

CHAPTER 1

Overview & Importance of Agricultural Extension

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Introduction

With a growing population, shrinking land base, and emerging threats of climate change, agricultural transformation has become a high priority globally to enhance productivity and conserve natural resources. Global efforts are needed to address the pressing challenges of food insecurity, hunger, malnutrition, and poverty, as well as to protect livelihoods, enhance economic growth, and engage youth with due consideration to gender equity in the food and agricultural sector. Along with research and education, extension and outreach remain key pillars for global agricultural development and food systems. Several models of extension have been implemented globally to serve the farming communities (Kumar et al., 2019; Antholt, 1998; Torimiro & Igodan, 2019). These models increasingly include emphases on other aspects of life in agricultural communities such as health, mental health, and youth development, which benefit from both long-standing and trusted relationships and a community-based framework for service delivery (Dwyer et al., 2017).

The Various Models of Agricultural Extension

The term *agricultural extension* means different things to people around the world, and even within specific countries. In general, extension includes transferring information, knowledge, and technologies from research systems to farmers; advising farm families in their decision-making; educating farmers; and empowering farmers to be able to clarify and realize their goals. To a large extent, most extension programs are publicly funded, supported by local, state, and national governments. During the past several decades, numerous models of agricultural extension and community outreach services have been implemented. A list of some of these models follows:

- Farmer Business Schools
- Farmer Field Schools
- Farm Science Centers (KVKs) Model of Extension

- Information and communication technologies (ICT)-enabled E-extension
- Nongovernmental organizations (NGOs)-led Extension
- Private extension services and consultants
- Self-help groups
- Student Field Schools
- Training and Visit (T&V) Model of Extension
- U.S. Land-Grant Model of Extension

These models of agricultural extension and advisory services are described in detail in the subsequent chapters of this book. In addition, entrepreneurship, professional development, digital messaging, and other important components for implementing effective agricultural extension systems will be addressed.

U.S. Land-Grant University System & Cooperative Extension

The U.S. agricultural system is organized at federal, state, university, private, and commodity group levels. The United States Department of Agriculture (USDA) is a federal agency that funds research projects of national or regional relevance. The USDA also plays a regulatory role at the national level. All 50 states have state agencies similar to the federal USDA. These agencies fund research projects that have relevance to individual state's needs. They also are responsible for and enforce state regulations. In the state of Michigan, this agency is the Michigan Department of Agriculture and Rural Development. Each state has at least one land-grant university dedicated to agricultural development. In Michigan, Michigan State University (MSU) is the 1862 land-grant university (known as an 1862 Institution) charged with the mission to meet the agricultural needs of the state (www.msu.edu).

The U.S. land-grant university system, which operates the U.S. Cooperative Extension System, is heralded throughout the world as a model for disseminating evidence-based information and technologies to farmers and local communities in rural and urban areas. The U.S. Congress passed the Morrill Act in 1862. This act established the land-grant university system whereby lands were set aside for the development of institutes of higher education to promote agricultural education. The Morrill Act of 1890 increased the size of the land-grant network by providing *separate but equal* designation to Historically Black Colleges and Universities with programs in agricultural sciences to increase opportunities for Black students and those from economically disadvantaged backgrounds. In 1994, land-grant status was extended to Native American Tribal Colleges through the Improving America's Schools Act. Although both the 1890 and 1994 Institutions face significant challenges (for example, funding), new efforts are under way to foster collaboration among these institutions to the benefit of students, families, farmers, and communities.

The Hatch Act (1887) created the Agricultural Experiment Station and established a method of using federal monies to fund agricultural research at the university level. In 1914, the Smith-Lever Act was enacted, establishing the Cooperative Extension System. These three acts set the framework for the land-grant university systems, leading to MSU's present-day mission of research, teaching, and extension (<https://bit.ly/3npV0Ea>). The land-grant

university system links research and extension by combining agricultural research, the cooperative extension system, and campus and field staff to disseminate information to the agricultural community in rural and urban areas (CALs, 2020). In Michigan, MSU Extension collaborates with colleagues and leaders at Bay Mills Community College, Keewenaw Bay Ojibwa Community College, and Saginaw Chippewa Tribal College (all 1994 Institutions).

Twenty-first century extension in the U.S. is now funded by a variety of revenue streams to meet the growing and diverse needs of agricultural communities. In addition to federal Smith-Lever funding, for example, the private sector funds agricultural research projects related to their own interests. Examples would include insecticide, herbicide and fungicide trials; hybrid variety trials; as well as other projects. Commodity groups fund research projects that meet their specific needs. The funds for these projects are usually obtained by adding a levy or tariff, collected by the commodity group, to the amount of the specific commodity produced by individual farmers. County and state funding are also critical to the ongoing support of the Cooperative Extension System. Finally, in Michigan, competitive grants and contracts, collaborative partnerships, and service agreements are now the single largest source of revenue supporting traditional needs in agriculture as well as health, mental health, and youth development.

MSU is recognized as the premier land-grant public university in the U.S. It was founded in East Lansing, Michigan, in 1855. Today, 17 degree-granting colleges offer studies from fine arts to human medicine. The College of Agriculture and Natural Resources (CANR) (<https://www.canr.msu.edu/>) was the first college of the university meeting the role of the land-grant mission. The CANR is the lead college for 10 departments and 2 schools including Animal Science; Agriculture, Food and Resource Economics; Biosystems and Agricultural Engineering; Community Sustainability; Entomology; Fisheries and Wildlife; Food Science and Human Nutrition; Forestry; Horticulture; Plant, Soil and Microbial Sciences; the School of Packaging; and the School of Planning, Design and Construction. Faculty members of these departments and schools have split appointments where their time is divided between research, teaching, and extension. This arrangement allows for a means of disseminating information obtained from research to the agriculture community through the extension system. In addition, MSU Extension has more than 600 staff members working in all 83 counties across the state in the following program areas: Agriculture and Agribusiness; Children and Youth; Community, Food and the Environment; and Health and Nutrition.

MSU Extension

The mission of MSU Extension is “Helping people improve their lives through an educational process that applies knowledge to critical issues, needs and opportunities.” They do this by “help(ing) people improve their lives by bringing the vast knowledge resources of MSU directly to individuals, communities and businesses” (www.extension.msu.edu). MSU works closely with the clientele of many commodities and agricultural industries. They review the long-term goals of these groups and identify the research, along with the needed education and policy, to reach their goals. In many cases, these partners also provide resources to jointly fund positions critical to the agricultural economy. MSU Extension strives for transparency,

accountability, and sustainability in their activities and provides annual programmatic and fiscal accounting to the university, counties, the state government of Michigan, the USDA, and all partners. MSU Extension has a statewide presence. There are 83 counties in Michigan, and each county receives the benefit of Extension educators and staff.

Figure 1-1. MSU AgBioResearch university research centers.



MSU Extension works in collaboration with 13 university research centers and MSU AgBioResearch. AgBioResearch was first conceived as the Michigan Agricultural Experiment Station in 1888 as part of a national network of such centers focused on conducting research for farmers. It continues to ensure profitability and resilience in agriculture and natural resources. AgBioResearch, the 13 outlying research centers, and several on-campus research facilities (see Figure 1-1) collaborate to ensure that MSU Extension agricultural educators are abreast of research that provides growers, natural resource managers, and commodity groups with the critical information they need to remain viable and competitive in the global economy.

Information from research is disseminated by various methods. Social media tools such as email, cell phones, Twitter, and Facebook are useful for providing information in real time. Weekly newsletters pertaining to current issues are published online and widely distributed. MSU faculty members and Extension educators write articles and visit farm sites where problems exist. Researchers and educators from MSU Extension teams have demonstration plots on growers' fields, or at one or more of the university farms, and conduct field days where they interact with the agriculture community. Winter conferences are also a means of providing information to growers. At these conferences, researchers from Michigan and neighboring states present findings from their research efforts. MSU provides customer-focused educational programming. Online resources help to supplement all of this activity. The MSU Extension website has more than 30,000 pieces of evidence-based content on a wide range of topics that generate more than 1.25 million visitors each month from around the world.

MSU International Extension Programs

MSU has a vibrant extension and outreach system respected around the world. The international programs of the CANR at MSU are receiving requests from several developing countries to share the MSU Extension model, approaches, and experiences in an effort to strengthen their national agricultural extension systems. MSU Extension embraces the need to respond to the changing needs of the food and agricultural sectors striving to remain competitive nationally and globally.

Harnessing the vast global network of MSU, MSU Extension launched an international extension program in 2017 to share their rich experiences with the global community for mutual benefits. MSU Extension has developed an innovative partnership with the National Institute of Agricultural Extension Management (MANAGE) in India. Through this partnership, exchange programs involving extension specialists from MSU and India have been implemented to share experiences, and best practices, and learn from each other. In 2018, the MSU Extension leadership team was invited to Central Asia to develop joint programs to enhance extension systems in Uzbekistan and Kyrgyzstan. In summer 2019, with support from USDA-FAS (USDA Foreign Agricultural Service), MSU Extension hosted a delegation from Nigeria for a two-week training program in agricultural extension. Similar requests have been received from Zambia and Senegal as well as other countries in Africa, Asia, and Europe. In 2019, MSU Extension also engaged in a leadership-level exchange effort with Northern Ireland's CAFRE (College of Agriculture, Food, and Rural Enterprise) (<https://www.cafre.ac.uk/>) to explore collaboration opportunities. A formal Memorandum of Agreement was developed to allow for annual professional development exchange programs for staff. Focal areas will be defined by each respective organization to share best practices and experiences along with mentored shadowing opportunities. The COVID-19 pandemic has delayed the 2020 exchange although planning continues for future exchanges.

The demand for technical assistance, information, and training for strengthening agricultural extension systems is growing. However, technical and financial resources are limited. In this context, using a demand-driven approach based on the expertise and resources available at MSU and with collaborating partners, MSU Extension will launch and implement the following three agricultural extension programs over the next several years: an annual international short course, a Michigan global resource network, and a youth empowerment program.

An Annual International Short Course in Agricultural Extension

The MSU Extension team in collaboration with MSU CANR International Programs will design and offer a 10-day short course *Innovations in Agricultural Extension* to share models and best practices in the planning, design, implementation, management, and evaluation of agricultural extension programs serving local farmers and communities in rural and urban areas of Michigan.

This short course will be offered annually during the crop-growing season in summer months and will provide training to 12 to 15 extension specialists from developing countries all over the world. The course program will use conventional methods as well as advanced emerging technologies (such as farm mechanization, farm management tools, and ICT digital tools used for precision and smart agriculture) and will include visits to research stations, county Extension offices, local farms, companies, and markets operated by both public and private sectors. Participants will receive a certificate of participation upon completion of the short course. Based on special requests and availability of funding and trainers, a similar short course could also be offered in international settings in developing countries to train a large number of extension specialists in a cost-effective way. In response to the COVID-19 pandemic and ensuing travel restrictions, MSU Extension and the MSU CANR offered a one-week online course in August 2020 focusing on the U.S. land-grant model of extension and various extension programming models in place of the face-to-face model. Participants from China, Ghana, India, Ivory Coast, Nepal, Nigeria, Pakistan, the Philippines, and Uzbekistan took part in the blended instructional model, which provided participants with self-paced pre-work in a course management system followed by synchronous video-conference discussion sessions. This adaptation proved to be an effective model for navigating the challenges of working with participants in various time zones, as it allowed synchronous sessions to focus more on discussion and interactions.

Michigan Global Resource Network in Agricultural Extension

The MSU Extension team will develop a web portal to serve as an online repository of global agricultural extension information resources and a roster of experts. These resources, coming from both MSU and other national or international extension services, will be freely accessible by the international agricultural development community. MSU-E Global will serve as a one-stop shop for up-to-date information on agricultural extension resources and expertise. Possible resources may include:

- Training manuals, handbooks, and curricula
- Tools and technologies
- Evidence-based articles
- Extension bulletins
- Field guides and pocketbooks
- Country and program case studies
- Policy briefs
- Various models of extension

Youth Empowerment for Agriculture Development

Globally, the engagement of youth in food and agricultural sectors is gaining increased attention. The U.S. land-grant universities have successfully implemented the 4-H Youth Development Program for several decades. MSU International Studies and Programs has recently launched a Global Youth Advancement Initiative (GYAI) to build youth capacity (<https://globalyouth.isp.msu.edu/>). The GYAI serves as a coordinating platform at MSU for research and international development activities

related to the education, entrepreneurship, mentoring, and leadership training of youth. MSU Extension is also a member of the World Food Prize (WFP) Global Youth Institute, which engages and inspires youth on issues and challenges related to global food security. The WFP Michigan Youth Institute hosts an annual one-day event that provides an opportunity for Michigan high school students to present their research, recommendations and vision on how to address key global challenges

(<https://www.canr.msu.edu/wfpmiyi/>).

Building on these platforms, MSU Extension will provide opportunities for youth from Michigan and from the global community for enhancing engagement of youth in the food and agricultural sectors. Pilot programs will be initiated for providing international exposure and opportunities for Michigan youth to visit and meet with youth in Asia and Africa with a goal of mutual learning opportunities toward youth empowerment and leadership development for global food and agricultural systems.

Mutual Benefits to Michigan, U.S. & Global Agriculture

We live in an interconnected global village. Food and agricultural systems and markets are becoming global. Internationally, MSU is recognized as a worldwide center of excellence for agricultural research, education, extension, and technology transfer. There are multiple benefits of internationalization of MSU Extension to Michigan, the U.S., and global agriculture. International experiences enhance intercultural development and global competencies through the exchange of information, knowledge, expertise, experiences, and technologies.

The international extension programs are helping to build global knowledge and partnerships, and sharpening and enhancing the resourcefulness of MSU Extension specialists through collaboration with other developed and developing countries. These programs are increasing understanding of emerging markets globally for Michigan and U.S. food and agricultural products and thereby enhancing global competitiveness. The outreach and extension programs are also opening new doors of opportunities for expanding international trade of Michigan and U.S. agricultural products, enhancing incomes and livelihoods of farmers and economic growth.

Additionally, these programs are bringing new knowledge, information, and innovative approaches to MSU classrooms, laboratories, and fields to enhance and diversify agricultural extension education opportunities for students, farmers, and local communities. Overall, internationalization of extension programs is helping to advance MSU's competitiveness as a global leader in agricultural research and education, as well as outreach and technology transfer.

Way Forward

Extension is a key pillar of agricultural development globally. While large investments have been made during the last few decades to strengthen agricultural research, extension, and advisory services, the extension and outreach systems in most developing countries remain weak and are often broken, under-funded, and disconnected from research and education

systems. Useful technologies, innovative farming, and marketing practices and information sources are available; however, they are not efficiently reaching to farmers and end users to create the desired impacts (Buehren et al., 2017). The extension systems in these countries need to be enhanced to better serve the target communities and stakeholders (Sharma, 2006; Alex et al., 2002).

The synergism between extension and research is well recognized, but in practice, often a lack of cooperation exists between them. Greater integration, cooperation, and effective communication are needed, and appropriate mechanisms to foster joint programs linking research and extension are critical. Additionally, extension programs should go beyond farm advisory support and encompass broader areas of community development in both rural and urban areas. Programs should include community nutrition, mental health, youth empowerment, leadership development, and agribusiness, among others. Extension programs need to be gender responsive and give due consideration to gender equity. The new tools of ICT are advancing rapidly, providing unique opportunities for agricultural extension programs that were not possible in the past. Leadership development and education of everyone engaged in strengthening extension systems is critical for success and sustainability of these programs. The extension advisory services and outreach programs should be continually monitored, evaluated, and adjusted as the agricultural sector evolves and the needs of the farmers, communities and other stakeholders change over time.

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