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Conducting off-station agronomic research

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Quick Facts

- Field crop research conducted on-farm is important to test ideas, determine application of laboratory and greenhouse results, and evaluate technology developed in other climates and field practices.
- Planning of the work between the researcher and the cooperator (farmer) should begin well ahead of the experiment.
- The site for the experiment should be on soils representative of the locality, avoiding areas that would adversely affect the experiment.
- Seedbed preparation, planting, cultural practices and harvesting operations should be carefully outlined and coordinated between researcher and cooperator.
- Time required to organize, analyze, interpret, and summarize the data and subsequent dissemination of the results varies with the experiment.

Off-station agronomic (field crop) research is routinely conducted by Colorado State personnel. Studies conducted on-farm allow researchers to test ideas, determine application of laboratory and greenhouse results, and evaluate technology developed in other climates and field practices. This permits farmers to observe new methods, equipment, products and plant materials first-hand. The objective of this report is to promote high quality off-station research by providing farmers, Cooperative Extension agent, and others with general guidelines for conducting off-station agronomic research.

Planning

Cooperators (farmers) usually are willing to permit researchers to conduct research on their farms. Communication between researcher and cooperator is essential and should begin well ahead of the start of the experiment. The local county Extension agent can provide worthwhile assistance in identifying and working with cooperators. The researcher should have a planning meeting with the cooperator, agent and others to discuss objectives, field procedures, application of chemicals, fertilizers and pesticides, and other

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To simplify technical terminology, trade names of products and equipment occasionally will be used. No endorsement of products named is intended nor is criticism implied of products not mentioned.

details of the research. Financial matters related to the experiment and a possible field tour at the site also should be discussed during the planning meeting. In some cases, a telephone planning meeting may be adequate. The researcher should consider making a written summary of the arrangements and forwarding it to the cooperator. The summary also could include liability considerations of the researcher and cooperator that relate to the research.

Subsequent discussions between the researcher and cooperator will often avoid problems encountered during the experiment. Despite thorough planning, unexpected problems may occur (e.g., insect, weather and disease problems); thus, the researcher and cooperator should be in communication with each other during the experiment.

Site Selection

The site for the experiment should be thoughtfully selected. The agent can provide valuable suggestions for a suitable site for the experiment. Uniform, representative soils for the locality should be used. Select an area of the field where soil variation within the experiment is minimized and where horses, cattle, dogs, deer, rodents, or other domestic and wild animals will not damage plants or disturb the area. Avoid old plow furrows, low spots in the field where water may collect, turn rows for equipment, and areas where soil compaction, snow drifts, or other undesirable conditions may exist or occur. Also avoid areas where buildings, trees, or other objects may shade part or all of the experiment at any time during the day, or cause otherwise abnormal situations in the experiment site. We suggest that a minimum of 50 to 100 feet separate the edge of the experiment from fences, ditches, buried pipelines or other structures.

Seedbed Preparation and Planting

The condition of the seedbed has a direct impact on planting and subsequent seed germination, plant emergence and crop growth. Consequently, seedbed preparation is an important consideration in field experimentation. Seedbed preparation and planting on the site may require practices and equipment different from those used on large acreages. It may be necessary to accommodate the objectives of the study by using small plots or specially designed equipment. The researchers may plant the research plots with their own equipment.

Cultural Practices/Harvesting

Cultural practices are defined as field operations performed during the cropping season. These include planting, tillage, pest control, fertilizer application and harvesting operations. The cultural practices used in field research may or may not be similar to those used traditionally by the cooperator. The design of the experiment may require modification to accommodate cooperator's equipment. For example, an expanded four-row plot (achieved by a slight change in the planting method using a four-row plot planter) may be necessary to allow for six-row cooperator equipment. During the planning meeting the cultural practices needed in the experiment should be discussed.

Harvesting the experiment area often is accomplished with equipment provided by the researcher. This equipment is specially designed for small plots. However, occasionally the cooperator's commercial equipment is needed. The researcher should discuss harvest needs with the cooperator before field work begins and confirm plans as harvest approaches. The cooperator should contact the researcher to inform when the plots will be ready for harvest. A few days advance notice will allow time to prepare equipment and arrange schedules. Occasionally, inclement weather occurs and schedule changes become necessary. During harvest cooperators and agents are invited to be present. This often provides a good opportunity for researchers and cooperators to exchange ideas and information. Disposition of the harvested commodity should be discussed between the researcher and the cooperator. The researcher may need to transport the harvested plot samples to the laboratory for analysis and arrangements should be made to return the samples if desired by the cooperator.

Data Collection and Processing

Once harvested, plot samples are processed to determine factors of interest (e.g., seed yield, seed quality, forage yield, moisture content). The data are statistically analyzed to characterize responses and to determine if differences between treatments (e.g., varieties, fertilizer rates, tillage practices) are significant or if these differences are just due to chance. The researcher interprets the results and usually writes a summary of the experiment. Depending on many factors, the results of the experiment may be available within a few days, or several weeks may be required to organize, summarize, analyze and interpret the data. Final results of experiments may not be available until data for several years are collected.

Dissemination of Results

A summary and interpretation of data collected over a two or three-year period is often published. Publications may be Agricultural Experiment Station technical bulletins and reports, articles for newspapers or magazines, or technical journal papers. Copies of these publications, AES reports, usually are available from local Cooperative Extension county offices. Check with your local agent for the latest agronomic information for your area. If you are interested in the results of particular tests, contact the researchers directly. They will be happy to discuss the results with you and consider your suggestions for improvement of future experiments.