PROGRESS REPORT FOR FISCAL YEAR 1971-72

Biological and Agricultural Engineering Extension

Because of the diversity of activities within Biological and Agricultural Engineering Extension, the following is a topical presentation which highlights our activities. The report may appear disjointed to the reader, but is in fact our accomplishments.

Major emphasis in farm structures centered on planning and development of swine and poultry housing systems with particular emphasis on waste management and environmental control. The underslat ventilation system developed from applied research conducted by the BAE specialist has been installed in the new swine facilities at the Upper Coastal Plains Research Station and by some innovative swine producers. This is the most effective ventilation system to date for odor control.

Information available as a result of applied research projects with two totally enclosed mechanically ventilated caged laying houses has provided the stimulus for several poultry producers to make changes in their systems even during an unfavorable marketing period.

Considerable time and effort were spent on preparation and dissemination of information on animal waste management in order to provide effective methods of pollution control. Six in-service training sessions that represented a unified effort of BAE Extension specialists and researchers were held for Extension, FHA, SCS, and ASCS personnel. The Associate Head in charge of BAE Extension is essentially serving as a liaison between the producer groups, farm organizations, and the School of Agriculture and Life Sciences, and the Legislative Research Commission Subcommittee on Animal Waste Control so that any legislation concerning animal waste control will be equitable for the producer and the general public. Extension specialists and research personnel are cooperating very closely in establishing animal waste management research that will provide alternatives to the producers.

A BAE specialist has been working with members of the North Carolina Pesticide Board concerning chemical application equipment, its use and calibration, and the development of educational efforts to insure proper application by licensed operators.

Systems of production were emphasized in all phases of mechanization. The BAE specialist working with tobacco mechanization continued to work with manufacturers of combines, bulk tobacco barns, and associated equipment so that the most economical systems of production can be developed. The innovations and new information developed and gathered by the specialist were presented at every opportunity to extension agents, farmers, Vo-Ag teachers, and farm managers. Hopefully this year was the "breakthrough" year for complete tobacco mechanization.

A streamlined and modernized cotton production technique was implemented with a grower in Robeson County. His 900 acres of cotton land were rotary tilled and bedded in one operation in the fall and winter, much of it without shredding stalks or chiseling. At planting time in the spring, the rotary tiller was equipped with bed shapers and planters. In one pass over the field, herbicide was applied and incorporated on the beds, and the beds were precision shaped and planted. All of the 900 acres had cotton plants which emerged and grew off well on these well drained beds, especially when the cool wet spring weather is considered. Considerable savings in land preparation costs, improved distribution of workload which provided timely planting, and no replanting resulted from this system of production. Quality production with maximum yields and minimum losses was emphasized in area cotton picker clinics in which the manufacturers cooperated.

A BAE specialist was responsible for preparing the soybean machinery exhibit which was part of the soybean emphasis at the 1971 North Carolina State Fair. A great advancement in weed control for soybeans in black land soils was made by a retired BAE specialist who developed an incorporation technique consisting of tines

and an additional press wheel which can be attached to most conventional planters with minor modifications.

A prototype trellised tomato harvesting aid and sprayer was credited with greatly reducing the amount of harvesting labor required as well as the strenuousness of the work. Much improved disease control was reported by the grower who used the prototype sprayer during most of the season. The power unit can be used for other cultural practices in trellised tomato production as well as for the cultural and harvesting practices for other trellised vegetable crops.

"Production size runs" with a commercial fresh market cabbage harvester proved the machine to be as functional and effective as hand harvesting. A major grocery chain readily accepted the mechanically harvested cabbage. Uniformity of head size and simultaneous maturation of all heads to minimize culls resulting from once-over harvesting remain the greatest deterrents to mechanical cabbage harvesting in North Carolina.

Pilot commercial models of a multiple-pick mechanical cucumber harvester were tested, evaluated and modified by the manufacturer in cooperation with a BAE specialist. Because the cultural practices and production techniques for multipick mechanical harvesting are radically different from current practices, and because successful use of the harvester requires a high degree of skill and management, a very active role was taken in obtaining data on the system of production and disseminating it to the producers.

A plan for a tractor mounted muscadine grape sprayer was developed and made available along with an extension folder that explains and emphasizes some of the considerations in grape spraying. This inexpensive sprayer of limited capacity is designed for the grower with five acres or less. One manufacturer has expressed an interest in building the unit for sale.

The first North Carolina Water Management Field Days held at the Horticultural Crops Research Station and arranged by a BAE specialist had displays on drainage, irrigation, water supply and fertilizer injection equipment from nineteen manufacturers and distributors of water management equipment. In addition, in-service training on water management was held for selected extension agents.

Cooperative demonstrations with TVA using drip irrigation for trellised tomatoes were conducted in western North Carolina. Also a BAE specialist is serving as a cooperator in a grape irrigation cultural practices study, a horticultural crops irrigation environmental control study, an apple irrigation environmental control study, and a container grown nursery stock irrigation study.

Phase II of a study entitled "Agricultural Water Needs in North Carolina" which is to provide tools to predict agricultural water usage and determine optimum crop mixes with limited water supplies was funded by the North Carolina Water Resources Research Institute.

Water management specialists presented a course "Special Problems in Water Management for Crop Production" during the Summer Session for Adult and Community College Educators.

Additional emphasis was given to the youth program with the addition of a part time BAE specialist. Revision and up-dating of project books is receiving priority. Project Book III for Electricity is in the final stages of preparation.

Approximately one-third of the counties were visited by the Associate Head in charge of BAE Extension. These personal visits have helped to shape the viable effective BAE Extension program.