CHAPTER 2

Global Experiences in Agricultural Extension, Community Outreach & Advisory Services

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Introduction

Extension, community outreach, and advisory services play a vital role in transferring new knowledge and technologies to farmers and end users. Globally, governments and international development agencies have invested large resources for developing agricultural extension systems. During the past six decades, the national governments and international development agencies have supported and implemented numerous extension models and programs (Birner et al., 2006). The nature of these programs has varied from country to country. These programs continue to evolve (Zivkovic et al., 2009). Many of these programs have been successful and created a great impact in enhancing the agricultural productivity and livelihoods of rural communities. The following sections describe various examples and models of extension that have been implemented in various regions of the world. They provide rich experiences on agricultural extension and advisory services from around the world.

Case Studies of Global Experiences in Agricultural Extension

Training & Visit Model of Extension in Developing Countries

The Training and Visit (T&V) system of extension was one of the early innovations in agricultural extension. This model was developed and

advocated by Daniel Benor in the early 1970s. The World Bank formally launched the T&V extension model in India and Turkey in 1974. Initially, this model was implemented on a pilot scale at Sehan in Turkey and at Chambal in Rajasthan and Madhya Pradesh states in India (Benor & Harrison, 1977; Benor & Baxter, 1984). The T&V model was later implemented in several countries of Asia and Africa.

Under the T&V model, systematic training programs were developed and implemented for village extension workers including regular visits to family farms in villages. This model was adopted in more than 70 developing countries as a national public extension program (Anderson et al., 2006). The T&V model promoted locally developed technologies to farmers at the village level with a goal of delivering the latest technologies developed by the national agricultural research systems to local farmers and end users.

The main feature of the T&V model of extension was a single line of command and a well-defined geographical boundary of operation for each extension program. The extension agents were trained to offer skills and share their knowledge for implementing best practices in crop management, evaluate production constraints, and provide advisory services to farmers. The trained extension workers visited local farmers every 15 days through a fixed schedule. The other features of the T&V system of extension encompassed regular training of extension staff, provision of feedback to research institutes on farmers' problems, and a continuous supervision, monitoring, and evaluation of extension activities. For the local farmers, the T&V model was found effective and led to agricultural growth and high rates of returns. The model was also helpful for staff training and increased extension services in additional geographical areas that further improved linkages between research and extension.

Like many other agricultural extension models, the T&V model also had several weaknesses. The national governments faced multiple challenges to implementing the T&V model of extension. The T&V model was a top-down model. Several implementing agencies and officials found it rigid and financially unsustainable. The cost included for training a large number of trainers and other personnel and their overall management was high. There was a lack of organizational structure, so a penetration at the village level was low. There was also a lack of coordination in regular farm visits by educators and extension agents and a lack of systematic supervision and support to extension staff. The communication between research departments, extension agents, and farmers was weak. Transportation facilities were lacking to visit farmers and demonstration sites, which severely impacted extension agent mobility. Also, few women extension agents existed, and technical expertise was lacking (Dejene, 1987). There was also a lack of political commitment to support the overall extension programs in many countries (Rivera & Alex, 2004). Learning from these challenges and impact studies of the T&V model, the intention, discussions, and debates were shifted to developing new models of agricultural extension, such as Farmer Field Schools.

Farmer Field School Model of Extension

The Farmer Field School (FFS) model of agricultural extension emerged in Asia in 1980 and was implemented by several institutions and organizations in over 90 countries with around 10 to 20 million farmers benefiting

globally (Braun & Duveskog, 2008, as cited in Phillips et al, 2014). The FFS model was an intensive, season-long program that focused on experiential learning where farmers met frequently and developed experiments, learned, and shared their skills and knowledge with other farmers in a village. The FFS was called a school without borders. It was a driving force in community engagement, rural participation, knowledge sharing, skill acquisition, and adoption of technologies in rural farming communities. The FFS model successfully facilitated Integrated Pest Management (IPM) practices in Asia and in Africa.

Using a people-centric approach, the FFS approach focused on learning via participation, using community-based learning systems with local people supported by technologies and methods developed by outside organizations and institutions. FFS activities were completely nonformal education (learning by doing), a school without walls, where adult male and female participants had an opportunity to learn new science-based agricultural practices and technologies through communication in local languages. The FFS addressed several topics since its inception, such as IPM, agricultural cultural practices, sustainable production system to value chain development, and nutrition. More recently, the FFS has helped address emerging agricultural problems such as fall armyworm and several other issues in agricultural systems (Food and Agriculture Organization, n.d.).

Through FFS in Indonesia, millions of smallholder farmers were trained in rice production (Pretty & Bharucha, 2015). This program was later expanded to vegetable production. Bangladesh conducted large FFS projects and trained hundreds of thousands of farmers on integrated fish culture and integrated rice IPM in FFS curricula through the INTER FISH project. Learning from Bangladesh's experience, this model expanded to Colombia, Brazil, and six Caribbean countries on rice and aquaculture. FFS contributed tremendously to farmers' knowledge and skill development that resulted in increased productivity (Van Den Berg, 2004). In Nepal, the FFS approach was applied to community forest management (Miagostovich, 2004), gender issues in Indonesia (Fakih, 2002), HIV/AIDS in Cambodia (Yech, 2003), women's self-help groups in India (Tripathi & Wajih, 2003), and many other areas of farmer and community empowerment.

In Africa, FFSs were launched in many countries with a focus on crop production and practices in pesticide management as there were comparatively low levels of production and pesticide use. In addition to the IPM, FFSs helped create awareness in additional areas such as nutrition and health, and combating HIV/AIDS and malaria in rural communities. In West Africa, the FFS approach to education regarding vector-borne diseases was undertaken by the Wageningen University and Research Centers, Food and Agriculture Organization (FAO), and other institutions (Van Den Berg, 2004). In Kenya, the International Livestock Research Institute adapted the FFS approach in 2001 for animal health and production (Braun et al., 2006) with the help of several pilot programs established in nine countries including Kenya, Tanzania, Uganda, and Nigeria that resulted in increased livestock production.

Additionally, FFSs provided training and capacity-building support to the farmers. Through FFSs, FAO in partnership with International Crops Research Institute for the Semi-Arid Tropics and the national research system, actively promoted environmentally friendly practices such as minimum tillage, conservation agriculture, water harvesting, and irrigation

systems (Hughes & Venema, 2005; FAO, 2008). The FFSs became the foundation of the food security program in Nigeria, Kenya, and Sierra Leone. In central and eastern Europe, through FFSs, the IPM approach was introduced in 2003 by FAO to tackle the western corn rootworm problem in maize. In Peru and Bolivia, FAO established a national program on FFS to effectively scale up IPM strategies. FFS long-term contributions were successful in many countries to strengthen the farmers, management of farm enterprises, and ecosystems (Jiggins et al., 2005).

Numerous studies conducted by various international organizations, universities, nongovernmental organizations (NGOs) and other public and private institutions highlight multiple benefits that FFSs have created. These include the following:

- Increase in crop production, productivity, and income generation
- Significant decrease in the use of chemical pesticides
- Enhanced market and value chain linkages for farmer groups and elimination of intermediary for marketing
- Favorable local policies and strengthening relationships among communities and local government authorities
- Enhanced farmers capacities and empowerment as well as leadership skills, program management skills, and problem-solving skills of farmers

Krishi Vigyan Kendra Model of Agricultural Extension

In 1974, the Krishi Vigyan Kendra (KVK) (farm science center) model of extension was first established in the Pondicherry region of Tamil Nadu, India, under the auspices of the Tamil Nadu Agriculture University. With the success of the pilot KVK, this model was replicated in every district of India. Currently, 675 KVKs cover every district. These KVKs operate under various platforms. Of these, 456 are under agriculture universities, 63 under the Indian Council of Agricultural Research (ICAR) institutions, 102 under NGOs, 36 under state governments, three under public sector universities, and 15 under other educational institutions (Ramsunder, 2019). The KVKs are financed by the Government of India.

KVKs have become an integral part of the National Agricultural Research System (NARS) in India. KVKs have played an active role in assessment of location-specific technologies for agriculture and allied enterprises, through technology assessment, refinement, and on-farm demonstrations. KVKs act as knowledge and resource centers of agricultural technology helping initiatives of public, private, and voluntary sectors for improving the agricultural economy of the districts. They link the NARS with the extension system and with farmers. KVKs have specific mandates and have important features as outlined following (Ramsunder, 2019):

- To assess the location-specific agricultural technologies
- To establish demonstrations of farms and fields to display the potential of technologies, information, and inputs
- To enhance capacities of the farmers and extension personnel to update and improve their skills and knowledge in modern agriculture technologies as well as capacity building of various stakeholders
- To work as a knowledge resource center of agriculture technologies

- To provide farm advisories services using information and communication technology (ICT)-based tools and other means on various subjects of interest to farmers
- To show participatory approaches in planning, implementing, executing, and evaluating

In addition, KVKs are also responsible for production of quality seeds, planting materials, and livestock. They also make these resources available to farmers and link them with current and ongoing government programs. KVKs have developed need-based training and frontline technology demonstration programs for farmers to empower them with knowledge and skills in crop management practices, which includes use of quality seeds, efficient irrigation practices, fertilizers and pesticides use, quality production, and assessment of markets for their produce. KVKs serve woman farmers, self-help groups, district extension workers, and other volunteers in their mandated regions. In India, KVKs also facilitate linkages among various programs implemented by the government departments and ministries at the district level including the Agriculture Technology Management Agency, Rastriya Krishi Vikas Yojana, and National Horticulture Mission of the Department of Agriculture as well as the Ministry of Rural Development`s national programs such as the Mahatma Gandhi National Rural Employment Guarantee Act.

KVKs have created a tremendous impact on farming communities. They have been active in demonstrating and communicating the benefits of new technologies through various training programs. Training conducted by KVKs on improved technologies has been adopted and implemented immediately by nearly 40% of the farmers. Nearly 80% of the farmers changed their agricultural practices patterns, diversified their crops, and implemented new cropping patterns as recommended by KVKs (National Institute of Labour Economics Research and Development, 2015). Through experts' advisory services of KVKs, farmers have used good quality seeds; changed their seed planting patterns, and applied appropriate pesticides, chemical and biofertilizers; adopted organic agriculture approaches; and implemented irrigation techniques such as drip irrigation and sprinklers. Through KVKs' intervention, nearly 50% of the farmers have mechanized their farm operations either by purchasing or renting machines on a seasonal basis (Ramsunder, 2019).

However, despite the KVKs' excellent work in many districts of India, few studies have reported great variations in their effectiveness on serving local farming communities. Several of the KVKs face insufficient infrastructure and field staff as well as constraints in reaching out to their mandated locations. Due to the remote location of many KVKs, some struggle to recruit and retain talented staff with advanced skills and knowledge in emerging technologies.

NGO-Operated Extension Programs

NGOs, often referred to as civil society organizations, play a vital role in agriculture and rural development globally. The NGOs have diverse origins (Padron, 1987). They are social charities or service organizations, and many of them emerge through social movements and specific group activities. NGOs vary in size and professional capacities. They work locally, nationally, regionally, and internationally. NGOs have played a legitimate and niche role

in agriculture development, focusing on local farmers and communities at grassroots levels. In the absence of public and governmental extension services, the activities and services offered by NGOs have filled the gaps. In several countries, the public extension system does not effectively reach poor farmers (Ashby et al., 1995; Howell, 1985; Rivera, 1996). To such poor farmers and communities, NGOs have provided effective support at the grassroots level.

Several NGOs refer to themselves as self-help groups and are proactive in providing support when there is a demand for extension and other services. Often, many of these NGOs working in agricultural extension have limited funding, facilities, and human resources (de Treville, 1991). Many local and regional NGOs working at the grassroots level are effective in communication, have built trust with communities, and provide extension advisory services to farmers. They are flexible and responsive, and they maintain their on-the-ground presence at the field level, whereas public or private sector extension service providers who are not as close to the community may not be as responsive or effective at communication.

NGOs' rapport with farmers help them disseminate knowledge and technologies to farmers easily (Chaguma & Gumbo, 1993). For example, in Bangladesh, an NGO developed an innovative technology for Soya Production (Buckland & Graham, 1990). In the Philippines, a technology on sloping agriculture land was developed by NGOs (Watson & Laquihon, 1985). In India, an NGO called PRADAN has been providing agricultural extension and technology transfer services (Aguirre & Namdar-Irani; 1992; Sotomayor, 1991). The major strengths of NGOs are in their group formation and responsiveness for the disadvantaged groups.

While many NGOs have been effective in providing extension and advisory services, the majority of stakeholders working in agricultural extension believe that NGOs and government organizations should work together for delivering extension and outreach services (de Janvry et al., 1989; Jordan, 1989; Korten, 1987). However, many of these NGOs want to keep their own autonomy and identity and focus on their priorities. Numerous NGOs have limitations in size, nature of funding, and mandates. The majority of NGO programs are supported through short-term external funding, and the donors have specific goals to create a short-term impact on specific communities or geographic areas, which often affects long-term sustainability and impact.

Private Extension Services & Crop Consultants

Agriculture is developing rapidly and increasingly becoming a commercial activity in many parts of the developing world. The demands for processed food and value-added products are rapidly growing. As the agricultural sector evolves, the demand for new skills, market information, and new technologies are increasing and changing day by day. In recent decades, the agri-food industry has been transforming, linking small-scale farmers to high-value markets through global supply chains (Reardon et al., 2009). Private extension services are growing and have been adopted by millions of farmers globally. In many countries, private sector extension and advisory services are provided by subject specialists, company agents, dealers, and

retailers of private seeds, fertilizer, pesticides, and chemical companies. They offer their private extension services along with selling and marketing their company's products.

Often, the private extension and advisory services are fee-based services. The fees are either paid individually or through a group of farmers or through a farmer association. The private extension specialists, companies, consultancies, and products suppliers offer these services. The strengths of the private sector extension services include delivering their services through the use of modern ICTs and promoting new and emerging agricultural technologies and products that have shown potential benefits for increased yields and quality production. These private extension service providers support farmers through connections to scientists and scientific institutions as well as annual farmer field days that demonstrate irrigation and crop management practices. Also, private extension service providers visit individual farms and offer their advisory services. In recent years, private sector extension services in agriculture and allied sectors have increased tremendously. A few examples follow:

- The New Zealand`s Ministry of Agriculture and Fisheries agricultural advisory services established the user pay commercial criteria (Hercus, 1991). It now runs a commercial consultancy business model owned by a private company called Wrightson LTD (Ritchie, 1995).
- The Netherlands has privatized one-half of its public agricultural extension system, where earlier it was a public extension system and used to run through government financial support (Le Gouis, 1991). Dutch farmers access extension services through the membership and farmers association.
- In Mexico, a fee-based private extension system has been developed for large-scale farmers (Wilson 1991).
- In Chile, the government pays for private extension services thorough vouchers (Cary, 1993).
- In the United States, the emergence and use of private extension services and private consultants has increased in recent years.

With the expectation of higher crop yield and use of advanced machineries, technologies, and scientifically proven methods and practices, farmers are in great need of information, skills, and advisory services that the private sector can offer effectively. However, several challenges are observed with private extension advisory services. Since demands for private sector agents have increased, they are not able to reach every farmer or each farm. Their advisory charges have increased multifold, so sometimes small-scale farmers are not able to afford their expensive services and are left out. It has been observed that, with private extension services, there is a pressure to buy their companies' products regardless of quality and high prices.

e-Extension: ICT-Based Extension

With rapid advances in ICTs, emerging technology has become an essential tool in agriculture extension systems and has received enormous attention globally. Access to timely and relevant information is critical to remain competitive in market-driven agriculture. ICTs are playing a key role in agricultural extension development and advisory services. Through ICTs' platforms, connections between farmers to farmers, farmers to extension specialist and scientists, and farmers to input suppliers and markets have increased.

With advances in ICT tools, timely, live, reliable, and accurate information is affordable and at the fingertips of producers. ICTs include electronic and social media, mobile phones, email, video and audio signals, and other information technologies (Celebic & Rendulic, 2011). With ICTs' tools, women and youth engagement has increased in the agricultural extension system. Currently, several public and private organizations are promoting ICTs to reap benefits in agricultural extension. In the future, ICTs will be used widely on a large scale. Several new tools and technologies are currently on the market and many more are in the development pipeline. Keeping this in mind, several national governments have developed polices, regulations, and guidelines on the effective use of ICTs.

Currently, numerous ICTs are helping extension specialists, agricultural scientists, and farmers in predicting crop yield and weather conditions, forecasting pests and diseases, and collecting and analyzing crop data, along with supplying automatic advisory services on irrigation applications and crops management practices (Hafkin & Odame, 2007). Through ICT tools, farmers can enhance their agricultural production and productivity, and increase access to local, regional, and international markets and commodity prices. ICTs are greatly contributing to the communication and capacity-building activities of extension workers and farmers as well as entrepreneurs in rural and underprivileged regions.

Several examples of the use of ICTs in agricultural extension follow:

- In India, agricultural extensions services such as e-Choupal and KHETI (Knowledge Help Extension Technology Initiative) were developed with the aim to facilitate speedy communication among stakeholders such as farmers, communication specialists, agricultural scientists, and local communities.
- In Afghanistan, "eAfghan Ag" provides credible relevant information to those helping farmers in Afghanistan.
- In Rwanda, YEAN (Youth Engagement in Agriculture Network) project is encouraging communities and supporting young farmers through social media platforms.
- In Sri Lanka, agricultural extension officers are using ICTs and social media platforms for offering trainings and other skill development programs (Gowda, 2018; Jayathilake et al., 2017).

The use of ICTs in agricultural extension and community advisory services is increasing worldwide, but with several challenges. ICTs are not utilized fully, and scale-up programs remain challenging due to internet connectivity issues in remote areas. ICTs can help illiterate and resource-poor farmers with land records assessment, pest and diseases management, farm management, and market information; however, these services are inaccessible to these resource-poor communities in many parts of the world (Meera et al., 2004). ICT-based tools are not easy to navigate, handle and manage; therefore, many older people are not comfortable using them due to lack of digital literacy.

Land-Grant University Model of Agriculture Extension: An Example of Michigan State University Extension

Michigan State University was founded in 1855 as the Agricultural College of the State of Michigan. In 1914, the U.S. Congress established the Cooperative Extension System through the Smith-Lever Act, making MSU Extension the longest-established university extension service in the U.S. The mission of MSU Extension follows:

Michigan State University Extension helps people improve their lives by bringing the vast knowledge resources of MSU directly to individuals, communities and businesses.

Although MSU Extension originally focused on agricultural extension, it has now expanded into many content areas, including health and nutrition, youth development, entrepreneurship and finance, community, civics, and government. MSU Extension brings translational science into communities, creating evidence-based programming to communities via its 600 plus faculty and staff members throughout the state of Michigan.

MSU Extension is a part of the MSU College of Agriculture and Natural Resources and is organized both topically and by geographic region. There are 14 geographic districts (see Figure 2-1) and four institutes, which are organized by content areas. Each district has a district director, and each institute has a director and associate director. The employees most frequently work within one institute, but also may work across multiple or all institutes. Thus, in one district, there are employees who report to different institutes, with different content-area expertise. The four institutes are:

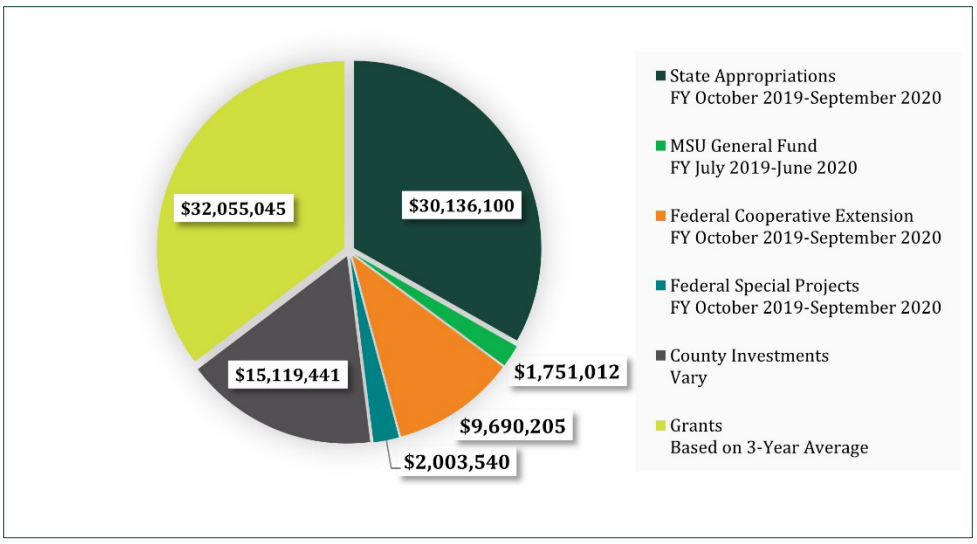
- Agriculture and Agribusiness Institute
- Children and Youth Institute
- Community, Food and Environment Institute
- Health and Nutrition Institute

Every county but one (of 83) in the state has at least one MSU Extension county office, ranging in size from a few employees to dozens. MSU Extension educators, who were in the past referred to as MSU Extension agents, specialize in a specific content area. Educators usually serve multiple counties across the state or may even cover the entire state.

MSU Extension staff and programs are supported through a variety of sources, including federal, state, local, and grant sources. In recent years, grant funding has increased to become the largest sector of funding (see Figure 2-2).

Figure 2-1. Michigan State University Extension districts.

Figure 2-2. Michigan State University Extension total revenue for fiscal year 2020.



Self-Help Groups: Community-Based Organizations/Farmers Helping Farmers

A Self-Help Group (SHG) is a small group of people that come together to help each other at local levels for mutual benefits. SHGs are usually made up of 10 to 15 people or more. The first SHG was formed in 1975 based on an idea conceptualized by the Grameen Bank in Bangladesh. Later, the SHG model flourished in India, and in 1987, the SHG model was adopted by the National Bank for Agriculture and Rural Development in India.

The SHGs are found in various categories, such as farmers' groups, savings groups, or women's groups, which all have specific goals and objectives. The majority of SHGs are found in rural areas where farming is a major activity. Several of these SHGs come together, collect their saved money, and deposit it in a nearby bank to support the development and implementation of their group. Their linkages to the local bank help to empower them financially and socially (Selvaraju & Vasanthi, 1999).

Many state governments in India and several civil society organizations and NGOs reach out to the SHGs to implement local programs in various areas. The SHGs' platforms help strengthen agricultural extension programs in disseminating information, sharing good agricultural practices, enhancing crop production, and supporting access to market (Munshi, 2004). Through SHGs, private organizations reach out to farmers to market their agricultural products, machineries, inputs, and technologies at discounted prices. At the local level, SHGs benefit from various government-supported programs for agriculture.

Recently, many SHGs have developed their own production, processing, and marketing networks. With their growing capacities to repay loan payments, several banks are now offering credit plans for SHGs and connecting them with regional business and entrepreneurs to expand their agricultural-related businesses. SHG members have great potential to learn new skills, adopt knowledge and technologies, and deliver agricultural extension services to women farmers. Learning from India's and other south Asian

countries' experiences in SHGs, several other countries in Asia and Africa are adopting the SHG model of agricultural extension.

Farmer Business School Model of Extension

The Farmer Business School (FBS) is a new model of agricultural extension services developed by the FAO. This model evolved from the experiences of experiential learning of the FFSs model of extension. The FBS model helps farmers to develop their capacities and knowledge in farm businesses, decision-making skills, and entrepreneurship skills (FAO, 2011). This model is designed for marginal and smallholder farmers who aim to manage their farms professionally and profitably.

The FBS model of agriculture extension can be started by public and private enterprises, farmer group and farmer producer companies, advisory services, cooperative and farmer associations, NGOs, and educational institutes. These institutions need to have capacity to effectively run the FBS as it is a long-term learning and mentoring program for individual farmers to develop their capacity in business development and entrepreneurship. Often, FBS training programs provide training materials, manuals, to-do lists, and future tasks to the participants in local languages.

FBS takes place at individual farms, community places, village schools, village training centers, and in meeting rooms of village leaders. These learning and training programs are managed professionally with excellent management plans created by district level trainers who facilitate training programs in FBSs at the village level. FBS is a unique platform where farmers learn practical experience and can plan their crop production, management practices, and marketing strategies. The key approach of the FBS is to develop business plans and create an attitude among farmers that they can develop a vision and goals along with the best marketing plan for their produce. With the increased interest, FBS is emerging in several countries in Asia and Africa. Countries such as Indonesia, India, the Philippines, Nigeria, Ghana, Zimbabwe, Togo, Côte d'Ivoire, Benin, Tanzania, Burkina Faso, Malawi, Cameroon, Zambia, and Mozambique are exploring opportunities in developing businesses and entrepreneurship skills among farmers in a variety of cash crops.

The FBS model of agricultural extension is at the preliminary stages in many countries and needs support from successful farmers, communities, local government officials, and public and private institutions. FBSs highlight several challenges. Among these include (a) a lack of skilled trainers who can communicate business development and strategies with farmers in local languages, (b) practical implementation of skills gained through training, (c) financial support, and (d) lack of courage and positive attitude among the FBS members.

Summary/Lessons Learned & Way Forward

Over the past six decades, several models of agricultural extension have been developed and implemented to support farmers and rural communities around the world. Every model has its strengths and weaknesses, and the success of these programs have varied from country to country and from region to region depending on sociocultural aspects and institutional support structures. No single model fits everywhere. Globally, the nature of farming is changing. Agriculture is transforming from a production-driven to a market-driven enterprise. Agriculture is becoming more technology and information intensive. This transformation is demanding new sets of extension and advisory services requiring new and innovative approaches to serve farmers and stakeholders along the value chains.

The recent advances in information and communication technologies are providing new and innovative tools for rapidly delivering timely and relevant information to farmers and stakeholders. These exciting new developments are offering tremendous opportunities for transforming extension and advisory services. Additionally, there is a growing interest in urban agriculture and urban food systems. Innovative approaches and programs will be needed to meet the growing demand of extension and advisory services for urban agriculture and urban food systems. Extension and advisory services will always remain a key pillar of agriculture in rural and urban development programs worldwide.

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- Farmer Business School: https://bit.ly/2HCFHZv
- Michigan State University Extension: www.extension.msu.edu/
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