COOPERATIVE EXTENSION SERVICE
UNIVERSITY OF KENTUCKY • COLLEGE OF AGRICULTURE

Extension Education: Conducting Effective Agricultural Demonstrations

John Hancock
County Agent-At-Large, Agriculture Programs

This handbook will serve Extension Agriculture Agents as a guide to developing effective demonstrations. It contains information about why demonstrations are needed, how to develop a good demonstration, and how to make certain that the demonstration has a widespread, lasting impact. There are also ideas for demonstrations you can modify to fit the situation in your county. Here's what you will find:

Introduction

One of the major functions of Extension workers is disseminating useful and practical information. One good way to do this is through well-planned and carefully-conducted demonstrations. On-farm demonstrations serve as one of the most effective Extension education tools ever developed.

Although complete demonstrations require considerable time and effort, the payback comes when producers more readily adapt practices they perceive to be appropriate under local conditions. This is known as "seeing is believing." And the clients who observe demonstrations of the latest techniques or practices and then apply them to their own particular situations are our present and future Extension leaders.

Demonstrations should not be casually developed or implemented. Instead, as their name implies, demonstrations should have predictable outcomes based on a research foundation. Demonstrations should illustrate the application of appropriate technology, that is, technology that fits the local set of conditions. When this occurs, the maximum learning will result from the resources invested.

Because the best demonstrations are localized, it is not easy to present a "cook book" of precise demonstatration recipes. However, ingredients can be listed, seasonings and cooking methods suggested, and sample successful dishes presented, all leading creative chefs (agents) to develop their own regional recipes.

History of Demonstrations

The need for demonstrations was first recognized nearly a century ago by Seaman A. Knapp, an Extension pioneer. Knapp's theory was that farmers would not change their methods as a result of observing farms operated at public expense, but that demonstrations conducted by farmers themselves on their own farms under ordinary farm conditions were the answer. In Knapp's words, "What a man hears, he may doubt; what he sees, he may also doubt; but what he does, he cannot doubt."

In 1903, Knapp proved his point through a now famous demonstration. The demonstration included a small farm in Texas planted half in corn and half in cotton. The purpose was to illustrate the effects of using different seed varieties, fertilizers, methods of planting, and cultivation. The farmer made $700 more than might have been expected and the demonstration was a success.

> *"What a man hears, he may doubt; what he sees, he may also doubt; but what he does, he cannot doubt."*
>
> Seaman A. Knapp
> *Agriculture Extension Pioneer*

Then the opportunity came to use demonstrations on a broad scale in the weevil-infested areas of Texas and two adjoining states. Knapp demonstrated improved cotton growing methods. With a $40,000 budget, he directed more than 20 federal agents who worked with some 7,000 farmers to establish demonstration plots. This marked the beginning of demonstrations in the Cooperative Extension Service.

How To Conduct An On-Farm Demonstration

On-farm research is a problem-oriented approach to agricultural research that begins by diagnosing the conditions, practices, and problems of particular groups of farmers. Once the problems are identified, a research-demonstration program is designed to address them. A key part of any such program is conducting experiments or demonstrations on farmers' fields under farmers' conditions and management. Those experiments are then evaluated using criteria that are important to farmers, and the results are used to make recommendations.

The process of conducting on-farm demonstrations can be divided into the following five steps:

1. *Diagnosis: Identifying the Problem*
2. *Planning*
3. *Establishment and Management*
4. *Evaluation*
5. *Recommendation and Diffusion*

Each step must be included, and the steps must be followed in the pre-determined sequence.

1. Diagnosis: Identifying the Problem

The first step is the designing stage; it involves collecting and analyzing information to design on-farm demonstrations. Activities may include a review of secondary data, informal farm surveys consisting of farmer interviews and field observations, and formal surveys with a questionnaire. The purpose of these activities is to gather enough information to describe the basic features of the research area, to identify problems that limit farmers' productivity, and to begin considering possible improvements in farmers' practices.

The information collected from the diagnostic activities can be used to design the on-farm demonstrations. The diagnostic activities should not end even after the first on-farm demonstrations are planned. Many on-farm demonstrations are designed for diagnostic purposes, and during the demonstration stage the need often arises for further diagnostic activities, including observations and formal studies.

2. Planning

Choosing a Guidance Committee. Planning a demonstration may begin with the selection of a guidance committee (**commodity advisory group**). The committee should

consist of Extension staff, agents, specialists, concerned farmers, local dealers, and other cooperating individuals who will help do the work.

Good judgement is essential in selecting a commodity advisory committee. This committee should be made up of people in the community who are:

- *progressive,*
- *aware of the problems that need to be addressed,*
- *willing to attend meetings and help gather support for your demonstration activity, and*
- *known for their leadership ability.*

To enhance the success of any demonstration this committee must clearly define the goals of the demonstration. Everyone involved needs a conceptual model of the demonstration and needs to know exactly what is expected of each of them.

Use this committee to advise you on demonstration needs and finding a suitable cooperator (the cooperator is often a committee member). Not everyone can be selected for intensive demonstrational efforts; so, although the individual selected as the cooperating farmer may benefit more in the short run, everyone in the community benefits in the long term.

Members should also be involved in planning the demonstration and helping to disseminate the results to other producers. If the committee members understand the potential value of the demonstration, they can explain this to the community and help avoid problems.

You should be sure that the advisory group understands that its purpose is indeed advisory, and that policy matters must be handled by the Agent and the cooperator directly involved.

Choosing a Demonstration Topic. One very important responsibility of the guidance committee is topic selection. The demonstration topic must fit a definite need of clientele being served by the Cooperative Extension Service. It should be non-hypothetical, relevant, and manageable, so that some type of answer can be obtained.

A topic is **non-hypothetical** simply because the original problem statement must be based on factual evidence. A review of literature relating to the chosen topic may yield helpful demonstration ideas. Also, the literature review may produce a solution to the actual problem.

Make sure that the demonstration is addressing a **testable** topic or problem statement. Testability can be determined by collecting and analyzing information relevant to the demonstration. If no relatively current information is available the objective of the demonstration may be hypothetical.

The topic should be **relevant** and **manageable**. Avoid the tendency to work at extremes. Don't work on problems where the outcome is highly predictable and has little or no impact, or on large problems that are unmanageable. Be ambitious, but don't avoid adequate forethought.

Example: Sustainable Agriculture

The following is an example of topic selection for demonstrations in sustainable agriculture. Remember, these are just examples of how the demonstration guidance committee can select a topic. Some of the sustainable agriculture topics are suitable for an entire field day and too complex for a single demonstration. Contact the appropriate state Extension specialist before pursuing a demonstration of this magnitude.

First, the committee should understand the goals of sustainable agriculture. Sustainable agriculture is any system of food or fiber production that systematically pursues:

- *More thorough incorporation of natural processes such as nutrient cycles, nitrogen fixation, and pest-predator relationships into the agricultural production process;*
- *Reduction in off-farm inputs with the greatest potential to harm the environment or the health of farmers and consumers;*
- *Greater productive use of the biological and genetic potential of plant and animal species;*
- *Improvement of the match between cropping patterns and the productive potential and physical limitations of agricultural lands to ensure long-term sustainability of current production levels; and*
- *Profitable and efficient production with emphasis on improved farm management and conservation of soil, water, energy, and biological resources.*

Keeping these goals in mind, it is possible to formulate some topics for demonstrations emphasizing sustainable agricultural systems (this list is based on information from *Alternative Agriculture*, National Research Council, 1989):

- *Crop rotations that mitigate weed, disease, insect, and other pest problems; increase available soil nitrogen and reduce the need for purchased fertilizers; and, in conjunction with conservation tillage practices, reduce soil erosion.*
- *IPM, which reduces the need for pesticides by crop rotation, scouting, weather monitoring, use of resistant cultivars, timing of planting, and biological pest controls.*
- *Management systems to control weeds and improve plant health and the abilities of crops to resist insects, pests, and diseases.*
- *Soil and water-conserving tillage.*
- *Animal production systems that emphasize disease prevention through health maintenance, thereby reducing the need for antibiotics.*
- *Genetic improvement of crops to resist insects, pests, and diseases and to use nutrients more effectively.*

Choosing a Cooperator. Once the topic has been selected the next step is to select a demonstrator and demonstration site. The success or failure of a demonstration may well depend on the ability of the committee to locate a person and a situation that meet acceptable demonstrational criteria.

> *"Selecting a key producer is a major start to success in county Extension demonstrations."*
>
> John Wilson
> *Madison County Agricultural Extension Agent*

First assess the acceptability of the person who will be the cooperator, and then assess the situation. These are some pointers to help with that assessment:

• **Use volunteers**. Cooperators who volunteer are more likely to be enthusiastic and successful in their projects.

• **Select cooperators who are dependable and honest**. Discreetly ascertain if potential cooperators are generally respected in their community. Otherwise, you may find yourself with a good demonstration that nobody believes.

• **Use leaders**. Try to select a cooperator who is respected as a community leader.

• **Use typical farmers**. Demonstrations work best when the cooperator is representative of the farmers you are trying to reach. For example, demonstrations directed at middle-income families should be conducted with middle-income cooperators.

• **Select cooperators who are in need of help**. The most successful demonstrations are conducted on farms where dramatic improvement can be demonstrated. The demonstration is less likely to be useful if the farmer is already an expert on the topic.

Remember, the perfect cooperator is probably impossible to find. However, it is better to have an imperfect cooperator than to have no demonstration at all.

Choosing a Demonstration Site. Locate the demonstration in an area accessible to farmers who need its information. Consider as many factors as necessary to select an appropriate site.

Example: Agronomy Demonstration Site Selection

When selecting a desirable demonstration site for an agronomy demonstration consider sites in which soil type is uniform and past management on the demonstration area has been uniform. Specifically consider such items as:

Fertilizer or lime — Select a typical soil type with a known deficiency of nutrients and/or lime. One treatment in a fertilizer demonstration should be according to soil test recommendations. If you obtain a soil test early, you will have enough time to select a site where you are most likely to achieve a response to a certain nutrient or lime.

Herbicide — Sites infested with a significant number of the most common weeds should be selected so that farmers may properly evaluate the practice.

Varieties — Site selection often determines whether differences in variety characteristics can be measured. Variety demonstrations are usually conducted to show superiority of yield, quality, lodging resistance, or tolerance to insects or diseases.

Source of Materials. Whenever a demonstration is conducted it is a good idea to obtain the cooperation of your local farm supply and feed dealers or appropriate businesses. If possible, get more than one dealer to work with you. Community agribusinessmen are generally anxious to help and be of service. Their assistance will provide valuable support for your program.

Furthermore, through this cooperation you can obtain the necessary items, inputs, and supplies for your demonstrations. If you do not establish a reliable source for these materials, conducting demonstrations can become a difficult task.

Be sure to give adequate public recognition for services and materials obtained from your local agribusinesses. A pat on the back to those who help you goes a long way, and is one more factor in a successful demonstration.

3. Establishment and Management

Establishing a demonstration involves the actual planting of test plots and/or field trials in the fields of representative farmers. These field demonstrations examine a small number of new variables, test possible solutions, verify recommendations, and demonstrate recommendations to farmers. The new variables may represent possible solutions and/or exploratory factors. Traditional farm production factors do not need to be part of the experimentation stage and are usually present at the local producer level.

Small Plots vs. Field Strips. The decision to use small plots versus field strips may depend on the individual county. You may have to experiment the first year and determine which method is most successful. Either method alone, or a combination of both, is acceptable.

Small plot sizes range from 1/100 acre to 1/20 acre. Use small plots when hand application or harvesting are necessary, or when a large number of varieties or other treatments is involved. If replicated, small plots usually offer the best opportunity for reliable interpretation of the values obtained. Small-plot demonstrations are also advantageous when seed or other materials are in limited supply.

Always contact the appropriate state Extension specialist for assistance when doing small-plot demonstrations.

Field strips are a production convenience to the demonstrator and farmers generally prefer them. Field strips should be used:

• where field equipment can readily be used for all operations such as fertilizing, seeding, and harvesting;

• where relatively few treatments are involved; and

• when method demonstrations under farming conditions is particularly important in gaining adoption of the practice.

Field strip demonstrations involve what is referred to as the border effect. This means plots should be wide enough to permit harvesting representative samples of a treatment and avoid side effects from adjacent treatments. For example, fertilizer row crop demonstrations should be at least two rows wider than harvested rows.

How to Set Up a Demonstration.

Design

• *Comparison of several treatments*—Where possible, replicate the treatments. The yield from two or more identical treatments is more reliable than the yield from a single treatment. Conducting a demonstration in several locations yields more information on results and increases clientele exposure to it, but your control over it decreases and supervision becomes more difficult. You must decide the size and scope based on the orientation of the project and the available resources.

• *Complete or all-practice demonstration*—It is often desirable to conduct a crop demonstration that includes all recommended practices. These help to establish a benchmark or goal for community farmers to achieve. Such demonstrations include two treatments, one showing farmers' current methods and one following recommended Extension practices.

Demonstration Boundaries

Always mark demonstration boundaries by placing permanent stakes in fence rows or off turning rows. Marking demonstration boundaries is a small task, but a very important part of any successful demonstration. Various treatment strips can also be marked in this manner.

Recordkeeping

Keep a detailed record of demonstration design, plot layout, distances to landmarks, etc. Do not rely on memory. Be certain the demonstrator keeps his/her own set of up-to-date records.

4. Evaluation

Check the demonstration from time to time. If unusual results show up, contact a state Extension specialist who may be able to explain the odd results.

Carefully analyze the results of all on-farm demonstrations. Even if the demonstration failed, you can learn a lot by discussing the results with everyone involved and trying to pinpoint the weaknesses. Don't be afraid to contact state Extension specialists, area program directors, and other county agents for their opinions on any demonstration you undertake. By learning from your weaknesses you will strengthen your chances of future success in your program with this effective Extension tool.

Each analysis should include an assessment of farmers' reactions and opinions, a general interpretation of the results, and statistical analysis, if appropriate. All results can be used to plan future demonstrations and make recommendations to farmers.

5. Recommendation and Diffusion

In a system of on-farm demonstrations that functions well, Extension agents participate in the entire process and so are able to transfer recommendations to farmers with skill and confidence. When farmers are actively involved in on-farm demonstrations, they act as an avenue for the diffusion of new technology. By monitoring farmers' opinions and use of new technologies, agents can improve their understanding of farmers' needs and preferences.

Publicity. An important factor influencing the success or failure of any demonstration is publicity. Publicity should start during the planning stage and continue until all demonstrations are concluded.

Signs—The demonstration or field trial should have a prominent sign that is in place when the demonstration is initiated. Also use signs to identify each treatment. This is helpful to farmers and others who informally stop by to view the plots on their own time, as well as for any tour groups you might organize. Always remember to take all signs down when the demonstration is completed.

Preliminary notice—Let farmers and other community leaders know (by postcard, letter, poster, newspaper, television, and radio) that a demonstration is being con-

> *"There's a demonstration in every recommendation."*
>
> Greg Hanson
> *McLean County Agricultural Extension Agent*

ducted. Remember to include the following information:

- *Purpose of meeting/demonstration*
- *Who is invited*
- *Place of demonstration*
- *Time of demonstration.*

Publicity campaign—When treatment differences begin to show up and give evidence of being consistent, and yield results are ready, begin a publicity campaign. Use the press, radio, television, and tours to let people know about and see the story. The results of any demonstration should be well publicized within the county and made available to other agents and Extension specialists.

Another effective way to promote the demonstration is to set up tours and meetings at strategic times (such as growing, spraying, harvest).

Photographs—Take plenty of pictures, at all stages of the demonstration, to help document your project. Black and white prints can be used in the local newspaper to announce the demonstration or accompany published results. They can also be used in a final report. Color slides are most useful in workshops or other Extension meetings.

Reports and meetings—Keep a consolidated report of demonstration results in the county each year for immediate use and future reference. The consolidated report can be the subject for a county producer meeting. For example, by using the results of an optimum level of nitrogen fertilizer on corn demonstration you can conduct a winter meeting to explain the fertilizer needs of corn and illustrate your remarks with the demonstration results.

Demonstration Types

Purpose

Demonstrations typically fall into two categories: result or method. The distinctions between the two types are not always clear, since many demonstrations incorporate aspects of both methods. However, the intended use of each type of method is clearly contrasted, as this example illustrates:

Demonstration A is designed to show that beef cattle can be profitably backgrounded on forages.

The purpose is to demonstrate by actual field experience that the objective can be completed. The producer is asked to accept nothing until results are available for consideration.

Demonstration B is designed to show proper fence construction to use in intensive grazing.

The purpose is to show how to complete a task. The audience is asked to accept the demonstrator as an expert. It is assumed that the observers wish to learn the process.

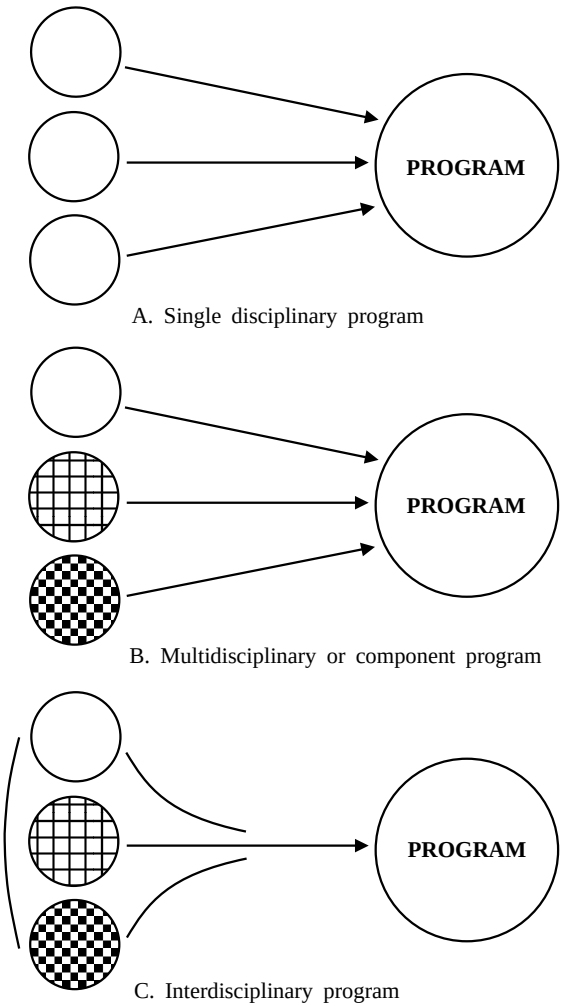
The purpose of a **result demonstration** (example A) is to illustrate cause and effect relative to the truth (or fallacy) of a proposition or assumption. The **method demonstration** (example B) assumes the acceptance of a practice and focuses on teaching skills or techniques to show "how to."

The purpose for which the demonstration is conceived, executed, and carried through is the real test of its classification. Although various qualifications have been suggested as ways of differentiating between method and result demonstrations (for example, a result demonstration must cover a substantial period of time, include records of results and comparisons, and be conducted by a farmer under the direction of an Extension agent), only the purpose really matters.

Complexity

Both method and result demonstrations can be further classified on the level of complexity and areas of study involved. Demonstrations may be disciplinary, multidisciplinary, and interdisciplinary, as illustrated in *Figure 1*.

Figure 1. Levels of disciplinary involvement in programs.



Source: Lippke, et al. in *National Assessment of Extension Efforts to Increase Farm Profitability through Integrated Programs*

"Multidisciplinary programs are common, but true interdisciplinary efforts are rare."

Swanson; Flinn and Denning; Barker

Disciplinary efforts involve subject matter or relationships within a single discipline. *Example*: conducting a fence building demonstration that only considers the engineering aspects (and not how the fence could be used for better pasture utilization, or the effect of method of pasture utilization on nutrition and efficiency of the animals).

Multidisciplinary demonstrations involve individuals from two or more different disciplines working on a common problem. Although the problem is the same the potential solutions are individually planned, implemented, and evaluated with little or no consideration of the other disciplinary approaches to the problem. *Example*: controlling a disease in a crop. One discipline would suggest crop rotation as the solution, another would recommend using a resistant variety, and a third approach would be to use both preventative and curative fungicides. In each case a particular disciplinary view was taken.

Interdisciplinary demonstrations involve a team approach, with individuals from different disciplines working together in an effort that is mutually planned, implemented, and evaluated. An interdisciplinary demonstration takes into account most of the possible cause and effect relationships that might be experienced. *Example*: the pasture fencing situation described above. Agronomic input would include the forage types to be used, the fertility recommendations, and the size pasture needed for efficient forage utilization; the engineers would construct the most practical fence; animal scientists would provide insight into the description and management of the cattle using the pasture; agricultural economists would help determine the program's profitability. Thus the interdisciplinary demonstration takes a comprehensive view of the enterprise.

Each of these types of demonstrations discussed above is appropriate in particular situations. Indeed, sometimes a simple demonstration is the most effective. But in general, the most effective Extension demonstrations are interdisciplinary. Interdisciplinary demonstrations often require more planning and may involve more people. Interdisciplinary demonstrations may involve many state Extension specialists, or may be done entirely by the local county agents or producer.

"Interdisciplinary county demonstrations may involve many specialists, but the local county Extension agent or the producer is the ultimate integrator."

Curtis Absher
Assistant Director for Agriculture

Six Goals For Effective Demonstrations

Long before the demonstration is conducted, the agent and guidance committee should read and understand each one of these goals. These goals do not guarantee the success of your demonstration, but they are the first step in the right direction.

1. Audience interest

Effective demonstrations deal with problems in which people are already interested, or else your demonstration must arouse their interest.

2. Understanding the purpose of the demonstration

The community should understand what the demonstration is about, why it is being conducted, and what it intends to accomplish. The publicity campaign achieves this through meetings, letters, posters, newspaper articles, and radio and television promotions. The objective is to make possible a correct interpretation of the results.

3. Simplicity

Demonstrations which teach one practice at a time are likely to be more effective than multiple-practice or management demonstrations involving a number of factors. Begin with the simple and gradually proceed to the more complex.

4. Repetition

Repeating the same demonstration adds to its effectiveness. Acceptance is more likely if the success is repeated. The successive impressions on the mind of the observer beget action.

5. Participation by observers

A skill has neither been taught nor learned until the pupil can actually perform the task with his or her own hands.

6. Satisfaction

Psychologists tell us that habits are most easily formed when the performance of an act results in satisfaction. Therefore, we can assume that demonstrations are most effective when they deal with real problems and present a solution which is possible, practical, and easy to apply.

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Examples

AGRONOMY

Field and Fertility Demonstrations

As a leader, you have an obligation and an opportunity to help your farmers. Teaching them about the benefits of fertilizers through conversations, articles, meetings, and demonstrations can lead to higher yields of crops. Higher yields mean more food and fiber and more money for farmers.

The best way to determine nutrient needs of crops is actually to conduct fertilizer demonstrations in the field. In these, fertilizers are applied at known rates of plant nutrients, crop responses are observed, and final yields are measured.

Field trials and demonstrations have the following advantages:

• best way to determine nutrient needs of crops and soils, to advise farmers about their fertilizer needs;

• show farmers and agricultural workers the benefits of fertilizer;

• economic evaluation of results gives a better insight into fertilizer needs;

• photographs of the growing crop can be used in publicity and are useful for many years.

NOTE*: Before conducting any agronomic demonstrations always remember to collect soil test information from the cooperator, or conduct adequate soil tests. Encourage participants to conduct soil tests and keep crop records.*

HOW TO CONDUCT A FERTILIZER TRIAL

Purpose

When you conduct a fertilizer trial you can introduce new fertilizers and fertilizer rates to your farmers. Once your trials are showing results, you can hold farmers' field days to see and discuss the growth effects and yield results.

Before establishing your trials, find out where you can get fertilizers to try out in your county. The recommended amounts for Kentucky are published in Cooperative Extension Service publication AGR-1, "Lime and Fertilizer Recommendations." Or you might contact the state Extension specialist. Also, local fertilizer dealers will have some recommendations.

Always do your demonstrations on the crop or crops that are the most important in your county. Remember to keep your demonstrations simple, and to keep in mind the economics involved for every producer in the county. The best treatment for a demonstration is a fertilizer rate that produces the maximum return on the money invested in the fertilizer. This treatment is not necessarily the one which produces the highest crop yield increase.

Materials

To conduct a fertilizer trial you will need:

• A cooperating farmer who will help put out the trial or demonstration in his field.

• Fertilizer of right grade or grades.

• A dry place to store the fertilizer (some fertilizers absorb moisture and get hard).

• A scale or balance to weigh out the fertilizer.

• Paper or plastic bags in which to put the different treatments.

• A measuring tape or device to determine the plot size and shape.

• Stakes and string to mark the plot boundaries.

• A field notebook for plot records, diagrams, and location of plot, growth observations, and final yields.

• Harvesting equipment, including cutting tools and scale or balance for taking crop yields.

Choosing Demonstration Treatments

Observations, knowledge about the soils and crops in your county, and previous fertilizer experiments or soil tests will all help you decide the nutrients and rates to include. Again refer to AGR-1, "Lime and Fertilizer Recommendations," for suggested rates of nutrients.

Sample Plan: Fertilizer

Objective #1*:* To show the value of following soil test recommendations.

Procedure**:** Select individuals who are not following soil test recommendations. Select a uniform soil site, collect a composite sample, and have it tested. Apply treatments as follows:

Soil Test Rate

Check — no fertilizer or farmers' regular practice

Size of each treatment:

1. An acre plot is preferable.

2. Small plots should be at least:

a. 4-8 rows wide for row crops

b. 12-20 feet wide for drilled crops

c. Long enough so that 0.01 acre can be harvested

d. If the plot includes only 3 or 4 reps, then 50 feet of 2 rows is adequate for harvest with row crops

Objective #2*:* To determine which major nutrients —nitrogen, phosphorous, or potassium — will give yield responses.

Procedure: Select a soil that is expected to respond to one or more plant nutrients.

Check - no fertilizer or farmers' regular practice
nitrogen and phosphorous only (no potassium)
nitrogen and potassium (no phosphorus)
phosphorous and potassium only (no nitrogen)
soil test treatment (see note)

Size of each treatment:

1. Small plots are preferred

a. 4-8 rows wide for row crops

b. 12-20 feet wide for drilled crops

c. long enough so that 0.01 acre can be harvested.

NOTE: *This design assumes that all three major nutrients are recommended. If a soil test shows that one or more is not needed on the type of soil involved, adjust the design accordingly.* N_1, P_2O_5, *and* K_20 *should be the same as rates in the soil test treatment.*

Objective #3*:* To determine the rates of nitrogen, phosphorus, and/or potassium needed.

Procedure: If this objective is selected, you may want to obtain the assistance of state Extension specialists. The major problem involves accurately applying the desired rate.

Check - no fertilizer or farmers' regular rate
0 - 50 - 50
50 - 50 - 50
75 - 50 - 50
100 - 50 - 50
125 - 50 - 50
150 - 50 - 50

Size of each treatment:

1. Small plots are preferred.

a. 4-8 rows wide for row crops.

b. 12-20 feet wide for drilled crops.

c. long enough so that 0.01 acre can be harvested.

NOTE*: Assume soil test recommendation to be 60-40-0; then set up two rates of N on either side of the soil test rate for N as indicated on demonstration design.*

The above demonstration will make it possible to compare the effect of varying rates of nitrogen. A similar demonstration could be set up to evaluate phosphorus and/or potassium. Do not vary more than a single nutrient in each demonstration.

Objective #4: To measure micronutrient or trace element responses.

Procedure: Obtain assistance from state Extension specialists if you select this objective.

Objective #5: To determine if the method of fertilizer application will affect yield responses.

1. Method of application for row crops.

Procedure: Determine fertilizer rate from a soil test. Suitable equipment should be available to apply the same rate by both methods.

2. Time of applying nitrogen.

Check - no fertilizer
Or farmers' regular rate
Broadcast

Procedure: Determine fertilizer rate from a soil test. The rates should be supplied from similar materials and with equipment that will supply fertilizer accurately or by hand. The example is for nitrogen but other nutrients can be varied.

Check - no fertilizer or farmers' regular rate
All nitrogen in fall
All nitrogen in spring
1/2 N in fall + 1/2 N in spring

ANIMAL SCIENCES

One-Litter Swine Production

(Result Demonstration)

One-litter swine production is a simple way for beginners to start a swine enterprise without much capital investment in facilities. In the one-litter system, gilts are bred in January and February to farrow in May and June. Pigs are weaned in July, and all adult females are sold to market. Gilts are selected from the market pen in November for breeding in January, and the cycle starts over.

This system requires good husbandry and perhaps higher inputs of labor than other systems. However, the rewards are very good to those who study their lesson and learn the essential management skills for outdoor pig production.

Before setting up your demonstration, contact the appropriate state Extension specialist for information on procedures, housing materials, feed, water, and finishing requirements.

Your demonstration should illustrate the following:

Advantages of One-Litter Swine Production:

• Eliminates cold weather farrowing.

• Minimizes the number of animals kept through January and December, thus reducing problems with mud, frozen water, etc.

• Requires lower capital investment in facilities and equipment.

• Concentrates production management at specific times of the year; for example, breeding in January, farrowing in May.

• Can readily adjust annual production to react to market price projections.

Disadvantages of One-Litter Swine Production:

• All market hogs sold in November and December, traditionally the lowest prices of the year. This is partially offset by selling the weaned sows in July, the highest price for the year.

• Lower use of boars, with possibly higher cost for breeding stock per litter farrowed.

• Farrowing only gilt litters. Do not realize the increased productivity from 3-6 parity females.

• Peak labor of farrowing may interfere with labor for planting crops. You can adjust the production schedule 1-2 weeks to reduce conflict.

HORTICULTURE

Result Demonstrations

Maximizing Returns with Staked Tomatoes for the Fresh Market

***Objective*:** To show the results of using the latest cultural technology.

***Procedure*:**

• 500-plant plot

• Mountain spring variety

• Pull soil samples to determine fertilizer needs

• Prepare raised beds, lay down drip irrigation line, cover with black plastic mulch

• Space rows 6 feet apart, center-to-center

• Set up fertilizer injector system

• Fertilize through the drip line

• Stake and tie the tomato plant

• Keep detailed records on the yields, labor expended, total costs, and returns

• Show the returns on each dollar invested.

Demonstrate the Effects of Irrigation on Tomato Yield and Fruit Quality

***Objective*:** To demonstrate the results of irrigation on increasing yield and quality of fresh market tomatoes.

***Procedure*:**

• Compare the results of irrigated tomatoes with non-irrigated tomatoes. Apply drip irrigation equipment to one-half of the tomato planting.

• Keep detailed yields and grade out on each of the two plots.

• Keep records by day of harvest.

• Compare results at end of harvest season.

Compare Bell Pepper Production in a Double-Row System (Plastic Mulch, Drip Irrigation) with Standard Single-Row System (No Irrigation)

***Objective*:** To demonstrate increasing yields and returns on each dollar invested in new technology over old technology.

***Procedure*:**

• Plant half of field in bell peppers using single-row planting, no irrigation; plant the other half in a double-row system through plastic mulch raised beds with drip irrigation lines under the plastic.

• Compare yields, grades, and dollar returns per dollar invested.

• Keep accurate data on each plot.

Method Demonstrations

• How to bud or graft apple trees.

• How to set up a drip irrigation system.

• When and how to harvest fresh market tomatoes.

1. Show breaken stage (color).

2. Show overripe.

• How to prune or sucker tomatoes for fresh market.

• How to tie up or stake and trim tomato plants.

• How to prune fruit or ornamental plants.

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