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Fundamentals of Agricultural Extension and Education

Agricultural extension is a form of rural development that relies on non-formal education. It is an old curriculum that works hand in hand with applied and academic agricultural scientific research. There is a wide debate about the necessity of separating the skills of the researcher from those of the agricultural extension worker. This study demonstrates what a scientific specialist needs to be a crucible that combines academic foundation, research mastery, and agricultural advisor skills. In this popular article, a quick presentation of the contents of 11 academic lectures separated into 10 sections on agricultural extension targeting master's students in plant protection at the University of Debrecen, Hungary. In the summary, a skilled agricultural supervisor needs broad academic capabilities, integrated research, scientific applications skills, and social characteristics, as well as the use of various media to understand the needs of the local community and build extension plans to affect the adoption of qualitative technologies that contribute to rural agricultural development. The article recommends the necessity to raise awareness on the importance of combining the characteristics of an academic, researcher, and agricultural advisor in agricultural societies.

INTRODUCTION

In 1773, an informal system of agricultural extension was established at Cambridge University, and one of the markers of the success of the extension effort was an increase in agricultural production. Rural development began in the countryside and communities.

In 1885, the University of Chicago established the first agricultural extension philosophy. The agricultural extension philosophy incorporates three key principles:

1. Adoption of innovations (new ideas).
2. Extension education.
3. Conducting a needs assessment in rural areas.

The importance of this article lies in the academic basics that represent the essence of agricultural extension, starting from the linguistic and comprehensive concept and passing through comparing it to formal education, extension education types, extension officer rules, traits, and skills. Mentioning the principles and objectives of agricultural extension and clarifying the concepts of adoption and dissemination of agricultural techniques will help to get a more precise idea about agricultural extension. Moreover, effective extension methods of communication were also identified, highlighting the comparison between agricultural extension projects, which are general agricultural extension programs and farmers' field schools specialized in teaching the principles of integrated pest management and analyzing the ecological and biological systems of plants.

EXTENSION EDUCATION

Since the farmer is the most key aspect of this process, extension education is aimed at him/her. To convey reliable knowledge, skills, and experiences to the farmers, professional research workers and a cooperative extension system are required.

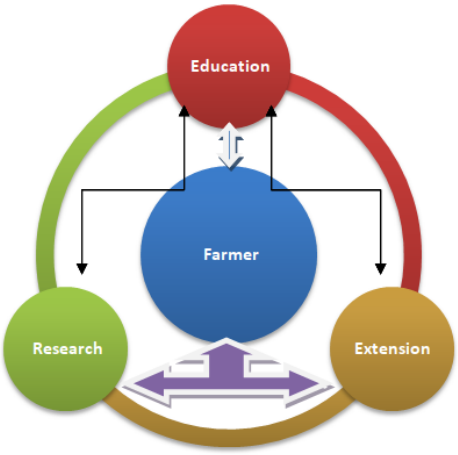

Figure 1. A dynamic connection between a researcher, an extension officer, and a farmer, with the farmer as the primary focus

The most basic description for agricultural extension is that it is a continuous informal educational process, a method of informal schooling that continues (linguistic definition).

Figure 2: Agricultural extension basic definition components

Agricultural extension is defined as an informal educational system and a continuous process based on farmers' needs, problems, and concerns, and it is implemented by specialized staff in several disciplines in collaboration with relevant agencies and institutions, to bring about desired behavioral changes in farmers' knowledge, skills, and attitudes, and it focuses on all members of the rural family.

EXTENSION EDUCATION VERSUS FORMAL EDUCATION

Table 1. shows a direct comparison between the features of extension education and formal education.

Table 1. Comparison between extension education and formal education

Extension Education	Formal Education
Starts with practicing	Starts with theories
Targeting farmers	Targeting students
Solving problems	Studying
No formal examination	Formal examination is mandatory
Farmers authority	Teacher authority
Voluntary attendance	Compulsory attendance
Optional education	Compulsory education
Dynamic education	Teacher supervisor
Leadership farmers are lecturers	Teacher is lecturer
Heterogeneous group	Homogenous group
Courses cover specific need area	Courses cover vast knowledge area (top-down)
Make changes	Gather knowledge
Open for all	Students only
Mass media	Books

EXTENSION EDUCATION TYPES

Extension education types include all aspects of rural life which are agricultural, environmental, water,

religious, tourism, health, family, university, psychological, investment, and home economics.

EXTENSION OFFICER RULES

- Transfer of innovations, In other words, the extension should not be considered the communication process between scientists as the primary supplier of ideas and farmers as passive adopters, but should instead understand adoption as a social process. Adoption is not a thoughtless reaction to extension information; rather, a conscious decision taken by an individual farmer to examine a variety of matters carefully.
  On and off the field, extension officers have a variety of responsibilities. As a conduit between both official agricultural institutions and non-governmental agricultural education, extension officers work directly with farmers. Officers learn about innovations and pass on their knowledge to farmers so that they may adapt and use it to increase productivity.
- Consultant, or specialist and expert. The agricultural extension officer is a member of a team of professionals as well as a member of a rural and educated community. The extension officer practices his profession in coordination with the farmers as a scientific reference with experience, opinion, knowledge, and training
- Extension programs planner. This means that extension workers must be able to learn from their farmers and listen and link to research and markets to identify extension priorities as a learning paradigm. Farmers and extension agents should therefore work together to set goals so that their annual action plans address farmers' requirements directly.
- Recognize the existence of a range of world viewpoints as a facilitator and coordinator. Farmers have diverse priorities, perspectives, attitudes, working styles, and issues. By extension, all styles' requirements must be met. In this extension model, the field staff first meets with various groups of farmers (e.g., small-scale men and women farmers, landless farmers, etc.) to identify their specific needs and interests. The next step is to identify the best sources of expertise after determining their specific needs and interests (for example, innovative farmers already marketing special products, subject matter specialists, researchers, specialists in the private sector, and representatives of rural banks) which may help the various groups address specific issues or opportunities.
- Informal teacher. Table (1) previously classified that extension education as a non-formal education directed to all groups and ages of the rural family. It is different from formal and compulsory education.

EXTENSION OFFICER TRAITS

A trait is a characteristic that an individual produces. It is observable in nature. Extension officer traits are:

- Mastery in technical information. It means that extension workers must be well-versed in a variety of agricultural disciplines and be able to communicate effectively with farmers to persuade them with high persuasion ability to embrace modern agricultural practices and ideas for use on their farms.
- Communication skills, agricultural extension specialists with practical expertise in the diffusion of agricultural technology, and a good understanding of how to engage with farmers should handle the process of transferring agricultural technologies and encouraging farmers to use them on their farms. This is accomplished through effective communication training courses.
- Familiar with the extension message and quality. Agents should be capable of promoting industry best practices, issue solving, appraising particular properties, and giving technical advice, as well as supporting farmers with business analysis and benchmarking, presenting options, and allowing farmers to evaluate risk levels.
- Full knowledge of farmers' problems and needs. If the extension is to be successful, it must be relevant to farmers' needs and prioritize their needs over institutional priorities.
- Credibility and not claiming what does he/she not know. The extension is a procedure in which the credibility of the advisor is an important aspect in the weighting of this advice by farmers. Credibility (framers confidence) is created over time by delivering credible, practical, and valuable responses that assist farmers to operate daily. Group facilitators who never advise on farm barely earn credibility.
- A desire to learn from the experiences of farmers and not to underestimate their experiences. Humility and initiative for farmers are traits required to achieve this goal.

EXTENSION OFFICER SKILLS

Skill is a learned and developed ability that humans acquire through practice (Acquired trait). Extension officer skills are:

- Skilled at persuasion and communicating information.
- Skilled as a team worker.
- Skilled in knowing farmers' needs.
- Skilled in extension outreach.
- Skilled at finding, selecting, and training local leaders.
- Skilled in selecting indicative technical fields.
- Data collection and analysis.
- Setting time and implementation plans.

To work with people and farmers, extension agents require some basic abilities. An extension officer must be able to persuade and communicate information to farmers, as well as gather and analyze data. Agents must be able to operate as part of a team and have experience with farmers' outreach. Finding, selecting, and training local leaders are all skills that an extension officer must possess. To develop time and implementation plans, the officer must also be skilled in an appropriate technical sector.

PRINCIPLES AND PURPOSES OF AGRICULTURAL EXTENSION

The principles of agricultural extension and development are the same as the principles of any successful project and include the following:

- Collaboration: Planning, implementing, and evaluating extension activities with the target audience and local leaders (Figures 1 & 4). Farmers, extension agents, and scientists all work together to communicate and collaborate (development term). Opposing the notion of imposing plans and rejection of pressure (down-top orientation).

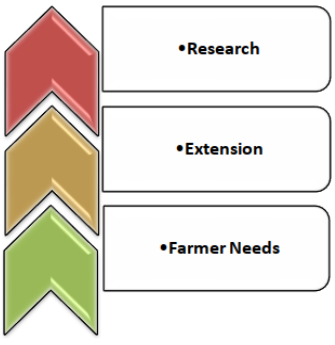

Figure 3. Down-top cooperation; opposition to the notion of imposing plans and rejection of pressure

- Improvement: It improves as a result of research. The main pillars of agricultural development are extension and research.
- Sustainability/ Longevity: Ongoing examination and monitoring.
- Financial Support: All the resources needed to carry out extension work must be provided.
- All-Inclusive/ Comprehensive Approach: From existing farm-to-market ties (all its employees, and its institutions).

Figure 4: Farmers, extension agents, and scientific researchers all communicate and collaborate (cooperation, and development)

However, agricultural extension aims at influencing farmers' knowledge (new technology), skills (alternative techniques and solutions), and attitudes to achieve desired behavioral changes (replace old practices and thoughts).

ADOPTION AND DIFFUSION OF INNOVATIONS

Rural development is a process that aims to improve people's quality of life and economic development. Using innovation and technology, it is feasible to boost agricultural output. Adoption and Transmission of Innovations is a systematic process that involves the diffusion of technology or the transfer of information. This procedure is divided into steps (Figure 5).

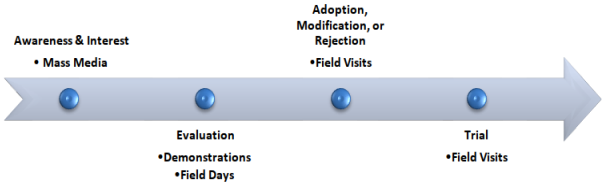

Figure 5. Adoption and diffusion of innovation stages process

The spread of innovation claimed that innovation is disseminated through channels between members of the social system throughout time (Figure 6).

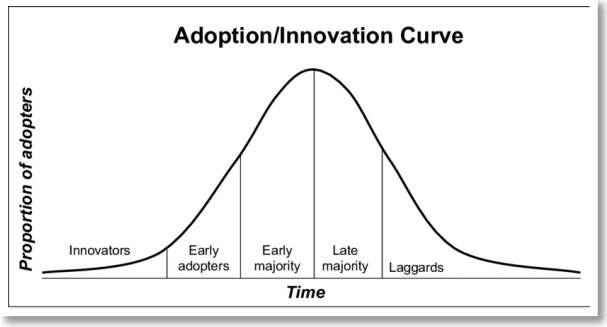

Figure 6. Normal distribution curve of the social system's adoption of innovation

The curve shows the normal distribution of the rural community segments regarding the adoption of innovations. Over time, during the adoption of technology, the proportion of community members (members of the social system) is divided according to the following types and proportions:

- Innovators 2.5%.
- Early adopters 13.5%.
- Early majority 34%.
- Late majority 34%.
- Laggards 16%.

EFFECTIVE COMMUNICATION CHANNELS

Communication is the exchange of information between two or more people, with one party acting as a sender (speaker) and the other as a receiver (a listener) (Figure 7). The message is the content of the dialogue, and the style is how it is communicated. In the communication process, there are two types of messages; spoken like (face-to-face, meetings, telephones, and video conferencing), and written such as: (letters, reports, e-mails, and reports).

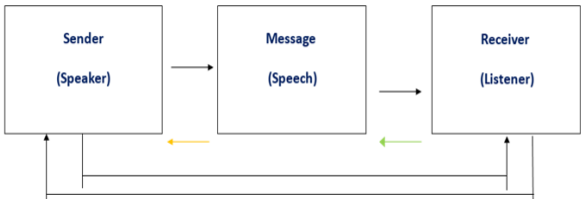

Figure 7. General communication

In a broader description, the extension communication process between the speaking sender, who is the extension officer, and the target, who is the beneficiary of agricultural technology/ innovation, is a process that contains many elements (Figure 8). The indicative message contains information conveyed by certain means (messages and channels), where it is expected that there will be simplification (encoding) on the part of the sender and clarification and analysis on the part of the beneficiary (decoding). This process involves a reaction of feedback and maybe confusion (noise) between the contact parties

Communication Process Components (Figure 8) are:

- Context.
- Sender.
- Encoding.
- Message (Channel).
- Decoding.
- Receiver.
- Feedback.
- Noise (lack of clarity of language, lack of simplicity, lack of clarity, different customs, traditions, and cultural levels).

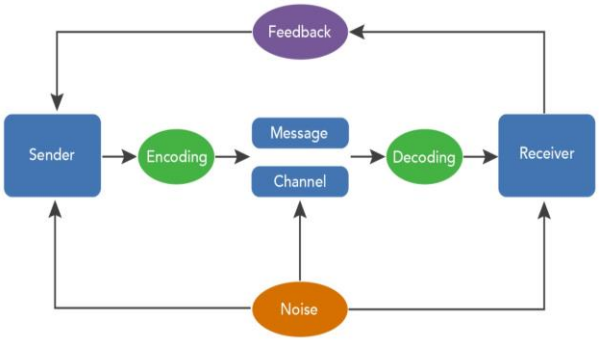

Figure 8. Communication process

Mass media used in communication channels for agricultural extension varies:

- Printed mass media: Pamphlets, booklets, books, posters, magazines, journals, reports, newspapers, and newsletters.
- Digital and social mass media: Internet, electronic mails, and blogs. Mobiles, what's application, Instagram, Twitter, and Facebook.
- Broadcast media: Movies, radio, and television.
- Outdoor media: Exhibitions, advertising, flyers, and stickers.
- Others (traditional): Lectures, training courses, meetings, and field days.

Types of extension education methods:

- Individual: Field visits, phones, and office.
- Collective (group): Field days, demonstrations, training courses, meetings, extension programs, and farmer field schools.

EXTENSION PROGRAMS VERSUS FARMER FIELD SCHOOLS

There are two types of extension projects; extension programs and farmer field schools. Plant protection and integrated pest management are the focus of farmer field schools.

Farmer Field Schools (FFS): The Food and Agricultural Organization (FAO) designed this type of agricultural extension to:

- Growing healthy crops.
- Keeping natural enemies.
- Continuous field monitoring.
- Produce expert farmers.

CONCLUSION

The agricultural extension can be defined as a continuous informal educational process or a technique of informal schooling that continues. It is necessary to organize the work of agricultural extension in rural communities along with applied scientific and academic research. The agricultural extension officer needs rehabilitation and training in various fields, especially communication skills and studying the needs of communities, in addition to the skills of planning, documentation, and building extension projects. The importance of combining the features of an academic, researcher, and agricultural advisor in agricultural communities is emphasized in the article.