Cooperative Agricultural Extension Services and Skills

1. Cooperative Extension Services

Agricultural extension refers to the informal education services provided by the Cooperative Extension System (CES) to U.S. farmers and rural people to help them obtain the knowledge, skills, and techniques needed to increase agricultural productivity and improve their livelihoods and well-being. The primary aim of agricultural extension is to improve the knowledge of farmers for rural development by facilitating the transfer of new knowledge and research findings to agricultural practices through farmer education.

The CES is operated through the nation's Land-Grant University System in partnership with the federal (USDA-NIFA) and state (land-grant universities) and local (county extension offices) governments (Figure 1). A land-grant college or university is an institution that has been designated by its state legislature or Congress to receive the benefits of the Morrill Acts of 1862, 1890, and 1994. These laws provided states with federally-controlled land and funding to establish universities and colleges focused on teaching the sciences, technology, and agriculture, an expansion of higher education's traditional focus on liberal arts. The Morrill Act of 1862 codified the notion of publicly funded agricultural and technology institutions through providing grants in the form of federal lands to each state. The states used the proceeds from selling those federal lands to establish a public institution to fulfill the act's provisions. The Morrill Act of 1890, aimed at former Confederate states, required states to either remove race as an admission criterion to land grants or designate a separate land-grant institution for people of color. The 1890 land-grant institutions established or designated from this law are some of the nation's historically black colleges and universities. In 1994, the land grant system was expanded via the Elementary and Secondary Education Act to include tribal colleges. The land-grant status has implied several types of federal support to the entitled institutions.

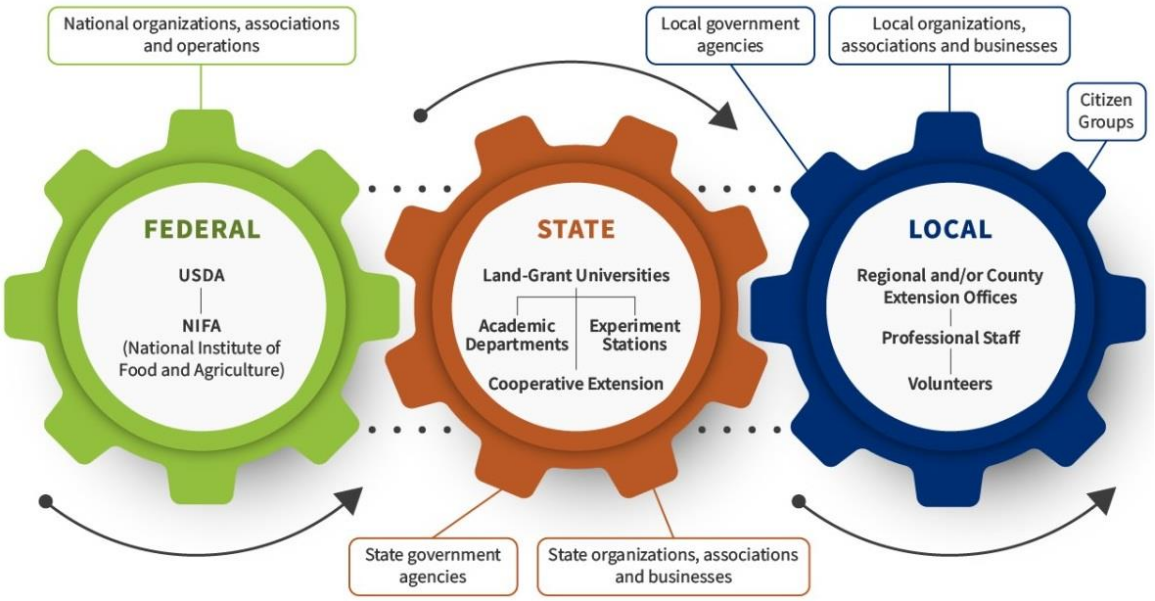

Figure 1 The structure of the Cooperative Extension System (CES)

A key component of the land-grant system is the **agricultural experiment station** program created by the Hatch Act of 1887. The Hatch Act authorized direct payment of federal grant funds to each state to establish an agricultural experiment station in connection with the land-grant institution there. The amount of this appropriation varies from year to year and is determined for each state through a formula based on the number of small farmers there. A major portion of the federal funds must be matched by the state.

To disseminate information gleaned from the experiment stations' research, the Smith-Lever Act of 1914 created a **Cooperative Extension Service** associated with each land-grant institution. This act authorized ongoing federal support for extension services, using a formula similar to the Hatch Act's to determine the amount of the appropriation. This act also requires states to provide matching funds in order to receive the federal monies.

Presently there are more than 5,000 colleges and universities in the U.S., of which 112 are land-grant institutions, including 60 major universities, 19 historically black universities, and 33 tribal colleges. Nearly all colleges and universities engage in teaching and research; but land-grant institutions also carry a third, critical mission — extension. Extension provides non-formal education and learning activities to farmers and other residents of rural communities as well as to people living in urban areas. A land-grant institution typically hosts multiple academic departments, an Agricultural Experiment Station, and a Cooperative Extension Service team to conduct education, research, and extension of agricultural sciences and technologies. Through extension, land-grant colleges and universities bring vital, practical information to agricultural producers, small business owners, consumers, families, and young people.

Nowadays the pace of innovation in the agriculture-related health and human sciences demands that knowledge rapidly reaches the people who depend on it for their livelihoods. Agricultural extension empowers farmers, ranchers, and communities of all sizes to meet the challenges they face, adapt to changing technology, improve nutrition and food safety, prepare for and respond to emergencies, and protect our environment.

A complete list of the U.S. land-grant Cooperative Extension institutions can be found at https://www.nifa.usda.gov/about-nifa/how-we-work/partnerships/land-grant-colleges-universities. Numerous educational programs such as 4-H, agricultural biotechnology, soil management, pesticide safety, integrated pest management (IPM), aquaculture, small farm education (e.g., small farm profitability, home horticulture, small poultry flocks, and small ruminants), student farm, school gardening, and family and consumer sciences (e.g., SNAP education, EFNEP, and brown bag parenting education) are being implemented nationwide through the Cooperative Extension systems. The 4-H (head, hand, heart, health) Program, for example, is the U.S. largest youth development platform providing kids with community, mentors, and learning by doing opportunities to empower them with confidence, creativity, community engagement, and life skills needed for creating positive changes in their lives and thriving in today and tomorrow.

Agricultural extension aims to improve farmer access to helpful information

2. Agricultural extension strategies and methods

In Delaware, Delaware State University and University of Delaware are the two land-grant institutions that provides agricultural research, education, and extension. The Kent County Delaware Cooperative Extension office is located at Paradee Center, 69 Transportation Road, Dover, DE 19901. The Office is hosted by College of Agriculture and Natural Resources, University of Delaware through the University of Delaware Cooperative Extension Program. The Office has been sponsoring numerous specific programs such as Soil Testing, Master Gardeners, Plant and Insect Diagnostics, Military Kids, Renewable Resources, and Livestock through the four categories of extension work: Health and Wellbeing, Sustainable Production Systems, 4-H, Personal and Economic Development, and Environmental Stewardship. Extension works are generally implemented following the "ASK ME" framework.

1) **A**udience - understand and engage the audience;
2) **S**olutions - find appropriate solutions;
3) **K**ey message – identify the key message;
4) **M**essage form and delivery - package and deliver the needed information in forms appropriate to the audience;
5) **E**valuation - improve the overall process.

Strategies and systems for effective extension implementation are considered as follows:

1) The land grant extension strategy

   This strategy involves strong links between specialists on university campuses with county advisors and farmers. The system has grown to bring in industry and other community groups. The system is highly effective.

2) The educational institution strategy

   This strategy relies on educational institutions with the technical knowledge and research ability to meet extension service demands.

3) The centralized extension strategy

   This strategy works on the assumption that the technology and knowledge needed by farmers exist but are simply not being used. The information flow tends to be top-down, fairly centralized and controlled.

4) The training and visit strategy

   This strategy is fairly centralized and involves a series of tightly planned visits to farmers. The system results in greater farmer contact and entails better trained extension agents.

5) The commodity-based strategy

   This strategy focuses on a single crop or on only one aspect of farming. The approach generally addresses everything from extension and research to input supply, marketing and prices to increase production in the selected crop.

6) The cost-sharing strategy

   This strategy assumes that cost-sharing with local people (who do not have the means to pay the full cost) will more likely result in a program that can better meet local situations and be more accountable to local interests.

7) The farmer field schools strategy

   This strategy is a form of participatory research that uses season-long, group-based learning processes. The strategy was initially designed to extend Integrated Pest Management (IPM) systems and methods.

8) The farmer participatory strategy

   This strategy involves active participation of farmers in planning and execution of the various research-extension activities. Program planning is typically controlled and implemented locally by farmers' associations and community organizations. Implementation is often decentralized and flexible.

9) The farming systems development strategy

   This strategy focuses on bringing appropriate technology to small-scale farmers with farmers engaged in the technology development and delivery process. It requires close ties between research, extension and farmers with technology developed locally through an iterative process.

10) The project strategy

    This strategy concentrates efforts on a particular location, for a specific time period, and is usually supported by outside resources. Part of its purpose is to demonstrate techniques and methods to farmers with the expectation that adoption will continue farmer to farmer after the project ends.

Individual-based and group-based methods are routinely employed to implement extension tasks.

1) Individual methods

   - Farm visits
   - Office calls
   - Telephone calls
   - Emails
   - Letters
   - Informal contacts at market days, holiday celebrations or religious events

2) Group methods

   - Factsheets, brochures, and magazines
   - Online short courses

- Group meetings
- Demonstrations
- Field days (larger events for method and result demonstration)
- Tours
- Workshops
- Conferences

3. Agricultural extension skills

One career pathway for agricultural students is to be an extension specialist. Extension specialists possess expertise and specialized skills for effectively communicating with farmers and the general public to transfer new agricultural knowledge and techniques to the rural community.

It is critical for extension agents to be specialized in communication skills, scientific reasoning skills, problem-solving skills, interpersonal skills, and time management skills.

1) Communication

- Understand work-related materials.
- Speak clearly so listeners can understand.
- Understand spoken information.
- Write clearly so other people can understand.
- Understand written information.
- Listen to others and ask questions.

2) Perceiving, reasoning and problem-solving

- Identify a pattern (a figure, object, word, or sound) that is hidden in distracting material.
- Notice when something is wrong or is likely to go wrong.
- Understand new information or materials by studying and working with them.
- Think of new ideas about a topic.
- Combine several pieces of information and draw conclusions.
- Follow guidelines to arrange objects or actions in a certain order.
- Analyze ideas and use logic to determine their strengths and weaknesses.
- Judge the costs and benefits of a possible action.
- Recognize the nature of a problem.
- Use reasoning to discover answers to problems.
- Think of original, unusual, or creative ways to solve problems.
- Recognize when important changes happen or are likely to happen in a system.
- Identify what must be changed to reach goals.

3) Using math and science

- Remember information such as words, numbers, pictures, and procedures.

- Add, subtract, multiply, and divide quickly and correctly.
- Choose a mathematical method or formula to solve problems.

4) Managing oneself, people, time, and things

- Manage the time of self and others.
- Check how well one is learning or doing something.
- Concentrate and not be distracted while performing a task.
- Go back and forth between two or more activities or sources of information without becoming confused.
- Motivate, develop, and direct people as they work.

5) Working with people

- Teach others how to do something.
- Look for ways to help people.
- Change behavior in relation to others' actions.
- Use several methods to learn or teach new things.
- Be aware of others' reactions and understand the possible causes.
- Persuade others to approach things differently.
- Solve problems by bringing others together to discuss differences.