extension research and service institutions should be strengthened.

Lopokoiyit *et al.* (2013) the purpose of this study was to identify the extension management competency needs of agricultural extension personnel, and a total of 440 extension agents were sampled for the study, with 325 from the public sector and 115 from the private sector. Data for the study was collected by using a questionnaire on the current competencies and training needs of the extension staff, Descriptive and inferential statistics were used to analyze the acquired data. The findings of the study are extension management skills that are important from four perspectives: first, in the administration of extension service programs and projects,

second, in the management of extension workers, and third, in the management of agricultural industry networks, collaborations, and partnerships. Finally, last but not least, excellent communication is a key ability required for effective management in managing farmer interactions to develop trust and an enabling atmosphere for effective extension service delivery.

**Baig and Aldosari (2013)** the aim of studying agricultural extension in Asia: constraints and options for improvement, was to identify the barriers to agricultural extension services in the Asian region and develop some workable strategies to improve productivity, efficiency, and cost-effectiveness of national extension services. The study method is, some theoretical background and previous studies were reviewed to know about the actual condition of agricultural extension services and rural conditions, the leading details for the failures have been documented by some organizations such as **FAO (2005) and APO (2006)**. The study's findings show that in many Asian nations, the extension service or system has not been able to make a significant influence, aid farmers in evaluating their problems and situations, and give them better development strategies in the last two decades, and the extension has several ways and approaches at its disposal. Extending techniques that take into account a country's perceived demands. Likewise, most Asian countries have low literacy rates, thus television, videos, and other pictorial communication tools could be effective for conveying and transferring new technology from the source to illiterate farmers and less-educated rural masses in this situation. The vast majority of poor farmers rely on farm radio for extension advice, and complex and intricate messages containing more technical information should not be transmitted by radio. However, information and communication technology (ICT) can be combined with other extension approaches to improve effectiveness.

**Altalb et al. (2015)** This research aims to explain the role of Extension workers in agricultural technology transfer, as well as the process of farmers transferring and adopting agricultural technology, the initial requirements

that are reliable in choosing agricultural technology for small farmers, the basic requirements that are reliable in choosing agricultural technology for small farmers, and the cycle of agricultural technology transfer to farmers methodology of this article, has been examined through the use of scientific studies and references, in addition to the benefits of prior studies linked to agricultural extension in the discussion and drafting of the study objectives. The findings show that agricultural extension is an instructional process for farmers aiming at developing agricultural skills and knowledge, as well as enhancing agricultural production in quantity and quality, agricultural extension is the cornerstone of transferring agricultural innovations to farmers and persuading them to embrace new farming techniques. Agricultural extension workers play a critical role in the transfer of agricultural innovations to farmers, according to the study's findings.

**Khan et al. (2017)** the researchers aimed to determine the efficiency of agricultural information and communication centers (AICC) in technology transfer to farmers in Bangladesh. Furthermore, crucial aspects that could contribute to farmers' interpretation of AICC's effectiveness were identified. The study took place in five sub-districts of Bangladesh's Mymensingh district, with 100 users of agricultural information and communication centers being questioned using a pre-tested questionnaire, to analyze the data, both descriptive and inferential statistics were utilized. The majority of farmers rated agricultural information and communication centers as ineffective or mediocre in disseminating agricultural information. As a result, there should be plenty of room to increase the quality of services given to farmers. Furthermore, extension policymakers should take into account the above findings and provide information communication technology training to users, as well as develop information communication technology infrastructure, maintain adequate center facilities, and other factors that influence the effectiveness and sustainability of agricultural information and communication centers.

**Danso-Abbeam *et al.* (2018)** explored agricultural extension and its impact on farm productivity and revenue in Northern Ghana, which was to evaluate the effects of extension services on farm productivity and income. The research used cross-sectional data from 200 farm households in two districts in Ghana's northern region. The study's findings suggest that engaging in agricultural extension programs has a beneficial economic impact. Using the estimating technique, institutional and farm-specific variables were estimated to have a considerable impact on farmers' farm income in addition to the key socioeconomic variable. The importance of extension programs in driving agricultural output and household income has been underlined by this study. As a result, agricultural extension service delivery should be increased through timely recruitment, agent training, and adequate logistics.

**Bushara *et al.* (2018)** focused on the adoption and impact assessment of improved potato crop production systems in Khartoum state, Sudan to look at the economic impact of technical output packages on potato production in Khartoum. Structured interview questions, interactive group discussion, and personal observation were used to collect data for the study from a total of 192 farmers spread throughout four large villages specializing in potato farming. The study's findings revealed that official and informal finance, extension services, potato revenue, and land ownership all had a beneficial impact on the well-being of potato farmers in the areas studied and also the adoption of suggested agronomic field methods by a large number of farmers requires an authorized institution to show the practicality of these techniques and technologies in the farm field.

**Dhehibi (2020)** this research was studied to assess the reliability of sources of information on two improved agricultural and livestock technologies, barley variety and feed blocks, as well as the efficacy of a variety of agricultural technology diffusion methods used in the livestock–barley system in semi-arid Tunisia. Primary data was acquired from (671) smallholder farmers for the study. A descriptive statistical analysis was undertaken, with Kendall's W-test and the chi-squared distribution

test used to categorize and assess the efficacy of the Tunisian extension system's various techniques of technological diffusion. The study's findings demonstrate that while knowledge transfer mechanisms have been improved to boost new technology adoption by smallholder farmers, the rate of adoption of the two technologies remains low, which has an impact on the farm's economic sustainability and performance. This is despite the significant proof of the economic and environmental benefits of these technologies, as well as the efficacy of the project's cost-of-diffusion models.

### **Discussion and Contribution Statement**

In reviewing past research in the domain of the importance of agricultural extension programs in technology transfer for rural farmers, substantial observations were made and used: Using previous research to design the research objectives, methodology, and participation measurement scales, studies that have been done before showed the scarcity of agricultural extension and agricultural extension programs management research in organizations, particularly in the technology transfer and farmer's production process. The majority of research depended on preferred questionnaires and face-to-face interviews to collect data, while statistical approaches varied from descriptive tools to inferential tools. Percentages, frequencies, mean, simple correlation coefficients, regression, Chi-square, and variance are all terms that were used to describe data. The previous studies enabled the researcher to select some parameters as independent variables that were expected to influence agricultural extension program management, technology transfer, and motivating farmers to adopt and use new technologies in their farm field practice, while they focused on transferring new technologies to farmers through agricultural extension program management in the rural area.

### **Similarities and Differences of the reviewed studies**

**Lopokoiyit *et al.* (2013)** shows that extension management is critical for managing extension service programs and projects, extension staff, networks, collaborations, and partnerships with

agriculture industry stakeholders, and, most importantly, managing farmer relationships to build trust and an enabling environment for effective extension service delivery. Thus, it indicates extension program management has a critical role in most of the segments of improving farmers' production. This is similar to **Danso-Abbeam *et al.* (2018)** who illustrate those positive economic gains from participating in agricultural extension programs, it means that having a managed agricultural program enhances the farmers to improve their production and income. In addition, (**Altalb *et al.*, 2015**) revealed that agricultural extension is the foundation for transferring agricultural technologies to farmers and persuading them to adopt new agricultural techniques, and therefore agricultural extension workers play a critical role in transferring agricultural technologies to farmers. This is similar to (**Dhehibi, 2020**) who demonstrates that smallholder farmers' adoption of new technologies has been improved as a result of improved information dissemination tactics, this is despite the significant proof of the economic and environmental benefits of these technologies, as well as the efficacy of the project's cost-of-diffusion models.

On the other hand, **Baig and Aldosari (2013)** revealed that in many Asian nations, the extension service or system has failed to have the necessary impact, support farmers in addressing their challenges, and give them better and improved solutions during the last two decades. This is different from (**Lopokoiyit *et al.*, 2013**) who observed that extension management is critical for managing extension service programs and projects, extension staff, networks, collaborations, and partnerships with agriculture industry stakeholders, and, most importantly, managing farmer relations to build trust and an enabling environment for effective extension service delivery.

### Conclusion

To conclude, the agricultural extension programs have a massive impact on the dissemination of information and transfer of technology to farmers by persuading farmers to adopt new agricultural technology to improve their products and raise their standards of living in terms of economic and agricultural

productivity. The program management helps rural farmers to obtain information on how to use the new technologies and what are the advantages of utilizing those technologies in their real life. Based on the reviewed studies the agricultural extension system is a link between farmers and agricultural research institutions, undoubtedly, a good extension system staff and well-managed programs have a significant impact on rural farmers according to utilizing agricultural technologies and techniques. While in some countries it seems that they do not pay enough attention to agricultural extension program management, which is crucial for developing rural areas through rural farmers and their families. The government must hire some qualified and skilled agricultural extension workers and place the right person in the right place such as a managerial position to make the right decision the manager must have the ability to establish and formulate an active strategy and develop a program management for transferring new technologies to a rural area for rural farmers.

### REFERENCE

- Akeredolu, M. (2016). Module 3: Agricultural Extension Programme Management module is developed as part of the New Extensionist Learning Kit. Global Forum for Rural Advisory Services, Switzerland.
- Al-Doski, Abid A.H. and C.M. HamaSalih (2017). Local Participation Level of Rural Women in Halabja Governorate in Kurdistan Region of Iraq. *Zagazig, J. Agric. Res.*, 44 (4): 1449-1456. <https://doi.org/10.21608/zjar.2017.52970>.
- ALEX, G. and W. ZIJP (2002). Rural extension and advisory services, Rural development strategy background, World Bank, USA.
- Alex, G., W. Zijp and D. Byerlee (2001). Rural Extension and Advisory Services: New Directions. The World Bank, AKIS (draft doc.). Washington, DC.
- Altalb, A. A.T., T. Filipek and P. Skowron (2015). The Role of Agricultural Extension in the Transfer and Adoption of Agricultural Technologies. *Asian J. Agric. and Food Sci.*, 03 (05): 201. (ISSN: 2321 – 1571).

- Anderson, J. and G. Feder (2007). Agricultural extension. In: Evenson, Robert, Pingali, Prabhu (Eds.), Handbook of Agric. Econ., 3: 2343e2378 (Chapter 44).
- Aquinas, P.G. (2007). Management Principles and Practice. Bharathiar Univ., Egypt.
- Aremu, P., I. Kolo, A. Gana and F. Adelere (2015). The crucial role of extension workers in agricultural technologies transfer and adoption. Global Advanced Res. J. Food Sci. and Technol., 4 (2): 014-018.
- Baig, M.B. and F. Aldosari (2013). Agricultural extension in Asia: constraints and options for improvement. J. Anim. And Plant Sci., 23 (2): 619-632. ISSN: 1018-7081.
- Bushara, M.O., M.E. Khalid and E.E. Elsayed (2018). Adoption and Impact Assessment of Improved Technologies of Potato Crop Production Systems in Khartoum State, Sudan. Int. J. Econ. and Manag. Sci., <http://dx.doi.org/10.4172/2162-6359.1000527>.
- Danso-Abbeam, G., D.S. Ehiakpor and R. Aidoo (2018). Agricultural extension and its effects on-farm productivity and income: insight from Northern Ghana. Agric. and Food Security, 7: 74. <https://doi.org/10.1186/s40066-018-0225-x>.
- Dhehibi, B., U.M. Rudiger, P. Hloniphani and M.Z. Dhraief (2020). Agricultural Technology Transfer Preferences of Smallholder Farmers in Tunisia's Arid Regions. Sustainability, 12, 421. <https://doi.org/10.3390/su12010421>.
- GODAD, K. (2010). Agricultural extension officers in the territory of Papua and New Guinea 1945–1975, Univ. Technol., Aust.
- Kahan, D. (2013). The role of the farm management specialist in extension. © FAO, ISBN 978-92-5-107551-7 (print), E-ISBN 978-92-5-107552-4 (PDF).
- Khan, Md.S., M.H. Rahman and M.N. Uddin (2017). Effectiveness of agricultural information and communication center in technology transfer to the farmers in Bangladesh. Asian J. Agric. Ext., Econ. and Sociol., 18 (4): 1-11; Article no. AJAEES. 34998. ISSN: 2320-7027. <http://dx.doi.org/10.9734/AJAEES/2017/34998>.
- LAFTA, A.H. (2009). Constraints to technology transfer as viewed by extension farmers. Iraqi J. Agric. Sci., 40 (4): 86-91.
- Lopokoiyit, M., O. Christopher and J.K. Kibett (2013). Extension management competency needs of agricultural extension agents in Kenya. Mediterranean J. Social Sci. Published by MCSER-CEMAS-Sapienza Univ. Rome, 4 (6). E-ISSN 2039-2117 ISSN 2039-9340. <http://dx.doi.org/10.5901/mjss.2013.v4n6p11>.
- QAMAR, M. (2005). Modernizing national agricultural extension systems, food and agriculture organization of the united nations, research extension and training division sustainable development department, United Nations.
- Rivera, W.M. and V.R. Sulaiman (2009). Extension: Object of Reform Engine for Innovation. Outlook on Agric., 38 (3): 267-273.
- Rivera, W.M. (2003). Agricultural extension, rural development, and the food security challenge. food and agriculture organization of the United Nations Rome. ISBN 92-5-105035-X.
- World Bank (2003a). A Multi-Country Agricultural Productivity Programme (MAPP) for Africa. (Draft). Washington, DC.
- Wossen, T., T. Berger and S. Di Falco (2015). Social capital, risk preference and adoption of improved farmland management practices in Ethiopia. Agric. Econ., 46: 81e97.

## أهمية برنامج الإرشاد الزراعي في نقل التكنولوجيا للمزارعين في المناطق الريفية

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يعد إدارة برنامج الإرشاد الزراعي هو القسم الأكثر فاعلية في مجال الإرشاد الزراعي، لتعديل وتسهيل البرنامج الإرشادي المصمم لتحسين إنتاج المزارعين الريفيين ومستوى معيشتهم من خلال استخدام المعلومات والتكنولوجيا الزراعية الجديدة. وللموافقة على ذلك، تم إجراء بعض الأبحاث المختلفة المتعلقة بنقل التكنولوجيا الزراعية للمزارعين المتأثرين بإدارة برنامج الإرشاد الزراعي. إلى جانب ذلك، يلعب المرشدين الزراعيين دوراً حيوياً في نقل التكنولوجيا إلى المزارعين، فهم يقومون بتحسين أفضل ما لديهم لإقناع المزارعين بتبني استخدام التقنيات في ممارساتهم الزراعية. مما لا شك فيه أن إدارة البرنامج الفعال لنقل التكنولوجيا للمزارعين يُنظر إليه على أنه أكثر التطبيقات تأثيراً لتحسين قدرة المزارعين على العمل الجاد والذكاء، بينما يعد تأثيراً سببياً لتحسين دخل المزارعين مما يؤدي إلى زيادة الدخل القومي. ان برنامج الإرشاد الزراعي تأثير كبير على إنتاج المزارعين نتيجة استخدام التقنيات الزراعية المتعلقة بعملهم. ومع ذلك، ينبغي تحديد بعض القيود المرتبطة بالعمل الإرشادي لنقل التكنولوجيا في معظم البلدان في العالم بأسره، وينبغي تطوير بعض الاستراتيجيات القابلة للتطبيق مع إدارة برنامج الإرشاد لجعل العمل الإرشادي فعالاً وكفؤاً بتكلفة أقل. من أهم القضايا التي تواجه مهمة الإرشاد الزراعي نقص المعرفة الصحيحة عن التقنيات الجديدة من المزارعين نحو تطبيق المعلومات والتكنولوجيا، لذلك يجب على موظفي الإرشاد الزراعي التفكير بشكل نقدي ومنطقي لإنشاء برنامج إرشادي فعال والعمل عليه بشكل جيد لإعلام وتنقيف المزارعين.

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