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Review

The Crucial Role of Extension Workers In Agricultural Technologies Transfer and Adoption

*¹Aremu P.A., ¹Kolo I. N.,¹ Gana A.K.,²Adelere F. A.

¹National Cereal Research Institute, Pmb 08, Badeggi, Niger State, Nideria

²Ladoke Akintola University Of Technology, Ogbomoso, Oyo State, Nigeria

Email: aremumola@yahoo.com, 08030746335

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The great challenge facing the agricultural technology transfer is not just how to approach the end users, but how to sustain the use of technology to meet the future challenges. Using appropriate, research technologies to promote food security is a major priority for many developing nations including Nigeria. Is a known fact that farmers differ in their social economic background, educational levels, learning needs and problems. These technologies must be disseminated to the farmers using modern extension education teaching methods and strategies And since teaching is deliberate and planned activity, the teacher {Extension workers} is expected to spend a considerable amount of time thinking about what to teach what method to employ. Different methods of transfer and adoption of new technology by the extension workers were thoroughly discussed and the crucial roles of agricultural extension services in promoting agricultural innovation processes are also highlighted. Extension teaching is deals with the conveyance or passing across of new skills, technology, techniques or new methods of production in agriculture that will ultimately improve the living standard of target audience. To be successful in technology transfer, extension worker must understand the farmers learning needs, problems, priorities and opportunities as well as psychological process, semantic, physical and economic barriers to adoption.

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INTRODUCTION

The world food situation is one of the greatest modern problems because about 100 million people are seriously malnourished. The world summit convened by the Food and Agricultural Organization {FAO} of the United Nations, Rome in November 1996 brought into world focus the issue of food security.

Food security implies access to the desired quantity and quality of food at all times by every men, women and child. There are three component of food security {1} availability {2} stability {3}accessibility. Food availability is

influenced by the level of food production and importation. Food stability is considerably influenced by the extent of post-harvest losses, while food accessibility is greatly determined by the purchasing power of the population {Adeyeye, 2007}.

Food is a basic necessity for the existence of man. Food in the appropriate quantities and qualities is required for health and productive life. Attention has been focus on elimination of food insecurity and hunger throughout the world {World Bank, 2010}. To alleviate rural poverty by

ensuring food security and sustainable improvement in people well-being, research based technologies must be widely disseminated and at the same time adopted by the target farmers. At times extension workers may identify and know the solution to the problem facing by the farmers still and may be unable to disseminate the solution due to lack of appropriate extension teaching method in agricultural technology transfer.

The economy of most developing countries is dependent on rural based small-scale agriculture whose productivity is not increasing and some cases even declining without contributing towards household food insecurity, alleviation of malnutrition and poverty. The ever-increasing decline in agricultural production has been attributed to a number of factors, one of which has been inappropriate and ineffective dissemination of technologies. The extension worker is a professional, who influences technology decision in a direction deemed desirable by a change agent. They play very important roles in technology transfer in Nigeria.

However the major objective of the agricultural extension and technology transfer policy of the Government is to teach the farmers or rural people to raise or improve their standard of living within minimum assistance and by their own efforts.

Concept Technology and Technology Transfer

Technology is taken to mean not only machines and equipment, but also skills, abilities, knowledge, systems and processes necessary to make things happen, thus technologies are meant to be total systems that include know-how, procedures, goods and services, as well as organization and operational measures.

A "technology transfers" is actually a structural process of learning. The key components of a transfer can be identified as knowledge, derives from real world experience together with human expertise capable of transforming that knowledge into action. "Technology transfers include a range of formal and informal cooperation between technology developer and technology seekers. In addition, technology transfers involve the transfer of knowledge and technical-know-how as well as physical devices and equipment.

The term "agricultural technology transfer" is then used to describe the process of formally transferring new agricultural discoveries, improved practices or innovations that may result from research institutions into the agricultural sector.

Agricultural extension is the process of carrying the technology of scientific agriculture to the farmers in order to enable him/her to utilize the knowledge and a better economy. Agricultural extension services seek to impart the necessary skills to the farmers for undertaking improved agricultural operations, to make available to

them timely information, improved practices in an easily understandable form suited to their level of literacy and awareness, and to create in them a favorable attitude for innovation and change {Bernor *et.al.*, 1984}.

Extension is an on-going process of getting useful information to people and then in assisting those people to acquire the necessary knowledge, skill and attitudes to utilize effectively these information and technology. Thus extension is central in the agricultural development process, both in terms of technology transfer and human resources development {Samanta 1993}

Basic requirements in adopting agricultural technology

There are six basic requirements that must be satisfied in choice of agricultural technology for small farmers;

{1} Technical feasibility, that is, capability to increase productivity given the technical elements and Trialability that is the degree to which a technology may be tried out on a limited scale to determine its efficacy before final adopting it on a large scale.

{2} Economic feasibility or viability, that is the dependability and risk minimization potentials, conveniences, low initial cost, decreasing discomfort, psychological satisfaction or saving of time. A cheaper technology will be adopted faster than a more expensive one {Rolling,1990}. Because farmers are eager to make money, extension workers must show them how a new technology will benefit them financially.

{3} Social acceptability, that is compatibility with community structure norms and beliefs. Technologies that compatible with existing farm practices encourage a positive attitude toward change, improve the agent's credibility, and may be adopted faster.

{4} Infrastructural compatibility, that is capability of being accommodated by the present level of infrastructure.

{5} Complexitytha is the degree to which a technology is perceived to be relatively difficult to understand and use. Technologies that are more complex to understand and use have lower rates of adoption.

{6} Visibility or observability is the degree to which the results of a new technology are visible or observable. The more viable a new technology is the easier its results are to be observed, described, and communicated to others, and also the more rapidly it could be adopted. Material innovations and concrete ideals that are easily observable are adopted faster than less concrete ones.

Williams {1985} however emphasized a problem-solving parameter as an important factor guiding the choice of any technology as an ideal one. He said "the knowledge about new inputs {improved seeds, fertilizer s and fungicides} and new technique must be such as to improve meaningful, practicable and attractive answer to farmers problem and requirement.

The Role of Extension Worker in Agricultural Technology transfer

The extension workers' role is to teach and demonstrate to innovative 'contact' or 'master' farmers how to use new technologies. Once innovative farmers have adopted the new technologies, it is assumed that other 'laggards' or 'follower' farmers will copy them and the technology will diffuse to the majority of farmers.

Knowledge and application of extension education principles help extension workers a lot in determining farmers' needs, constraints, priorities and opportunities. This also helps in teaching farmers the value of improved agriculture; recommending suitable crops and, livestock for different agro- ecological zones; encouraging adopting of appropriate technologies, and evaluating farmers' reaction and attitudes toward development projects.

Extension workers are also helpful in raising farmers in involvement in project identification, planning, implementation, and evaluation as well as persuading respected community leaders to legitimize and support viable development projects.

The Role of Extension Workers

Extension worker create awareness of innovation, something new or perceived to be unknown before to his/her clients.

- b. Persuasion of the usefulness or importance of the new technology
- c. Reinforcement of continued use of technology that is created. The interest to continue to practice the new idea that was introduced is sustained through supporting services e.g. input etc.
- d. Intermediary between the researchers and farmers. This is done by creating awareness to the farmers, and also taking of farmer's problem to the researchers.
- e Diagnose problems of his/her clients by telling them the way out.
- f. Extension workers stabilize change and attempts to prevent discontinuance, individuals tend to seek confirming information for the decision they may make. Extension workers can effectively stabilize new behavior by directing, and reinforcing messages to those clients who have adopted innovation.
- g. Extension workers act as catalyst to speed up the rate at which his/her clients accept changes or innovation.
- h. Extension worker is a solution provider that is he or she has an idea about effective solution to farmers problems.
- i. Extension worker play a role of resource linker that is linking them with necessary agricultural inputs, to locate source of finance for their farms.
- j. Strengthening and supporting farmer organization.

Three Major Lessons for Agricultural extension workers

a It is important to make new things visible; An important role of extension is to make visible the state of the environment and the extent to which present farming practices are untenable. In addition, extension can demonstrate the feasibility of sustainable practices. Even more importantly is to give farmers the tools for observation and to train them to monitor the situation on their own farms.

b. The use of farmers' knowledge; the location-specific nature of sustainable agriculture implies that extension must make use of farmers' knowledge and work together with the farmers. Often, indigenous practices, which have been ignored under the impact of chemical farming, can be fruitfully revived. Indigenous technology development practices and farmers experimentation can be an important 'entry point' for introducing sustainable farming practices (Brouwers and Rolling, 1999)

c. An emphasis on facilitating learning; Instead of 'transferring' technology, extension workers must help farming 'walk the learning paths'. Extension workers should seek to understand the learning process, provide expert advice where required, convene and create learning groups, and help farmers overcome major hurdles in adapting the technologies.

Application of Extension Teaching Methods in Agricultural Technology Transfer

The importance of teaching methods and strategies cannot be over emphasized. This is because it promotes and facilitates learning when used appropriately and hinder learning when used otherwise{Onwalu, 1981}. Since teaching is deliberate and planned activity, the teacher {extension worker} is expected to spend a considerable amount of time thinking about what to teach, who to teach, what method to employ? These are clear indications that the teacher must give teaching methods or strategies sufficient thoughts and attention. Oyetunde and Famwang{1996}, defined methods as overall plan for the orderly presentation of content or learning materials. Oyetunde and Piwuna{2002}, sees it as the means by which learners are kept interested in activities which result in learning. However, teaching is a way or an act of imparting knowledge. It could also be referred to as process of guiding and directing an individual to acquire new skill.

Extension teaching deals with the conveyance or passing across of new skills, technology, techniques or new methods of production in agriculture that will ultimately improve the living standard of the target audience.

Farmers are referred to as adult learners and extension workers as a teacher. Education has been defined as the production of changes in human behavior. Extension workers are continuously striving to bring about changes in the behavior of farmers and their families. They want farmers to discard the old method of farming and follow new techniques. They try to show farmers merit of better and improved seed/seedlings, of chemicals, fertilizers of effective insecticides and with the profits that will follow their uses to provide more and better food for their families, better clotting, housing and happier living. This is teaching in its truest sense.

Classification of Extension Teaching Methods

Extension teaching methods guide the learning process so that the farmer learn more and better. Technique adopted in the conduct of extension work emphasizes the practice of extension as that of extending knowledge to farm families. The nature of subject matter and the circumstances of the farmers such as their level of education will help to determine the type of method to be used.

The primary responsibility of extension workers is education. A substantial number of proven educational methods or techniques exist from which the extension worker may choose to set up learning situations and to maximize the transfer of information and technology to both young and adult learners. Once the needs of a community have been identified, it is the task of extension workers to choose the teaching methods that will be most effective in achieving their educational objectives.

Extension methods are categorized as;

- 1. Individual contact Method**
- 2. Group Contact Method**
- 3. Mass Contact Method**

INDIVIDUAL CONTACT METHOD

This is method of technology transfer whereby extension workers interacting with the farmers or household on one-to one basis. In this regard, discussion with the whole family highlight more problems and more experience is brought to the discussion' though this method is time consuming it has been found useful when relating with non-literate/uneducated farmers. Hence it is the best when the objectives of the extension program calls for a change in behavior.

Examples of individual methods are; Home/farm visit, office call/enquires, Telephone call, The model farmer and Result demonstration.

It has the followings merit;

- <It afford the extension worker the opportunity to be acquainted and make friends with the farmers.
- <It helps in building and gaining the confidence of farmers.
- < It helps in gaining first-hand experience of the living condition of the farmer and farmers' family.
- <It enables the extension workers to identify local leaders and progressive farmers.
- < It may be the best way to ensure that everyone in the family participates in decision-making

And the followings demerit;

- <it is expensive in term of time and transport
- < The area covered is small since all the effort is concentrated on a few farmers.

GROUP CONTACT METHODS

This method of technology transfer involves with working with groups or the community at large. It is suitable when discussing matters related to the whole community. Group teaching methods are more frequently used in extension work than individual teaching methods. By utilizing group technique, an extension worker can reach more people than is possible. This method proves important when time and staff are limited. Group methods are especially effective in persuading extension 's clientele to try a new idea or practice.

Group method include, method demonstration, field trips, general meetings, informal or group discussion, exhibits, tour, role playing, modified conference method, on farm adaptive research {OFAR}, Management Plot Trial {MTP}, farmers field day, adopted village and model farmers.

Mass Media Contact Methods

Mass media methods of technology transfer are useful in reaching a wide range audience at a very fast rate. They are important in stimulating farmers' interest in new ideas and practices. The various methods which come under mass media classification include; newspapers, radio, television, publications, posters, drama, slide shows and films.

Newspaper / Publication

This is a method of technology transfer that provides a

valuable channel for transmission of educational information where they exist and where rural people receive and read them. It must compete for attention with other items. The materials should be short, simple sentences, factual, well written and intelligently planned.

It is a means of giving information to a large number of people and gives timely information to people.

Radio

It is the one of the fastest, most powerful instrument of communicating with the masses of rural people and farmers. Radio is useful in reporting news, such as announcement of meetings, and disseminating new skills, technologies, techniques or new methods of production in agriculture that will ultimately improve the living standard of the farmers.

Posters, cinema vans/ public address system.

The films demonstrate new techniques that the farmers can apply on their own farms. Extension workers can also use public address system to make announcements and bring agricultural to the farmers.

A poster is another good method used by the extension workers to transfer technology to the target audience. It is usually a sheet of paper or card board with an illustration and usually in a few simple words. It is designed to catch the attention of the passer by, impress on him a fact or an idea and stimulate him to support an idea, get more information or take some kind of action.

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