NORTH CAROLINA

AGRICULTURAL EXTENSION SERVICE

ANNUAL REPORT

for

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Name of Project: EXTENSION AGRICULTURAL ENGINEERING

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TABLE OF CONTENTS

FOREWORD

The Extension Agricultural Engineering Department is charged with the responsibility of conducting that segment of the overall Agricultural Extension Service program that deals with educating and motivating people to make the best possible use, from an economic standpoint, of labor, power, and equipment. This educational program is necessarily broken down into different areas; and in the area dealing with engineering, it is further broken down into phases with an Extension Agricultural Engineering Specialist responsible for each phase.

Two full time specialists conduct an Extension farm machinery and equipment program. There are now approximately 140,000 farm tractors being operated in North Carolina. These tractors represent approximately 3,500,000 horsepower. These tractors, plus the associated machinery, make up the major investment item on most farms. A very high percentage of this machinery is poorly maintained, which results in excessive repair and fuel bills that might easily be reduced considerably by a better schedule of simple daily maintenance.

As power farming progresses, the need for knowledge of how to repair and maintain power equipment will be stressed. Due to the fact that the tractor is the major machine around which power farming revolves, its proper maintenance and use have been highlighted in the 1960 program.

In the field of farm buildings, two full time specialists are employed. One has responsibility for the general farm buildings program, the other with housing. The general buildings program consists of working with agents on county programs by conducting special interest meetings, construction demonstrations, buildings clinics, and by the preparation of visual aids for agents' use. A buildings specialist has been very instrumental in the construction of county

agricultural office buildings. This specialist works with the county agencies which will be housed in the new building, and with them plans space allotment, general arrangement, etc. These preliminary plans are then turned over to the architect for final planning.

The program in housing follows the same general pattern as the program for farm service buildings. A rather unique segment of this program is that of the result housing demonstration. This program consists of working closely with a few key families in the construction of a new home or the remodeling of an old one. Plans are prepared by the specialist to fit the needs of the family involved and to furnish necessary construction supervision during actual construction. As nearly as practical, complete records are kept; and slides are made of the major steps of construction. Many method demonstrations are conducted by the agents while construction is underway. These demonstrations furnish complete reports of costs, labor, and materials along with a set of slides for use by the field agents. While it is recognized that only a few individuals are benefited by this program from the standpoint of better housing, many agents are trained and valuable cost data obtained.

Another phase of the farm buildings program is a farm buildings plan service. Free plans are distributed to the citizens of the state, and this service will be explained more fully in the body of the report.

One full time specialist devoted the major part of his time to crop processing, with the remainder on rural electrification. The objective of this program is to teach farmers to make more and better use of electricity, and insofar as possible to eliminate crop losses caused by lack of drying facilities. Mechanization has intensified the problems in this area tremendously. First, the problem of safe storage has been magnified while the necessity of removing every possible risk has been greatly intensified.

For those enterprises where it was known to be economically feasible, on-the-farm feed mixing was emphasized.

Irrigation has been accepted as a production tool by our most progressive farmers. A lot of educational work remains to be done before it will be generally accepted. Progress is slow, but each drought adds more growers to the ever-expanding numbers of irrigation conscious people.

The specialist responsible for the irrigation program also assists agents with their county programs of other phases of land improvement. The two principal parts of this program, other than irrigation, are drainage and soil conservation.

This specialist also conducts programs on the improvement of farmstead water systems, fence construction, and a number of minor programs.

In each phase of the engineering program we are concentrating attention on helping people to recognize their problems, and then proceeding through the demonstration method of teaching them to help themselves. Insofar as possible demonstration meetings conducted by specialists are pointed directly toward agent and leader training.

A large number of miscellaneous activities are carried on by the personnel of this department. Among them are assisting in the conducting of programs covering farm safety, rural telephones, rural fire prevention, 4-H Club work, farm ponds, farm sanitation, etc.

Changes are continually being made in the Agricultural Engineering Extension program in an attempt to keep it working toward more efficient production coupled with sound conservation practices.

As the Agricultural Extension program expands, and as the requests for engineering assistance increase, work in connection with coordinating the efforts of the specialists within the department and of the department with

other subject matter departments increases. These facts and additional administrative responsibilities make it necessary for the specialist in charge to spend more time in the office with each passing year.

FARM MACHINERY AND MECHANIZATION

MAJOR PROJECT AREAS (Two specialists)

1. Tractor and Farm Machinery Extension Schools:

Mechanization continues to be a significant consideration in North Carolina agriculture, and farmers are becoming more and more alert to possibilities of mechanization and even automation. This is a means toward improving efficiency and maintaining insofar as possible, a reasonable net profit from their farming enterprises. Training Schools on various phases of farm machinery, ranging in duration from three hours to as much as three days, have been held throughout the state during the past year. Requests for assistance come from county agricultural agents, vocational agriculture teachers. In some instances local implement dealers ask for assistance as well as rendering invaluable service in this field of activity.

Over a period of several years a number of teaching aids have been developed, such as working models, charts, mimeographed hand-outs, color slides, supplemented by the use of actual machinery furnished by dealers, distributors, and manufacturers.

Since few of our county agents are trained in Agricultural Engineering, special agent training schools dealing with power and machinery subjects are quite appropriate and an important phase in our overall activity.

Tractor maintenance and Automotive Leader training schools, including assistant agents who normally do 4-H work, have been a most effective means of promoting the 4-H tractor and automotive projects.

An ever-increasing number of requests are received each year from vocational agriculture supervisors for assistance in further training vocational agriculture teachers. Teachers also frequently request our assistance with their adult classes.

2. 4-H Project Activities:

There are two 4-H projects, namely Tractor and Automotive, in which power machinery Extension specialists assume a leading role. Assistance is rendered to agents, local leaders, and club members in these two projects. During the year three three-day training schools for adult leaders and 4-H agents were held at State College, Raleigh, and A & T College, Greensboro. Two area leader training schools were held for counties participating in the Automotive Project, with interest rapidly increasing.

As a part of the tractor project, many county tractor operator contests are held annually by which county contestants are selected to compete in district competition. From a state contest during 4-H Club Week, a state champion is selected, finally to compete in regional competition with 20 or more other state winners. In addition to this organized plan that has been in operation for several years, the North Carolina State Fair in cooperation with the Farm Equipment Dealers' Association and Agricultural Extension Service has set up an annual 4-H tractor driving contest, and in 1960 included a plowing contest. Attractive trophies and substantial cash awards make the State Fair driving and plowing contests extremely attractive to 4-H members enrolled in the tractor project, and is a stimulating influence in the matter of participation. To be eligible for State Fair competition a contestant must place first, second, or third in an Extension district contest.

While the automotive project is still in its infancy and is only now in its second year past the pilot stage, there does appear to be considerable interest, and it is anticipated that an increasing enrollment may be expected.

3. Farm Machinery Field Days and Demonstrations:

Since farm machinery in general is undergoing rapid changes with many innovations being constantly introduced, it is only logical that such new items

be field demonstrated and presented to the farmer so that he, in turn, may determine its adaptability to North Carolina agriculture. Such field day programs may involve tillage machinery, planting and fertilizer equipment, along with fungicide, herbicide, and other pesticide control equipment.

Since multiple row units are becoming more and more popular in North Carolina, more work is being included in the selection and efficient methods of setting up and operating both planting and cultivating equipment. Special emphasis has also been given to the proper use of spray equipment in weed, disease, and insect control.

Mechanical peanut and cotton harvesting has been of special interest during the past year with many improvements being made, not only in the harvesting machinery, but in cultural practices which contribute to their more efficient use. A number of harvesting demonstrations were arranged jointly with local implement dealers, county agricultural agents, and Commodity Promotion Associations with the idea of further promoting wide-spread use and adaptation of modern mechanical harvesting methods.

Several field meetings and demonstrations in both forage and grain crops have also been included.

Much of the Agricultural Engineering work in farm machinery is done jointly with other specialists, thereby making it possible to present a more complete and well rounded meeting or demonstration than would be possible with specialists working independently. This system has been particularly effective in both county-wide cotton meetings and field demonstrations involving the Agronomy cotton specialist, Entomology, soils fertility, weed control, and Agricultural Engineering specialists.

Similar joint efforts in tobacco and peanut production activities have also been quite effective.

3. Commodity and Short Course Groups:

The Agricultural Engineering specialists in farm machinery are called upon frequently to participate in the instructional programs arranged for commodity and short course groups meeting on the campus throughout the year. Such groups include the North Carolina Cotton Promotion Association, Pesticide School, Modern Farming Short Course, and others.

4. Radio and Television:

Farm machinery specialists present regular television shows averaging one show per month with an approximate equal number of radio presentations. Television shows are presented live through the University system television facility located on the campus and are also taped for later presentation by other television stations. Radio tapes were prepared in the college studio for distribution to many stations throughout the state and live shows with agents in the counties were presented on several occasions.

5. News Articles, Bulletins, and Farm Machinery Memoranda:

Timely news articles have been prepared throughout the year dealing with farm machinery and related subjects which receive general distribution to both daily and weekly papers in the state.

Assistance has been given the cotton specialist in the preparation of a new cotton production bulletin, and the weed control specialist in preparation of two new weed control leaflets. A section was also contributed to the Pesticide Manual dealing with nozzles, spraying and dusting equipment.

Four Agricultural Engineering Farm Machinery Memoranda were prepared during the year.

6. Other Activities:

Both Specialists attended a one-week Communications Workshop, also several

out-of-state meetings and conferences. One specialist completed 3 credit hours of graduate study.

7. Statistical Record of Specialists' Activities in Farm Machinery:

Specialists' days in field	244
Specialists' days in office	228
Visits to agents	220
Visits to others	82
T.V. shows	12
Radio programs	11
News articles	7
Bulletins and memoranda	6
Meetings and demonstrations	192
Attendance at meetings and demonstrations	8189

FARM STRUCTURES

Housing

The surge of home improvement in North Carolina begun after World War II still seems to be strong. A recent report showed that in 34 of the largest urban areas there was an increase in construction work of 7% in 1960 over 1959. This is contrary to the national picture in which construction was down as much as 24% in some months of 1960 under the 1959 figures. A preliminary estimate made by the U. S. Department of Labor indicated that house construction for the country would be about a fifth below that of 1959. Preliminary census reports show that the United States gained 27% in housing units during the decade from 1950 to 1960. During the same period North Carolina gained 25% in housing units. This was an average for the South.

North Carolina, like its southern neighbors, has long been below the country average in housing standards and still needs great emphasis on house improvement. A continuous effort is being made by Extension to up-grade housing in the state. Progress is being made, but there still remain many rural families without the minimum standards in their houses. For instance, it is estimated that more than 30% of the rural families in the state lack the basic standard of running water.

WHAT WAS ATTEMPTED

The Extension housing program in North Carolina consists of two phases, namely promotional and technical. Promotional work has to do with increasing interest in house improvement and motivating families to action. The technical phase has to do with functional requirements for family living and in construction materials and methods. Both phases have received attention to the state level. There are, of course, some counties that are not as strong as others in doing housing work. Housing is considered to be a responsibility of the total

county staff, but the home economics agents and the Farm and Home Development agents (both men and women) have carried the housing load in the counties to a large extent.

HOW THE WORK WAS CARRIED ON

1. Agent training is considered to be the primary job of the housing specialist. Most of his efforts are directly or indirectly aimed at increasing the agents' knowledge and interest in housing. A total of eleven meetings were conducted for agent groups with an overall attendance of 472.

2. Another phase of agent training is work with agents on housing problems which they are unable to solve in their counties. A total of 82 visits were made with agents on problems of farm housing. This is a realistic type of training as well as providing excellent on-the-spot training for agents. In addition to this it causes the agent to become more interested in home improvement.

3. Another phase of agent training was the 3-weeks summer school course on rural housing. This course was taught by the specialist and had to do with realistic problems in rural housing. College credit of 1½ hours was earned by this course.

4. The result demonstration housing program was continued in 1960. A total of two houses were open for public inspection. Many others were planned, and construction has been partially or fully completed on five houses. This phase of the program furnishes housing specialists with pictures and cost information that is used in agent training to good advantage. In counties where agents have had few calls for housing assistance, the result demonstration house has proved to focus public attention on the county Extension office as a valuable source of information on housing.

5. The new house plan book distributed to agents in 1959 has caused about a 40% increase in the number of house plan requests. Requests jumped from 1084 in 1959 to more than 1400 in 1960. Three new plans were added in 1960.

6. Requests from agents for the specialist to conduct housing meetings totaled 17 in 1960 with an attendance of 635. This type of meeting is requested by agents for getting information to home owners directly from the specialists. The agents feel that some of the housing information is too technical for them to handle, or they are not familiar enough with the subject to conduct the meeting. Such meetings are, of course, also training for the agents.

7. During 1960 a list of suggestions for a county Extension housing program was mimeographed and sent to all the county agricultural agents and county home economics agents. It was felt that new agents especially needed some concrete methods for reaching the people with a housing program. They also needed to know what help could be expected from specialists in conducting a county housing program.

ACCOMPLISHMENTS

Emphasis on housing by specialists has been on agent training. It is felt that a fairly effective program was carried out as has been detailed. A continuous effort has been made to help the agents to become conscious of the housing conditions in their county.

Home improvement for some has been very rapid, but there remains, of course, a low socio-economic group where it is slow. By referring to the total annual report of the county Extension workers, the number and extent of home improvements can be seen.

SPECIAL REPORT

It has been known that the number of North Carolina Negro families with running water in their homes is low in comparison to the state as a whole.

There are around 1600 Negro families in Nash County, and the Extension Negro agents estimated that fewer than 10% had running water.

In February 1960 the Extension Agricultural Engineering specialist met with the Extension Negro agents and about 40 Negro neighborhood leaders in Nash county. The specialist demonstrated a home-made wooden cabinet, 4 feet long, that gave promise to low income families for home improvement. The cabinet contained a sink, a 6-gallon water heater, a water pump, and a drawer. The equipment demonstrated would give reasonable service, and the total could be had for as little as $150. This equipment was compared to the cost of a portable television set which cost $157.

Agents reported that a total of 64 families agreed to install this unit in their homes. For tenants it could be made portable, and plans were furnished for a portable unit. By the end of the year a total of 25 families had installed this piece of equipment. It is felt by the specialist that a family without hot and cold running water could not obtain more for so little money. Encouraging the use of this inexpensive unit, named "The Waterboy," will be continued in 1961. It can be the beginning of a complete system for some, but for others it may be all that can be afforded.

SUMMARY OF SPECIALIST'S ACTIVITIES ON HOUSING

Specialist's days in field	100
Specialist's days in office	135
Visits to agents	82
Assistance at meetings	28
Attendance at meetings	1107
Result demonstration houses shown	2
Attendance at showing of result demonstration houses	500
New house plans added to book	3
News articles	3
T.V. programs	6

Farm Service Buildings

Emphasis in farm service buildings work has been on the construction of buildings which would represent a minimum investment for sound structures with good functional planning for efficient production. The need for low cost buildings is felt because so many farmers are trying to establish new enterprises or expand existing enterprises, especially in livestock and poultry where the investment in buildings may be a major obstacle. In constructing low cost buildings, there is always the danger that farmers will go overboard and build structures which are too cheap to be economically sound.

Many of our agricultural agents do not feel that they have been sufficiently trained in farm buildings work to give sound advice; and partly because of this lack of training, they do not have a good working relationship with the building materials dealers, builders, and others in the county who may be more directly involved in building construction.

Increased emphasis on marketing work has caused a demand for assistance in planning specialized buildings for various marketing groups. The farm buildings specialist has been able to give only limited help in this field due to lack of time and lack of the specialized training required.

The county agricultural agents also rely on the farm buildings specialist for assistance in planning new and remodeled office space, and this is another field where only very limited assistance can be given.

WORK CARRIED ON

District Farm Buildings Schools

The district farm buildings schools were conducted for the third consecutive year on a basis similar to that described in the 1958 Annual Report. The program this year included a discussion by the farm buildings specialist on farm buildings

problems for each district, a talk by a Portland Cement Association representative on new trends in concrete masonry, a discussion by the Extension housing specialist on electric heating versus fuel burning heating systems, and talks by the Extension specialist in crop processing and a farm management specialist on the design and selection of equipment for feed processing, and the economics of these installations. The program also included a tour of educational exhibits which brought out information on a number of other subjects related to farm service buildings and homes. These schools were attended by a total of approximately 300 individuals in the six Extension districts. One or more agents and Farmers Home Administration representatives from most of the counties were present, but the attendance of building materials dealers and builders was not large.

Information on Silo Costs

There has been a large increase in silage feeding over the state, both in the number of animals fed and in the tonnage per animal; and for this reason interest in silo construction has been high. With this thought in mind, an effort was made to summarize available data on the cost involved in storing and feeding silage from various types of silos. This information was published in a mimeographed paper which was distributed to county agricultural agents and others, and discussed at the district farm buildings schools. It should prove helpful to farmers who are faced with the problem of deciding how to store and handle silage.

Snow Damage Survey

Most areas of the state experienced unusually heavy snows during the winter of 1959-60, and there were many building failures, particularly in the newer poultry houses, some of which were of very cheap construction. This afforded an opportunity to determine the cause of failures in typical buildings, and a survey was made through county agricultural agents in March 1960 for this purpose. The

results of this survey with recommendations for future improvements in building construction were distributed to the agents in all counties. Also, this information was helpful in preparing a paper on wind and snow damage to farm buildings in North Carolina, which was presented at the national meeting of the American Society of Agricultural Engineers in June 1960.

Storage of High Moisture Corn

There has been very little interest in the storage of high moisture corn in silos in North Carolina up to this time, but specialists in this and other departments felt that based on results in the midwestern states, this practice would have a place in North Carolina, particularly in the eastern counties. Specialists from several departments cooperated in summarizing the information available on high moisture corn storage and distributing this to the county agricultural agents. The distribution of this information should encourage the adoption of this practice, where applicable, and aid in getting farmers who do try this storage method off to a good start.

Assistance with County Programs

As in previous years, a good portion of the specialist's time was devoted to work in the counties consisting of assistance with meetings, visits to agents, and visits on individual farms for special problems. Assistance was given to agents and others in conducting a total of 30 meetings in the field of farm service buildings, with a total attendance of 1260.

Requests are received frequently for assistance in planning public buildings for various agricultural groups. We have been able to give only limited assistance in this field, but feel that some help is justified because of the contribution it makes to an over-all agricultural program. The assistance given usually consists of a visit to the county and rough sketch or preliminary plans for the proposed building. In the case of major buildings, these plans are a basis for

further discussion with county officials or architects; but in less important buildings, they may be the only plans prepared.

During 1960 assistance was given on 15 of these projects as follows:

Office buildings	5
Fair buildings, livestock show, and sales buildings	6
Community buildings	2
Fruit and vegetable packing and processing buildings	2

Plan Service

An important means of distributing information on farm buildings is through the plan service. A large portion of the specialist's time in the office is devoted to work to improve this service. During 1960 a major revision of the plan service in farm service buildings and equipment was initiated with the goal of putting the plans in a more usable form, and also having a type of plan book which would be better coordinated with the type of plans now being distributed through the U.S.D.A. plan exchange service.

The system of advertising and distributing plans for the past several years has consisted largely of a plan book in each county agent's and vocational agriculture office, which was made up of full size working drawings of the plans available, plus a brief description of plans which were not included in the book full size. Individuals are encouraged to visit the offices and order plans selected from the books. These books were bulky to handle and were not adapted to the plan leaflets now being distributed by U.S.D.A. It was decided to convert to an $8\frac{1}{2}$ x 11 sheet for the plan book which would be consistent with the U.S.D.A. plan leaflets. This conversion was made for the house plans in 1959. In 1960 it was decided to work on a book of equipment plans, which, when completed, would be followed by a book of farm service building plans. Most of the work on the equipment plan book was completed in 1960, and the book when distributed will consist

of approximately 35 of the former plans revised to 8½ x 11 sheets, 22 new plans prepared in North Carolina, and 20 additional U.S.D.A. plan leaflets which were not formerly in the plan service. In almost every case it was possible to include the working drawings for equipment plans on the 8½ x 11 sheets; but it is anticipated that when the farm service building plans are revised, it will be necessary in most cases to use the 8½ x 11 sheets as illustrations for the plan book with the working drawings being made available on larger size sheets.

Radio, News, Television

The specialist has prepared news articles, radio, and T.V. programs for distribution through college facilities, and also given some assistance in county radio and T.V. work. The college radio programs are usually in the form of 3-minute tapes which are distributed to stations all over the state and receive very wide use. The television programs are broadcast over an educational network and also recorded on tape for rebroadcast by one of the commercial stations.

A total of 20 news articles, radio, and television programs were prepared or presented during the year.

RESULTS

It is difficult to measure accurately the progress in most phases of this project. The district farm buildings schools conducted over the past three years have been well received, but one of the major objectives was to reach more of the rural builders and dealers, and this result has not been accomplished. Even though the schools have served a good purpose as training for agents and other agricultural workers, it was decided not to continue them on an annual basis but to put more emphasis on an effort to develop some type of county programs through which a better working relationship between Extension workers and builders and dealers might be established.

The effectiveness of the plan service can be partly determined by a comparison of plans distributed in 1960 was approximately 12,000. This is a decrease of about 5,000 plans from the total distributed in 1959, and most of this decrease was in the classification of swine and poultry buildings. This would seem to indicate a slower rate of growth in these enterprises; although from observation they are both growing rapidly, and more buildings are being built. It is possible that the building pattern is well established in most areas of the state, and many new buildings are being built without the need for additional plans. Also contributing to this decline was the fact that no new building plans have been released this year due to the fact that available time was used in working on the equipment plan book.

Inspection of buildings over the state and particularly those which fell during last winter's heavy snows indicates that mistakes are being made in farm building construction which would be avoided if farmers did follow closely an engineered plan in erecting buildings.

An effort was made during the year to concentrate more time in the office on preparation of plans and teaching materials than has been true in previous years. There is always a tendency to neglect this work in favor of requests from county workers, particularly requests for individual farm visits. While it is not desirable to eliminate farm visits entirely, it is necessary that the specialist make a conscious effort to allot time so that necessary office work can be done.

SUMMARY OF SPECIALIST'S ACTIVITIES IN FARM SERVICE BUILDINGS

Days in the field	95
Days in office	147
Visits to agents	86
Visits to others	119

Assistance at meetings	30
Attendance at meetings	1260
New plans prepared	22
Old plans revised	35
News articles, radio, and T.V. shows	20
Circular letters	4

Plan Service

With limited personnel available, efforts are being made to continually improve the plan service in farm residences and service buildings. The one full time worker in the drafting room is occupied largely with work on charts, graphs, and visual aids for this and other departments. This work coordinates the planning, filing, and mailing of plans with help from the office secretaries and student help. Most of the work on preparation of new or revised plans is done by the specialists with some help from students.

The house plan service has been converted to a system where letter size sheets are used to illustrate each plan. These sheets are available in the county farm and home agents' offices, and in the home economics and vocational agriculture offices over the state. When requests are received for working drawings, the full size sheets are mailed out.

During 1960 the major effort was toward preparing a book of equipment plans as described under the Farm Service Buildings sections. This equipment plan book will be distributed early in 1961. The farm service buildings plans are illustrated in each county office by a loose leaf binder of full size working drawings, but this will be replaced by a binder of letter size sheets illustrating the plans as soon as this can be accomplished.

Plans Added During 1960

House plans	1
House plans, U.S.D.A.	2
Equipment plans	
New U.S.D.A.	20
New North Carolina	22
Revised	35

Plans Distributed During 1960

Residences		1,424
General purpose barns		439
Dairy buildings		3,017
Beef Cattle buildings		571
Swine buildings		933
Poultry buildings		615
Tobacco buildings		275
Other buildings		648
Equipment, miscellaneous		3,793
	Total	11,715

In addition to distribution of standard plans, a great deal of work was done by drafting room personnel preparing graphs, charts, posters, lecture materials, special blue prints, etc., for this and other departments. This work is summarized below:

Display Panels		37
Banners		7
Lettering Strips		290
Charts		90
Posters		92
Signs		105
T.V. Cards		47
Flip Charts		52
Certificates		74
Cover Designs		7
Graphs		47
Maps		5
Special Blue Print Plans	Approx.	1,311

IRRIGATION

FOREWORD

The task of establishing and promoting irrigation in a humid climate such as North Carolina is an extremely difficult one. While total rainfall annually is far in excess of the amount needed, the thin layer of soil which supports our crops loses its moisture rapidly, leaving only two practical known possibilities for permitting production to keep pace with the progress being made in other sections of the country not handicapped by a thin layer of soil for root pasturage.

The two possibilities open to North Carolina farmers in general are:

Increase the depth of the root pasturage, or

Irrigate the thin layer they must depend on.

Research work is underway and points to a practical remedy in some areas of the state for increasing the depth of root pasturage by deep liming and the application of nutrients to the deep soil. Until that practice has progressed far beyond its present adoption and in those areas of the Piedmont where this method of increasing depth of top soil is not practical, irrigation must and will be accepted as a production tool in order for farmers to place quality products before the public in a competitive market.

May, June, and July are the critical months in North Carolina for irrigation. This is because in general the interest of our farmers is for tobacco irrigation, and in this period the crop is made or lost. It has been conclusively proved by both research and farmer experience that the irrigation of tobacco will pay during a normal year from $100 to $200 per acre, dependent upon the varying situations. To those with little knowledge of North Carolina conditions, this would brand the non-irrigator as an ignorant person. This is not altogether correct because of the very limited acreage of tobacco on a

great majority of our tobacco producing farms. Likewise, this crop can stand some moisture stress without seriously affecting quality; and there are a great many other factors that should be taken into consideration in analyzing the situation as it exists in this state with respect to irrigation.

With the ever rising cost of labor coupled with the fact that this crop has not been mechanized from a production standpoint, it is becoming ever increasingly important that producers eliminate all possible risks. We know the practice will pay on the vast majority of our farms, and the task of helping our producers see this fact remains a challenge.

During 1960 our principal objectives remained the same as the previous year; namely, creating an awareness on the part of people of the possibility that irrigation has for producing additional income. Time devoted by the specialist was 34 field days and 25 office days. The training of county agricultural agents and irrigation equipment manufacturers' representatives - namely, distributors and dealers - was decided to be our immediate target. Agents were assisted in program planning and with special interest group meetings where leader training was emphasized. The actual field work on the part of the engineering specialist consisted of working with county agricultural agents in program planning and in the conducting of special interest meetings and demonstrations. In every instance the responsibility for the work within the county was left with the agent and his selected leaders. If there was one thought advanced more than another to agents and leaders, it was that growers must be educated to the fact that irrigation is a production tool, that it is to be used when needed throughout the growing season of the crop in question, and that it should never be accepted or bought as a crop saver to be used only in times of severe drought.

RESULTS AND ACCOMPLISHMENTS

A. Objectives.

1. To educate people to the income producing possibilities of irrigation for those crops being grown under conditions where income could be appreciably increased.
2. To teach county agricultural agents and, through them, farmers the fundamentals of irrigation and how to evaluate it with respect to a particular set of conditions.
3. To teach sales people the importance of proper design and how to properly design systems.
4. To see that designers of irrigation systems are supplied with research facts covering design factors such as water holding capacities, infiltration rates, rooting habits, and moisture use rates of various crops.
5. To conduct one-day workshops for the teachers of vocational agriculture on irrigation that they might play a bigger role in this educational effort.

B. Accomplishments.

(Note: At this point it might be well to call attention to the fact that assistance was rendered agents in the conducting of meetings only when there was special reason for the specialists to be present. These meetings were planned along group discussion procedures. Rather than attempt to answer growers' questions, growers were encouraged to answer their own questions through the discussion medium. A number of equipment dealer and distributor conferences were held which would aid these people in better system design. It was stressed with dealers, agents, and all others that the distributors of equipment should be

responsible for design that they might be held accountable by the buyer if trouble was experienced. This tie-in with industry greatly facilitated the educational effort and brought about better relationships between the distributors of the various manufacturers.)

An engineering specialist assisted with 17 meetings, with a total attendance of 1,035.

1. Actual accomplishments, or results, in 1960 might be summarized by saying that during the year far better than average growing conditions prevailed. This was proved by the fact that all time tobacco yields per acre were broken. In spite of this, North Carolina farmers purchased more than $2,000,000 worth of irrigation equipment which enables them to irrigate an additional 7,200 acres of tobacco.

EVALUATION OF PROGRAM

(Note: It would not be just to attribute all the progress made to the efforts of the Agricultural Extension Service, and yet it would not be just were it not pointed out that this service alone conducted the educational program, and they have been gradually increasing their efforts along this line since 1946.)

Figures of gross sales were obtained from distributors of irrigation equipment in North Carolina during 1960. An overall estimate of value of equipment sold is $2,152,000. This equipment under the system used by the average North Carolina tobacco producer will irrigate 7,200 acres of tobacco annually. If used properly with respect to amount of investment, it could easily irrigate twice this acreage. Based on 7,200 acres at a net return of $150 per acre, the annual income from the use of this equipment should be an additional $1,080,000 to the tobacco growers involved.

It would be well to realize that during anything like a dry year, the additional net income per acre might easily be four times $150, or four times $1,200,000 for the additional acreage irrigated.

While this additional income is one objective, it should be borne in mind that irrigation is another means with which farmers can eliminate risk and one step nearer in their dream of farming under controlled conditions with controlled environment for production that assures an annual income to produce a standard of living which will make it possible for them to maintain their place of distinction.

SPECIAL REPORT

(Note: We have at every opportunity included irrigation equipment manufacturers, distributors, and dealers as members of our educational team. The following letter and annual report are included as an example. Distributors supplied us, confidentially, their gross annual sales. We supplied them the total gross sales and acreage figures. This procedure is followed each year.)

Agricultural Engineering Specialist

AGRICULTURAL EXTENSION SERVICE

COOPERATIVE EXTENSION WORK IN AGRICULTURE & HOME ECONOMICS
NORTH CAROLINA STATE COLLEGE · RALEIGH, NORTH CAROLINA

March 6, 1961

TO IRRIGATION EQUIPMENT DISTRIBUTORS

Gentlemen:

No longer is a devastating drought required in order to sell a substantial volume of irrigation equipment in North Carolina. Farmers are adopting this practice based on their knowledge of its value. I want to thank you for the important part you have played in bringing about this change in attitude. I have every reason to believe that the results we see were made possible by the cooperation of you in industry with a general educational program.

Last year was a record breaking year for flue cured tobacco production in North Carolina. The over-all state average was 1852 lbs. per acre. Wayne County was the highest producing county with an average of 2147 lbs. per acre. The number of farmers who averaged over 3000 lbs. per acre was so large that even this enormous yield seemed to lose significance -- and yet

North Carolina farmers purchased $2,152,000 worth of irrigation equipment during 1960.

The general opinion expressed concerning cost of equipment per crop acre was that $300 should be allowed. On this basis

7,170 acres were added to the irrigated acreage in 1960.

Since January 1, Ronald Sneed, our recently employed irrigation specialist, and I have attended a number of irrigation dealer training meetings and a larger number of farmer meetings. In every instance we have found interest at a high pitch; and, more thrilling yet, we are finding better informed people. They are becoming more conscious of the need for application rates to suit the soil, along with other fundamental design principles.

In one county the county agricultural agent stated that in spite of the fact that farmers were standing in line to get ponds constructed, the lack of ponds would prevent some of his farmers from irrigating this year even though they wanted to.

The attached sheet brings our annual estimates up to date; and again I would like to call your attention to the fact that you sold over $2,000,000 worth of equipment during a year when the growing season was so favorable that new record yields were established.

Sincerely yours,

H. M. Ellis

H. M. Ellis, In Charge
Extension Agricultural Engineering

HME:s
Enc.

SPRINKLER IRRIGATION IN NORTH CAROLINA

Number of sprinkler systems in use 1952	*96	Acres irrigated	*2,000
Number of sprinkler systems in use 1953	*1600	Acres irrigated	*15,000
Number of sprinkler systems in use 1954	2704	Acres irrigated	25,423
Number of sprinkler systems in use 1955	*3790	Acres irrigated	*36,000
Number of sprinkler systems in use 1956	*4050	Acres irrigated	*38,500
Number of sprinkler systems in use 1957	*4370	Acres irrigated	*41,500
Number of sprinkler systems in use 1958	*4636	Acres irrigated	*44,500
Number of sprinkler systems in use 1959	*5705	Acres irrigated	*54,200
Number of sprinkler systems in use 1960	*6460	Acres irrigated	*61,400

1959 figures were based on gross sales of $2,416,000, adding 9700 acres at $250.

1960 figures were based on gross sales of $2,152,000, adding 7200 acres at $300.

Figures through 1956 were furnished Dr. Ivan Wood, January 26, 1957. At that time estimates for 1966 were made as follows:

Number of sprinkler systems in use 1966	*9800	Acres irrigated	*88,500

*Estimate

Compiled by H. M. Ellis, In Charge
Extension Agricultural Engineering

CROP PROCESSING AND FARM ELECTRIFICATION

During 1960 the Extension Agricultural Engineering specialist principally responsible for this field worked specifically in the following areas:

Grain drying and storage

Peanut handling and curing

Bulk tobacco curing

Feed processing

Materials handling

Wagon hay drying

Farm electrification through adult and 4-H Club programs

In several of these areas of work the educational program was conducted jointly with other Extension Agricultural Engineers or with subject matter specialists in other departments. The primary objective during the year was to keep agricultural and home economics agents informed of new developments in these subjects.

As for the breakdown of time spent with the various educational techniques, considerably more time was spent by this specialist in farm visits and farm meetings where information was given directly to the farmer than was spent in the preparation of new materials and training of agents. Efforts were made to use farmer meetings and farm visits as training for county Extension workers. The majority of requests from counties came for assistance in helping solve problems rather than in creating awareness among the farm population which could stimulate change. As assistance was given individual farmers, steps were taken which would permit the county Extension workers to use the results of this assistance for demonstration purposes.

I. Conditioning Crops through Curing and Drying.

A. Grain

During 1960 this specialist was elected chairman of the North Carolina Grain Production and Marketing Committee, which is an inter-agency group primarily responsible for promoting better production, harvesting, and marketing practices among grain farmers and handlers within the state. This group spent considerable time with an educational program in the commercial corn area to improve the quality of corn being in commercial channels.

For many years prior to 1960 corn farmers in northeastern North Carolina harvested their crop with high moisture content and placed it on the market to obtain the slightly higher price available before the regular harvest season began. It had been determined by research that corn harvested above 25% moisture content and dried rapidly deteriorated and became susceptible to mechanical damage as it was handled in commercial channels. Considerable effort was expended during 1960 to hold the harvest of this corn until the moisture content was 25% or less in the fields.

The Grain Production and Marketing Committee worked through the North Carolina Grain and Feed Dealers' Association to encouraging buying firms to abstrain from purchasing grain harvested above 25% moisture content; and from reports available from the North Carolina Department of Agriculture their efforts were almost 100% successful.

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, and partly to the gradual increase of acreage planted each year. An estimated 40,000,000 bushels of corn moved into markets outside of North Carolina shortly after the harvest period ended.

Exports markets were pleased with the quality of corn sold in 1960 as a result of emphasis placed on allowing the corn to dry naturally in the field until the moisture content was reduced to 25% or less.

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%.

At the end of 1960 there existed in North Carolina approximately 24,000,000 bushels of commercial grain storage, the majority of which have no means of artificially drying again.

Approved farm storage increased by 7,000,000 bushels in 1960 because of the continued depressed price at harvest. It is estimated that 95% of all new farm storage added in 1960 was equipped with some means of drying the grain.

Grain storage facility loans through the ASC increased during 1960; 941 loans were processed for a capacity of 4,500,000 bushels of grain storage. This compared with 530 loans and a capacity of 2,500,000 bushels in 1959.

Grain consumption by livestock and poultry in North Carolina continued to increase during 1960. It was estimated that more than 31,000,000 bushels of grain were used in the poultry industry of the state. Meat animals consumed approximately 1,650,000 tons of feed during the year with a major portion of this feed coming from grain products. Even though the number of dairy cattle fed in the state remained about the same during the year, dairy farmers are increasing slightly the amount of grain fed per cow.

B. Peanuts

In 1960 North Carolina farmers were allotted 168,128 acres of peanuts. The expected yield was slightly more than 1,825 pounds 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 processors of peanuts are buying the artificially cured peanuts without discriminating against poor quality. Since the rate of drying and the final moisture content have considerable influence over the quality, and as a result of milling quality being left out of the grade more, poor quality nuts have been sold from the curing systems. This has become a serious problem with the processors. In checking with one firm, it was learned that the artificially cured peanuts graded out with from 10 to 15% more #2 nuts than desired.

More commercial buying stations have become equipped with bulk handling equipment. Many of these firms are quite interested in constructing custom curing facilities.

Work continued during the year in the developing of the once-over combine and the curing facilities necessary to handle green peanuts. Many farmers experimented with artificially curing green peanuts during the early part of the season.

The design of a home constructed peanut curing building was well received, with approximately 18 farmers constructing such a facility during the year.

C. Tobacco

An educational effort was begun during 1960 on bulk curing of tobacco as result of a field test conducted in Robeson County with a

pre-fabricated building. The tobacco industry has acknowledged the bulk curing principle as a step toward the more efficient production of tobacco of high quality. Considerable interest among farmers in this new technique of curing has been exhibited as the result of publicity given the field test. Several farmers have expressed interest in building their own facility for curing tobacco in bulk.

II. Feed Processing and Handling.

During 1960 interest in feed processing on the farm increased quite rapidly. Since approximately 80% of the cost of producing livestock is for feed, it is natural that farmer interest in the new techniques of feed processing has increased.

The use of more field shelling equipment for harvesting corn is making it possible for 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. All livestock and poultry producers have become quite efficiency conscious since simple and inexpensive electrically powered equipment is available.

Two Extension Agricultural Engineers with an Extension Agricultural Economist prepared an analysis of several types of feed processing equipment that could be adapted to farm use. This material was presented to all Extension agricultural agents at the Farm Building Clinics during the spring of 1960.

A number of field meetings were held for promotional purposes, but considerably more time was spent in the field in working with individuals who were planning new farm feed systems.

As has been the case for several years, assistance was given commercial processors of feed and custom mill operators in planning improvements to

their facilities so that they could handle greater capacities or become more efficient with the present level of feed production.

A lecture and demonstration on materials handling and feed processing were presented before 150 young farmers attending the Short Course in Modern Modern Farming at North Carolina State College.

Assistance was given at the North Carolina Dairyman's Conference in setting up exhibits on feed handling and processing.

III. Specific Programs in Farm Electrification.

A. Wiring

Better farm wiring systems continue to be the major obstacle in preventing the successful adoption of many practices that would improve efficiency, safety, and conveniences on the farm and in the home.

During 1960 agents and adult leaders were trained in approximately ten counties by the Extension Agricultural Engineer and electric power supplier personnel, who in turn led in the discussion of better wiring before home demonstration club members and farmers.

A workshop in simple wiring procedures was prepared and presented in four district meetings of the Negro vocational agriculture teachers of the state.

B. North Carolina Farm Electrification Council

The Extension Agricultural Engineer continued to serve as a member of the Board of Directors of the North Carolina Farm Electrification Council and assisted in its planning and conducting of two programs of statewide interest. One program concerned the use of electric energy in heating homes. This program created considerable interest among industry personnel and provided the largest attendance for any such meeting in several years.

C. The 4-H Club Program in Farm Electrification

Approximately 12,000 4-H Club members were supplied educational data in use and care of electrical equipment through the newly published Second Year and Advanced Electric Project Record Books. Approximately 6,000 4-H Club members completed the Electric Project and received additional educational information through various project activities. It was estimated that 32 counties conducted one or more electric workshops under the guidance of electric power company or Extension Service personnel.

More than 5,000 4-H Club members received detailed instruction in the use of electric equipment in a 2-day class taught at the summer 4-H Club camps for both white and negro club members. The subject taught the girls was lighting, and the boys received instruction in motors and their application to farm work. Instructors were provided by the electric utilities serving North Carolina. The Extension Service provided a workshop for training the instructors prior to the camp season.

An Extension Agricultural Engineer took major responsibility for planning the 14th annual North Carolina 4-H Electric Congress held in Winston Salem. There was a total of 221 4-H Club boys, girls, and agents from 79 counties in attendance. Agents were provided latest information on assistance available to carry on an effective county-wide 4-H Electric Program.

IV. Others.

An Extension Agricultural Engineer continued to serve on the State 4-H Club Advisory Committee for the purpose of planning an active program for adult leaders as a part of the re-directed 4-H Club program in North Carolina.

Out-of-state travel during 1960 included a trip to fulfill a speaking engagement before the Southern Seedman's Conference at Mississippi State College on the subject of grain drying; to V.P.I. at Blacksburg, Va., to speak to the Farm Electrification Workshop on grain drying and storage; and the Virginia Section of the American Society of Agricultural Engineers on the subject of feed processing; and a trip to the University of Illinois to participate in the second National Materials Handling Conference.

This specialist participated in a special three-weeks Extension summer school program at Cornell University where two courses were taken in program development. Study was continued at North Carolina State College during the fall semester in a course in Rural Sociology.

SPECIALIST'S ACTIVITIES IN CROP PROCESSING AND FARM ELECTRIFICATION

Specialist's days in field	98.5
Specialist's days in office	123
Counties assisted	49
T.V. and radio presentations	7
News articles	4

Meetings and demonstrations	Number	Attendance
Grain schools, tours, field days	16	695
Peanut curing meetings and field days	6	670
Bulk curing of tobacco	3	230
Farm wiring	5	180
4-H Electric	9	645
Feed processing	8	800

SAFETY

Each Extension Agricultural Engineering specialist stresses safety in his particular phase of the Extension engineering program. In addition to this effort, one specialist has the responsibility for a general safety program. For a number of reasons the organization of a general safety committee or council within the state has never been undertaken. Discussion of such a committee and its need has taken place, but no formal organization undertaken.

After considerable preliminary planning, the North Carolina Rural Safety Council was formally organized on April 8, 1960. A constitution and list of by-laws were adopted. The only non-rotating office was that of secretary and chairman of the Executive Committee, and that was to remain in the Agricultural Engineering section of the Agricultural Extension Service. The objective of the Council is to coordinate safety programs and activities.

Immediately following the organizational meeting, a farm pond safety program for 1960 was launched. The first phase of this program was a stepped up short course for 4-H camp waterfront supervisors. This covered plans to teach waterfront safety at each 4-H camp to each set of campers, in addition to swimming instruction and supervising the swim periods. The number of boys and girls receiving this training was 6,650.

The second phase of the farm pond safety program consisted of training teams of older 4-H members from volunteer counties in order that they might conduct waterfront safety programs and train other teams to do the same. This plan was carried out as follows:

District Training Session:

Two hours of instruction.

One hour of planning meeting.

To attend:

1. District agents.
2. Man and woman Extension agents (2).
3. Four 4-H Club members.
4. Home Demonstration County Safety Chairman, or representative.
5. District Home Demonstration Safety Chairman.

County Meeting:

At farm pond, if possible.

Purpose: To create awareness of need for water safety.

To announce availability of team for giving a program.

To demonstrate the kind of program the team might give.

To stimulate the leaders to plan such a meeting for their community.

To attend:

1. Home Demonstration Club Safety Chairman
2. All Extension agents.
3. One representative from each Home Demonstration Club.
4. One representative per Grange.
5. One representative per Farm Bureau.
6. Home Demonstration Executive Board.
7. 4-H County Council Executive Board.
8. Extension Advisory Board.
9. Rescue Squad.
10. Civil Defense.
11. Weekly newspaper editors, or representatives.

This program was presented to the men and women district agents and was adopted by them. It was then presented to all agents, men and women, at their district meetings.

At the district training sessions 61 white county groups participated, and 23 Negro county groups. In addition, the demonstration was conducted at the Negro annual 4-H leader-parent picnic and viewed by approximately 3,000.

Because of the awareness created by the farm pond safety program many exhibits on this subject showed up at county fairs and at the State Fair. It is no accident that the two blue ribbon winning exhibits, one for 4-H white and the other for 4-H Negro, at the State Fair were on farm pond safety. The red ribbon Negro 4-H booth was also on this subject, while the red ribbon white exhibit was on tractor safety. These facts were presented in the annual report of the Southern Regional Director of the American Red Cross.

Home Demonstration Safety Program

The following section is included as another program that was stepped up because of the influence of the North Carolina Rural Safety Council. This program will be a cooperative effort of the Home Demonstration Clubs, the Extension Agricultural Engineering Department, and the North Carolina Highway Patrol.

Highway Safety.

Objectives:

1. To have an active safety educational program in every county in North Carolina.
2. To sell young Americans on the fact that patrolmen are public servants employed to get people safely from one point to another, and they are not employed just to arrest people.
3. To have more women participating on county and state safety committees, particularly the North Carolina Rural Safety Council.
4. To obtain more information on traffic regulations that pertain to highways.

5. To promote enabling legislation for highway patrolmen to do a more effective job.
   a. A chemical analysis test that would prove alcoholic content of blood and establish guilt of drunken drivers.
   b. Pass a motor vehicle inspection law.
6. To encourage establishment of uniform basis ground rules for safe driving and walking throughout the nation.
7. To promote driver education courses for all high schools in North Carolina and encourage young people to participate in these courses.

Farm and Home Safety.

Objectives:

1. To encourage farm and home equipment safety as a family project.
2. To stress the importance of recreational safety, with particular emphasis on farm pond safety.

Action Program.

1. District Safety Chairmen will meet with all county safety chairmen in each district and:
   a. Discuss importance of Safety Program.
   b. Set forth the objectives of the Home Demonstration State Safety Program.
   c. Hold a brainstorming session for ideas to develop safety program in each county.
   d. Select ideas to put into action in each county.
   e. Invite patrolmen and other needed resource people to these meetings.

2. Each County Safety Chairman will report to the District Safety Chairman by May 1 and December 1 the work that has been done up to date.
3. Organize and conduct a publicity campaign through your local newspapers, radio and television stations.

The Traffic Safety Program

The Extension Agricultural Engineering specialist conducting the general safety program, through prior knowledge of the publishing of the manual, "Vehicles, Roads, People", had North Carolina's allotment sent to him for distribution. A plan was formulated with the North Carolina Highway Patrol Safety Officer and the Educational Director of the Automotive Safety Foundation to launch a joint traffic safety program. A conference was held and the following plans made and executed:

Sufficient copies of the manual were made available to supply one to each Agricultural Extension worker, each uniformed highway patrol officer, each state legislator, and a few key people throughout the state. The manual was personally handed each Extension worker at their annual district meeting after they were briefed on how to use it. At the same time a copy of a letter to all Highway Patrol officers from their safety director was presented the Extension workers. At the same time the Highway Patrol officers were being presented a copy of the manual along with information that was being given to Extension workers. The objective was a coordinated traffic program in each county. Extension workers had the name of their patrolman and knowledge that he was going to call on them for the purpose of assisting in planning and carrying out a program. Likewise each patrolman had been similarly briefed about his Extension workers.

These are highlights of the programs and activities in connection with safety that were conducted last year. There were a number of other important items started that will be reported later.

During the year Extension Agricultural Engineering specialists devoted 38 days to field work and 27 days to office work in connection with the safety program. During the year all Extension agents reported 1890 days devoted to safety programs.

GENERAL

Under this heading we are listing a number of other phases of Agricultural Engineering work to which varying amounts of specialists' time is given each year. The amount of time devoted to these phases does not indicate our appraisal of the value of the project, but simply means that only limited time can be given to many important lines of work because of their relative values in comparison with major phases.

FARM DRAINAGE

In 1935 this department through county agricultural agents set up a drainage program and established a number of tile drainage demonstrations. At that time there were a very limited number of demonstrations in the entire state, and relatively few farmers had any knowledge whatever of the possibilities of tile drainage. For many years, beginning in 1936, this educational program was the second major undertaking of this department, and the objectives of the program we are conducting today are almost identical to the objectives stated more than twenty years ago; that is, to teach farmers the advantages of properly draining their wet lands by the most economical method, and motivate them to adopt the practice.

As our farmers adopt better methods, and particularly as they mechanize their operations, they are being forced to do a more thorough drainage job.

Forced, or pumped, drainage is slowly but gradually entering our area. Its possibilities have long been known, but the cost of the project has been prohibitive because, in the main, of the low level of production maintained by our farmers. With competition growing annually, forced drainage will soon be accepted much as we have seen irrigation come into our farming enterprises. Along with pumped drainage, we will see a move toward land forming, which has wonderful possibilities in the eastern part of the state.

We have three demonstrations of land forming for the combined purposes of irrigation and drainage, and others will be started in the near future.

Assistance was given and received from the Soil Conservation Service, the Department of Vocational Education, and the Agricultural Stabilization and Conservation program with the 1960 drainage program.

FARM FENCING

There is a growing interest on the part of county agricultural agents and farmers in better fencing methods. The growing interest in livestock has made farmers in general more conscious of the tremendous expense involved in fencing. Cheaply constructed fences are our most expensive fences in the long run, and this fact is being recognized as never before.

The fencing program is handled as a cooperative project between Extension Forestry and Extension Agricultural Engineering departments. Four actual demonstrations were conducted with a total attendance of 112.

During 1960 an engineering specialist spent seven days in the office and seven days in the field in assisting agents with their fencing programs.

For an explanation of the length of life demonstrations and how they are set up, refer to the 1954 Annual Report.

FARMSTEAD WATER SYSTEMS

In general, county agricultural and home economics agents handle this phase of the program, generally with the help of local dealers, and do not as a rule call on specialists for assistance. This department encouraged and helped in conducting county programs, and in many cases lined up local leaders and dealers to handle the technical side of the county program and assist with meetings.

The need for a complete farmstead system was stressed in all county programs that were conducted along the lines of housing institutes, and also in the result housing demonstrations.

During 1960 an engineering specialist spent seven days in the office and four days in the field in assisting agents with this program. This program will be expanded since our specialist vacancy has been filled.

SOIL CONSERVATION

For a number of years the terracing program was the chief project of this department, and the work done by the county agricultural agents formed the foundation for the building of the present soil conservation program. At present soil conservation is very definitely one of our minor programs, but this is not because the problem has been solved.

County agricultural agents are well versed in existing programs and still handle the educational phases.

The agencies organized primarily for the purpose of conducting conservation programs have, to a great extent, taken over this phase of the Agricultural Engineering program; and the work of this department consists in cooperation with the Soil Conversation Service and the Agricultural Stabilization and Conservation program. Considerable specialist time is still required, mostly in committee work.

FARM PONDS

Interest in farm ponds continues to increase. This interest is stimulated by the growing knowledge of the benefits of irrigation, and water supplies are being planned and developed on many farms that are not now irrigating. In addition, ponds are being constructed for recreation, for stock water, for the sale of fishing privileges, and for other purposes.

This department has sponsored and promoted the program of pond construction since 1935. Every practical effort, as time permits, is made to stimulate the construction of more ponds. We have felt that this practice is a cornerstone for many other worthwhile practices.

COMMUNICATIONS SCHOOLS

During 1959 and 1960 the North Carolina Agricultural Extension Service tackled the problem of conducting Communications Schools for the benefit of its staff members. A staff of eight instructors were selected to conduct these schools. A member of this department was selected as an instructor, and during the year devoted 18 days to teaching.

OTHER ACTIVITIES

Short Course in Modern Farming

This very worthwhile short course sponsored by the Bankers' Association and conducted by the School of Agriculture covers a period of two weeks. During the course the Agricultural Engineering Department is responsible for two full days' program. During these two days we revised certain of our Extension demonstrations to meet the needs of the young men involved. Approximately twelve Extension Agricultural Engineering Specialist days were required in making our contribution to this short course.

Forestry State 4-H Club Camp

One specialist devoted four days in conducting six meetings on preservation of fence posts and proper construction of fences at the 4-H State Forestry Camp. This was attended by approximately 120 people.

New Agricultural Engineering Building

During 1960 one Extension Agricultural Engineering Specialist served on a Steering Committee for the Department of Agricultural Engineering in connection with the preparation of plans and other work involved in the construction of the new Agricultural Engineering Building. As a result of this building being constructed, the entire department consisting of resident instruction, research, and extension is housed together. This makes the program of the department as

well as the various phases more effective. Since the steering committee was responsible in one form or another for everything in connection with plans and the necessary adjustment to conform to appropriation - and the bids exceeded the amount appropriated - a great deal of time was involved.