NORTH CAROLINA AGRICULTURAL EXTENSION SERVICE

AGRICULTURAL ENGINEERING PLAN OF WORK
(Name of project)

for

Calendar Year 1961

Major phases of project or subdivisions of project covered	Name of Worker*	Percentage of time devoted to entire project by each worker
Administration, Farm Drainage, Irrigation, Safety, Soil Conservation	H. M. Ellis	100%
Rural Electrification, Crop Processing	E. S. Coates	100%
Farm Machinery, Cotton Gins	J. C. Ferguson	100%
Farm Machinery	J. W. Glover	100%
Farm Buildings, Plan Service	R. M. Ritchie, Jr.	100%
Irrigation, Home Water Systems	R. E. Sneed	100%
Farm Housing	W. C. Warrick	100%

Date submitted: December 19, 1960. Signed: H. M. Ellis
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Date approved: Dec. 23, 1960. Signed: G. W. Smith
State Director of Extension

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* If phases of project are divided between two or more workers, indicate assignment to each.

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PLAN OF WORK FOR THE DEPARTMENT OF EXTENSION

AGRICULTURAL ENGINEERING

Existing situations must be studied, and problems with respect to progress must be defined before an effective plan of work can be prepared. Following are brief statements of the general situation affecting North Carolina farmers and rural communities in 1960 which were taken into consideration in preparation of this plan of work.

In looking toward 1961, we find much the same conditions existing that we faced at the beginning of 1960. There is not too much reason to expect a much better over-all climate for farmers during the coming year. They will continue to operate in a cost-prize squeeze situation. The migration from farms continues, and circumstances in general demand better management and maximum efforts in production.

FARM MACHINERY: Farm sizes, acreages planted, kinds of crops and enterprises need adjusting in line with availability and productivity of labor and the family's actual needs. Additional capital, which is hard to obtain, is needed in making changes toward mechanization. The lack of know-how for new enterprises poses a problem. Short term leases result in inefficient production on tenant operated farms by inhibiting mechanization. Available resources, namely land, labor, capital, and equipment, are inefficiently used.

Inadequate use of improved practices results in low unit yields, and often in poor quality. Inexperience in handling and maintaining equipment results in high operating costs and frequent repairs or replacements. Enterprises on most farms have not been adjusted to efficiently employ existing labor throughout the year. Many farmers are now living off their depreciation and repair allowances;

and as their machinery and equipment wear out, they are unable to replace it.

FARM BUILDINGS: The demand for more efficient farm buildings, both from the standpoint of the use of materials and labor-saving operations, is continually increasing. Lack of information and capital restrictions often result in inadequate and poorly arranged buildings.

Insufficient planning before construction, remodeling, or repair of houses has resulted in inadequate and unattractive homes.

Unwise selection, purchase, care, and use of household furnishings, equipment, and appliances result in expensive repairs or replacements.

IRRIGATION: Interest in irrigation rises and falls with the distribution of rainfall during the growth season of our principal cash crop, which is tobacco. This was forcibly brought out during 1960 when report of sales by distributors of equipment exactly pinpointed areas suffering from drought during May and early June. Farmers in general are recognizing the importance and dollar and cents value of irrigation. They postponed the adoption of the practice because of the expense involved in purchasing equipment and the labor involved in using equipment. There still exists a great need for educational work to show farmers that irrigation is a production tool and a must in the production of tobacco on a competitive basis.

DRAINAGE: Partial drainage has been accepted in eastern North Carolina for many years. Adequate drainage is something that farmers do little about, but interest in adequate drainage is growing. Land forming will be the next big step toward adequate drainage as well as irrigation in North Carolina.

CROP PROCESSING: In the production and marketing of agricultural products it is essential that new techniques of harvesting, handling, and storage be employed to improve the efficiency of the operation as well as to maintain the quality demanded by the users of these products. As the farming enterprise is mechanized, the moving of grains and feeds mechanically becomes more important. The use of hand labor for these chores cannot be tolerated much longer.

RURAL ELECTRIFICATION: This phase of the program is being expanded by a closer relationship with industry. Greater efficiency in farming stimulates selection and use of productive electrical equipment.

SAFETY: Our large rural population, our large tenant group, the adoption of mechanization, and, in general, the poor layout of our farms for mechanization are all outstanding factors affecting our high accident rate. During the first eight months of 1960 all accidents claimed the lives of 1,961 residents of North Carolina. Of these fatalities, 615 were because of home and farm accidents.

During 1960 a North Carolina Rural Safety Council was organized. This Council is, in general, a coordinating group and will enable all agencies to do a more effective job in promoting safety.

The lack of enabling legislation prevents our Highway Patrol from doing as effective a job as they might do in suppressing highway fatalities.

WATER SYSTEMS: With approximately 98% of our farms being served with electricity, only 56% of them have running water. This means that 44% of our farmers are still spending around 800 hours per year pumping and carrying water.

YOUTH PROGRAMS: The era in which we are living is increasingly placing importance on science. Scientific training is a definite requirement. This is rapidly bringing about a consciousness and a demand for better prepared young men and young women. This scientific era is truly a youthful and a youth era. These thoughts were taken into consideration in the definition of problems stated in this report.

OTHER PHASES: Extension Agricultural Engineers will be called on and will render assistance on a large number of phases of agriculture that cannot be planned for or described at this time. Many needs for engineering knowledge and skills will be experienced by other subject matter specialists, and cooperation from this department will be given when needed. In each specialist's time schedule there will be an allotment of time for special, unplanned projects.

FARM MACHINERY

II. ANALYSIS OF PROJECT SITUATION:

Changes, Trends and Needs

1. Definite trends exist toward larger commercial farms.
2. Small tractors are gradually being replaced by larger multiple row units.
3. Self-propelled harvesting machinery is rapidly replacing trail type units particularily in the Coastal Plains area.
4. Trends toward specialization on larger commercial farms are evident throughout the state.
5. There are increasing demands from commercial farms for detailed information regarding new techniques and equipment.
6. Obsolescence of tractors and other field machinery is being recognized more readily as manufacturers redesign and modify more frequently than in past years.
7. Small subsistence farmers are relying more and more on industry for supplemental income and more frequently renting alloted acreage to neighboring farmers.
8. While tractor population has reached approximately 137,000 units, North Carolina still does not average one tractor per farm.
9. Commercial farms to be more competitive and meet the problems of a dwindling and expensive labor supply must meet this situation with increased use of machinery.
10. Many owners as well as farm machinery operators fail to realize the need and importance of a good program of daily maintenance or the benefits of judicious operation of modern machinery. A shortage of skilled farm machinery labor contributes to this situation.

Methods of Integrating Farm Machinery Educational Work into an Extension Program

1. Work with county agricultural agent personnel to develop further interest and appreciation for farm machinery potential in North Carolina.
2. Leadership in 4-H programs dealing with machinery and mechanization problems help to stimulate interest in both the youth and their parents.
3. Direct contact with farmers through meetings and field demonstrations make possible the dissemination of research findings, proven practices and procedures.
4. Cooperation with other specialists and educational groups with a mutual goal can bring about more efficient production and higher standards of living for farm people of North Carolina.

III. MAJOR SPECIALISTS' PROBLEMS:

1. Inappropriate division of time due to large demand from interested agents versus lack of demand from disinterested agents.
2. Limited income from small subsistence farms cannot support the mechanization level to which they aspire.
3. Larger commercial farms are ofttimes inadequately or inappropriately equipped to accomplish full utilization of modern farm machinery possibilities.
4. Slow adoption of proven practices and procedures require many repetitions.

5. Constantly changing production practices and associated machinery needs require alert dealers and service organizations that too often are not sufficiently responsive to the situation.
6. Research in the field of farm machinery is not adequately meeting the diversified need of North Carolina farmers.

IV. WORK TO BE DONE AND METHODS OF PROCEDURE:

Objectives

To increase net farm income through wise adaptation and utilization of modern farm machinery. More extensive use of machinery is a means of reducing farm drudgery and is a factor in farmer prestige.

Methods of Accomplishment

1. Conduct tractor and machinery maintenance schools at county level for both adults and 4-H members. During the year approximately 75 such schools will be held throughout the state, cooperating with county agricultural agents and vocational agriculture teachers.
2. Three 3-day 4-H adult leader training clinics on tractor maintenance are scheduled as a contribution to the 4-H Tractor Maintenance Project.
3. The 4-H Automotive Project will involve possibly three leader training schools and assistance with county programs in 15 or more counties.
4. As a contribution toward the further training of agents in recognition of proper adjustment and use of planting and cultivating equipment, two area workshops for agents and assistant agents only on this subject are being considered.

5. A series of nine cotton production demonstration located in three selected counties is planned. These demonstrations will conclude a three year series of demonstrations testing and demonstrating in-furrow fungicide application at time of planting. Pre-emerge chemical weed control will also be included this year. The multiple operation of planting, side placing fertilizer, application of in-furrow fungicide, and band application of weed control spray will be accomplished in a once-over operation.

6. Field day programs at research stations and at county level are excellent means of demonstrating newly approved practices and machinery adaptable to required mechanical operations. Numerous field days involving planting, cultivation, pesticide applications, and harvesting of all major crops are already on the schedules of both county agricultural agents and subject matter specialists.

   Other field day activities will be planned as the need arises.

   Farm equipment dealers cooperate generously in such activities, supplying equipment and trained personnel when desired for most effective demonstrations.

7. Result demonstrations are being planned in several counties in cooperation with agents and agronomy specialists on fertilizer placement and subsoiling for tobacco.

8. 4-H tractor driving contests from county through to Regional level are conducted annually. As a result of successful tractor driving and plowing contests held in connection with the 1960 State Fair, it is presumed that these events will be continued in 1961.

9. During 1961 several requests for cotton gin operator schools are anticipated. The increased use of mechanical cotton pickers tend to further complicate the ginning processes requiring more elaborate drying and cleaning facilities along with more operational "Know How." These schools are normally held in cooperation with the Division of Marketing, State Department of Agriculture, and the Carolinas Ginners' Association.
10. Agricultural Engineering mimeographed memos dealing with farm machinery operation and adjustment will be prepared as needed.

V. RESULTS EXPECTED AND METHODS OF MEASURING:

Results Expected

Mechanization being a means to an end does not contribute directly to farm income, and for this reason net results are somewhat intangible and difficult to measure.

The ultimate desirable result to be expected from an Extension program in farm mechanization would be full utilization of every economically justified piece of equipment available to North Carolina farmers. This, of course, can only be a long time goal.

Maintenance is a major cost item associated with farm machinery, and educational work in this field has shown and will continue to show positive evidence in machinery conservation.

Impartial evaluation and demonstration of newly developed machines and practices should help to minimize unsound investments and improve the acceptance of satisfactory innovations.

Continued effort in Extension work with 4-H members and adult leaders should stimulate growth and accomplishment in the field of mechanization. While few agents are trained agricultural engineers,

some are keenly interested in mechanization and its many ramifications. As agent ability is improved, more farmers will rely on and benefit from their council.

Methods of Measuring Results

Certain statistics are good measures of mechanization progress; however, it is difficult to obtain current information in this regard. County agricultural agent and random sample farmer surveys indicate trends, but are not always conclusive.

Keen observation, if done objectively, is ofttimes the only practical method of measuring short term results in the application of modern machinery to agriculture.

FARM STRUCTURES

Housing

II. ANALYSIS OF PROJECT SITUATION:

Preliminary census figures show that on April 1, 1960, there were 1,332,790 total housing units in North Carolina. There was an increase of 264,423 units, or 25 per cent, over the 1,058,367 units reported in the 1950 census.

Also there is a trend to somewhat larger houses at present over the post-war two bedroom houses. More houses now have three bedrooms, two baths, etc. Nationally the median size of the new medium-priced and low priced homes has grown to 1100 sq. ft. in size. More emphasis is being placed on functional design and design for more gracious living.

The "shell home" idea has grown rapidly in North Carolina in the past several years. Many low income families that manage to get title to a lot anywhere can buy for one dollar down the shell of a small frame house. Usually the interior is added as the family can afford it. This may require many years and perhaps in many instances may never be completed.

Generally great improvements have been made in the construction of houses since World War II. Educational programs and the requirement of building plans and specifications for housing loans have brought about this great change in the quality of homes constructed.

North Carolina is largely a rural state; that is, in 1950 two-thirds of its inhabitants were rural farm or rural non-farm. Some changes may have been made in the last decade, but it is doubtful that the trend has changed very much. The fact that most of the homes in the state are outside towns or cities may account for the fact that many homes lack running water. Some sources estimate that around 40% of the rural homes in North Carolina are without running water. It is safe to assume that most of these also lack the conveniences

associated with running water.

County Extension workers are becoming more aware of their responsibilities in home improvement, and in most counties Extension agents have grasped the situation and are doing an excellent job in meeting the needs of the people. In some counties because of a shortage of personnel or insufficient interest, the Extension office may not be known too well as a source of housing information.

III. MAJOR SPECIALIST'S PROBLEMS:

It is assumed that the housing specialist will work through the offices of the county Extension agents in his efforts on home improvement. Some handicaps are recognized, namely:

1. There is a contest among all specialists for agents' time. This is important when time is needed to build an agent's interest in housing.
2. Some interested and qualified agents make excessive demands on specialist's time.
3. Some counties have not developed an effective method of reaching the people on housing problems.
4. The specialist has been delinquent in suggesting methods to agents for reaching the most needy group.
5. It is difficult to give agents sufficient technical training to make them proficient in solving housing problems.
6. Appealing and up-to-date plans are necessary for public acceptance. To keep this up to date plan service is difficult with student draftsmen.
7. Plans developed by U.S.D.A. are regional. Those now being developed are for the western region, and only a few are acceptable to North Carolina residents. It is expected that a change more favorable to the south will be made soon.

8. Too few families are using 4% Farmers Home Administration housing loans.
9. Elementary as well as currently new information needs to be taught to new agents and newly formed families.
10. New proved teaching techniques are needed.
11. Full use has not been made of community organizations as a channel for reaching people.

IV. WORK TO BE DONE AND METHODS OF PROCEDURE:

The continual upgrading of family living through improved housing is one of the final objectives of the Agricultural Extension program. The housing specialist will work mainly through the Extension agents in his contribution to the total effort. Two principal responsibilities are recognized by the housing specialist. The first one is agent technical training; and second, assistance to the agent in plans and methods of communicating housing information to the people so that they will be informed and motivated.

A list of planned activities of the housing specialist are:

1. Three district training schools will be held for home economics agents jointly with the house furnishing specialists.
2. Six new house plans will be developed and added to the plan service.
3. Attempts will be made to assist agents in three counties with organizing a builders club. Night programs for such clubs would further their knowledge in construction and functional planning.
4. The housing work with Negro agents has never been satisfactorily accepted by the Negro families in the state. A concentrated effort will be made in three counties to effect a plan that will reach the people, and with motivating force. The "Waterboy" sink cabinet with pump and 6-gallon water heater combination has ~~been~~ shown promise in one county.

Social-cultural linkage was achieved by this portable, inexpensive water system.

5. Seven demonstration housing projects will be completed and shown in 1961, and others will be planned.
6. Agent training and planning conferences will be held on a county basis all through 1961. This will include Agricultural Workers' Council meetings in many counties.
7. The specialist will encourage and assist three county staffs in planning housing tours. This will be in counties where there is need to build interest in housing.
8. Six television programs are planned for 1961.
9. Loose leaf sheets with drawing and building instructions on household storage units will be planned, printed, and distributed.
10. Visits with agents to work on individual housing problems will be continued. This work will be held to a minimum especially where capable agents are involved. It will be looked on as a chance to involve new agents and agents who have shown little interest in housing.
11. Ten per cent of the specialist's time will be devoted to improving himself in his specialty.

V. RESULTS ANTICIPATED AND WAYS TO EVALUATE:

Definite goals have been set for certain specialist activities. Evaluation will be made by actual count in such cases. Individual counties will be polled for certain result data where it is feasible to secure.

VI. PROJECTED NEEDS:

The need for new home construction in the United States is about 1,300,000 yearly. Of these 100,000 are farm homes. By the second half of the 1960's the World War II baby crop will be marrying and joining the labor force. A large increase in the number of new housing units will be needed by these newly formed families. They will contribute to a possible total increase of 1,000,000 households a year.

Farm Service Buildings

II. ANALYSIS OF PROJECT SITUATION:

In most North Carolina farm enterprises small, inefficient building units prevail. In recent years there has been a trend toward larger units in livestock production, often associated with confinement, or partial confinement, of animals. This trend has been most evident in poultry buildings where large, mechanized units, with birds completely confined, have become the rule rather than the exception for both broilers and layers.

Many questions concerning building design are still unanswered. In the case of poultry, mechanization of egg collecting is still a bottleneck in full mechanization of egg production. In broiler houses such troubles as disease, mortality, and poor feed conversion are being blamed on cold houses, and growers are under pressure from feed dealers to insulate and put more heat in houses.

Pork production is in a transition stage from farrowing and growing hogs on pasture with small individual buildings to growing them in complete or partial confinement in much larger units. Additional information on design of these buildings would be very helpful at this time. Particularly needed is data on the relation between disease control and building design and management.

Dairy and beef cattle operations show only a slight trend toward confinement production. Most of these farms have some land best suited to pasture, where it is not practical to grow and harvest crops with machinery. Even though most Grade A dairies involve buildings which could be used for complete confinement feeding, they are used that way only in the winter months. In beef there is a growing interest in eastern corn producing areas in drylot feeding, and this will increase the need for building and equipment planning.

With farmers turning to more and larger livestock enterprises to increase income, building cost is often a major obstacle to expansion. Low cost buildings are needed, but some farmers are cutting too many corners and are erecting buildings too weak to be economically sound. This has been shown by recent wind and snow storms in several areasof the state. Often an entire building was lost because of an obvious weakness at one particular point which could have been strengthened at very small cost.

Buildings of chief interest in crop production are grain storage, tobacco curing barns, and plastic greenhouses. (See sections on crop drying, bulk curing of tobacco for work with grain storage and tobacco curing.) There has been a growing interest in the use of plastic greenhouses for plant and vegetable production, and up to now we have been using information and plans from other states. Horticultural specialists have felt the need for up-to-date information on this subject for North Carolina conditions.

There has never been a close working relationship between the Extension Service and rural builders and dealers in the state. Generally, farmers and rural builders do not accept and follow closely information on buildings as it is being presented in plans and publications. Information needs to be not only technically accurate but presented in a way to be understood by non-technical people. Part of the reason for this situation is in the lack of sufficient time and competent drafting personnel for work on plans. Also involved is the fact that there are a great many good plans and information available from U.S.D.A. or other sources which is not being used in the state, either because it does not fit our conditions or because of personal preferences of some of the specialists in other departments.

III. MAJOR SPECIALIST'S PROBLEMS:

1. Need for more information on which to base building designs for this region, especially in swine and poultry production.
2. Need for more training of specialists.
3. Need for more training in farm buildings for agents.
4. Need for more farmsteads which will serve as demonstrations of good overall planning of buildings and equipment for various enterprises.
5. Need to present building information in a form that will have wider acceptance and use on the part of builders and farmers.
6. Need for more competent drafting personnel in order that building information may be taught through more accurate and readable plans.

IV. WORK TO BE DONE AND METHODS OF PROCEDURE:

1. Approximately 40% of the specialist's time will be spent in answering requests from agents for assistance in supplying information, training county workers, assisting with meetings, and visiting individual farms.
2. Work was begun in 1960 on a new and more usable book of equipment plans which will be placed in county agricultural agent and vocational agriculture offices. This book will be completed early in 1961.
3. Following completion of the equipment plan book, work will be started on a new book of building plans, similar in form. It will consist of 8½ x 11 sheets representing North Carolina and U.S.D.A. plans available. When these two books are completed, they should result in wider and more intelligent use of the plan service.
4. Efforts will be made to organize training for county groups of builders and dealers in approximately three pilot counties.

5. Work already begun will be continued with the objective of developing swine building plans better suited to methods of saving labor and controlling disease in confinement production. Under development are plans for a new farrowing house combining desirable features of several in use. Also work has been started on plans for a building designed to carry pigs all the way from farrowing to market in the same space. Observation has indicated that this may help in controlling certain diseases. As these plans are developed, they will be made available to growers interested in testing the designs.

6. Plans are being made to set up one or more field tests for the purpose of evaluating the use of insulation and higher room temperatures in broiler houses. If suitable cooperators can be located, these tests may be expanded to include other treatments, such as larger brooding areas, different types of brooders, and dividing houses by temporary partitions or curtains to permit heating only a portion of the house.

7. Assistance will be given to dairy specialists in organizing and conducting milking machine clinics as a part of a mastitis control program. This program will be concentrated in one or more pilot counties for the coming year.

8. A publication on the building and operation of plastic greenhouses is planned in cooperation with horticultural specialists.

9. In all farm buildings work which involves other subject matter specialists plans will be discussed and efforts coordinated so that information distributed will represent joint thinking.

V. RESULTS EXPECTED AND METHODS OF MEASURING:

1. The volume of plans distributed is taken as a good indication of the acceptance and usage of information available in this form. Records will be kept of plans distributed so that figures can be compared with

past and future years. These records, as well as agent reaction, should be particularly helpful in determining the effectiveness of the new plan books.

2. The reaction of builders and dealers to the special training programs in pilot counties will indicate the effectiveness of this approach.

3. Evaluation of efforts to develope better buildings for swine production will be largely by observation of those which are built on farms. These observations will be the basis of further improvement in order to make available the best possible plans.

4. Records will be kept to indicate the effectiveness of modifications in broiler house design or brooding equipment which are tested by growers.

5. The work on milking machine clinics in pilot counties will be evaluated by records of dairymen on mastitis troubles.

VI. PROJECTED PROGRAM NEEDS:

1. Call attention of research workers to new problems as they arise, in hopes that research programs in the future can be expanded to include work which will give more answers to practical questions that face farmers.

2. Continue and expand efforts to work with rural builders. As farms become larger and more complex, farmers will turn more to professional builders, and they will have increasing influence on what farmers build.

3. Continue efforts to present farm buildings information in more acceptable form.

IRRIGATION

II. ANALYSIS OF PROJECT SITUATION:

Research and farmer experience have definitely proved that irrigation will increase the net income in tobacco production. The amount varies from $100 per acre to several hundred dollars per acre, depending on amount and distribution of rainfall during the growing season. Irrigation is a neccessity for the nurseryman and is rapidly becoming a necessity for the commercial truck farmer.

For 1961 North Carolina has an allotted acreage of flue cured tobacco of 470,835 acres. Approximately 12 per cent of this acreage can be irrigated with equipment on hand. Assuming a season that irrigation will not be too much needed, tobacco farmers will realize approximately $5,500,000 additional income because of the practice. If the season is drier than normal, the additional net income because of irrigation may easily be as much as $15,000,000.

When this can be accomplished on 12 per cent of the allotted acreage, it is clearly indicated that income from tobacco production could be substantially increased by irrigating a larger acreage. There is no reason to believe that at least 50 per cent of the allotted acreage could not be irrigated.

The figures are not readily available, but similar comparisons could be made for other crops listed; and as our knowledge of irrigation increases, still other crops will be added.

Because of the crops grown, the variations in soils, and the undulating topography, sprinkler irrigation best suits the needs of North Carolina farmers.

III. MAJOR SPECIALISTS' PROBLEMS:

1. Lack of knowledge, or the acceptance of facts, on the part of people, of the value of irrigation in a humid climate. From the standpoint

of specialists' problems, "people" will be subdivided as follows:

A. Farmers (in general)

B. Paid agricultural workers (college personnel, county agricultural agents, vocational teachers, personnel of other agricultural and allied agencies)

C. Bankers and other allied businesses

2. Lack of knowledge or interest in proper design of systems.

A. Farmers

B. Distributors

3. Lack of knowledge of proper use and maintenance of equipment.

A. Farmers

B. Agents

IV. WORK TO BE DONE AND METHODS OF PROCEDURE:

(See III-1-A)

An attempt will be made to reach the maximum number of farmers principally through general educational and special interest meetings on the value of irrigation to them. Meetings will be conducted jointly by specialists and agents and by agents alone.

(See III-1-B)

At every opportunity special interest meetings, agent training programs, and work shops will be conducted for agricultural workers.

(See III-1-C)

Local county agricultural agents and irrigation equipment distributors will be encouraged to enlighten their key bankers on the value of irrigation and the need for sound financing. Specialists' assistance will be available,

and specialists as well as county agricultural agents will work directly with Farmers Home Administration supervisors.

(See III-2-A)

Special interest meetings will be conducted by specialists at the request of agents for the purpose of informing farmers what they need to know with respect to proper design of systems.

(See III-2-B)

Specialists will assist distributors with dealer training schools and will give some assistance to individual leaders with special problems dealing with system design.

(See III-3-A and B)

Special demonstrations will be conducted on proper use of equipment for the joint benefit of agents and farmers.

V. RESULTS EXPECTED AND METHODS OF MEASURING:

Through the program of informing and motivating people, it is expected that an additional 8,000 acres of crops will be irrigated in North Carolina in 1961.

The number of acres added will be determined from compiling gross sales of distributors and converting this to acres.

Results will be obtained from spot surveys in several counties. Comparisons between irrigated and non-irrigated acreages will be made.

DRAINAGE

II. ANALYSIS OF PROJECT SITUATION:

North Carolina contains approximately 4,000,000 acres of poorly drained land. This figure includes woodlands, muck soil acres, and wet sands, as well as wet areas that are cleared. It is generally accepted that one-fourth of the 4,000,000 acres is in cultivation, and that 980,000 acres have some form of drainage, but that not more than one-fifth of this 980,000 acres has adequate drainage for the crops commonly grown; and it is known that a goodly portion of the nearly level land on our mountain farms is practically lost because of wet areas produced by meandering streams. It is easy to understand that inadequate drainage of potentially good agriculture land is a statewide problem.

The salt water flooding of good farm lands by hurricanes has focused attention of farmers in tidewater North Carolina on the need for protection as well as for adequate drainage systems. There is a vast area of potentially good land in this area that could be cultivated if forced or pumped drainage was employed. Several projects are underway which have been set up for the protection of lowlands from flooding by sea water and for forced or pumped drainage on the cultivated side of the levees. These projects underway are trial ballons with wonderful prospects of proving successful.

III. MAJOR SPECIALIST'S PROBLEMS:

1. Lack of knowledge on the part of farmers (and to a lesser degree on the part of agricultural workers) of the importance of adequate cropland drainage.
2. Lack of cooperation or coordination among educational and action agencies.

IV. WORK TO BE DONE AND METHODS OF PROCEDURE:

An Extension specialist will assist agents in planning and conducting their county educational programs. In special cases assistance will be given in conducting educational meetings and field demonstrations. This work will be done primarily for the benefit of agent and leader training. The educational program will include informing farmers and making recommendations for their seeking service from other agencies capable of and set up to render such service. Agents will be supplied with teaching aids so that they may feel confidence in carrying on educational programs.

V. RESULTS EXPECTED AND METHODS OF MEASURING:

In any extensive drainage program some additional land will be made available for crop production. Our primary objective with our drainage program is to teach how to adequately drain land that is already in crop production. Additional income per acre will be realized when these wet lands are adequately drained. Approximately 85,000 acres of cropland will be adequately drained during 1961.

Definite inventories of such projects are practically impossible. Overall results will be indicated by the land adequately drained as reported by the State A.S.C. office; and, in addition, check surveys will be conducted on special demonstrations that are completed.

CROP PROCESSING AND FARM ELECTRIFICATION

II. ANALYSIS OF PROJECT SITUATION:

A. Grain

North Carolina farmers produced approximately 124,000,000 bushels of grain in 1960, of which 90,000,000 bushels were corn. The record crop of 1960 was due partly to the favorable climatic conditions and improved production practices (46 bushels per acre average for state) and partly to the gradual increase of acreage planted each year. An estimated 40,000,000 bushels of corn have moved into market outside of North Carolina with 800,000 bushels moving into foreign markets from North Carolina ports.

Export markets were pleased with the quality of corn sold in 1960 as a result of emphasis placed on allowing corn to dry naturally in the field until the moisture content was reduced to 25% before being harvested and artificially dried.

Approximately 3 bushels of corn per acre were lost in the eastern half of the state because of Hurricane Donna.

Because of the limited number of farm and commercial driers available to handle high moisture corn, a considerable amount of corn soured before it could reach a drier. In many instances corn was held in "wet" bins for 48 to 60 hours with moisture contents as high as 25%.

There now exists in North Carolina approximately 24,000,000 bushels of commercial grain storage. The majority of these storage facilities have no means of drying grain.

Approved farm storage increased by 7,000,000 bushels in 1960 because of the continued depressed price at harvest. Commercial

buyers of corn in eastern North Carolina have discontinued paying farmers a "flat price" for corn regardless of the moisture content. Moisture discounts are severe, and farmers in this area are moving rapidly to the practice of drying on the farm and marketing the grain in an orderly manner. It is estimated that 95% of all farm storage added in 1960 was equipped with some means of drying the grain.

Grain storage facility loans through the ASC are increasing. In 1959, 530 loans were processed which would handle 2,500,000 bushels of grain. In 1960, 941 loans were made for 4,500,000 bushels of grain.

The support price for grain under the government loan program is dropping. In 1959 North Carolina farmers could borrow at the rate of $1.21 per bushel. In 1960 this was reduced to $1.15 per bushel.

The consumption of grain in North Carolina is increasing. During 1960 it was estimated that approximately 31,333,000 bushels of grain were used in the poultry industry of the state. The predicted gains in number of birds to be produced in 1961 would mean that there would be an increase consumption of about 1,500,000 bushels of grain during the year.

Dairy farmers are increasing slightly the amount of grain fed per cow. The total number of dairy cattle in the state will be about the same for 1961 as in 1960. The number of Grade A herds reduced from 4200 in 1959 to 4000 in 1960. This trend is to continue into 1961. The size of the herds, however, is increasing.

Swine production in 1960 reached the low point on the usual four year cycle. It is estimated that the number of animals to be produced in 1961 will be considerably higher than in 1960. Livestock specialists predict that the increase in number of animals produced

will be greater than normal, which may mean that the cycle will tend to be completed in two to three years rather than the usual four years.

The number of beef cattle produced will be about the same in 1961 as in 1960.

With the increase in hog production, the total consumption of grain by all meat animals will increase during the year. It has been estimated that a total of about 1,650,000 tons of feed are consumed annually by the meat animals produced in North Carolina. A major portion of this feed will be from grain products.

As our consumption of grain increases, the greater will be our need for more commercial and farm storage in North Carolina.

More manufacturers of grain drying, storage, and handling equipment are entering the state through many local distributors and dealers. One manufacturer within the state has made considerable effort to cooperate completely with the Agricultural Extension program in the promotion of more and better farm grain storage.

B. Peanuts

In 1960 North Carolina farmers were allotted 168,128 acres of peanuts. The expected yield will be slightly more than 1,825 lbs. per acre. The number of farm curing installations for peanuts increased during 1960 by approximately 100. More than a dozen commercially operated custom peanut curing installations were made.

The acceptance of peanut curing by the processors will have considerable effect on the increase of these facilities in 1961. As new bulk buying stations are constructed, it is anticipated that curing facilities will also be planned as a part of the operation.

Weather continues to be a hindering factor in the operation of windrow harvesting equipment. This has encouraged many farmers to experiment with new techniques of handling green peanuts. Research efforts are being made to determine conditions that may be satisfactory for handling peanuts of high moisture content.

The acceptance of new design for a home constructed peanut curing building which reduced the investment in the curing facility resulted in many new installations in 1960 and should have some effect on the number constructed in 1961.

C. Tobacco

A field test with bulk curing of tobacco during 1960 and the publicity given this test have created considerable interest among farmers in this new technique. It appears that the tobacco industry might accept the tobacco cured in this manner; however, it is important that more bulk cured tobacco be placed on the selling floor before predictions can be made as to the general acceptance of this system.

Due to the relatively high initial cost for the only commercially manufactured bulk curing unit and the unavailability of a plan for a home constructed bulk curing unit, it is anticipated that farmers will be slow to move toward bulk curing of tobacco. Many farmers have expressed a desire to build their own facility with information now available. Other manufacturers of tobacco curing systems are also working on a new design for bulk curing. The results of experimentation by these companies and the few farmers buildimg their own systems may have some effect on the immediate trend toward bulk curing.

D. Feed Processing and Handling

Herd sizes are increasing on dairy, beef cattle, and swine farms

in North Carolina. Poultry production is also increasing, with an anticipated 5% increase in the number of broilers, layers, and turkeys on North Carolina farms in 1961. These trends provide farmers with a better bargaining advantage for buying feed and for marketing their products. They also favor a more efficient production system.

New developments in feed processing and handling systems encourage on-the-farm feed manufacturing and mechanical feed distribution.

The use of more field shelling equipment for harvesting corn is forcing many livestock producers to move away from ground ear corn which in itself makes possible the use of smaller, less expensive, and automatic feed grinding and mixing equipment.

Since approximately 80% of the cost of producing livestock is for feed, it is natural that farmer interest is new techniques to reduce these costs is increasing.

Competition among feed manufacturers and increased farm feed processing is resulting in lower feed costs in many areas of the state.

E. General Farm Electrification

On June 30, 1960, it was estimated that 97.3% of North Carolina farms had electric service. Information available from REA financed electric cooperatives indicate that total electric power consumed on the farm has increased from 10 to 15% whereas the membership has increased approximately 2% during the past year.

Specialization of farming activities and the increased size of production units have been key factors affecting the acceptance of electrically powered farm equipment. Quality consciousness has also affected acceptance of certain specialized equipment such as bulk milk coolers. In 1960 more than 90% of all Grade A milk producers in this state were equipped with bulk milk coolers.

Other types of specialized equipment will also find a place on farms as the demand for quality products increases.

The enrollment in the 4-H Electric Project and the participation in the 4-H Electric Demonstration Program have remained at nearly the same level during the past three years. Lack of interest in certain mountain counties resulted in no awards being made to boys in the 4-H Electric Project for one area.

The North Carolina Farm Electrification Council continues to sponsor special interest meetings of statewide significance to electric power distributor personnel. Conflicting interests continue to disappear as representatives of the different power suppliers meet to discuss common problems in the promotion of new farming technology involving electrical equipment.

The continued reluctance toward establishing a stronger Council through the adoption of an aggressive educational program and the hiring of an Executive Secretary has prevented the North Carolina Farm Electrification Council from becoming a strong educational force. The fear of losing identity among the customers of certain power suppliers has prevented their accepting fully a program involving a salaried employee and an extensive budget.

III. MAJOR SPECIALIST'S PROBLEMS:

A. Grain

1. Ignorance of farmers and business men of the economic advantage of drying and storing grain for orderly marketing within the state.
2. Desire of farmers in commercial corn counties to harvest corn at too high moisture content.

3. Lack of information about grain drying on the part of grain drier and storage bin representatives, agricultural representatives for electric power distributors, and county agricultural agents.

B. Peanuts

1. Lack of information concerning certain factors in curing procedures that affect peanut quality.
2. Ignorance of farmers, representatives of peanut curing equipment manufacturers and certain county agricultural agents to proper methods of drying and handling artificially cured peanuts.
3. Farmers' and peanut buyers' lack of knowledge concerning economic advantage to windrow harvesting and artificially curing peanuts.

C. Tobacco

1. Lack of information concerning bulk curing facilities economically suitable to North Carolina farms.
2. Lack of information on part of farmers concerning operating procedures of bulk curing systems.

D. Feed Processing and Handling

1. Ignorance of farmers of advantages of farm feed processing.
2. Ignorance of farmers of saving in labor possible through mechanized feed distribution systems.
3. Lack of knowledge by county agricultural agents concerning equipment available for feed processing and handling which results in his inability to intelligently discuss economic advantages and system design of feed handling systems.

E. General Farm Electrification

1. Ignorance of farmers concerning the need to maintain a safe electrical distribution system as more electric power is used in the home and on the farm.

2. Lack of knowledge on the part of farmers and county agricultural agents of the economic advantages of using electrical powered and controlled equipment for improving efficiency and product quality.
3. Lack of materials suitable for county Extension agents' use in effectively influencing adult and 4-H member opinions concerning the proper use of electrical equipment.
4. Lack of training on part of county Extension workers in farm and home electrification practices.

IV. WORK TO BE DONE AND METHODS OF PROCEDURE:

A. Grain

1. Through district workshops train county agricultural agents in the essentials for designing a farm grain drying and storage system.
2. As Chairman of the North Carolina Grain Production and Marketing Committee, direction will be given to the total educational program jointly conducted by the cooperating departments and agencies.
3. Assist with county grain schools for farmers, training agents in details of drying and storage practices.
4. Conduct farm grain drying and storage workshops on the campus for agricultural engineers employed by electric power suppliers and also for representatives of grain drying and storage bin manufacturers.
5. Participate on the Carolina Grain & Feed Dealers' Association annual program, keeping grain buyers informed of assistance needed by farmers in securing more drying and storage facilities.

B. Peanuts

1. Work with research agricultural engineers to interpret new research data for farmer use in improving quality of artificially cured peanuts.
2. Hold workshops for agents in peanut producing area with other subject matter specialists. Purpose of workshops will be to present to county agricultural agents the latest information available on peanut handling.
3. Inform all sales representatives of peanut drier manufacturers serving the state of the latest data available on curing and handling of peanuts.
4. Maintain intimate contact with peanut buyers and processors to determine future needs in peanut curing techniques.

C. Tobacco

1. Study more completely bulk curing procedures by working with new facilities to be erected on research farm.
2. Assist county agricultural agents with problems that may occur with new bulk curing facilities operated by individual farmers.
3. Observe new home constructed bulk curing installations accumulating information necessary to prepare a plan for future farmer use.

D. Feed Processing and Handling

1. Assemble information and prepare mass communication materials relating to successful farmer installations of feed processing and handling systems.
2. Assist with equipment displays at diarymen's conference and other field days of the year on material handling systems.
3. Prepare teaching aids for agricultural agents on farm feed processing and handling.

E. General Farm Electrification

1. Actively promote a Farm Electrification Council workshop on automatic controls for farm equipment.
2. Prepare mass media materials concerning need for maintaining a safe electrical distribution system on the farm.
3. Assemble and distribute to county agricultural agents information concerning the need for more selective purchasing of labor-saving electric powered farm equipment.
4. Prepare adult leaders' materials helpful in the 4-H Electric Project.
5. Assist selected counties with planning effective 4-H Electric programs.
6. Seek sponsorship of adult leader recognition in the 4-H Electric program.
7. Seek to have established a statewide advisory committee for the 4-H Electric program.
8. Prepare a 12-minute sound color movie on 4-H electric demonstrations.

V. RESULTS EXPECTED AND METHODS OF MEASURING:

A. Grain

1. An addition of 7,000,000 bushels of farm grain storage in North Carolina with drying capacity equal to the new storage capacity. Information concerning the new facilities will be obtained through the State ASC office and representatives of drier and storage bin manufacturers.

2. A closer working relationship between grain buyers and the educational agencies promoting farm grain storage. Results will be measured by the cooperation received in conducting grain schools throughout the state and the interest shown at the annual Grain and Feed Dealers' Association meeting.

3. A more adequately trained group of electric power company representatives assisting with county agricultural agents in promoting more and better grain storage facilities.

B. Peanuts

1. More farm peanut curing installations turning out a better quality peanut for the market. The number of new installations will be determined by survey of the county agricultural agents and the peanut drier representatives in the state. Quality will be determined by contacting the peanut buyers in the state.

2. A more informed sales force of peanut driers in North Carolina. This will be determined by comments made by agents and farmers concerning their contact with dealers.

C. Tobacco

1. The assembling of enough information to prepare a plan for farmer use in building a bulk curing system on the farm.

D. Feed Processing and Handling

1. An increase of at least 50 farm feed processing systems through county agricultural agent promotion, and also a more active promotion on the part of agents of the farm feed processing advantages. This will be measured by the number of requests for teaching aids prepared for this purpose.

E. General Farm Electrification

1. An adequately planned leader recognition program for the 4-H Electric Project.
2. An increase in the number of counties participating in the 4-H Electric Congress to at least 85 counties.
3. A 20% increase in the 4-H Electric Demonstration Program participation.

FARM FENCING

II. ANALYSIS OF PROJECT SITUATION:

The need for an educational program in farm fence construction is evidenced by the poor quality of fences on North Carolina farms.

The majority of farm fences are poorly constructed regardless of quality of posts and wire used.

Fences require many times the hours of maintenance they should require.

Farmers are becoming conscious of the need for better fencing because of the increased interest in livestock farming.

III. MAJOR SPECIALIST'S PROBLEMS:

1. Lack of know-how of proper fence construction.
2. Inclination to continue using grandpa's method.

IV. WORK TO BE DONE AND METHODS OF PROCEDURE:

1. The post life and end post bracing demonstrations in six counties will be maintained and publicized.
2. A course in fence construction will be taught at the State Forestry Camp.
3. A limited number of fence construction demonstrations will be conducted in counties requesting such assistance.
4. News articles will be used to publicize demonstrations and good farmer constructed fences.

WATER SYSTEMS

II. ANALYSIS OF PROJECT SITUATION:

On December 1, 1960, the North Carolina Rural Electrification Authority estimated that 97.7% of North Carolina farms had electricity. Only an estimated 56% of these farms have running water. This means that 44% of our farmers are still spending approximately 770 hours per year pumping and carrying water. 40% of this total, or 308 hours, is for household use and the remaining 60% for livestock watering.

North Carolina farmers are realizing the value of a good water system. This is made clear by the fact that the number of water systems on North Carolina farms has almost doubled during the past ten years. Most farm owners have a complete water sysem in their homes. However in the tenant and low income group the per cent having water systems is low.

Nothing would raise the standard of living of these groups more than a good water system. Attempts will be made to reach them through combined efforts of specialists, county agricultural and home economics agents, and 4-H Club members.

III. MAJOR SPECIALIST'S PROBLEMS:

A. Lack of proper appreciation on the part of agents and farmers (landowners and tenants) of the need for a good water system and for proper maintenance of that system.

B. Lack of knowledge on the part of agents and farmers of methods of designing an economical, more efficient water system.

C. Competition from other commodities that farmers would like to purchase or feel that they need more than a water system. (This may be stated as a lack of motivation on the part of agents and specialists to help farmers to see the value of a good water system.)

IV. WORK TO BE DONE AND METHODS OF PROCEDURE:

A. To educate agents and farmers to the need for a good water system and the maintenance of that system. This will include demonstration of water systems in several key counties that have a high percentage of farmers who do not have water systems or who have poor water systems. Also included in these demonstrations will be methods of properly maintaining the systems. These will be method demonstrations.

B. To educate agents and farmers on ways of designing economical, more efficient water systems. General educational meetings will be held to acquaint agents and farmers on good design procedures, on ways to use farm labor, and ways to save money and still have an efficient system. Pilot counties will be selected to demonstrate the "Waterboy" system. The "Waterboy" system is an inexpensive partial water system which anyone in North Carolina can afford. It consists of a cabinet sink, water pump, and water heater; and it can be designed to be portable.

C. To motivate agents to promote more, better, and more efficient water systems. This will be done by visits with agents and through general educational meetings on water systems.

D. An attempt will be made to start a 4-H Club Water System Project. It is hoped that 4-H members can be interested in such a project. The work they will do will be determined by the needs on their own farms or other farms in the community. If the project is successful, it will be integrated with the total 4-H program. Materials will have to be prepared for adult leaders and for the 4-H members.

V. RESULTS EXPECTED AND METHODS OF MEASURING:

A 5% increase in the number of water systems on North Carolina farms is expected in 1961. Most of this increase will be among our tenant farmers.

Power company surveys and county agent surveys will be used to determine the per cent increase. Also in the pilot counties through Extension efforts we expect 60 farmers per county to add water systems. This increase will be measured by contact with county agricultural agents in the pilot counties.

A successful 4-H Club Water System Project will be the result expected in working with 4-H Club members.

FARM AND HOME SAFETY

II. ANALYSIS OF PROJECT SITUATION:

Home and farm accidents claimed the lives of 49 North Carolinians in September, 1960. During the same month motor vehicle mishaps claimed 112 lives, and all other accidents combined accounted for 40. During the first eight months of 1960 all accidents claimed the lives of 1916 residents of the state.

The breakdown of fatilities due to major types of accidents was as follows:

Motor vehicles	889
Home and farm	615
Others	412

The loss of human life is terrific; but in the shadow of this loss are thousands of other accident victims, many maimed for life.

It is impossible to place a dollar and cent value on the cost of these accidents, but it stands to reason that a fraction of the cost spent in prevention could have saved many lives and diverted a vast sum of money into other channels.

III. MAJOR SPECIALIST'S PROBLEMS:

1. Lack of awareness of the seriousness of the problem on the part of people.
2. Lack of sufficient emphasis in educational programs.
3. Lack of coordinated effort on the part of those stressing safety.
4. Insufficient facts on farm and home accidents in the state.

IV. WORK TO BE DONE AND METHODS OF PROCEDURE:

1. The major effort during 1961 will be guiding the newly organized State Safety Council in analyzing the situation, defining the major problems, and establishing both long time objectives and short term goals. A program will be conducted to coordinate efforts of all interested organizations in accomplishing these goals.
2. Each Extension Agricultural Engineering specialist will be encouraged to step up his efforts to stress safety in his segment of the overall program.
3. An Extension Agricultural Engineering specialist will serve as secretary of the North Carolina Rural Safety Council and also as chairman of the Council's Executive Committee.
4. A farm pond safety program will be conducted with an estimated twenty counties participating.
5. A coordinated highway traffic safety program between the Agricultural Extension Service and the North Carolina Motor Vehicles Department will be conducted.

   Every uniformed Highway Patrol officer, ever county agricultural agent and assistant agent, and every home economics agents and assistant home economics agent will be contacted and presented with a fact book and a suggested plan for launching a county traffic safety program.

V. RESULTS EXPECTED AND METHODS OF MEASURING:

The results will have to be measured in terms of those participating in the program and in terms of those contacted during 1961.

Tangible results will be obtained in the form of demonstrations and meetings held, T.V. shows conducted, etc.

It should be definitely understood that time and considerable effort will be required before people are made aware to the point of reducing accidents on any broad scale.

GENERAL

4-H CLUB WORK:

More time is being devoted to 4-H programs in general by the specialists of this department at present than has ever been done in the past. Major emphasis by Extension Agricultural Engineering Specialists in 4-H Club work is given to the areas of machinery, rural electrification, and safety. In 1956 and again in 1957 we had a national winner in safety; in 1958 and 1959 we had a national winner in tractor maintenance; and in 1960 we had a national winner in the automotive project.

Emphasis will be placed again on these 4-H Club programs, and the amount of specialist time devoted will be increased.

4-H SHORT COURSE, STATE FAIR, COOPERATING IN CONDUCTING SHORT COURSES PLANNED BY OTHER DEPARTMENTS, ETC.:

All members of this department will participate in conducting these annual programs. Definite plans for these programs have not as yet been made for 1961, but each specialist in the department will spend a great many days in planning and conducting engineering activities during these programs, and time for them has been allotted.

SPECIAL FARM ENGINEERING PROBLEMS:

There is a large variety of problems of an engineering nature that confront an Extension Agricultural Engineer on each trip to the field and in his office work. Many agent requests are received for assistance with general problems. A few of these problems are on general farm sanitation, the construction and management of farm ponds, farmstead planning, land clearing, special field days, etc. For such phases of an engineering program only tentative plans can be made, but some time must be allotted.

A number of lines of work have been indicated in this general plan of work even though only a few days of planned time in the field have been allowed.

These projects have been included because it is anticipated that they will grow in importance, and more time will be devoted to them in the future. It should not be construed that projects not now being given the attention that they deserve are not considered important by the specialists of the department. It is merely because in allotting time, emphasis must be placed on the lines of work that the general program demands assistance with during the current year.