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Global Need for Revitalization of Agricultural Extension Training

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ABSTRACT

This article surveys the trends in agricultural extension programmes and services found across the world, including privatization, decentralization, and pluralism. The general movement from top-down extension services to demand-driven programmes is explored along with its impact on the skills needed by extension professionals. Process skills and competencies required of modern extension professionals—programme planning and development, programme implementation, written and spoken communication, educational and informational technology, facilitative leadership, diversity and multiculturalism, public relations, and applied research and evaluation—are explained and linked to relevant skill sets. In-service training of current extension agents and improvements to the facilities, faculty, and curricula used in the education of future agents are proposed as solutions to the challenges facing agricultural extension programmes and services. In-service training would raise knowledge, skills and attitudes of extension agents to meet changing contexts and needs. The changing nature of professional extension work requires that university training programmes respond with new courses and experiences for students. Practical education through fieldwork, internships, or practicums and techniques for adult learning, technology and communication skills, and leadership development are all possible solutions for closing the gap between the agricultural and extension education training programmes and the competencies required of professional extension agents.

Keywords: *Agricultural extension ; human resources ; competency*

INTRODUCTION

Global food demand is expected to double by 2050, driven largely by population growth, energy needs and higher incomes in developing countries. Food insecurity has been a concern for many countries. The number of food insecure people in 2011 is estimated at 852 million (ERS, 2011). To meet this food need, the world will require approximately a 70-100% increase in agricultural production (Feed the Future, 2011). This increase is possible if agricultural producers adopt new technology and practices. Developing countries particularly need to adopt new technologies, policies and practices to increase production, processing and distribution of food. Agricultural extension has a key role in technology adoption. Extension can spread

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research-based information and technology to farmers and agribusinesses and transmit information about farmers' and food industry's needs to researchers.

Agricultural extension exists worldwide, with most countries having a national system for agricultural extension. Agricultural extension is organized in many ways. Countries have developed different types of agricultural extension systems based on purpose, context and external support. In the United States it is part of the Cooperative Extension Service. In European countries, agricultural extension is called advisory services. In most developing countries, agricultural extension programmes and services are organized under the country's ministry of agriculture.

Extension serves both rural and urban populations with a wide range of programmes aimed at helping to improve beneficiaries' quality of life. Key elements embraced by contemporary agricultural extension services include privatization, pluralism, decentralization, client participation, and focus on women and youth. The traditional agricultural extension approach -- top-down, supply- and technology-driven -- no longer appears to be an appropriate model. Today the intended beneficiaries participate in the identification and prioritization of learning needs (Suvedi and Kaplowitz, 2016). In demand-driven extension services, extension professionals need to be able to respond to farmers' requests rather than deliver predetermined packaged solutions.

Most agricultural extension services work in collaboration with agribusinesses, such as seed, fertilizer, pesticide, and production credit businesses, to facilitate ***technology transfer***. Frequently, extension services emphasize ***advisory work*** such as responding to requests from farmers and agribusiness operators. Often, extension services support ***human resource development*** and ***facilitate empowerment*** (Swanson and Rajalahti, 2010). In many instances, extension services offer all four of the above kinds of services to their clientele and/or stakeholders.

Challenges Facing Agricultural Extension

Agricultural extension, based on educational strategy and number of professional staff engaged under publicly funded systems, has reached a critical point. In the United States, for example, with fewer people engaged in production agriculture, the agricultural industry's demand for public extension professionals has fallen. In response, extension services are redirecting efforts beyond the needs of farmers to include urban consumers and are using technology creatively. The traditional focus on yield increases has shifted to market-driven agricultural production. New programmes in food, nutrition and health are taking the place of traditional production-oriented agricultural extension activities. Canada has experienced a gradual reduction in governmental funding for agricultural extension (Milburn, Mulley, and Cline, 2010). Countries in Western Europe, such as the United Kingdom and the Netherlands, have moved toward privatization. Public-private partnership has been the buzz concept in India.

Extension services in the developing world also have changed. The conventional top-down, supply- and technology-driven extension system no longer appears to be an appropriate model. Some countries have been promoting decentralized and/or bottom-up extension systems, and others are considering market-driven or fee-for-service systems.

Advancements in agricultural research, education and communication have a direct impact on agricultural extension. Originally, most technologies, such as new crop varieties or breeds of livestock, were developed by public research institutions and were disseminated by public extension services. This is changing very quickly. Today, many technologies, such as hybrid seeds, pesticides, and information and communication technologies (ICTs), are being developed by international and national private sector firms. Private sector entrepreneurs have succeeded in providing communication services through the Internet, radio, and television. Non-governmental organizations are extending education and training services for farmers and agribusinesses. In most countries, the central government provides an overall policy framework for extension, but a variety of actors (public organizations, civil societies, or private firms) provide a range of services to farmers and agribusiness operators. As a result, pluralistic extension systems are common in many countries. Key elements embraced by contemporary agricultural extension services in various countries include:

- **Privatization**—In the United Kingdom, the public extension service has evolved over time into a private consulting business. In the Netherlands, farmers provide the majority of the funding for extension. Other forms of privatization include cost-recovery, outsourcing, and contracting of extension services.
- **Pluralism**—Pluralistic systems are those that recognize the heterogeneity of the farming community and the need for diversity of extension service delivery systems. Multiple organizations, both public and non-public, deliver extension services. Examples include extension services delivered by governmental extension service and local NGOs in Mali, Nepal and Bangladesh.
- **Decentralization**—Decentralization involves the transfer of decision-making functions to local levels, encourages public participation, and expands local involvement in organizing and delivering extension services (Swanson and Rajalahti, 2010). Decentralized extension services are planned and implemented by district or sub-district level governments, as in the Philippines, Tanzania, India, and Indonesia.

Demand-driven (not supply-driven) agricultural extension is the buzz concept today, which means that extension responds to what farmers or clients ask for to satisfy their educational and informational needs. The hope is that clients will value the educational advice received so much that they will be willing to invest their own resources to receive

the service. According to Chipeta (2006), service providers under this approach would be accountable to the users and the users would have free choice of service providers. Swanson (2008) argues that, to make these institutional changes, public extension systems must become more decentralized, farmer-led and market-driven.

The emergence of a global economic system, the expansion of scientific knowledge and discoveries, and the rapid spread of information and communication technologies (ICTs) have a profound impact on agricultural extension. To prevail, the agricultural extension system must change its role from a supply-driven to a demand-driven system. It should change from a top-down technology transfer system to a bottom-up participatory process. It must serve the needs of female farmers who have been neglected by traditional extension services in most developing countries (Axinn, 1988; Chambers, 1995; Swanson, 2008). It must learn to work in partnership with many public, not-for-profit and private sector organizations that offer similar services to farmers and agribusiness operators. Extension also needs to be flexible to meet the educational and informational needs of new clientele groups. These changes in the role of the extension system demand different competencies from extension professionals (Cooper and Graham, 2001). To carry out the new roles, extension professionals need a different type of knowledge and attitude along with more diverse skills and working patterns. Ultimately, this has a tremendous impact on undergraduate and graduate curricula in agricultural and extension education (Scheer, Ferrari, Earnest and connors, 2006). It also has implications for professional development of extension professionals—specifically, the content of in-service training programmes. To put it simply, the changes taking place within the agricultural extension system have significant implications for human capacity development in general and the training of extension educators in particular.

This paper describes the desired core competencies for agricultural extension professionals and suggests areas for curricular change to better serve the needs of bottom-up and demand-driven extension systems. It concludes by offering strategies for human capacity building for agricultural knowledge management.

Desired Process Skills and Competencies for Agricultural Extension Professionals

Employees are the most valuable assets of the extension system. The quality of educational programmes heavily depends upon the professional role played by extension educators. To perform their roles effectively, all extension educators should possess sound technical knowledge and skills in the subject matter with which they work. For example, identifying the causal organism of rice or maize disease, testing the soil pH and interpreting the results, and skills in performing artificial insemination on dairy cattle are examples of technical competencies (Suvedi and Kaplowitz, 2016). Technical skills and competencies are necessary but are not sufficient for extension educators to serve

effectively. To perform their extension roles effectively, they also need basic educators' process skills and competencies, which are known as core competencies.

According to Mclean et al. (1999), core competencies are collective organizational skills that are present or achievable and upon which the organization bases its primary operations and services. These are the fundamental capabilities needed for reliable job performance (Cooper and Graham, 2001; Ghere et al. 2006). Core competencies should include knowledge, attitudes, skills, and behaviors that contribute to excellence in extension programmes.

Areas of skills and competencies for human capacity development have been a topic of debate and discussion. A recent publication about the road to global competitiveness and leadership in food, agriculture, natural resources and related sciences by the APLU states that:

> *[f]ood and agribusiness employers rank interpersonal skills and critical thinking twice as highly as production agriculture experience as components necessary for career success. In addition, graduates need to be knowledgeable about issues of globalization, the value of a diverse workplace, information literacy, and how their products/processes affect environmental sustainability." (APLU, 2009, p. 4).*

According to the National Research Council (2009), agricultural graduates should develop competency in "teamwork and working in diverse communities, working across disciplines, communication, critical thinking and analysis, ethical decision making, and leadership and management" (p. 40). Professional associations and accreditation boards also have contributed to establishment of knowledge and competency requirements for graduation in various technical and vocational fields.

Professional extension educators are expected to hold some common knowledge and competencies that have relevance to extension work. The types of competencies, however, may vary from country to country. For example, extension staff in industrialized countries may require a higher level of computer skills than those in a developing country. Similarly, staff having multiple roles, such as educator, grant writer, and administrator, need different competencies than staff having a singular function or role. For example, County Extension Directors in the United States, who have diverse roles, need a different set of competencies than an extension educator in Nepal whose primary role is technology transfer. Core competencies, when combined with sound technical skills, form the foundation for becoming a successful educator.

Michigan State University Extension (MSUE), for example, launched its core competency development initiative in 1993. A group of campus and off-campus staff members identified essential skill sets for extension educators. MSUE supports core competency development throughout the organization. It is designed to encourage each

staff member to take responsibility for and be actively engaged in his/her own professional development.

Scholars and practitioners have proposed many areas of core competencies for agricultural extension educators (Levine et al. 2002; Maddy et al. 2002; Cooper and Granham, 2001; Scheer et al., 2006). Eight areas of professional core competencies to address the needs of a demand-driven, decentralized, pluralistic, participatory extension system are described below.

Programme planning and development: Developing educational programmes and services with community input, establishing clear and relevant objectives, and making efficient use of resources to serve the needs of targeted audiences results in a strong impact. Planning is the most basic role of extension educators under the decentralized, pluralistic, demand-driven extension system. As a front-line educator, s/he should possess skills and competencies in:

- Conducting needs assessments.
- Prioritizing needs and programmes.
- Identifying stakeholders and engaging them in extension programmes.
- Acquiring and allocating resources (resource mobilization).
- Conducting the nominal group technique.
- Conducting community forums.
- Conducting brainstorming exercises.
- Identifying market opportunities.
- Designing services based on gender analysis.
- Developing a work plan.
- Developing a grant proposal.

Programme implementation: The extension educator is responsible for effective programme execution. To be effective, s/he should have skills to:

- Use appropriate educational design to respond to local learning needs.
- Organize demonstrations, farmers' field day, farmer field schools and communication campaigns.
- Plan and conduct nominal groups, focus group discussions and rapid rural appraisals.
- Establish an instructional environment that is conducive to learning.
- Share instructional responsibilities with partner agencies.
- Promote learning in groups.
- Work in a team.
- Identify and use appropriate instructional materials.
- Involve volunteers in the delivery of instructional programmes.
- Establish and utilize advisory committees.
- Provide timely feedback to participants/ learners.
- Understand barriers to participation and/ or learning; and assist learners in applying learning to real life situation.

Written and spoken communication: As planners, educators, and managers of local educational programmes, extension workers must possess strong communication. These include:

- Knowledge of different types and styles of communication.
- Understanding of the information transfer model 'diffusion of innovation,' and the role of interpersonal communication in the innovation decision process.
- Effective public speaking skills.
- Effective listening in a variety of settings.
- Skill in writing grant proposals.

Educational and informational technology: Agricultural extension systems were conceived of and developed in response to the information asymmetries of poor farmers, particularly those without access to many sources of communication (Aker, 2010). Advancements in information and communication technologies (ICTs) have had a profound effect on extension. Effective exploitation of advances in ICTs will be necessary to disseminate research results more widely and rapidly (APLU, 2009). Using ICTs has become a part of extension educators' daily work. Therefore, it is important that all extension educators possess the abilities to:

- Use computers for word processing and information access.
- Effectively use voice-based information delivery services such as telephone hotlines and extension call-in centers.
- Use radio dial-up and broadcasts to provide timely information about market prices, crop production alerts, or other information.
- Use social media and SMS-based services to collect and disseminate information.
- Develop e-learning materials that allow clientele to access internet-based resources.
- Use mass media technologies (radio, television, newspaper, mobile phones, and Internet) for extension.
- Retrieve/share information via the Internet, YouTube, iPhones, and mobile phones.
- Effectively use audio/visual materials for teaching adults.

Facilitative leadership: Facilitative leadership is the process of building a group's capacity to achieve its common goals. Successful extension work requires group facilitators and educators to:

- Understand group dynamics and effective team member roles.
- Understand basic approaches to conflict resolution.
- Respectfully deal with conflict and skillfully keep communication going.
- Ynderstand facilitation and the role of a facilitator.
- Effectively record group work using a variety of methods.

- Use a variety of leadership approaches; and practice consensus decision making.

Diversity and multiculturalism: We live and work in communities with people having diverse racial racial backgrounds (e.g., race, caste, ethnicity, or tribe), cultures, and religions or faiths. To be effective, extension educators should be able to:

- Engage people from different socio-cultural groups in extension programme development.
- Demonstrate sensitivity to the unique and diverse needs of different cultural groups in the community.
- Enhance participation of various cultural groups in extension programmes and services; and
- Effectively organize and offer programmes that are reflective of laws and policies that support diversity and pluralism.

Marketing and public relations: Every extension educator should promote extension's reputation, image, and awareness and support of programmes. S/he should engage communities, decision makers, and users of extension services and media in promoting extension. Extension staff should be able to:

- Use appropriate strategies for marketing educational programmes.
- Know the availability of local technology for publicizing educational programmes.
- Identify formal and informal community leaders and establish working relationships.
- Identify major political forces that operate in the community.
- Create strategic/competitive positions for extension in the local community.

Applied research and evaluation: We live in an era of accountability. Funding agencies continually ask for impacts of extension work. How good a job did we do? What impacts do we make? Why should we continue to do what we do? How can we improve our services? Knowledge and skills in applied research and evaluation help answer these questions. Results add to the scholarly work of learning that helps us improve programme and document the net social value of extension programmes. Sharing evaluation results with stakeholders strengthens stronger support for our programmes (Fretchring et al. 2002). Thus, every extension educator should be able to:

- Understand the various types and levels of program evaluation.
- Develop outcomes and indicators to evaluate a programme.
- Design evaluation instruments and understand the uses of participatory evaluation.
- Design and implement formative and summative evaluations.
- Apply quantitative and qualitative data analysis tools and techniques to analyze and interpret evaluation data.
- Communicate findings to appropriate audiences.
- Use results of evaluation to improve programming.

It should be noted that these competencies are core to the extension profession. They are needed irrespective of extension position assignment, whether field crop educator, livestock educator, or nutrition educator. Additional managerial competencies are needed by those who have administrative responsibilities.

One of the greatest challenges facing our profession is that extension staff often do not have the appropriate and updated skills to perform effectively. There is great variation in the knowledge and skill levels among extension workers. This is due primarily to variations in types and quality of pre- and in-service training programmes for extension professionals. In many countries, fiscal constraints have forced public extension systems to hire staff having few competencies or skills. Many extension organizations do not have a well-defined system of in-service training for systematic staff development.

The problem of professional incompetence among front-line extension educators has been a persistent issue within extension. Related to this problem is the lack of motivation among extension employees to develop the core competencies needed for their jobs. How do we establish a vibrant staff development unit? How do we motivate someone to participate in professional development programmes? What mechanisms should we have to reward staff who excel in these professional competencies or disincentivize those who consistently lack these skills?

Improving the Quality of Human Resources: Challenges and Opportunities

Human resources are the most important factor in a nation's development. Well-equipped and skilled people will contribute to the individual, organizational, and national development of a country through improved performance (Osman-Gani and Liang-Tang, 1998). A nation's development is not sustainable unless it is supported by a well-trained workforce of its own people. This is equally true for agricultural extension. Extension workers should remain current with emerging technologies, be able to handle challenges, tap opportunities and demonstrate competency in their services. Extension cannot sustain itself unless it has technically and professionally competent workers from the grass-roots to the national leadership level. We propose three strategies to address these capacity-building issues.

Improve In-service Training and Professional Development

Most agricultural extension and rural advisory services have some form of staff training or professional development department. However, in recent years, most governments or donor agencies have given little attention to strengthening and improving in-service training of extension staff. Agricultural training centers are poorly staffed and underutilized. These units should be charged to develop both technical and

core competencies for the national extension service. The staff in these units should conduct competency assessments on major areas identified above. They should determine areas of need for staff training based on these assessments. In-service trainings can be organized in-person or online. Experts can be invited to develop or update training and resource materials. These educational materials can be made available online or disseminated through electronic media.

To reinforce the importance of core competencies to extension employees and to the organization, a "campaign" mentality is needed. The necessary and important aspects of a core competency campaign are (a) a clear and visible organizational message from the national/state leadership, e.g., director and other key administrators; (b) a well-articulated plan for fully implementing the core competency system and integrating it with employment, evaluation, and professional development systems; and (c) a dynamic system that meets differing needs within the organization.

Improve Pre-service Education at Agricultural Colleges and Universities

Agricultural education is an integral part of capacity building for agricultural knowledge management. Agricultural colleges have played a significant role in meeting the food and fiber needs of our growing population. The system of higher education in agriculture evolved over a period of more than 150 years. Today, we estimate that the number of agricultural colleges and universities exceeds 1000 worldwide, and each year more than 100,000 students graduate with four-year degrees in subjects related to food, agriculture, and environmental sciences. These graduates populate agricultural teaching, research, and extension organizations.

Agricultural colleges and universities, however, are facing a quality dilemma (Suvedi, 2008). First, the student population has changed—very few come from rural agricultural backgrounds, many are not interested in hands-on agriculture, and thus, they tend not to farm after graduation. Second, our colleges and universities are divesting themselves of courses that provide students with practical and vocational skills. As a result, the graduates have fewer manual skills useful in farming. Third, the physical infrastructure is growing old. Laboratory equipment is not repaired or replaced because funding is lacking. Fourth, and most importantly, the faculty recognition and reward system does not support extension or outreach on par with research. To promote scholarship of extension, colleges and universities may adopt a separate track for extension faculty similar to the teaching track suggested by the National Research Council (2009). Quality education is not possible until we require our faculty to maintain close working relationships with farmers and extension professionals.

Women are poorly represented as staff members of agricultural extension systems. This could be a reflection of the low enrollment of women in agricultural colleges and universities in developing countries. It is important that the world's colleges and universities attract and retain more women in agricultural disciplines. It is also imperative that

agricultural extension systems recruit female professionals to help reach underserved audiences (Hill, et al. 2010).

Developing technical and professional core competencies among agricultural extension professionals is fundamental to improving extension effectiveness. Pre-service training programmes, such as undergraduate and graduate programmes at colleges and universities, must incorporate courses to address these competencies. A requirement for hands-on learning, such as living and working with farmers, agribusiness operators, or nongovernmental organizations through fieldwork or internships, has become essential. Employers look for graduates with relevant internship experience.

Curriculum development is a dynamic process. Therefore, agricultural universities should be continually updating curricula as new knowledge becomes available or needs for specific skills or competencies emerge within the profession. Accordingly, textbooks, lab equipment, chemicals and manuals, and computer hardware and software need to be updated. Universities and colleges need to invest in faculty development programmes to keep faculty members current in their fields. The buildings are aging, labs are rusted, and faculty members lack vigor without funds to support their development or exchange programmes. So, improving the extension system requires simultaneous investment in several areas to improve academic programmes at colleges and universities.

More specifically, it is time to examine undergraduate and graduate curricula. What types of work will graduates be doing upon graduation? Does the undergraduate curriculum address the core competencies for a demand-driven, decentralized, pluralistic extension service? For example, are students required to take courses in programmes planning and evaluation, instructional strategies for adult learning, information and communication technology, leadership development, and working with local leaders? Is enough hands-on and practical education offered through fieldwork, internships, and practicums? Service-learning activities and cooperative education programming have been suggested as effective vehicles to accomplish this. As APLU (2009) states, "service learning combines traditional instruction with community service to provide a more complete educational experience for students. It has evolved rapidly in recent years as a relevant pedagogical approach… The Extension system is ideally positioned to help identify these community-based opportunities" (p. 9).

Strengthen Agricultural and Extension Education as a Field of Study

Most countries have established colleges of agriculture, and most of them offer undergraduate and graduate degrees in agricultural and extension education. In the United States, there are 83 agricultural education programmes (Camp, Broyles and Skelton, 2002). Agricultural teacher preparation and extension educator preparation are two tracks offered by these programmes. About two thirds of these programmes (65%) offer a graduate degree.

Enrollment in both agricultural teacher education and extension education has dropped in recent years. As a result, many universities have merged the agricultural and extension education department with other related departments. In some cases, these departments have been closed. For example, both Delaware State University and Southern University and A&M College dropped their agricultural education degrees.

In developing countries, on the other hand, enrollment numbers in extension education departments have been steady. However, there have been issues with quality of educational delivery. We have observed major weaknesses in the style of instructional delivery. Most of the instruction has been hierarchical, test-based, instructor-driven, and passive-knowledge-transfer.

In general, agricultural and extension education needs major improvements. The instructional delivery system needs to be transformed into a hands-on, internship-based, team-based, experiential, and learner-centered approach. In addition, colleges and universities need to ensure that students gain proper understanding of multicultural issues and can communicate effectively with clients or customers, marketers, and policymakers. They must ensure that they promote ethics, interpersonal skills, entrepreneurial skills, teamwork skills, and leadership skills among students. To address these issues, universities may need to revise curricula and graduation requirements. Students should be encouraged to be problem solvers through immersion in the world of work through internships. Higher education systems in developing countries should consider pedagogical innovation in college teaching and learning (Suvedi, 2008).

CONCLUSION

Agricultural extension and advisory services have worked closely with agricultural research and educational institutions to disseminate new technology to farmers and other end-users. Many non-governmental organizations and private firms also are engaged in technology transfer work. To survive and thrive, agricultural extension must change its way of operation. It should offer services on a demand-driven basis. It should offer quality service by maintaining technically competent professional staff.

Higher education systems are the engines driving human resource development. The quality of human resources in a nation depends on the quality of higher education—its faculty, curricula, research, and outreach programmes. So, investment in agricultural extension must consider investment in human capacity building through in-service/on-the-job training and pre-service professional education. Equally important is the need to strengthen the agricultural and extension education discipline. Investments are needed to upgrade faculty capacity, make curricular revisions, implement hands-on and learner-centered pedagogy, recruit and retain females in the profession, and keep the system dynamic. Academic programmes are the building blocks for human capacity building. Investments in strengthening these infrastructures lead to sustainable knowledge management.

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