NORTH CAROLINA AGRICULTURAL EXTENSION SERVICE

PLAN OF WORK

AGRICULTURAL PRODUCTION, MANAGEMENT, AND NATURAL RESOURCES USE
Title of Project

EXTENSION AGRICULTURAL ENGINEERING
Section

1962 - 1963
Fiscal Year

Name and Title of Worker	Percentage of Time Devoted to Entire Project by Each Worker
H. M. Ellis, In Charge Project Leader	100 %
J. C. Ferguson, Specialist	100 %
John W. Glover, Specialist	100 %
R. M. Ritchie, Jr., Specialist	100 %
Ronald E. Sneed, Specialist	100 %
W. C. Warrick, Specialist	100 %
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Signed _____
State Director of Extension

Date Recommended _____

Signed _____
Administrator, Federal Extension Service, U.S. Department of Agriculture

Date Approved _____

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1962 - 1963

PLAN OF WORK FOR THE DEPARTMENT OF EXTENSION

AGRICULTURAL ENGINEERING

III. STATEMENT OF PROBLEMS

To raise the net income of Extension's clientele with present resources through existing and new enterprises and products, the Department of Extension Agricultural Engineering will devote 50% of its time to the following specific problems:

1. Farm mechanization is behind the times.
2. Bulk tobacco and mechanical peanut curing are relatively new and used by a very few farmers.
3. Poultry and swine buildings and plastic greenhouse designs are, in general, near the level of least possible investment with very little attention to maximizing overall efficiency.
4. Less than 14% of the tobacco allotment is irrigated.
5. Low income families live in horrible houses.

IV. PLAN OF ACTION

Farm Mechanization - J. C. Ferguson

Work in mechanized cotton and tobacco production will be intensified in ten counties for each crop. Equipment in mechanization will be used on the basis of an "all practice" demonstration. Main teaching objective is more economical production of a quality unit with less man hours. Evaluation will be based on adoption as determined by surveys.

Crop Processing - John Glover

Bulk tobacco curing will reduce harvesting and curing man hours per acre approximately 50%. Educational effort will be directed toward proper operation of equipment by early adopters. The educational objective will be the general

success of the method under field trials; and the program will be evaluated not in terms of adoption but in terms of the ability of the farmers to successfully use new method.

In peanut curing emphasis will be directed to maintaining high quality by proper selection and operation of equipment. Evaluation will be based on reports from agents and buyers.

Farm Buildings - R. M. Ritchie, Jr.

Poultry Housing: As against the concept of least possible investment, educational effort will be toward designing houses for maximum overall efficiency. Research will be studied, cooperators will be selected, and the advantages of more controlled environment will be demonstrated.

Swine Housing: Standard plans will be revised to adapt them to larger, more completely mechanized units. These will be demonstrated through volunteer cooperators. Late research information will be used in developing new designs which will be field tested with cooperating farmers before adoption as standard plans.

Plastic Greenhouses: Will cooperate with horticulturists in applied research-type project. Training schools for agents and producers will be conducted on presently known facts.

Evaluation of applied research demonstrations will be based on performance or results as the case may be. Evaluation of work on plan revision will be based on requests for plans.

Irrigation - Ronald E. Sneed

Irrigation has netted tobacco farmers $125 per acre per year, or approximately $40,000,000 during the past ten years, yet less than 1½% of our allotment is irrigated. Irrigation will pay handsome profits on many of our other high income producing crops. Tobacco irrigation will be emphasized at the winter tobacco meetings, and each known irrigation distributor will be visited.

To determine needed facts, two applied research project demonstrations will be conducted, one on cotton irrigation and one on peanuts. Evaluation surveys will be conducted through agents and distributors. A special meeting of distributors will be called for determining total equipment sold and new acreage added to total irrigated acreage.

Housing - W. C. Warrick

The lack of piped water denotes an extremely low level of housing and living. In North Carolina 80% of rural farm non-whites and 20% of whites are in this classification. Such conditions are unnecessary and exist only because of lack of knowledge, initiative, or desire. When properly informed and motivated, they will earn the income to make the needed house possible.

The emphasis program will be directed toward Extension's clientele falling in the very low income group and will be conducted through workshops and follow-up meetings. County leadership will be developed. Three complete result demonstrations on low-cost housing will be conducted. Evaluation of effort will be determined by survey of low-cost housing units completed and by statements of agents.

Rural Civil Defense - H. M. Ellis

Radiation must be considered as a weapon of war. Our citizens must be convinced that survival against radiation is possible. They must be taught how and motivated to take action. This must be done in such a way that a false sense of security will not be promoted. Survival plans must not be sold in a way that will detract from national peace efforts.

Extension's responsibility is to help rural people analyze the situation, understand the problem, and teach them known facts that will help them in coping with the problem. Work will necessarily be conducted at a relatively low level of intensity.

During the coming year the specialist's program of teaching awareness and plan of action will be directed to:

1. County Extension personnel.
2. Personnel of other agricultural agencies.
3. Other organized groups.

NOTE:--This plan is directed as stated because of the confusion existing at all levels regarding civil defense. The specialist in charge of Extension Agricultural Engineering will direct this program, and in addition will direct the program of the North Carolina Rural Safety Council.

POWER MACHINERY

III. STATEMENT OF PROBLEMS

While farm mechanization has moved rapidly in North Carolina during recent years, it is still far short of our potential; and only a relatively small percentage of farmers have availed themselves of all present possibilities in mechanization and automation. This situation is due in part to lack of income, but equally important is lack of initiative required to deviate from already established and custom-bound practices.

To cite examples in production, the state average in cotton production has consistently been less than one bale per acre, while a limited number of more progressive farmers applying modern methods of production have produced bale-and-a-half to two-bale yields rather consistently.

Tobacco being the major cash crop in North Carolina, it has received more concerted effort toward higher per acre yields, yet the state average has never approached 2000 lbs. per acre, yet many tobacco growers have exceeded 3000 lbs.

Peanuts, while limited to a relatively small area of the state, have shown increased yields only with growers who have accepted and put into practice the many detailed production techniques recommended to produce such high yields.

IV. PLAN OF ACTION

Modern farm machinery, including the many and varied applications in the production of crops, is a major contributing factor to overall production efficiency.

Three major fields of activity regarding the use of machinery will be dealt with in the 1962-63 period:

Cotton

Intensify work in machanized cotton production, concentrating mainly in ten counties. This will include work on improved planting practices, including

correct fertilizer placement, pre-emerge chemical application, shallow cultivation, and late season weed control, including both chemical and flame. Special attention will be given to insect control and defoliation equipment. With successful weed and grass control, the possibilities of mechanized harvest have improved considerably, evidenced by the fact that 278 mechanical cotton pickers operated in the 1961 season. It is believed that by further promotion of good practices and additional educational work in the field of mechanical harvesting the number of harvesters may be increased by at least 50% in 1962.

To meet the associated needs brought about by mechanized harvest, still further cotton gin improvement will be necessary to maintain quality and meet gin capacity problems brought about by more rapid harvesting.

Tobacco

While the production of tobacco in North Carolina has improved at a more rapid pace than other crops due largely to more intensive research and greater interest on the part of producers, we are still far short of the potential and extremely lacking in the field of mechanized harvest. Tobacco is more nearly a universal crop throughout North Carolina, but it is contemplated that more effective results may be obtained by concentrating work in the field of mechanization to not more than ten counties. Activities would include transplanting and fertilizer application, equipment, procedures, and combinations. Equipment for the application of insecticides and sucker control materials require continued emphasis toward improvement. While interest is keen concerning newly developed harvesting and bulk curing systems, much educational work is necessary to guide and direct tobacco farmers in a wise choice of equipment that their acreage will justify. Bulk handling and curing as now developed require an entirely different approach to assure success compared to previously accepted practices.

Peanuts

Production of peanuts is confined chiefly to the northeastern area of the state. It is a major crop and presents many problems to growers regarding yields in the face of existing disease and insect problems. Newly developed production practices have proven their merit, but will require additional machinery for the application of pesticides heretofore not included. Work in this field will be confined to approximately five counties, working directly with county agricultural agents who have indicated a need for assistance in the adaptation of field machinery to accomplish these newly recommended practices. For example, work will be done with field equipment combinations to accomplish soil fumigation and the application of systemic poisons in combination with the planting operation. While mechanized harvest of peanuts has progressed very rapidly in the area, still the stack-pole method prevails with many growers. Combine harvesting and the associated problems of curing still justify considerable educational work in this area.

Other Activities in the Farm Machinery Field

1. Adult and 4-H tractor maintenance schools.
2. 4-H Tractor Operator Contests (County, District, State, and Regional levels)
3. Agent training in machinery familiarization and field adaptation.
4. Farm machinery dealer contacts, visits, and field demonstrations.
5. Specialized crop production and processing, including blueberries, sweet potatoes, bunch grapes, and other horticultural crops.
6. On-campus short courses and special training activities.
7. Chairman All Practice Demonstration Committee on small grains.

Methods of Accomplishment

1. Agent group training meetings and cooperative work with agents, including both 4-H and adult activities.

2. Work with vocational agriculture teachers in their adult training programs
3. Field meetings and demonstrations involving agents, farm equipment suppliers, and cooperating farmers.
4. Live and filmed T.V. shows; radio, both live and taped material; timely news stories.
5. Mimeographed and leaflet material.
6. Special interest group meetings.
7. Individual agent and farmer visits.

CROP PROCESSING

III. The major problem of the crop processing project is to raise net income by reducing labor, raising or maintaining quality, and reducing field and storage losses.

IV. Plan of Action

Bulk Tobacco Curing

Tobacco is the major cash crop in North Carolina. The harvesting and curing process involve 174 man-hours per acre. Bulk curing will reduce this harvest labor approximately 50%, or 88 man-hours per acre. An additional 18 man-hours are saved in the marketing of the crop by eliminating removal of tobacco from the stick.

Bulk curing is new, with only 15 farmers adopting the practice on a trial basis in 1961. The educational effort will be conducted towards the proper operation of the equipment, and a program with the manufacturers to incorporate the best specifications in the commercial equipment. No effort will be devoted to promote the adoption of the practice until more is known about the commercial acceptance of the bulk cured product. However, the manufacturers estimate that about 500 bulk curers will be sold in North Carolina in 1962.

The educational work on bulk tobacco curing will be evaluated in the following ways:

1. The general success of the method in the field; not in terms of adoption but in terms of the ability of the farmers who do adopt the practice to cure properly.
2. The interest and educational information that the county agricultural agents display.
3. The cooperation of the manufacturers.
4. Field observation.

Mechanical Peanut Curing

While mechanical peanut curing is an integral part of mechanized harvesting, it is a separate step. The practice has been adopted on about 25% of the North Carolina crop; however, quality has not been maintained in many instances. The Extension Agricultural Engineering effort will be directed to maintaining higher quality by proper selection and operation of the curing equipment. The planned activities include preparing plans and bulletins and training meetings for agents, farmers, and equipment dealers and manufacturers.

The project will be evaluated in one or more of the following ways:

1. The adoption of good curing practices by the growers and custom operators as reported by county agricultural agents and the peanut industry.
2. The purchase of equipment that will meet the requirements for good curing.
3. The cooperation of the equipment manufacturers.
4. Field observations.

Grain Drying and Storage

North Carolina still needs additional on-the-farm grain drying and storage facilities. The Extension Agricultural Engineer will continue to serve as a member of the North Carolina Grain Production and Marketing Committee.

One function of this committee is to promote adequate drying and storaging facilities in North Carolina. In addition, a bulletin is planned on this subject, and training meetings will be conducted for agents and farmers.

An educational effort will be conducted also to promote good grain drying and maintaining of quality during drying and storage.

The results will be measured by:

1. Added grain drying and storage facilities.
2. County agricultural agent interest.

3. Grain quality in on-the-farm storage.

Other activities

1. Hay drying.
2. 4-H Club work.
   a. Electric project.
      (1) Agent and leader training.
      (2) New record books.
   b. Automotive Care and Safety Project.
      (1) Agent and leader training.
3. Rural electrification and wiring.
4. Cooperative work with Entomology on stored grain insects, etc.

FARM BUILDINGS

Major opportunities for increasing net income through improved farm buildings exist in the following areas:

(1) Poultry Housing

Poultry buildings represent the largest volume in farm service building construction. Any improvements in poultry building design which would either lower the building cost or increase the efficiency of production would yield correspondingly large increases in income. Present poultry buildings designs are generally near the level of least possible investment, but with narrower margins of profit, poultrymen are becoming more receptive to information on designs for maximum overall efficiency, even though they may mean a higher initial investment. There has been keen interest in recent innovations such as insulation, fan ventilation, and improved heating systems for broiler houses; and insulation, ventilation, high density housing, automation, and colony cage houses for layers.

(2) Swine Housing

The swine industry appears to be on the threshold of a revolution as far as systems of housing are concerned. The trend is very much toward larger units, more mechanization, and confinement production. With efforts of other departments and agencies directed toward an expansion in the swine industry, improved building designs at this time would yield large benefits in the near future.

(3) Plastic Greenhouses

Production of flowers, plants, and vegetable crops in plastic greenhouses is a relatively new practice. Horticultural specialists have seen the potential for increasing income through the use of these low-cost structures, and considerable expansion has already taken place. Improvements are needed in the

structural design and heating and ventilating equipment for these structures. The increased income from these enterprises in the immediate future will not be large compared to the overall farm income, but their potential for the future is great. In general, the production from these enterprises will represent "new money" which is not derived from products competing directly with those produced by other North Carolina growers.

There are other areas where farm building improvements need attention; and the farm building specialist works with all other specialists and with all areas of the state in various activities; but the three above have been selected for special emphasis as having greater potential for increasing present and future farm income.

Educational Objectives:

(1) To evaluate information available in the three areas mentioned above, in order to develop recommendations and building plans for North Carolina use.

(2) To distribute information on a mass basis through county agricultural agents and other agricultural agencies, news, radio, television, and other channels.

(3) To set up demonstrations in selected counties which will prove the value of new design where appropriate.

(4) To conduct a program of general information in all areas of farm Buildings to the extent determined by agent requests and time available.

Activities

(1) Poultry Buildings

a. Continue to assemble and evaluate research information and field demonstrations on insulation, ventilation, and heating of broiler houses, and distribute this information through agents and other channels.

b. Review and evaluate available research information and farm records on insulation and ventilation of laying houses in our climate. Find cooperators to demonstrate practices which seem feasible, and distribute information through agents and other channels.

c. Develop a colony-cage laying house plan adapted to North Carolina climate. Test this plan in cooperation with interested producers.

d. Revise present poultry house plans to incorporate best information available as developed above.

(2) Swine Buildings

a. Revise present standard plans to better adapt for larger units and more mechanization.

b. Evaluate available research information on environmental requirements and develop preliminary plans for farrowing and growing buildings which incorporate indicated methods of environmental control, along with structural and labor efficiency.

c. Find interested producers who will cooperate in building and testing new types of swine buildings which appear to have merit.

d. Work with regional committee for southeastern states in developing design criteria for swine buildings for this region.

(3) Plastic Greenhouses

a. Assist horticultural specialists in conducting training schools for agents and producers.

b. Work with cooperating growers in developing information and cost records on various types of structures and heating systems.

c. Work with horticulturists on experimental greenhouses on college farm in an effort to develop improved heating system and frames for supporting plastic covers.

d. Release information through agents and other channels as developed.

(4) Other Farm Building Activities

Approximately 50% of the specialist's time will be devoted to the following activities:

a. Keeping up to date on available information in all areas of farm buildings work.

b. Preparing and distributing information in areas of farm buildings other than those mentioned above.

c. Revision of standard plans other than mentioned above.

d. Assisting agents with county meetings, demonstrations, and farm visits.

e. Assisting with preliminary design of public agricultural buildings such as office buildings, livestock sales barns, fair buildings, fruit and vegetable processing buildings, and community buildings.

f. Conferences with other specialists and workers from other agencies to coordinate activities.

Evaluation

Work will be evaluated by:

(1) Observation of results obtained by cooperators in demonstration buildings.

(2) Performance of plastic greenhouses built on college farm.

(3) Acceptance of information distributed in plan form as indicated by:

a. Observation of buildings built including recommendations.

b. Records of total number of plans requested which will indicate their acceptance.

IRRIGATION

III. It is assumed that we all have the same major problem - to raise net income.

A. (1) Irrigation has grown in the past ten years from an estimated 2,000 acres irrigated in 1952 to an estimated 67,765 acres irrigated in 1961. Probably double this acreage could be irrigated if the equipment were used to the maximum extent. In terms of dollars and cents, on one crop alone - tobacco - irrigation has meant a net income of $125 per acre per year or approximately $40,000,000 during the past ten years. To the dealers of irrigation equipment, irrigation has meant approximately $20,000,000 in sales in the past ten years.

This looks good on the surface. The fact still exists, however, that only 13% to 14% of our total flue-cured tobacco acreage is being irrigated, and irrigation of our other cash crops, corn, peanuts, cotton, and small grains is practically non-existent. Even on many of our high income truck crops, such as blueberries, strawberries, tomatoes, flowers, etc., irrigation is not used to any large extent. Irrigation should be used on many of these crops because lack of water is limiting production.

Many farmers who have irrigation equipment do not use it properly. Much work needs to be done in educating them on the proper use of equipment. Also many dealers of irrigation equipment are selling sprinklers that apply water faster than the soil can absorb it. Our only restraint of these dealers is to maintain proper relationships with them and to try to guide their thinking in selling proper equipment.

(2) (a) To promote the use of irrigation of cotton and peanuts, I do some work on an applied research type project to get information to carry to farmers. Our North Carolina research does not at present provide this information. This work will be done mainly on two farms in Edgecombe and Montgomery counties.

I plan to visit at least half of the tobacco producing counties with the tobacco specialist during the winter tobacco meetings. I will try to visit counties where irrigation has not been accepted to any appreciable extent.

(b) I plan to visit each known irrigation distributor at least once during the year to discuss irrigation problems.

(3) (a) Other than these two areas, I plan to still assist agents in county education meetings.

(b) Use all types of news media to promote the use of irrigation.

(c) Plan for irrigation trailer.

(d) Bulletin on "How to Buy and Use Irrigation".

(e) Assist on all-practice demonstrations and tobacco irrigation demonstrations.

WATER SYSTEMS AND RURAL SANITATION

III. It is assumed we all have the same major problem - to raise net income.

A. (1) In a state that boasts of having 98% of its farms electrified, we still have a deplorable situation in our rural areas as regards to piped running water. The 1960 census shwos that 34.6% of our rural farm population is without piped running water to the kitchen. This breaks down to 19.4% of the rural white farm population without running water, and 85% of the rural non-white population without running water. The people cannot possibly advance very far without the basic necessities of life. Running water can and will do more to raise the standard of living of that group than any other single item they can purchase.

The need is even greater in the area of bathrooms. Using as a criterion, exclusive use of flush toilets, 59% of the rural farm population is without this convenience. This breaks down to 47.8% of the rural farm population without flush toilets, and 92.9% of the Negro rural farm population without flush toilets.

Another area that is causing concern in many parts of the state is the problem of bad water conditions. The extreme eastern part of our state is plagued with many water conditions - iron, acidity, sulfur, salinity, and hardness. Other areas of the state have problems with acidity, iron, and hardness. Contamination of wells from human and animal wastes is causing State Board of Health officials some concern. Reports come in almost every day of some illness caused by drinking impure water.

(2) (a) Since such a need exists among the Negro group, I plan to concentrate on ten counties working with the Negro agents to promote a water systems program. This work will be in counties where the greatest need exists.

(b) Preparation of a bulletin on water conditioning. This and other educational material will be used to help agents in carrying out an effective program on water conditioning. This material will go to all counties.

(3) (a) Other than the two areas above, I plan to assist other agents in promoting water systems programs in their counties.

(b) Preparation of demonstration material on water systems, rural sanitation for use by agents.

(c) Work with utility companies in water systems promotion work.

(d) Try to get a 4-H project started in water systems and rural sanitation.

(e) Self improvement.

RURAL HOUSING

SITUATION

Extension's responsibility in housing work is mainly with rural housing. Rural housing made up 57% of the 1,204,715 occupied residential units in North Carolina in 1960. Generally, rural housing is inferior to urban housing. In fact, of the total 133,163 non-white rural occupied swellings in 1960, only 9.4% were considered sound and had a complete bath. More than 80% of the rural farm non-white occupied units lacked the elementary essential of cold piped water. Of the white occupied rural farm and rural non-farm units, 18% lacked cold piped water. Running water is a fairly good index as to the condition of a house. Houses without water usually are dilapidated, poorly heated, lack storage and enough space, and are unattractive.

A. Program Emphasis

1. One Agricultural Engineering Extension specialist will devote full time to housing. Fifty per cent of his time will be spent on promoting better housing for low-income families. Popularity of "shell homes" in North Carolina indicates a need and a desire for houses available to low-income families.

2. Educational programs for county Extension agents on planning county housing programs, technical information, and teaching methods will be conducted. It is expected that most of the effort on low income will be with the non-white population. Minimum housing standards considered to be necessary for decent family living will be taught agents to help them in working with the low-income clientele. County efforts to improve housing may be through existing community organizations, but other means of reaching the lowest income clientele may be necessary.

3. Teaching Methods and Program Strategy

The emphasis program will be conducted through educational workshops and follow-up meetings with agents. In addition, the specialist will cooperate with agents in conducting actual housing demonstrations.

At least three demonstrations in low-cost house construction (under $5,000) will be planned with agents. These will be demonstrations in building methods for self-help built houses and/or low-cost financing for building low-cost homes. Actually, these will be experiments to search out practical methods of constructing and financing low-cost houses. This is a gap in conventional house building processes filled mainly heretofore by the "shell home" industry.

Associations of building trade firms will be solicited for assistance in developing this program. House plans for minimum standards will be developed with economy of construction in mind. It is hoped that these three demonstrations will serve as pilot projects for the state.

4. The Housing and House Furnishing Department and the water systems and irrigation specialist will be solicited for assistance with the low-cost housing program.

5. Evaluation of this program will be by count of the number of low-cost demonstrations completed, and by new agent interest in housing. Also a count of new homes or improved homes in the state will be listed by counties.

B. Other Housing Work Planned

Work will be continued with Extension agents in the state on a housing program. Some anticipated activities:

1. Three result demonstrations already built will be opened for public inspection.

2. Four result demonstration houses are planned to be built.

3. Mass media to include T.V., radio, newspapers will be used in timely publicity of demonstrations and subject matter information.

4. Training schools on technical subjects will be conducted for agents.

5. Development of house plans for the standard housing book will be continued.

6. Requests from agents for county visits will be answered, with special attention to requests from agents from counties where interest in housing has lagged.

7. Continued efforts will be made to assist Farmers Home Administration in their housing loan program.

C. Rural housing improvement contributes little to rural income. It is more importantly one of the final goals of rural families and involves one of the greatest family expenditures. This expenditure for efficiently and suitably planned houses may be considered saved income.

RURAL CIVIL DEFENSE

Radiation must be considered as a weapon of war. Our citizens must be convinced that survival against radiation is possible. They must be taught how and motivated to take action. This must be done in such a way that a false sense of security will not be promoted. Survival plans must not be sold in a way that will detract from national peace efforts.

Extension's responsibility is to help rural people analyze the situation, understand the problem, and teach them known facts that will help them in coping with the problem. Work will necessarily be conducted at a relatively low level of intensity.

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3. Other organized groups.

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SAFETY

North Carolina's contribution to the accident toll for 1961 was 2629 deaths. Home and farm accidental deaths accounted for 792 of this total. Teaching safety is a continuous job, so the North Carolina Rural Safety Council was organized. This coordinating Council through Extension leadership is doing a job Extension could never have done alone.

All specialists will continue conducting safety programs in their respective areas of leadership, but one specialist will devote approximately 20% of his time to directing the Council's efforts.

The North Carolina Council was one of five in the nation to receive a National Safety Council Certificate of Commendation because of their 1961 program.

1963
accident total
deaths Home & farm 704
other 608

1960
704
608
2212