A WORKING DOCUMENT

target 2

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Extension's Long-Range
Plan For Progress

FOREWORD

The North Carolina Agricultural Extension Service is historically committed to the idea of having a detailed, comprehensive, unified and well understood program. Looking back over the years we find many examples and forms of programs for specific periods of time. The development and publication of such a program was brought to a high level of proficiency in the long range program, known as "1.6 in '66," developed during the fall and winter of 1961-62.

New levels of attainment were reached by Extension within the framework provided by "1.6 in '66." Although the primary emphasis may have been agricultural income, all phases of Extension work have been affected. Numerous organizational changes and changes in emphasis have been brought about during the 1962-66 period. These changes placed us during 1966 in the best position we have ever been to plan on a long range basis.

While the groundwork for "Target 2" was laid in prior years, actual work began in January, 1966. The formal organization of state committees shown on the following pages represents only the beginning in terms of involvement of people. All Extension workers in the state and an estimated 7,600 friends of Extension have been involved. The result is the most comprehensive plan for progress ever developed by Extension in North Carolina.

This document was designed for use by Extension workers in North Carolina. We recognize that this is a large document. Not all Extension workers will be concerned with all sections but all Extension workers will be interested in some portions. The value of the document, itself, will depend upon us. For maximum value, we must use it as a guide in developing annual plans of work and in other efforts to define problems and plan specific activities. Thus, the problems and objectives specified here and the kinds of programs envisioned can provide us with a splendid framework for planning during the next 5 years. It will be up to us individually, however, through using this document as a planning guide to make this program come to life in North Carolina in the years ahead.

George Hyatt, Jr.
Director

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STEERING COMMITTEE

This committee was composed of the chairmen of each of the other committees plus W. M. Roberts, E. R. Collins and G. L. Capel, chairman.

GENERAL CONTENTS

FEED, LIVESTOCK, POULTRY

FEED

FORAGE CROPS

Present Situation

Dairy producers have increased emphasis on silage due primarily to increase in herd size and the need to increase milk production per cow. This situation has resulted in decreased emphasis on pastures and hay crops due to an inability to furnish a constant supply of constant quality feed through these sources. Improper land use has resulted from these trends in that upland soils are being used excessively for row crops.

Beef cattlemen, especially cow-calf operators, are dependent on grazing crops for the major nutrient supply. Depressed cattle prices over the past five or more years, have been influential in poor fertilization and management.

Many beef and dairymen have the erroneous concept that pastures are "permanent." This concept has contributed considerably to low yields, to low and improper fertilization, to lax management, and to disease and insect problems with perennial grazing crops.

Within the past five years the Extension programs in forage crops have been evaluated and revised to attempt to correct the conditions mentioned above. Past programs have been most effective in expanding the total improved acreage and creating awareness of forages as crops in their own right.

The new forage Extension program, Triple "F" Forage Production, is a fast rotation system of using forage crops. This program is designed to change the concept of "permanent" pastures to one of using perennial grazing crops in a fast rotation with tall-growing annual plants for silage or other uses. The primary aims of the program are, in addition to changing the "permanent" concept, to produce a constant supply of a constant quality feed, to improve the fertilization of forages, to bring about adoption of proper management practices, to break the disease and insect cycle, to raise the yields of forages to an economical level, and to foster proper land use.

Review of 1.6 in '66 program

The goals for the 1.6 in '66 program were optimistic in that a 23 percent increase in improved pasture acreage was suggested whereas a 6 percent increase was achieved and the 39 percent increase recommended for alfalfa resulted in 59 percent decrease in acreage due to the alfalfa weevil. Silage acreage increased 54 percent or as predicted.

Specific plans were not drawn up for attempting to accomplish the goals in forage crops. It was considered that these goals would be met through activities as had been carried out before.

Major Problem Areas

Proper Concept: A primary problem is the present concept of "permanent" pastures held by most farmers. This concept has led to a belief that once pastures are seeded they will grow and produce for an indefinite time. This condition has resulted in low yields and poor quality from many pastures. There is a real need for a change of concept from "permanent" forage crops to one of perennial forage crops in a fast rotation system. This would result in higher yield and quality, better fertilization and management, less severe infestations of diseases and insects due to break in cycle via rotation, and a more constant supply of a more constant quality feed throughout the year. Most perennial forages are relatively short lived. Many of them produce top yields for only 3 to 5 years. A system of perennial forages would further decrease erosion and associated soil, fertility, and water losses in areas where this is a serious problem (Mountains, Piedmont, Upper Coastal Plains).

Principles of Fertilizations: A second major problem is that most livestock farmers do not understand the principles of fertilization as they apply to clover-grass pastures and pure grass pastures. To successfully grow legume-grass and pure grass pastures the farm operator must understand that fertilization requirements differ drastically.

Also, most farmers use too little fertilizer and an improper ratio of nutrients for the plants they are trying to grow. This is further complicated by the fact that both researchers and farmers have considerable difficulty measuring forage production since it is consumed by animals rather than harvested directly.

Proper grazing and cutting management: When to start grazing (at what height or stage of growth), when to cut for hay, when to stop grazing, or how much stubble to leave after cutting or grazing or how many animals to place on a particular pasture at a particular time are questions about which many livestockmen have only limited knowledge. Such conditions contribute greatly to poor yields and poor quality, and severely decrease length of life or stand of perennial plants.

Forage Quality: A factor which greatly influences animal production is forage quality; yet, both the farmer and researcher have only a limited understanding of this subject. Consequently, more knowledge of the factors which make up quality is necessary before new and better plants can be developed or the quality of plants being used can

be improved.

Soil Management: Proper land use is the key to maximum, sustained production of forages in the area of livestock (cattle) concentration. The soil cannot be maintained in place and in proper physical and fertility conditions without sound use of soil conserving and soil building crops in rotations. The Soil Conservation Service should be fully utilized in planning and carrying out cropping systems to supply forage.

Extension Program

The program is a fast rotation system of forage crops production (sod-crops for 3-5 years followed by row-crops for 1-2 years). It is referred to as the Triple "F" Forage Production Program.

The program involves news articles, television, and radio programs, a series of posters and letter stuffers, and concentrated meetings in selected counties. Some six to twelve counties will be chosen the first year, from those who seek the program in which efforts will be concentrated. Demonstrations and field tests will be conducted as deemed useful. Field studies will supplement research efforts in an attempt to obtain practical and useful budgetary information. The number of counties in which efforts will be concentrated will be expanded each year as agricultural workers and farmers become aware of the program.

Program Needs

Very few agents are adequately trained in the specialized area of forage production. One-week training sessions for agents should be held every 3 to 5 years. One-day workshops should be held in between as necessary to keep up to date. Specialists should be required to continue their professional development and training.

It is forseeable that area agents or area specialists will be needed and should be thoroughly trained.

Value of Forage Crops in N. C. *

1965

Crops	Acreage (1,000)	Yield (Tons/Acre)	Value Per Ton	Value Total
Improved Pasture	1,118	1.5 Dry matter	$30)	$66,127,500
Unimproved Pasture	703	0.75 Dry matter	$30)	
Hay	579	1.3 Dry matter	$30	$22,581,000
Silage	100	12.5 Green Wt.	$ 6	$ 7,500,000
Green-chop, hogged, etc.	40	4.0 Dry matter	$30	$ 4,800,000
Total	2,540			$101,008,500

1971

Improved Pasture	1,150	1.6 Dry matter	$30	$55,200,000
Unimproved Pasture	650	0.8 Dry matter	$30	15,600,000
Hay	500	1.4 Dry matter	$30	21,000,000
Silage	150	14.0 Green Wt.	$ 6	12,600,000
Green-chop, hogged, etc.	50	4.5 Dry matter	$30	6,750,000
	2,500			$111,150,000

*This is an attempt to show the true value of forage crops. Another method might be used, such as 50% of the worth of cattle as being the value of the forage crops consumed by these animals.

CORN

Present Situation

Corn is planted on approximately 40 percent of the land devoted to crops in North Carolina. Recent figures show that 42 percent of the farms in North Carolina range in size from 10 to 49 acres and 3.6 percent of the farms are 100 acres and over. Corn in production on farms ranges from ten acres to approximately 4,000 acres. Progress in increasing the yield of corn per acre in North Carolina for the past several years is evidence of the fact that Extension's educational program is reaching a portion of the clientele in each size of farming operation. About half the total production of corn in North Carolina is marketed each year. Cash receipts from the sale of corn have been averaging about $30 million a year for the past several years. The general trend of corn prices have been downward since 1952. The highest price recorded for corn since 1930 was $2 a bushel in 1947 and the price in 1965 was $1.20 per bushel. It is estimated that corn was planted on 166,708 farms in North Carolina in 1965.

The Extension corn program looks good. There is much interest

in high populations, narrow rows, and the sod method of planting. There is also interest in the single cross hybrid seed. Control of weeds chemically has been well demonstrated. The problem continues to be getting the right amount of chemicals used and applied properly.

Corn production in the state appears to be on two plateaus, one at approximately 70 bushels per acre and the other at 100 bushels or more per acre. The same information that is used by the 100 bushel man is also available for the 70 bushel man, but he has not been reached or is not following all the recommended practices. This means that educational programs must continue.

Review of 1.6 in '66 program

In order for corn to take its proper place in the 1.6 in '66 program, the idea of using the all-practice approach in production was set up and organized, complete with committees to work in the area of production and marketing.

Meetings were held with county Extension staffs the first year when the all-practice idea was explained. Later visits were made to the demonstrations to see the progress. At the end of each year the success or failure of the demonstrations was tabulated.

The goal of 80 million bushels of corn for the 1.6 in '66 program was reached in 1962. In 1965, 94 million bushels were produced.

Major Problem Areas.

Major production problems in corn are centered around weeds, management, stands, non-use of the all-practice concept, diseases and insects, and some deficiency in amounts of fertilizer topdressing, and lime. A major marketing problem is in sufficient storage space with dry facilities. There is also a balance of nutrient problems in corn at high fertilizer levels which is not a major problem but one which must be watched very carefully from year to year. Continued use of the soil testing program and the identification of the micro-nutrient deficiencies will help to keep this problem from becoming a major one.

Work should be continued with research-type demonstrations on new corn diseases such as corn stunt and the other maize dwarf mosaic. Some corns show tolerance to the virus disease but more information is needed.

The major insect problem in corn is perhaps wireworm. Educational work to control this insect must be continued.

Since officially recorded yields are above 175 bushels per acre in the state, it is not felt that there is a need to develop more hybrids of the exact type now grown. However, emphasis should begin to be

placed on improving the quality of the feed value.

The problem of irrigation for corn in North Carolina will become increasingly important, particularly if the trend to single cross hybrids continues. The short droughts that quite often occur during the silking and tasseling period of corn are disastrous to corn yields and irrigation at this time alone would add greatly to the corn yield.

The Extension Program

The Extension corn program is set up to help the corn growers with their problem in producing the best economic yields of corn. The success of this program will depend basically on the training given the agents so that they can successfully assist the growers in seeking solutions to their problems.

Agent training will include the following:

1. Hold one day training meetings during January and February by districts or counties with each subject matter specialist working with corn assisting.

2. Conduct production meetings in each county producing corn commercially.

3. Demonstrations - Outline and help in setting up to provide information for high quality corn production.

4. Supply summaries of research information as it is released.

5. Prepare slide sets for agents' use.

6. Assistance will be available for diagnosing problems and evaluating programs at all times.

The training program above will keep the agents abreast of the major corn problems, and in turn enable them to better assist their corn producers.

The method suggested to put this program into operation would be to use the Extension specialist concerned in each of the items listed. Also the training school for county Extension personnel assigned to corn would be held in January and February each year. In addition, information provided at the district meetings would be made available in printed form and assistance provided for radio and television programs.

Program Needs

1. Keep the present system of having one member of the county staff assigned to corn.

2. Give the county staff member assigned to corn the opportunity to travel to other counties and to North Carolina Experiment Stations to observe research work.

3. Use the feed grain advisory committee already activated in county to work out corn programs for county.

4. At end of the year, a report should be made of all educational work done on corn and this report should show what part of the corn program was completed and problems not yet solved.

Program Results

This program would result in two clienteles, one of Extension agents assigned to corn and the other of corn growers themselves armed with adequate knowledge to meet the problems of the ordinary corn growing season. During the next 5 years, the acreage of corn is expected to rise to 1,855,195 acres with a state average yield of 80 bushels per acre. This will produce a gross crop of 148,415,600 bushels with a total value of $177,600,000, of which $104,294,610 will be sold.

SMALL GRAIN
(Wheat, Oats, Barley, and Rye)

Present Situation

Small grain producers are not receptive to known production practices. Present state average yields of 29 bushels per acre for wheat, 43 bushels per acre for oats, 38 bushels per acre for barley and 17.5 bushels per acre for rye are well below the break-even point for economic production. Less than 10 percent of the present small grain acreage is properly managed for maximum net returns. Profitable management practices are known and are applicable, but are not being accepted by the small grain producers.

All Extension techniques normally used with the small grain program have failed to keep the small grain producer operating at a profitable level. Even the highly successful all-practice approach used for other crops has failed to be accepted by the small grain producer. A lack of interest on the part of producers caused a lack of interest by the agents. This general apathy toward small grain has increased rather than decreased in the past two years.

The annual field day held at the Rowan Station each May has been well attended. However, it appears that only the most interested producers attend this program.

Fertilizer demonstrations were well accepted by producers in

the fall of 1965, but this was probably the result of getting the material free. Most growers are not willing to take the extra steps needed to improve their yields.

Review of 1.6 in '66 Program

Gross earnings have dropped from nearly $31 million in 1961 to near $13 million estimated for 1966. Grower apathy to change in production requirements, diseases, severe winters, and inadequate fertilization has resulted in the 1.6 in '66 noting a complete failure in small grains. Extreme and far-reaching programs will be needed to save these crops from greater economic destruction in North Carolina.

Major Problem Areas

Lack of adequate fertilization for fall-planted small grain is a major reason for the low average yields that are being recorded. A part of this problem has been caused by the misconception that highly fertilized crops such as tobacco leave such a residual supply of nutrients that small grains do not need to be fertilized at planting. Growers have found that this is not true.

Delayed plantings or planting after November 1 each year have often resulted in inadequate growth prior to cold weather with resulting loss of stands, less tillering and lower yields. Late plantings do not allow time enough for the grain to become established and hardy.

Worn out equipment is another real problem with the low yields of small grain. Much of the equipment now being used will not plant the seed at a uniform rate or depth. Farmers hesitate to replace this equipment due to the low return from small grains.

Virus and rust have caused losses in nearly all grain crops in recent years. Yellow dwarf and mosaic have caused severe losses in scattered areas of the state. Variety resistance to yellow dwarf and other diseases may be a long way off.

Inadequate weed control has done much to lower yield and quality of all small grains. Farmers in the piedmont have a more severe weed problem than coastal plain producers and do less about weeds.

Delayed nitrogen applications in the spring because of wet soils, coupled with a lack of starter fertilizer in the fall, cause low yields. Both of these problems are management problems and will only be corrected with a change in attitude towards small grain.

Extension Program

An all out-effort to set a record wheat yield in North Carolina is being attempted by three farmers in 1966. These farmers are using a new variety called "Blueboy" due to the blue tint of the foliage. This new variety is an extremely high yielding semi-dwarf type and responds to high levels of fertility. This variety has excellent milling characteristics and should be readily demanded by mills in the area.

A continuing educational program based on basic research conducted at the Agricultural Experiment Station, along with applied research from on-the-farm testing, helps to overcome these problems.

More emphasis should be placed on the all-practice approach by the local leaders. An in-service training program with agents working on small grains would serve to show these people that good yields can be obtained. A well-trained agent could then work with local agri-business and farm leaders.

Program Needs

The Agricultural Extension Service should be capable of accepting the challenge of this crop area. An effective on-the-farm testing program should be a part of the new 5-year outline. Research has shown that high yields are possible. Extension must convince the grower that he too can do it. Extension programs must be capable of changing during the course of the 5-year program. Additional personnel may be needed.

Greater emphasis should be placed on training the 4-H youth in the proper management of these commodities. The agent could be trained to include the 4-H program in his over-all commodity program.

County workers should be throughly trained to handle all situations that arise from agri-business to farm related problems. A one-day training session annually would suffice.

Single practice demonstrations are greatly needed to solve some of the production problems related to small grains. Fertilizer and nitrogen rates are sorely needed to drive home the need for increased applications of commercial fertilizer.

New varieties that will be available in 1967 and 1968 will need greater emphasis on heavier rates of nitrogen.

Program Results

By 1971 it is expected that the acreage and yield will change as follows:

	1965 Acreage	Bu/A	1971 Acreage	Bu./A
Wheat	181,000	29	350,000	37
Oats	135,000	43	140,000	49
Barley	68,000	38	72,000	44
Rye	20,000	17 1/2	20,000	18 1/2

GRAIN SORGHUM

Present Situation

Acreage of grain sorghum is localized in the counties of Stanly, Cabarrus, Anson, Union, and Montgomery with scattered acreage in surrounding counties. A small acreage can be found in many counties throughout the state. Most producers do a fair job of producing sorghum, but do not produce extremely high yields. The yield potential of this crop is reached by only a few growers.

No organized Extension program has been conducted in the past. Since acreage is expected to stay around 50,000 acres harvested for grain, no demonstrational programs are planned. Producers have been following the corn all-practice outline with good success. Only slight modifications in seeding rate are needed to adapt the corn outline to grain sorghum production

Review of 1.6 in '66.

Grain sorghum was lumped with small grain and soybeans in the 1.6 in '66 program. Since 1961 the acreage has fluctuated between 40,000 and 68,000 acres with a gross value of harvested grain ranging from $2,000,000 to $3,121,000. Essentially no change from 1961 estimates has been noted as acreage of this crop fluctuates with weather.

Major Problem Areas

Inadequate fertilization for maximum yields is the number one problem. Lack of nitrogen at the seed developing stage causes yields to be far below the potential.

A general lack of weed control by some farmers results in some fields being taken over by weeds. Several excellent materials are available for controlling weeds in this crop but these chemicals are not used on a large percentage of the acreage.

Extension Program

A few well-placed fertilizer and weed control demonstrations will be helpful. Since 90 percent of the acreage is grown in five or

six counties an area agent could do an excellent job of working with this commodity. For example, an agent in Stanly County may be appointed to work only with grain sorghum growers in the adjoining counties. On-the-farm tests of varieties, rates of fertilization, chemical weed control, and proper harvesting techniques would aid in raising the average yield of grain sorghum to a more profitable level.

An area field day of such demonstrations as mentioned above would aid this program. Several local television programs, coupled with radio reminders and news articles, could be used very effectively to keep growers aware of recent changes, new varieties, herbicides, etc.

Program Needs

The Extension Service should continue to work with this crop to the extent of keeping agents informed of changes. Greater benefits would come by a more active program, but growers appear uninterested. Few requests have been made for demonstrational assistance either by farmers or agents.

The appointment of a county worker as an area agent to work in the five-county area on demonstrations would be adequate for this commodity. Large advances in yields could be shown by a concentrated effort in this saturated growing area. The biggest problems of inadequate fertilization and inadequate weed control are easily corrected by proper demonstrations.

A county Extension worker could train himself in all aspects of this commodity. Additional in-service training periods in other areas, such as grain marketing schools, pesticide schools and fertilizer schools would be helpful.

Program Results

Under present yield levels of 48 bushels per acre, the crop is grossing approximately $2 million per year. If yields were raised to 75 bushels per acre, the gross value of the same acreage would be $3,712,500. Maximum yields of 125 bushels per acre would return a gross of $134 per acre. Some growers have obtained yields in excess of 7,000 pounds per acre or 125 bushels per acre.

INSECT CONTROL IN HANDLING AND STORAGE OF GRAIN AND GRAIN PRODUCTS

Present Situation

The grain and grain products industry is concerned about the

present chemical residue picture both in whole and processed grains. The level of training of leaders in this industry varies a great deal - from fully trained people to those who have absolutely no training in any aspect of grain handling.

In the past entomology was concerned primarily with control of insects in farm grain storage. Now much attention is given to commercial storage and mills. Entomologists are also called upon to control insects in trucks transporting grain, railway box cars, and in food supplies in supermarket, prison, and other warehouses.

In new grain-handling facilities entomologists have been consulted about proper construction of plants and operation of fumigation chambers.

Major Problem Areas

There is a lack of knowledge about insect control in grain handling and storage.

Extension Program

Develop information for on-farm storage for use at meetings and in regular Extension channels.

Continue on-site meetings and consultations.

Work cooperatively with the North Carolina Department of Agriculture grain division, the North Carolina Crop Improvement Association, the Foundation Seed Growers Association, the Eastern and Western Grain Millers Association and the ASCS on grain storage.

Program Needs

Since there is an increased amount of on-farm storage of whole grains, more emphasis from the Agricultural Extension Service is needed in this area.

Additional effort should be directed toward suggesting farm and industrial pest control programs.

More cooperation with allied agencies would be desirable.

Program Results

Insect losses in grain and grain products will be reduced.

LIVESTOCK

BEEF CATTLE AND SHEEP

Present Situation

The number of part-time farmers continues to grow, especially in the mountain and piedmont counties. Cow herds are popular projects on these farms because of the small amount of labor required to produce feed and care for beef cows. The herd size is generally small. Farmers in the eastern and southern piedmont counties are showing interest in cow herds because of land being made available through drainage of damp soils and the use of Coastal Bermudagrass as a pasture plant on deep sandy land.

The trend with dry-lot feeding operators is for the number of operators to decline but the remaining ones are increasing in the number of animals fed annually. The farmer with a small cow herd and a lot of feed is beginning to feed out his own calves to slaughter weights rather than sell them as feeders. A few eastern and central North Carolina farmers are trying out a combination of wintering stockers and feeding grain-on-grass during the summer. Results look promising.

The small farmers in the western piedmont and mountain counties are discovering that because of their high yields of corn silage they can keep a large number of stockers over the winter months.

The number of farmers keeping yearling steers has declined during the last five years and is not expected to make any substantial growth in the immediate future.

Extension Program

Cow and calf herd - Commercial: This is the best known and accepted of Extension's beef programs. Cow herds are adapted to all of the 100 counties and is the safest program for a new producer. This is currently the top beef program in the state.

Cow and calf herds - Purebred. Fifteen years ago this was the most popular part of the beef program. Declining prices, dwarfism and other breeding problems caused a loss of interest in the production of purebred breeding stock. North Carolina does not have enough purebred herds to furnish breeding animals to its own producers and the quality of breeding stock produced is not adequate to improve commercial herds. Emphasis is being placed on this part of the cow herd program. Expansion and improvement of purebred herds is expected during the next 5 years.

Performance Testing Program: This program was started in

1960 and is offered to both purebred and commercial herds as a tool to improve herds through culling and selection. Over 10,000 cows are currently enrolled in the program. Interest is good and further expansion is anticipated.

Stocker Cattle Program: This project outlines a recommended procedure for a producer to follow in handling stocker cattle. Interest was high in the early sixties and is picking-up again, mainly in the western half of the state.

Feeding for market is one of the weak links in the Extension program. It is most complicated of all the production programs to sell through education; and marketing is hampered by lack of volume. Grain-on-grass demonstrations are creating interest in this phase of cattle feeding and more emphasis will be placed in this field in the next 5 years.

Review 1.6 in '66 Program

1. The last 5-year program was a little too ambitious for beef cattle expansion. The goal of 400,000 beef cows was based on the land available for production of pasture and forage crops plus increased production of current acres. The cow numbers actually had reached 256,000 in 1965. The potential still exists for the 400,000 cows but it is not realistic to expect expansion at this rate in a 5-year period. A goal of 320,000 head by 1971 seems well within this state's capability.

2. The goal of 100,000 head of cattle on feed was reasonable and could have been made under normal market conditions. The goal was based on feed and market conditions existing, especially in the middle and eastern counties. The numbers actually reached 50,000 head but losses sustained by the low market prevailing in the last half of 1963 and first half of 1964 discouraged many small feeders and numbers dropped back to 45,000 head by 1965. The loss in number of operators was greater in proportion than the loss in number of cattle being fed. The effect has been to have larger feeding units. This still is the area of greatest potential and numbers should reach 65,000 by 1971.

3. The 1.6 goal of increasing the calving percentage of cow herds from 65 to 75 percent was actually reached and exceeded by 1965. Current figures show herds calving at a 78 percent rate. Further increase in this direction is possible and very desirable but progress will be slower in the next 5 years.

4. The goal of raising the average grade of feeder calves one

grade seemed reasonable at the time it was made. Improved breeding and management practices could make this improvement. However, the grade of feeder calves declined during the 1.6 program. Sixty-four percent of calves graded good or better in 1961 as compared to 57 percent in 1965. It should be noted that the number of calves sold almost doubled during the same period. Records are from feeder calf sales.

5. The goal of raising the weaning weight of calves 25 pounds was based on improvements that could be expected in feeding and management of the calf crop. The actual results were in the opposite direction as the weight of calves declined from 473 pounds to 449 pounds. Again it should be noted that volume sold doubled during these years. Records are from feeder calf sales.

Major Problem Areas

Weight of Calves Too Low at Selling Time: The pounds of animal sold has more influence on income from the cow herd than any other single item. The 24 pound decline in weight from 1961 - 1965 was a difference of $5.70 per head at the 1965 price level.

Amount and Quality of Feed Being Produced: The key to expansion of cow herds and cattle feeding operations is the production of enough good quality feed to support them. Production of economical, high grade pasture plants and high yielding top quality silage are essential to support this growing industry.

Low Percentage Calf Crop: Improvement in the past five years was most gratifying. However, a 78 percent calf crop is only slightly above the breakeven point. Better producers are calving 90 percent or better but farmers are still keeping too many non-producing cows.

Quality of Production Low on Many Farms: Too many North Carolina farmers keep cattle with no planned system of production. With little management the quality of animals produced will not return a profit to the seller and the only chance a feeder buyer has to make a profit is to buy them at less than the cost of production.

Too Many Feeder Cattle Are Leaving State: Sixty percent of feeder calves, yearling steers and stocker cattle are sold to out-of-state buyers. North Carolina is producing only about one-fourth of the beef its people consume. If more cattle were fed to slaughter weights on North Carolina farms it would increase income and the added buying power on the feeder markets would have a stabilizing influence on the entire beef industry.

Lack of Adequate Financing for Beef Operations: Stocker and feedlot operations require a lot of capital for the purchase of animals alone.

Automation of feeding methods also requires capital and is a must where large numbers of animals are involved. In many areas of the state lending agencies are not familiar with these types of operations and are reluctant to make loans of this kind.

Producers Do Not Use Special Sales for Marketing Feeders: A net-work of feeder calf, yearling steer and stocker cattle sales covers the State. Most producers will have a special sale within easy driving distance of their operation. However, North Carolina is marketing only 5 to 10 percent of feeders through these sales at the present time. Records indicate that producers selling through these sales receive 1 to 5 cents per pound more than other marketing methods.

Extension Program

Increase Weaning Weight of Calves: To overcome this problem the following program is suggested:

1. Promote the use of performance tested bulls with gains of 2.0 + pounds per day pre-weaning daily gain by commercial producers.

2. Promote a controlled breeding program to get calves born during December, January, February and March.

3. Advocate a winter feeding program for cow herds that would assure adequate diet for the January - April critical period. A pasture program that would include a legume in the mixture and a field providing sufficient summer grazing will be needed.

4. Promote a parasite control program that will reduce the effect of internal parasites on the thriftiness and gain of the calves.

Lack of Adequate Quantity and Quality Feed Being Produced: To overcome this problem the following program is suggested:

1. Recommend that producers follow the "Triple F" program of our forage crop specialists.

2. Urge beef farmers to shift from hay to silage as the basis of their feed program.

3. Promote more grain storage on farms which would result in more grain being used for livestock production.

4. Plan a pasture program that will have the proper plant on the proper soil and will give maximum production over the

greatest number of months of the year.

5. Make maximum use of field gleanings and cover crops.

Low Percentage Calf Crop: To overcome this problem the following program is suggested:

1. Cooperate with the State Performance Testing Program on identification of each cow and keeping record of production.

2. Check pregnancy of cow herds.

3. Test fertility of bulls.

4. Feed bull and cow herds properly.

5. Cull non and low producers annually.

Quality of Production Low on Many Farms: To overcome this problem the following program is suggested:

1. Work out a definite plan of production adapted to each area of the state.

2. Advise on sources of breeding stock, especially performance tested bulls and heifers.

3. Cull cow herds annually on production records, official or kept by producer.

4. Plan adequate winter and summer feed program.

Too Many Feeder Cattle Are Leaving State: To overcome this problem the following program is suggested:

1. Promote grain on grass feeding in eastern and central parts of the state by having result demonstrations in these areas.

2. Set up result demonstrations in eastern part of the state for small cow herd owners to feed out own calf crop.

3. Meet with representatives of lending agencies to encourage more loans for the purchase of animals to be fed for market.

4. Assist present operators with their problems to encourage expansion of current facilities.

Lack of Adequate Financing for Beef Operations: To overcome this problem the following program is suggested:

1. Conduct schools for agricultural representatives of credit

agencies to acquaint them with beef production methods.

2. Include local credit representatives on all tours of successful operations.

3. Conduct schools for producers on use of credit.

4. Advise prospective producers on potential of contract feeding of stockers and slaughter animals.

Producers do Not Use Special Sales for Marketing of Feeders: To overcome this problem the following program is suggested:

1. Conduct demonstrations on preparation of animals for special sales during winter months.

2. Give maximum publicity to results of sales.

3. Arrange tour of non-consignors to observe a sale in progress.

4. Personal contacts of key non-consignors in communities by members of sales committee.

Program Needs

Some additional personnel may be needed at the state, area or district level.

Training needs are seen as follows:

1. At the state level specialists assigned to expand feeding, need additional training in housing, automation and interior arrangements of feed lots and ideas to solve marketing problems of fat cattle. Tours and attendance of field days and other educational events in cattle feeding states are recommended.

2. Area specialist and cross-county agents need annual 2-day seminars to keep informed on new research.

3. Agents assigned beef cattle responsibility in counties need one-week training schools conducted annually for refresher purposes. Agents to attend will be selected jointly by district agents and animal husbandry Extension specialists.

Program Results

Beef cattle fed for market will increase from the present 45,000 up to 65,000 during the next 5 years.

Beef cow herds will expand at the rate of 5 percent per year and

reach approximately 320,000 head by 1971.

Stocker cattle will increase at the rate of about 4 percent per year with 9,000 - 10,000 being sold in special sales in April, 1971.

The percent calf crop will be increased frm 78 percent in 1965 to 83 percent in 1971.

The average weaning weight of feeder calves will be increased from 449 pounds in 1965 to 479 pounds in 1971.

The grade of feeder calves will be increased from the present 57 percent Good or Better to 65 percent Good Plus by 1971.

SHEEP

The sheep population has declined to the point where marketing lambs and wool are a major problem. There is not a single county with sufficient sheep numbers to justify agents spending a substantial amount of time with them. However, current producers must be informed on new developments in this field.

A potential does exist to expand sheep numbers in the mountain and northern piedmont counties. The long range outlook for lambs and wool are both favorable. Technical information is available and the Extension staff is well qualified to support expansion of sheep numbers. However, farmers are not interested in expansion of sheep at this time. Since other crops and livestock seem to be preferred by the farmers in the most favorable area for sheep expansion it is felt that the major effort in the next 5 years should be directed toward improvement of present flocks with total numbers remaining about stationary.

SWINE

Present Situation

In planning ahead for the period 1967-1971, it is necessary to look back over the last few years to see what changes have taken place. The clientele in the future may not be the same as in the past.

Emphasis has been placed on efficiency of production which has encouraged larger units and labor saving devices built around multiple farrowing systems. The increase in capital investment required, as the units get larger and involve more confinement with on-the-farm feed processing, has been greater than many farmers have been willing to invest. Therefore, the increase in hog numbers in North Carolina has occurred with fewer people producing hogs.

Corporation production has been gaining in popularity. Investor-owned swine operations with full-time managers are relatively new in North Carolina but it is anticipated that these will increase in the future.

Contract production associated with specialization in production phases, such as, feeder pig production or finishing for market, has been widely used.

Intensive production units with high capital investment have applied considerable pressure on land and labor utilization and made managerial decisions more critical.

According to estimates made by the North Carolina Agricultural Extension Service, in 1965 there were 345,460 litters farrowed and an average of 7.4 pigs per litter weaned for a total of 2,556,400 pigs. About 75 percent of these were in the coastal plains, 22 percent in the piedmont and 3 percent in the mountains.

Aside from the changes and trends indicated, there are several factors that will affect the distribution and development of the industry in North Carolina.

Governmental policy on feed grains, cash crops, military commitments, minimum wage laws and transportation will have a direct effect on the expansion of hogs in North Carolina.

The research and educational program at North Carolina State University, including training of personnel at the producer and county worker level, as well as commodity program development will have its impact.

Traditionally, hog production has been associated with grain production. The increased in-shipment of grain at more competitive prices could serve to change this situation. Also minimum wage laws would serve to take away some advantage that the high labor cash crop areas have held over the more industrialized areas of North Carolina. These two factors working together could make swine production more important in limited grain production areas of this state.

Special feeder pig sales have encouraged the development of this specialized phase of production. It is estimated that about a fourth to a third of pigs sold as feeders move through quality feeder pig sales.

Extension Program

Extension programs are presently directed toward development of economical units with emphasis on efficiency of production. In-

creasing numbers has been an indirect effect. It is felt that efficient production will bring about an increase in total numbers.

The swine performance testing program is now in its fifth year at the evaluation station and on-the-farm testing is in its third year.

1. There have been 545 litters tested through the station with approximately 20 percent of these meeting certification requirements. During this period there has been approximately a 1 percent per year improvement in "percent lean cuts." Assuming this rate of change is representative of the hogs marketed in North Carolina, the value of pork carcasses has been increased by over $4 million.

2. The testing program has been one of the more popular programs undertaken and has been readily accepted by commercial producers. As an educational tool it has focused attention on the potential for improving efficiency of feed utilization, growth rate and carcass quality.

3. The on-the-farm phase of this program has been limited because of lack of personnel to expand it to its potential. In 1964, 800 pigs were tested and in 1965 the number had reached 2,735.

The feeder pig program is being developed primarily in areas and on farms with limited grain production. In 1964 and 1965, three quality feeder pig sales were initiated which served to stimulate production in areas not readily serviced by commercial marketing agencies. These sales, along with the current high "top" hog market, contributed to the expansion of this program. These sales are now being conducted by non-Extension personnel. The grading of feeder pigs was initiated in 1965 and has been readily accepted by producers and buyers. It is anticipated that this program will continue to expand.

The swine farm records program was initiated in 1965, with 22 farmers participating. The program was limited to a small number so that program problems could be worked out and more control exercised over types of farms and systems of production involved in the initial stages.

Review of 1.6 in '66 Program

The income goal from swine as set forth in the 1.6 in '66 program was surpassed in 1965. There was an increase of approximately $30 million from 1960; however, there was a 32 percent increase in top hog prices so $10 million of this can be accounted for by an increase in market price of top hogs.

The goal to increase litter size from 7.0 to 7.6 was not met. The increase to 7.4 was quite significant considering the changes in production systems, larger units and the demand for skilled labor in intensive confinement operations.

The increase in litters farrowed (as reported by the Crop Reporting Service in 1960 and the North Carolina Agricultural Extension Service estimates in 1965) was approximately 25 percent. The relative increase was greater than this since North Carolina was expanding in swine production when the number of hogs nationally was declining.

The goal for 20 percent increase in efficiency which included a 15 percent improvement in feed efficiency may have been reached; however, this is impossible to measure under present circumstances. At the same time, considerable emphasis has been placed in educational programs on efficiency of production and it seems reasonable to feel that it has been effective. There has been considerable interest by producers to make use of balanced rations and to eliminate feed waste.

Major Problem Areas

The major problem area (with all subject matter equated to a common denominator) is attitude. The opportunity that the swine enterprise offers as a potential major source of income, which has to be given the required time and know-how to be successful, has to be constantly emphasized.

Specific problem areas include the following:

1. Lack of managerial ability for intensive production units

2. Lack of skilled labor. Most of the available labor is row crop oriented and unsuitable for working with hogs without further training.

3. Underemployment of available labor on many of our row crop farms that could be employed (with training) in the off-season in the swine enterprise

4. Disease and parasite control program not being followed on many of our swine farms

5. Improper feeding of the breeding herd which impairs optimum reproduction and also increases feed costs

6. Lack of economical grain supply due to out-shipment of grain and lack of local storage

7. Availability and utilization of performance tested breeding

stock due to lack of personnel to expand the performance testing program

8. Conflict of labor requirement with cash crop production

9. Lack of regard for swine enterprise as a business with meaningful records for making decisions

10. Lack of appreciation of the economic opportunity offered by swine production in a cash crop oriented agriculture

11. Lack of understanding of the type of credit needed as applied to the individual situation. Capital availability appears to be less of a problem than credit availability. The lack of sound credit ratings by applicants and the lack of a planned program when applying is credited for the apparent difficulty in obtaining loans. It should be pointed out that most lending agencies tend to rely on cash crop collateral rather than livestock. It is assumed that this is due to lack of understanding of the economic opportunity of the swine enterprise.

Generally, producers fail to develop a total program making use of the technical help available to them and often expand the size of the operation too rapidly.

Extension Program

Educational programs should continue to be designed with emphasis on production efficiency but oriented more to the business aspects. A total program for the farm should be developed taking into consideration long-range changes and trends of the industry as well as the individual farm involved. This should include records, labor, facilities, feed, land, capital investment, operating capital, and the required management as changes are brought about in addition to the mechanics of growing hogs per se. Knowledge of these factors is necessary for a producer to consider alternatives and types of enterprise that best suit his operation and to make proper managerial decisions.

Emphasis will be placed on the commodity responsibility assignments for county personnel allowing them to develop and follow-through with county swine programs.

Training schools for swine managers and herdsmen will be developed. These schools, which would be designed to present up-to-date research in production and business management, will be given a high order of priority.

In each of the educational programs, the teaching goals and

objectives should dictate the methods used and not the reverse. They should allow flexibility to try new approaches and methods in solving old problems.

Subject matter areas to be emphasized include:

1. Herd health programs
2. The use of performance tested breeding stock
3. Controlled feeding program for breeding herd
4. Record and business management
5. Full labor employment
6. Adequate housing, equipment and waste disposal

Program Needs

The swine industry in North Carolina will become increasingly important as an enterprise to increase farm income. As the trend toward more efficient production units continues this will put an increasing burden on the research and educational institutions to design programs to solve problems and to lead the way. If Extension is to continue its leadership role, more emphasis needs to be placed on the time and training of field workers to enable them to do a better job in working with commercial swine production. This will involve a close working relationship between departments on campus and with agri-business groups at all levels.

Considerable emphasis is being placed on swine production in some areas but would require a realignment or increase in personnel in some cases to be more effective.

On-the-farm testing is an area of work that needs immediate attention. In order for this program to be expanded to its potential additional efforts and personnel will be required. This will mean additional personnel and/or a realignment of present personnel.

Training needs are as follows:

1. More intensive subject matter training by the county Extension workers. This will include agent and producer subject matter workshops making optimum use of resident and specialist staffs. Consideration should be given to designing subject matter courses and workshops for agents so that academic credit is available.

2. Emphasis on training needs to stay abreast of the latest information without regard to academic degrees at all levels.

3. One week refresher course at Raleigh every 2 years on total swine program for personnel responsible for swine work and involving the teaching and research staffs

4. Sabbatical leave for state personnel for visiting other states and institutions

5. Visiting professorships in Extension and resident staffs

Program Results

The numerical projected changes are indicated below:

LITTER	PIG/LITTER	TOTAL PIGS	ESTIMATED INCOME*
1967 - 345,460	7.4	2,556,430	95,044,761
1968 - 374,460	7.5	2,808,450	94,729,000
1969 - 403,460	7.6	3,066,300	103,426,300
1970 - 432,460	7.7	3,329,900	112,317,500
1971 - 461,460	7.8	3,599,400	121,569,830

*Based on an average of $33.74 per head and a 40 percent increase in numbers.

Improve carcass quality by .5 percent per year and decrease lard by .25 percent per year as follows:

	%LEAN CUTS	% LARD
1967	48.0	11.00
1968	48.5	10.75
1969	49.0	10.50
1970	49.5	10.25
1971	50.0	10.00

This improvement in carcass quality is valued at approximately $2 million.

Improve efficiency of feed utilization by 15 percent by 1971 from 4.5:1 to 3.85:1 per pound of pork marketed. This improvement in efficiency of feed utilization is valued at approximately $14 million net income but is not included as an increase in gross income.

Improve rate of gain per day of age by 20 percent from 1.22

pounds per day of age to 1.47 pounds per day of age or decrease time to market from 6 months to 5 months.

LIVESTOCK MARKETING AND UTILIZATION

Present Situation

Livestock is an important enterprise on many farms in North Carolina. The 1959 census shows approximately 92,000 farms reporting the sale of cattle and calves and 132,000 farms selling hogs. Most of the cattle are sold through 55 auction markets in the state. Hogs are marketed through the daily buying stations many of which are located at or owned by the local meat processing plants.

In addition to the production units and marketing firms the industry is composed of ham curing plants, processing plants, freezer locker plants, and retail stores throughout the state. A comparison of livestock marketings with slaughter, processing and consumption in North Carolina indicates a strong market demand and potential for increased livestock production. However, there will be a decrease in the total number of meat processing plants. A larger volume of meat will be handled per plant and efficiency will increase.

Demand for meat will continue to increase as incomes and population rise. More convenience foods will be in demand. There will be more standardization of the product leaving the farm.

Major Problem Areas

Major problem areas include the following:

1. Lack of knowledge on the part of the producer on relative raw product value and consumer demand

2. High unit cost of assembling livestock and raw material (as related to producer, market operator and processor)

   a. Seasonal fluctuation in production coupled with sparse production of certain classes of livestock
   b. Lack of uniformity

3. High per unit cost of processing

   a. Technical problems with standardization (quality, packaging, size, color)
   b. Maximum efficiency through equipment and labor combination
   c. Lack of understanding as to the changes in technology and the economic effect of these changes

4. High per unit cost of distributing meat and meat products resulting from relatively small, widely dispersed markets

5. Lack of competent managerial and supervisory personnel

Increased automation requires greater technical competence on the part of the management and labor. The higher investment cost requires a greater use of machines. Technical training for both management and supervisors at the college level is necessary and this should be supplemented with Extension courses and in-plant training programs as technology changes.

The recruitment, training and retention of competent workers is becoming a greater and greater problem for local industry. Management training courses are important to assist managers with efficient growth and development of human resources as well as facilities. These courses are complementary with the technical training and operational phases of management.

Extension Program

The Extension program for the marketing and utilization of livestock and meats will furnish economic and technical information to producers, various market managers, and consumers. The educational program will guide the growth and development of the market structure and market facilities and will determine and demonstrate the most efficient methods and practices of handling, processing and merchandising meat and meat products. The clientele to be reached include: livestock producers, public livestock markets, meat processing plants, country ham curing plants, meat merchandising operations, and consumers.

The problem identification and problem analysis or problem solving approach will be used on both industry and plant problems. Specialists from Food Science and Marketing Extension will work cooperatively at both processing plant and associated industry level.

DAIRY

Present Situation

From 1963 to 1965 sales of fluid milk increased on an average of 4.3 percent per year while production increased only 2.5 percent per year. During this period the blend price for Grade A milk increased from $5.75 hundredweight for 3.76 percent butterfat to $5.93 or 7¢ per hundredweight per year. The number of herds producing Grade A milk has declined at the rate of 218 herds per year for the last 4 years. Further decline in the number of Grade A producers is expected, but this decline should be at a much slower rate. Production per cow is increasing. The number of cows 2 years

old and over kept for milk has been declining about 3 percent per year during the last 4 years. Dairy herds are getting larger and production per cow is increasing. Average daily milk shipments per farm in December 1965 were 1129 pounds as compared to 771 pounds in 1962. Milk available for manufacturing purposes has been declining steadily during the past several years.

Outlook: Dairying has developed to become a significant agricultural enterprise that can continue to contribute greatly to the agricultural economy of the state. Needed are enough dairy farmers to supply all of the fluid milk needs and part of the manufactured dairy products for North Carolina. Based on the trend of the national milk production, the supply on hand, and adjustments in the price of milk, both nationally and within the state, the next 5 years can be a favorable period for milk producers if they will improve management and marketing practices. There will be greater specialization on dairy farms. Herd size will continue to increase. Production per cow must continue to increase. Fewer but more capable individuals will be managing dairy herds. More employed labor will be required. Properly trained and qualified dairy labor will be a major limiting factor. Feed grains will probably increase in price requiring more emphasis on the use of forages in the dairy ration.

Major Problem Areas

The major problem confronting North Carolina dairy farmers is a low net return due to inefficient management, poorly trained dairy labor, increasing production costs and problems associated with adjusting production to the market. Inefficient herd management and lack of farm business management are the two major causes contributing to low net returns on the dairy farm.

Inefficient herd management is due to:

1. Lack of experienced and properly trained dairy labor
2. Lack of labor management
3. Improper milking practices
4. Lack of production and feed records
5. Inadequate feeding
6. Insufficient number of high quality replacements
7. Production losses due to disease
8. Lack of adequate facilities

The lack of proper dairy farm business management is

indicated by:

1. Lack of training in business and personnel management, techniques and principles
2. Excess investment in facilities and equipment
3. High operating costs
4. Lack of knowledge in securing and using agricultural credit
5. Insufficient financial and accounting records on dairy farms

Inability to adjust production to the market is due to:

1. Lack of communication and understanding between producers and processors
2. Lack of organized producer bargaining with distributors
3. Lack of understanding of the pricing system
4. Lack of an understanding of the production base plans
5. Inadequate distribution system for excess milk

Extension Program

An Extension dairy production program will be developed and implemented that will assist county agents, agricultural and dairy leaders and dairy farmers in more efficient dairy production practices. Emphasis will be placed on the following subject matter areas:

1. Feeding the milking herd
2. Dairy facilities
3. Herd replacements
4. Milking management
5. Reproduction efficiency
6. Production testing
7. Improvement through breeding
8. Dairy farm business records
9. Dairy farm business management
10. Herd health
11. Milk marketing
12. Manufactured milk production
13. Dairy youth activities
14. Milk quality

Extension specialists will be assigned the responsibility of developing a state-wide educational program for one or more of these subject matter areas. The objective is to eliminate problems confronting North Carolina dairymen. This will be done as follows:

1. Conduct in-service training for county agents responsible for dairy work.
2. Conduct work conferences with county agents to plan and develop educational programs in major problem areas.
3. Cooperate with technical institutes in providing training

programs for dairy labor.

4. Assist county agents in planning and developing an effective county or area dairy program.

5. Prepare and distribute leaflets, folders, bulletins, newsletters, etc., on dairy subjects for county agents, other dairy workers and dairy farmers.

6. Prepare a dairy handbook for county agents as a working reference in dairy herd and farm management.

7. Prepare and disseminate material on dairy subjects by radio, TV, news releases and other mass media.

8. Develop area and state conferences for dairy farmers, dairy fieldmen, feed dealers, milking equipment dealers, artificial breeding representatives, DHIA supervisors and personnel in other associated industries.

9. Organize and develop on-the-farm demonstrations and applied research on recommended practices in cooperation with local county agents and dairy farmers. Complete evaluation data will be kept and used in educational programs for all dairymen. This will include such projects as production testing, complete farm business records, labor saving equipment and facilities, raising herd replacements, mastitis control, breeding efficiency, and feeding systems.

Program Needs

In developing and initiating an Extension dairy husbandry program during the next 5 years, emphasis will be placed on a certain degree of specialization among the dairy specialists for a more thorough and complete development of the subject matter and effective ways of implementing recommended practices by the dairymen. Greater specialization is needed among county Extension workers, especially in the commodity areas.

The development of area dairy agents (special dairy agents for two or more counties) is badly needed to effectively provide and implement a county dairy educational program for dairymen and the leadership in related industries. The specialization that is developing with fewer but larger dairy farms will require a well trained and equipped county agent to provide the educational leadership needed in this commodity area.

Area dairy agents should have some advanced training in dairy production, economics and marketing supplemented with some knowledge of teaching methods in adult education. The Extension organization should be structured to permit area dairy agents to work more

closely with dairy specialists in planning, developing and implementing a state dairy educational program. There should only be one dairy Extension program for the state. There should be also a system through which it can function that will involve all Extension workers responsible for dairying.

Often convenient services are not available to permit dairy farmers to readily implement recommended practices. Specialists should assist in developing the organization, system and facilities that can provide these service effectively and economically. When these services can be provided by cooperative farmer support, Extension workers should phase out of the functional operation to a consulting and educational role. Many service-type functions are needed that are not adequately provided through commercial sources such as production testing associations, servicing milking equipment, dairy farm business records, and mastitis testing.

Program Results

Accomplishments will be determined by:

1. Amount and financial worth of milk produced for the market
2. Production per unit such as production per cow, per man
3. Changes made in recommended practices as indicated by survey of county agents
4. Net returns to producers
5. Effective producer and service organizations
6. Changes in and effectiveness of Extension organization, procedures and methods

The numerical projected changes are as follows:

	1965	1971
Number of units	220,000	200,371
Production per cow	7,070 lbs.	8,505 lbs.
Total production	1,557,000,000 lbs.	1,689,477,478 lbs.
Quantity sold	1,223,912,000 lbs.	1,509,500,000 lbs.
Value of sales	$71,027,407	$96,415,707

DAIRY MARKETING AND UTILIZATION

Present Situation

The quantity of sales of fluid milk items is expected to increase 4 percent per year. Milk prices are rising as supplies are tightening throughout the United States. Increases in production up to 5 percent per year will therefore still allow average farm prices to rise.

The volume of dairy products processed in dairy plants has

increased 5.5 percent yearly for the past 10 years, a portion of which has consisted of increased processing of imported milk powder and cream. In addition, non-dairy product processing amounts to an additional $7 million per year.

Over the past 15 years, plants manufacturing butter, milk powder, evaporated milk and cheese have been unable to secure sufficient milk to operate economically. Some have ceased operations and others may be forced to do so. Markets for manufacturing milk are available in supply areas surrounding South Boston, Virginia; Statesville; West Jefferson and the Waynesville area.

Total number of dairy firms	55
Total number of employees	5100
Total payroll annually	$24 million

Major Problem Areas

Expansion of Present Operations: In order for present firms to have greater stability and compete in the market place an increase in the size of the business unit is needed. Many plants have reached an efficient size; however, there are still a number of plants in the state that must become larger or their competitive position will be weakened.

In some cases, firms will be encouraged to specialize in specific products in which they can better compete. For example, a particular plant may be advised to devote its resources to specializing in the processing of fluid milk products and to purchase their other products, such as cottage cheese and ice cream, from outside sources.

Increased Efficiency of Operation: Regardless of the size of any industrial unit, efficient operation is necessary to compete in the market place. Accordingly, special emphasis is being directed to this phase in order that North Carolina's dairy plants can remain in a competitive position.

Labor costs make up a significant amount of the total plant costs. Also, the number one problem facing the North Carolina dairy industry is maintaining an effective and qualified labor force. Thus, special emphasis is being directed to assisting the dairy industry in dealing with its labor problems. Two programs are presently underway:

1. Job evaluation which gives a company a consistent wage scale. Job evaluation is essential to a successful wage incentive program because it permits the employee to be paid according to the content of the job. He then receives incentive pay for extra effort and initiative.

2. Personnel evaluation whereby the progress of the individual employee can be measured. Management personnel in dairy

plants need a tangible criteria in evaluating the performance of its employees. If management does not recognize the difference between capable and conscientious employees, and the undesirable and inept one, then low morale and inefficiencies will result. Personnel evaluation assists management in solving this problem.

Two other areas important in efficient operation are automation and control.

Automation of plants. Upgrading of employees, and determination of break-even points for automated equipment is another area of concern to increase efficiency.

Control of operations. Efficient scheduling of operations and rapid product flow are important keys to efficiency.

Improved Product Quality: Many times the consumption of a poor quality dairy product by the consumer will turn him against such products for a long time. Thus, the whole industry loses for the inadequacies of a few. Therefore, much attention is being directed to maintaining and monitoring the quality of North Carolina dairy products.

Informing the Public: The public needs to be informed of the progress of the dairy industry, especially in connection with its efficiency, product quality and the impact of the industry on the economy.

Extension Program

Specialists in dairy marketing will contact plant managers and other plant personnel through a dairy newsletter, dairy technical society meetings, programming and speeches at trade association meetings, leaflets on current topics, demonstrations on product quality and operation techniques, and assistance on specific plant or firm problems when requested.

Assistance in solving industry problems will be provided by surveys and analyses presented in various forms to action agencies. Extension agents will be informed through seminar programs, in-service training, and occasional newsletters and written materials. The general public will be provided marketing and industry information through radio, TV and newspaper articles.

Program Results

Value added by processing and distribution firms to the value of farm deliveries of milk is one measure of industry growth. This is expected to be $99.8 million in 1971, compared to $70.9 million in 1965.

Plant facilities, industry employment, output per man, output per unit of physical facilities, distribution cost per unit are other measures which will be evaluated. Product quality is measurable by product life and product uniformity, but these measures are relatively subjective in nature. Specific measures are available such as improvement of product standards, taste panels and product clinics, shelf life of product and results of laboratory tests.

Although fewer plants are expected in 1971 than in 1965, they are expected to be better organized, larger, and more efficient.

POULTRY

Review of 1.6 in '66 Program

In 1961 North Carolina produced 186,354,000 broilers and realized a gross income of $82,369,000. The industry produced 12,123,000 farm chickens for a gross income of $7,137,000. Gross egg income amounted to $72,615,000. Turkeys brought in $11,949,000 from 2,765,000 turkeys giving a gross income from poultry and poultry products of $174,070,000. Five years later, in 1965, North Carolina produced 234,477,000 broilers for a gross income of $118,176,000. Egg income in the state had increased to $75,873,000. Turkeys showed a phenominal increase to over 5 million birds for a meat income of $19,865,000. Add to this the 13 million turkey hatching eggs produced, with a value of $3,240,000, and turkey income for 1965 amounted to $23,105,000. Farm chicken income had increased to $7,361,000, for an estimated gross income from all poultry and poultry products in North Carolina of $224,515,000--well above the 1966 goal of $218,400,000.

Present Situation

The poultry situation in North Carolina reflects phenomenal growth and efficiency. It has been and is charting the course for all agricultural commodities in the area of production and marketing efficiency.

Unit size: From the standpoint of present production, many of the poultry farms or enterprises in North Carolina are too small to be considered economical units. The opportunity exists for these small units to expand into a more competitive size unit, utilizing full time the labor available on the farm.

Housing: Broiler and poultry house construction is expanding and most new units carry insulation and a high degree of mechanization. Many of existing units are still without insulation. The trend toward insulation and mechanization will continue in the future until all houses are insulated and equipped with the latest in mechanized equipment to offset the increasing labor shortages.

Labor: The industry is faced with a labor shortage in processing as well as on the farm. The labor situation is expected to become more acute in the next 5 years. This will necessitate higher wage scales, both in processing plants and on farms in order to compete with the labor demand caused by the influx of other industries.

Attitudes: In some sections the attitude of the people toward the poultry industry leaves much to be desired. Many people are guided by past history, resulting in a visionary void. Unfortunately, poultry's greatest growth potential is the area where people's attitude toward poultry

is hindering development of the industry.

Capital: Money available for investing in poultry production in some sections of North Carolina is quite scarce. Ironically, in some areas a lending agency is quite liberal with poultry financing while in other areas the lending activity of the same agency is practically non-existent. Although money available for poultry operations is a factor on individual farms, it is not expected to be a major hindrance to the development of the poultry industry during the next 5 years.

Business Management: The complexity of the poultry industry, its competitiveness, and its rapid turn-over demand excellent business management by the entrepeneur, both on the farm and in the integrated business. A high percent of individual farm operators of poultry enterprises are not keeping adequate financial records. They are also not utilizing a budget for proper business analysis so as to allocate available resources most efficiently. Management in the processing and integrated firm operations is improving. It will continue to improve as more management training is conducted for potential managers. This program has been initiated in cooperation with the Economics Department at North Carolina State University and plans are to continue it.

Potential: The industry is ever expanding into centers of food production and no limit is seen in the foreseeable future to the amount of expansion that can take place. World population and income levels are increasing. With this expansion comes increased demand for protein food, where poultry is the leader, not only in quality but also in output per unit of input. One average North Carolina turkey grower can easily provide all the protein 2, 938 adult males need for an entire year.

Many firms are looking to North Carolina for additional broiler production, additional hatching egg production, and additional turkey and egg producing units. Some of these firms are already in operation in North Carolina; others anticipate doing business in North Carolina. Within the next 5 years additional processing facilities will be established for turkeys, eggs, and broilers in North Carolina. Some are already in the planning stage; others are in the exploratory stages of development.

Major Problem Areas and Extension Program

The major objective of the 5 year program will be to improve the competitive position of poultrymen in North Carolina and to increase profit margins. Marketing emphasis will be a key factor in trying to improve poultry's competitive position.

Commercial Eggs: In the area of commercial egg production,

North Carolina poultrymen are experiencing feed conversions of about 4.5 pounds of feed per dozen eggs. Considering this feed conversion rate and the fact that feed costs are higher in North Carolina than in competing areas, the feed cost per dozen eggs is too high in North Carolina to insure competitive position. Two approaches will be used in North Carolina to reduce feed cost per dozen eggs. The actual cost of feed must be reduced, and feed conversion must be improved by .1 pound per year to reduce the conversion rate by the end of the 5 year period to 4.0 pounds of feed per dozen eggs. Profits can also be increased by reducing the number of cracked eggs. The concept that he is a food producer must be instilled in the mind of the commerical egg producer. He must realize that his product is food and that the egg must be handled as food from the time it is laid until it is marketed. The commercial egg farm must look and be as clean, neat, and sanitary as any other food producing unit.

Feed Conversion: Feed conversion on hatching egg flocks is approximately 8 pounds of feed per dozen hatching eggs. This, likewise, is higher than it should be. Hatchability of broiler hatching eggs will average around 75 percent in North Carolina. This is too low, based upon available knowledge on producing hatching eggs.

In broiler production, feed conversions average about 2.35 pounds of feed per pound of broiler. With the knowledge of feed formulation gleaned from research in broiler nutrition this should and can be reduced by at least .1 pound of feed per pound of meat during the next 5 years.

Feed conversion on turkey meat on a statewide average would probably average 3.65 pounds of feed per pound of meat. This is considerably above what many of the better, more efficient producers are getting. North Carolina is lagging in further processing of turkey meat. This marketing function must be expanded.

Disease: The problem area of disease control and flock health, as well as excessive condemnations in broilers at processing plants, is ever present. North Carolina poultrymen are experiencing excessive trouble with both broiler and turkey diseases. Broiler condemnations in 1965 averaged 2.44 percent of all broilers processed. Mortality of broiler chicks during the brooding period has not been excessive except in a few instances. Chick mortality can and should be reduced if the profit position of North Carolina broiler producers is to be improved.

Condemnations in turkeys have been fluctuating. North Carolina turkeymen are experiencing problems with mold, synovitis, cholera, coccidiosis, and salmonella infections. Many turkeymen are routinely experiencing mortality as high as 12 percent to 15 percent and, in some cases up to 20 percent during the growing period. Others experience only about 6 percent. These high mortality figures are well above the United States average of 9 percent and

this is a loss that will receive much attention in the next few years.

Mold infections are the most serious problem at present. Although synovitis and fowl cholera are causing no serious problems now, they continue to linger and are a threat to North Carolina turkeymen. More adequate control programs are needed for these two diseases.

Business Records: Most poultry producers in North Carolina are not keeping adequate financial records. Recent investigations in this field have shown that records, when they are present, for the most part are meager and inadequate for sound business planning. Budgets are practically non-existent in poultry operations in North Carolina. The financial plan which a budget provides would be most desirable and would encourage the producer to keep records of his cost. It is imperative that one know his total cost of production and the distribution of these costs if he is to use his available resources adequately. The lack of a budget is not restricted to the producers in North Carolina but carries over into large firms as well. The need of a budget by integrated firms in North Carolina is urgent.

Started Pullets: North Carolina has a shortage of high-quality started commercial egg pullets. Thousands of pullets are being imported into North Carolina from Arkansas and other areas because of this shortage. Whether the shortage has been due to unsatisfactory performance of pullets purchased locally or a delay in accepting the trend to specialized pullet production is not clear. North Carolina has developed a pullet program designed to alleviate the problem of performance and quality. This program, when it is adopted by all started pullet producers, will go a long way toward solving the problem of high quality commercial egg pullets.

Broiler Hatching Eggs: North Carolina has a tremendous broiler hatching egg industry; 20 percent of all hatching egg breeders are located in North Carolina. Sub-optimum performance of hatching egg flocks and subsequent low hatchability are causing problems in the hatching egg industry. This problem is serious enough that one man has been assigned to work in this area. Breeder flock size needs examining. Research has shown that broiler flocks consisting of chicks from several egg sources may be a factor in the incidence of disease outbreaks. A breeder program will be developed to correct these problems.

Labor: On poultry farms, in processing plants, and other plants allied with poultry production, the cost, availability, and dependability of trained labor has become a problem. In the past farm and processing plant labor has been available at a low cost. Today, even with higher wages, it is difficult to attract and keep capable workers. The public image of a farm or plant worker must be changed. The work

must be made more attractive by a combination of improved working conditions, improved personnel supervision, and increased wages.

To afford higher wages, poultry farmers and poultry plant operators must make more efficient use of labor. Labor saving machinery and other devices must be used where the cost of such devices is less than the labor they replace. Optimum size of operations must be determined. Reaching optimum size can be accomplished by growth and/or merger. Structure of operation can often be improved by a broadening to include another phase of overall production. This broadening can also be attained by independent growth and/or merger. These two kinds of growth, increase in size of a single phase of poultry production, and increase caused by adoption of other phases (vertical integration), can make possible not only more efficient use of labor but also more efficient use of management. The Extension Service should be able and ready to advise and encourage operations in poultry production to expand production, merge with other producers, and integrate when such actions increase efficiency.

A shortage also exists in the labor ranks at the level of farm managers. This shortage is especially acute in geographical areas which are newly expanding into poultry production. In these situations there are farm managers trained in the production of field crops, but lacking in poultry management knowledge. In geographical areas with histories of poultry production, there is a steady need for new poultry farm managers to replace those retiring and to fill the needs of a constantly expanding industry.

Management Training: Courses in poultry farm management should be planned on a regional or multi-county level. The courses should be taught by the county Extension staffs of the region involved and the state specialists. Full use should be made of industry leaders as guest lecturers.

Managers and supervisors in processing and production facilities need management training to more effectively plan, coordinate, and control production and marketing functions of the integrated industry. As poultry firms get larger and more complex, the need for this type training becomes more evident. Some labor turn-over problems in the poultry industry are due, in part, to the quality of business and personnel management. Most poultry firm managers have not been trained in human relations or in dealing with the various functions of management. Expanding managerial capacity within poultry firms may be the vital key to whether some of these businesses remain solvent.

Marketing Efficiency: In the area of production and marketing efficiency within the poultry industry, Extension has a responsibility to advise various firms regarding mergers. In some instances merging various firms would create a more competitive unit,

especially in the area of egg production. Firms should be so advised. The trend in the production of commercial eggs is toward enormous production units. A part of the poultry program will be to create a proposed organizational structure of independent egg producers, small packers, and hatcheries whereby large market egg complexes can be developed to compete with other areas.

Program Needs

In the area of organizational changes, consideration should be given to more area poultry specialists. The rapidly increasing complexity of poultry production and marketing firms requires that the Extension Service provide specialized and highly technical information to these firms. This is a necessity if the Extension Service is to maintain and enhance its leadership position.

In order to amplify the specialists' performance and to make it more effective, assistance for supervising and carrying out field trials or applied research is desirable.

Program Results

Broilers

Reduce feed conversion from average of 2.35 to 2.10 pounds of feed per pound of meat. This is .05 pound reduction per year. Economic value based on projected annual production and $80/ton feed cost is $35,418,413 total or $13,022,994 in 1971.

Reduce condemnations by 4 percent per year. The 1965 average was 2.44 percent and early 1966 figures indicate that there will be little improvement. This rate would reach a condemnation rate of 1.99 percent by 1971. The savings would be $2,292,000 for the 5 years, or $820,000 in 1971.

Turkeys

Reduce feed conversion from 3.75 to 3.40 @ $73/ton
Saved 1971 = $52,356,130 @ $.0365 = $1,910,999

Hatching Egg Birds

Reduce feed conversion from 8.0 to 7.5 lbs/dozen or .10 lbs/yr.

Feed cost @ $85/ton or $.0425/lb.
Figure 12 1/2 dozen eggs per hen
Saved 1971 vs. 1966 = 46,910,603 lbs or $1,933,701
281.62%
Saved 1967 through 1971 = $5,445,689

Increased hatchability 1% per year from 75% in 1966 to 80% in 1971.

With chicks valued at $.09, the increase of 1971 over 1965 is 32,267,226 chicks or $2,904,050

283.08% of 1971 over 1965
The five-year total is 91,342,063 chicks, worth $8,220,786

Commercial Egg Production

Reduce feed conversion .10 pounds per year from 4.50 pounds of feed per dozen eggs in 1966 to 4.0 in 1971. Economic value with feed at $75/ton is $3,268,021 in 1971, or a 4-year total saving of $9,215,819. Save in 1971 87,147,224 pounds or 43,573,612 tons @ $75/ton.

Increase production one egg per bird per year from 220 hen-day eggs in 1966 to 225 hen-day eggs in 1971 -

Total increased egg income = 132,918,473 eggs @ 2.5¢ = $3,322,961
Increase in 1971 vs. 1966 = 47,197,810 eggs @ 2.5¢ = 1,179,945

POULTRY MARKETING AND UTILIZATION

Present Situation

The poultry processing industry of North Carolina is composed of 43 broiler, fowl, and turkey processing plants operating under United States Department of Agriculture and North Carolina Department of Agriculture programs of inspection and 30 egg processing plants handling at least 500 cases of eggs each week. These facilities provide employment for approximately 6,529 people with annual wages of approximately $31,234,736.

Processing beyond the whole ready-to-cook product is performed in several of the broiler and turkey processing plants. Two egg processing plants are engaged in the pasteurizing of broken-out liquid egg meats.

Over 60 percent of all poultry processed products move in interstate commerce. To facilitate rapid movement of farm produced raw poultry products to the processors, poultry processing plants are located in close proximity to production facilities. Poultry products plants are located throughout North Carolina.

Major Problem Areas

1. The high level of competition in the poultry industry places increased emphasis on the need for efficiency in assembling, packing, processing and distributing poultry products.

2. The need is great for more organizational efficiency in the

structure of firms and industries.

3. Firms need to be more aware of opportunities to innovate new technology for processing.

Extension Program

The objective will be to maximize net returns to the poultry processing industry. Methods to be used include:

1. An interdepartmental team approach to economic, engineering and technological improvements of processes within poultry products plant.

2. Consultation with industry leaders and firm managers regarding the development of a multi-product poultry meat further processing plant.

3. Distribution of information through publications, advance information of timely importance, meetings, and mass media.

4. Promote and encourage intra-and inter-departmental activities in applied problems related to poultry products.

Program Results

1. Value added in marketing will increase.

2. Unit costs will decrease.

3. Quantity and quality of new poultry products will increase.

FIELD GROWN CROPS

FIELD GROWN CROPS

Agriculture is North Carolina's greatest industry. Field grown crops make up the chief component of this giant industry that now measures $1.5 billion in size.

The production of cash crops has characterized North Carolina agriculture from the time of "King Cotton" through the transitional period of the 1920's when tobacco became "king" and until the present when the state's crop production is characterized more by variety than the largeness of any single commodity. Such diversity means more stability to the economy.

These changes have shown that the Tar Heel farmer can change and adjust. He can change his major emphasis from one crop to another or from one to several. But, also revealed is the basic nature of the North Carolina farmer: crop production is the kind of farming he likes and knows best and the kind of farming in which he is likely to continue from one generation to the next.

In recent years the forces affecting the production of field grown crops in North Carolina have included: fewer but larger farm units, mechanization, higher production per unit area, stricter government control programs, changing support prices and a wider range of markets.

Production controls and support prices have affected cotton, tobacco, and peanuts. Other crops have been more directly affected by the changing food needs of an exploding world population, available labor and adjustments made necessary by change in other cash crops. Affected are soybeans and the field grown horticultural crops: sweet potatoes, Irish potatoes, peppers, cucumbers, snapbeans, greens and other vegetables. These same forces are expected to prevail during the next 5 years and shape the future of crop production in North Carolina.

Due largely to the persistence, knowledge and ability of the farmer, crop farming is not fading, weakening or faltering. Rather it is adjusting, growing and becoming more economically important, not only to the farmer and to agriculture, but to the state as a whole. The Extension Service has been and continues to be, singularly and in cooperation with other agencies, a leading educational force in helping the farmer adjust and strengthen this crop industry.

The long range committee on Field Grown Crops, in attempting to look 5 years into the future of crop production, has had to look backward in an attempt first to evaluate prior efforts by Extension to find its role and fulfill it effectively. An accurate evaluation provides the soundest of foundations upon which to develop a long range program for field grown crops. It is necessary to reassess the relative position of each crop, to evaluate Extension's program,

to study previous long range programming efforts, to identify problems, to attempt to identify the reasonable potential of each crop during the next 5 years, and finally, to develop goals and means for reaching those goals.

The following represents these commodity-by-commodity studies and projections by this committee:

COTTON

Present Situation

Since the early 1950's, the trends in cotton production have been toward higher mechanization and larger farm units. These trends have been geared closely to the following factors: reduction in number of allotment farms, release and reapportionment, custom application of practices and new technology of production.

The movement of cotton acreage within the state has been rather intense in recent years, especially since the advent of release and reapportionment in 1960. The shift in acres has been mainly from the piedmont to the upper coastal plain. Acreage has decreased in the piedmont from 30 percent of the total crop in 1950 to less than 12 percent in 1965. This downward trend is principally due to industrialization, small size of allotments and unadaptibility to mechanization.

In 1960, there were 82,898 allotment farms composing a 475,217 acre cotton allotment for the state. By 1965, the number of allotment farms had been reduced to 61,269 while the effective allotment was set at 458,381 acres. In addition to numerous allotments being permanently released, countless others have been eliminated by failure of being planted for 3 consecutive years as required by law.

Approximately 85 percent of all cotton allotments in North Carolina are 10 acres or less, composing approximately 218,000 acres of the total number available for production. These figures are expected to change considerably by 1971, because of the sale and lease provisions of the Agriculture Act of 1965. In 1965, 6,058 acres representing 1,002 owner transfers were made and over 31,000 acres were leased. Owner transfers and leases are expected to increase sharply during the next 3 years. This will place more acres into the hands of capable growers interested in cotton, thereby, increasing allotment size which will result in more mechanization, better production practices, and consequently, higher yields.

The 10-point program, designed and initiated by Extension personnel in 1960, is now the basic program of the vast majority of

the state's cotton producers. In 1962, the program was modified to include the all-recommended practice program. Adopting the all-practice approach proved very beneficial to all growers, including the traditionally high producer. In 1965, the all-practice program was adopted as the official program for cotton by most of the larger cotton counties. In 1966 and subsequent years, it will be the accepted program by Extension and other farm leaders in all cotton producing counties in the state.

Extension has worked and will continue to work closely with the North Carolina Cotton Promotion Association and other groups working primarily with cotton. County Extension agents are encouraged to work closely and to share responsibilities with commercial firms and others in setting up programs designed to furnish useful information to producers. Contests, Two-Bale Clubs and other promotional programs, although sponsored by cotton interest groups, are and will continue to be administered by Extension personnel.

The objectives for the 1.6 in '66 Program were determined under the assumption that government programs would remain essentially the same as in 1961. It was further assumed that no major catastrophe would limit production possibilities.

In 1961, 405,000 acres were harvested, yielding 332 pounds of lint per acre with an estimated income of $47.5 million. Yield per acre increased but fewer acres were planted due to changes in government programs. An average yield of 490 pounds of lint on 381,000 acres provided an income of $68.3 million in 1964. In 1965, as a result of extreme insect activity and a very wet season, the average yield per acre was only 295 pounds. Major changes in government programs will prevent the 1966 goals from being attained.

Major Problem Areas

The 1965 Farm Bill increased problems for the cotton producer and the overall cotton program in North Carolina by:

- Creating confusion among producers, particularly the small allotment holder, with respect to alternative choices in 1966 and subsequent years

- Causing a considerable number of acres to be taken out of production and thereby, resulting in a major reduction in the total cotton economy of each county

- Reducing the incentive of many small farmers to increase and improve efficiency of production

- Causing a large percentage of allotment acres to be lost permanently to North Carolina

Many problems are created by some individual farmers who have little concern for other producers or for their own future cotton welfare. Some growers are reluctant to release, sell, or lease unwanted cotton acres and will not accept sound production practices that directly affect themselves and other producers. Such practices include inefficient insect control, poor weed control, inadequate soil pH levels and fertilization, improper cultural practices, and excessive mechanical field loss during harvesting.

Many additional factors cause or create problems in production. These are:

- Lack of adequate equipment on the small farm
- Lack of available labor and high labor costs
- Difficulty in obtaining uniform stands under adverse conditions
- Rotation practices not suitable for high yields of good quality cotton
- Competition with other areas for the production of market quality cotton
- Lack of adequate applied research in all areas of cotton production within the state, including nematode, disease, levels of fertilization, and land preparation
- Failure to apply all the technology now known for cotton production
- High quality varieties not yet available for local production
- Lack of production cost studies

Extension Program

Plans for putting the program into action with respect to priority implementation will be to:

1. Conduct annual area meetings and training schools for county agents with the assistance of subject matter specialists for county personnel emphasizing economy and efficiency of production in all aspects of production and marketing.
2. Hold individual conferences with agents promoting and assisting with special procedures and techniques.
3. Assist agents, subject matter specialists and others in conducting educational meetings at the producer level.

4. Collect, assemble, interpret and distribute research information to leaders and producers.

5. Encourage and promote accelerated cotton research by informing proper research persons of the problems in the field.

6. Encourage related business firms in promoting and assisting with field programs, such as field tours and all-practice demonstrations, by supplying them with necessary information and material.

7. Plan and organize methods and techniques necessary for proper and complete evaluation of the program from season to season and year to year.

8. Encourage all-practice demonstrations to show what can be done with cotton production.

9. Use a newsletter to keep agents abreast of cotton activities and timely tips.

4-H Club activities in cotton will continue to be an integral part of the overall program. Specialists and county personnel will work closely with sponsors and promotional groups to stimulate interest and participation in the demonstration and project phases of the 4-H cotton program.

Program Needs

Related industry and agencies should be consulted in planning, implementation and evaluation of the total Extension program. A memorandum of understanding relative to the areas of planning and work activity should be executed with each agency, group or individual concerned with the total program in order to prevent duplication of effort and to delineate areas of responsibility.

An area approach to some cotton problems and opportunities may be more effective in providing a more complete cotton program for the producer. For cotton to be profitable it is necessary that a grower follow all known good production practices based on available technology.

Specialists and agents should be encouraged to involve themselves with workshops, training sessions and campus course work in technical and administrative studies. They should be permitted to take occasional trips to major cotton producing states to observe methodology and production practics. They should be encouraged to attend informative sessions and tours with respect to marketing and processing of cotton.

The above policies, changes and training needs would require

complete coordination of planning between specialists, district chairmen and county personnel. It is necessary for all to be kept fully informed of plans and objectives.

Additional resources would permit the staff to carry out needed on-the-farm tests. Such tests would lend a tremendous boost to the cotton program and provide needed information to the producers.

Program Results

It is anticipated that the number of acres will be 300,000 in 1971, down from 1965 by 70,000 acres. However, the yield per acre should be up 625 pounds, so that total production will be 390,625 bales. With larger, more efficient farm units, the trend toward increased yields per acre should continue. Prices will probably be down, but total value of farm sales should be up to about $55.5 million.

COTTON ECONOMIC DATA 1965 AND 1971

ITEM	1965	1971
Number of production units	370,000 acres	300,000 acres
Lint Cotton:		
Yield	295 lbs/A	625 lbs/A
Total Production	227,000 Bales	390,625 Bales
Quantity sold	227,000 Bales	390,625 Bales
Price per lb.	$.305	$.260
Value of sales	$34,617,500	$48,750,000
Cotton Seed:		
Yield	497 lbs/A	1,064 lbs. A
Total Production	92,000 Tons	159,600 Tons
Quantity sold	90,000 Tons	155,000 Tons
Price	$44.00 Ton	$44.00 Ton
Value of Sales (seed)	$3,960.000	$6,820,000
Total value of sales	$38,577,500	$55,570,000

PEANUTS

Present Situation

During the past 10 years the number of farms with peanut allotments has decreased from 17,500 to 15,300. A high percentage of the allotments are leased. It is estimated that as few as 8,000 growers actually grow the 175,000 acres allotted to the state. The rapid adoption of practices requiring the use of costly and highly specialized equipment has tended to increase both yield and quality. At the same time the high cost of equipment such as granular applicators, sprayers, combines, and curing units has made it necessary for many growers to increase the size of their operations, cash rent to another grower, or have a

custom operator perform these operations. Twenty-five to 30 acres are considered a minimum acreage on which the cost of the specialized equipment can be justified. It would appear by observation that the average age of the actual peanut producer has decreased by as much as 10 years during the past 5 years. Apparently, the young grower has been more willing to invest in equipment and to rent acreage from his neighbor.

Rapid changes have occurred in peanut production during the past 5 years. For example, the use of herbicides has increased from less than 1 percent of the acreage treated to more than 80 percent, the percentage of the acreage combined from 15 percent to 85 percent, and the use of systemic insecticides from 1 percent to over 90 percent of the acreage. Changes have also occurred in all other practices but not as fast as those above. Change is therefore an accepted norm in peanut production.

The fact that peanut growers are younger than the average farmer, plus the fact that change is an accepted norm in producing peanuts, makes the job of getting new information to growers and having it adopted much easier than was the case 5 years ago when the 1.6 in '66 program was introduced.

During the past 5 years, considerable effort was devoted to developing and improving the all-practice concept. This concept has proved very useful in working with growers who needed help in raising their yields. One of the biggest side benefits of the all-practice concept was that it proved to be an excellent tool in training agents in how to produce high yields of peanuts under practically all conditions present in the county. This confidence by the agent has been important in carrying the message of good peanut production practices to all growers in the county. The involvement of industry in the all-practice demonstrations has been helpful in having a single peanut production program for the state with both industry and the adult educational agencies supporting it.

Contests have also been helpful in calling attention to good peanut production. Membership in the Two-Ton Peanut Club continues to grow with total membership now at 189 members. Competition continues to be keen for the county trophies awarded each year in the peanut production contest. The average yield on all the peanuts produced by a grower is used as a basis for selecting the winner.

Extension agents, in addition to holding all-practice peanut demonstrations, conduct many other single variable demonstrations such as variety tests, herbicide tests, and disease and insect control tests. Many of these are in cooperation with research people from industry. Most agents in the major peanut counties conduct at least a few community peanut meetings, send out newsletters, write news articles, and appear on local radio and TV programs to keep farmers

informed on the latest peanut production practices.

The 1.6 in '66 Program developed by county agents through their peanut advisory committees called for an increase in income from $30 million to $35.7 million by 1966. This estimate was prepared before the impact of improved technology and the innovation of working with producers having low yields had begun to pay off in terms of influencing their neighbor's yield. The estimate was much too conservative as the 5-year goal was exceeded the very first year. By 1965, peanut income had reached $44 million, an increase of 70 percent, 51 percent more than was called for in the 1.6 in '66 Program. Acreage remained virtually static during the period 1961-1966.

Major Problem Areas

The major problems limiting peanut production may be listed as follows:

1. Small size of average allotment (11 acres) making it necessary for a producer to (a) rent additional acreage in order to justify the use of mechanized equipment, (b) lease or rent his acreage to another producer, (c) obtain custom operators to perform certain operations requiring specialized equipment

2. Lack of control of the timing of certain operations

   In some areas of the state where the county average allotment is only about 5 acres, all specialized operations are performed by custom operators. Only a minimum number of custom operators are available on a community basis. Because of the time required to dig, combine and cure peanuts, the custom operator is forced to start several weeks before optimum maturity is reached and does not finish for several weeks after optimum maturity. Yield and quality reductions often are very high on a large percentage of the custom operator's customers because of early or late digging.

3. Low level of interest in peanut production in most counties with less than 1,000 acres of peanuts and in all of the southeastern counties of North Carolina

4. A small but persistent hard corps of growers in each county who are characterized by (a) producing yields less than one-half the county average, (b) not being in contact with Extension agents, (c) working on the farm only part time, (d) growing peanuts the old fashioned way

5. Not enough diversity in peanut varieties for such things as (a) dates of maturity, (b) resistance to major diseases, (c) pod retention,

and (d) insect resistance

6. Inability to determine quality factors for varieties or the effect different treatments might have on quality

Extension Program

The Extension peanut program will be geared to help solve the problems growers encounter in producing high yields of good quality peanuts. A basic ingredient of such a program will be training agents to the point where they are fully capable of helping growers solve production problems.

Agent Training: Agent training will include the following:

-Office conferences - one or more per year per county

-Training meetings - one or more per year of one-day training sessions conducted by the specialists working with peanuts

-Production meetings - at least one meeting per county per year

-Field Days - at least one field day per year at the Lewiston Station (County or area field days conducted by agents with or without the assistance of specialists will be encouraged)

-Peanut Information Notes - timely notes furnished to agents on a weekly basis during the production season

-Research Information - to be furnished to agents in many different forms as it becomes available

-Slide sets - to be furnished to agents on an annual basis

-Demonstrations - outlines and assistance in conducting demonstrations to be furnished on a variety of practices that will help increase peanut yields

-Personal Assistance - to be offered to all agents in helping diagnose problems, develop and evaluate programs, and to up-grade training

The training as outlined above should be useful in equipping agents to work with individuals and groups so that they can work effectively with both the individual grower who leases peanuts and the custom operator operating on a community basis as listed under Major Problem 1. This training should also be beneficial in solving the problems outlined under Major Problem 2. For example, it is now possible to lengthen the harvest season by 2 to 3 weeks by utilizing the varieties now available. This was not possible before the 1966 season because all the varieties

available matured at the same time. It is felt that by working with growers and custom operators on a community basis that about a third of the growers can be organized to grow an early maturing variety, a third to grow an intermediate maturing variety, and a third to grow a late maturing variety. Such action would alleviate the major portion of the problem as outlined under 2 in the Major Problem section. The training provided would include information on how the agent might go about solving this problem.

It is felt that demonstrations coupled with recognition are the major educational tools that should be effective in dealing with the problem of producers with low yields as outlined under Major Problem 4. Considerable experience has already been gained in working with this group with the all-practice demonstration approach. The awards program in the Peanut Production Contest and the Two-Ton Peanut Club has been effective in stimulating interest as well as a feeling of competition among all growers.

Planning, Executing and Implementing a Statewide Program: Specialists working with peanuts will plan, execute and implement an educational program on peanuts throughout the production area. This will consist of many parts and activities with the over-all objective being to place the person responsible for peanuts in each county in an active leadership position. The specialists will act in the capacity of agent trainers and as a backup force for the county personnel.

Liaison with Research: The specialist staff will keep research workers in the land-grant universities aware of production problems encountered by growers and will encourage research on these problems. Whenever possible the specialist will act in a similar way with research workers in industry. New research findings will be incorporated into the existing program framework and taken to the counties by various means of communication.

Liaison with Industry: Specialists will work closely with all members of the industry that have an interest in peanuts. Close cooperation will be maintained with the peanut shelling and manufacturing industry in order to understand and to help solve their problems. Specialists and agents alike will work closely with members of the pesticide industry in conducting demonstrations and make an effort to secure industry's support of the entire peanut program, not just the tiny segment in which they may have products to sell.

The items listed under Major Problems 5 and 6 will be brought to the attention of all segments of the industry. Organization already in existence such as the North Carolina-Virginia Peanut Advisory Committee, Peanut Shellers and Manufacturers Association, and the Peanut Improvement Working Group can help solve some of the more pressing problems by encouraging and sponsoring research. Every effort will be made to encourage all segments of the industry to learn

more about quality factors and how different treatments affect quality.

Work with 4-H Clubs: 4-H Club activities in peanut production will continue to be encouraged. The state peanut project winner is awarded a trip to 4-H Club Congress each year. Many of the Two-Ton Peanut Club members are 4-H Club members. All 4-H Club members will be encouraged to participate in the Two-Ton Peanut Club and the Peanut Production Contest.

Program Needs

Specific responsibility for the peanut program should be assigned to a staff member in each county. Peanut growers appear to be grouped in two categories: those who are following good practices and making average or higher than average yields, and those who do not follow good practices and make very low yields. Because of this it may be beneficial in some cases to program differently for the two groups since they do not begin at the same point. The main objective would be to move members of the low producing group to the high producing group.

In any of the major peanut producing counties a staff member newly assigned the responsibility for peanuts should be provided adequate opportunities to visit counties with successful peanut programs, state experiment stations and peanut research and Extension personnel at North Carolina State University. Out-of-state visits may at times also be beneficial. Adequate time should be allocated to the staff member to plan, design, and implement an effective adult education program on peanuts.

Each county staff member assigned the responsibility for peanuts should plan his program with a county peanut advisory committee. The complete plan would identify problems, suggest methods for solving these problems, and specify what job is to be done, where, when, and by whom. Yearly and long-range goals would be specified. The completed plan for peanuts would become a part of the county plan of work. Each specialist concerned with peanut production would be furnished a copy of the peanut plan of work.

At the end of each reporting year a report on the peanut educational program for the county would be prepared. This report would be keyed to the previous plan of work. It would explain what was done, methods used, results, and observations. This report on the past year's activities would become the county's annual report on peanuts. Again, each specialist concerned with peanut production would be furnished a copy of the peanut annual report.

The level of competence and the training needs of each county staff member assigned responsibility for peanuts should be reviewed at least every 2 years by the specialist concerned and the appropriate district

Extension chairman. The rating given each staff member should become a part of his permanent records. Training needs would be decided for each individual staff member at the biannual review.

Specialists should be permitted to upgrade their subject matter training by attending national peanut workshops, visiting other states and reviewing their programs, taking on-campus and off-campus course work when such course work would improve their knowledge of peanut production and/or Extension methodology.

An area approach to many peanut problems and opportunities may increase effectiveness of the program. Additional support for the present staff would also be helpful.

Program Results

During the next 5 years, it is anticipated that the harvested peanut acreage will vary between 165,000 and 175,000 acres. * The trend toward increased yields should continue with the 1971 yield averaging 2,700 pounds per acre. The price per pound should rise from 12 cents to 12 3/4 cents. The increase in production and in price per pound should produce a gross income of $57.67 million in 1971 compared to $44.82 million in 1965, an increase of 27 percent.

PEANUT ECONOMIC DATA 1965 and 1971

ITEM	1965	1971
Number of Production Units (acres)	168,000	175,000
Yield/lbs/acre	2,311	2,700
Total Production	388,248,000	472,500,000
Quantity Sold	388,248,000	472,500,000
Price per lb.	$.116	$.12
Value of Sales	$44,829,533	$56,665,801

SOYBEANS

Present Situation

Soybean producers in North Carolina are experiencing a change in attitude. Old producers are adopting new techniques to increase

*This does not represent an increase in allotment. Basic allotment is 169,000 acres. This plus the 6,000 acres generally planted under the one-acre provision should give the state 175,000 acres of harvestable peanuts.

their level of production and thus to increase new profit. New growers are seeking out information before growing soybeans. The general management level of all soybean growers is lower than in crops with a higher cash value. However, this is changing rapidly and by 1971 should be vastly improved. A favorable market price for soybeans has stimulated interest in the production of soybeans.

Most of the new producers are looking for crops with minimum labor requirements, lower costs of production, easily mechanized, and with high net returns. The new growers are mostly cotton and tobacco farmers. Thus in 1966 and for several years to follow, some farmers will be growing soybeans for the first time. This indicates a need for an enlarged Extension educational program.

Few growers have been receptive to conducting demonstrations on their farms. However, this has changed considerably in recent months. Both agents and farmers are now considering soybeans as a cash crop. Farmers are now beginning to ask for demonstrations on their farms. Particular interest is being expended on row spacing, varieties, weed control, and fertilization demonstrations. These are considered as single practice studies where only one variable is studied.

Attendance at production meetings, field days, and farm tours has increased tremendously in the past two years. Farmers are becoming aware of the need for improved production and management practices.

The present all-practice demonstration program is a good example of total management system. An increasing number of farmers are following this concept.

Requests for bulletins, leaflets and other forms of information have also shown an increase. Farmers are asking for bulletins in such numbers that it is difficult to keep them in print. Increased numbers of magazine and newspaper articles on soybeans also reflect an increasing interest in this crop. All of these facilities are used to present information to farmers and to keep them up-to-date with research.

In preparing the requirements for the 1.6 in '66 Program the soybean was grouped with other grains. Thus, the large gains shown in soybeans have been overshadowed by decreases in small grains and grain sorghum. However, the gross yearly total for soybeans and other grains has shown a consistent rise.

The 1966 goal set for soybeans was 40 percent above the 1961 level. In 1961, the soybean showed a gross value of $32.5 million. By 1965, this had climbed to $47.5 million. This represented an increase of approximately $15 million or $2 million more than the goal set for 1966.

Major Problem Areas

Lime and Fertilizer: Problems regarding lime and fertilizer fall into two categories.

1. Inadequate use of lime

Inadequate lime usage or low pH soils used for growing soybeans is the number one problem causing low yields. Approximately 85 percent of all soil samples analyzed in 1965-66 for soybeans showed a need for lime. An estimated 2.25 million tons of lime was needed by all crops in 1965, but only 650,000 tons were used. Thus, only 25 percent of the amount needed was actually used. Increased usage of nitrogen and other acid forming fertilizers results in lowered pH levels of these soils. Inadequate lime usage along with increased applications of acid-forming fertilizers on crops other than soybeans presents a challenging problem for best growth of beans. An entire new educational approach on the advantages of liming needs to be initiated immediately.

2. Need for P & K fertilizer

Application of mixed fertilizers containing P and K will be necessary to increase yields and net profits. Lack of adequate fertilization can result in soybeans depleting a soil of needed nutrients and, thereby, resulting in lower yields and decreased efficiency of production. Rates of application, grades and placement are all areas needing immediate attention.

Need for Weed Control: "Beware of weeds" should be a slogan for soybean producers. Research has shown that one pigweed or cocklebur plant per linear foot of row results in a decrease in yields of 7 to 20 bushels per acre. Can we afford to grow as many weeds as we do in North Carolina? Inadequate use of herbicides, poor rotations and lack of timely cultivations result in weedy soybean fields. Approximately 50 percent of the soybean fields were weedy in 1965. Better weed control practices are needed in order to lower costs of production and to increase soybean yields. Only 10-15 percent of all soybean fields were treated with herbicides in 1965. Economic studies are needed. Better herbicides for soybeans are now appearing on the market, but these materials are not effective in some of the major soybean growing areas such as the high organic soils.

Insect Control: Insects are one of the important limiting factors in soybean production. With anticipated increase in North Carolina acreage, the insect problems may be expected to grow somewhat in number and severity.

Soybeans are attacked by a large and diverse assortment of

insects, some of which are present in most fields throughout the season. The most serious injury is caused by pod-feeding insects such as corn earworms, stink bugs and bean leaf beetles, but general defoliators can be highly destructive depending on plant maturity and pest populations.

The development and recommendation of insect control practices in North Carolina is made particularly difficult by the unpredictable nature and intensity of insect activity by crop area. This problem situation could be materially helped with an increase in research information on insect distribution and abundance, seasonal occurrence, damage potential, life histories and control practices. Application methods and the economics of control need study. Soybean insects and their control must receive a generous share of the over-all educational effort of the Extension Service.

Need to Follow All-practice Program: Increased acreage means more marginal land coming into production. In order to make a profit, this land needs to be properly managed. Farmers would do well to follow the all-practice outline on this land. Proper management, proper timing of treatments, and a little extra attention can mean a bigger net profit.

Harvesting Practices: Proper harvesting techniques need to be emphasized. A uniform grading system for moisture, foreign material, splits and damaged beans would benefit the soybean producer who needs to sell quality beans. Since 25 to 30 percent of the crop is exported to foreign countries, the importance of quality cannot be over emphasized. Farmers should be paid for high quality and docked for low quality beans.

Disease Problems: Per acre losses due to diseases will probably increase during the next 5 years if the present trend toward short rotations continues. Producers can minimize these losses by longer rotations and other good management practices.

Use of resistant varieties is a major part of disease control and should remain so for the next 5 years. Losses due to the soybean cyst nematode should decrease due to a new resistant variety.

The use of chemical disease control measures is presently limited to seed treatment. In the next 5 years, it is not likely that the use of chemicals will increase greatly due to the low per acre value of soybeans and the high cost of chemicals.

Extension Program

A continuing educational program based on basic research done at the Experiment Station level joined with applied research gained from an on-the-farm testing program will help eliminate or minimize several of the production problems in soybeans.

In-service training of agents for each county on a yearly basis will help to keep these people informed and competent and in a position to help a soybean producer with his problems. These agents could then present the latest information at countywide meetings, community club meetings as well as local radio and television. Thus, the responsibility of the specialist would be to furnish materials and supplies to the local county representative working with soybeans. Such information as slide sets, charts, folders, newspaper, radio hints, etc. would keep this agent as well informed as the specialist.

Preparation and distribution of information materials through the visual aids and news sections of the Extension Service will be stepped up considerably. Newspaper articles, radio tapes, and television programs will be designed to keep the soybean producer aware of timely management tips. Late season cocklebur control in mid-July or insect control in late August would be examples of such tips. Circular letters to agents will be used to remind them of potential problems.

The specialists will assist in planning and carrying out on-the-farm tests and demonstrations in such areas as:

adequate liming
adequate fertilization
chemical weed control
inoculation and seed treatment
insect control
proper harvesting techniques
varietal selection
trace elements
nitrogen vs. no nitrogen
diseases
rotations

Such demonstrations as indicated above will supplement the entire soybean program and provide information of an applied nature under farm conditions. Guides for setting up these demonstrations will be worked out by the specialists and agent in charge of soybeans at the county level. Only a limited number of these can be handled each year due to a lack of personnel and funds.

Conduct soybean marketing schools in problem areas. Such schools would cover proper harvesting, drying and storing of soybeans. Growers would be furnished information on quality and discounts in grain grading.

Material is available in the area of 4-H for the efficient production of soybeans. They should be taught the "hows" and "whys" of the economic production of quality soybeans. A guide for the production of soybeans is available for 4-H leaders and other interested personnel.

Program Needs

The basic objectives of the Extension Service should be to motivate producers to lower their costs of production, increase yields and at the same time improve quality. The total Extension program for the next 5

years should be geared for a maximum effort in solving the most important management problems, yet still remain flexible enough to allow for changes in the overall objectives. More emphasis should be placed on the area of applied research to fill the existing gap between basic research and farmer acceptance. There is a wide gap between the top soybean producers (50-55 bu/A) as compared with the state average of 24.5 bushels per acre. This gap needs to be narrowed by a stronger educational program.

Due to increasing interest in soybeans in North Carolina there is a growing need for a full-time soybean specialist. A designated person should be assigned responsibilities for soybeans in each county or several counties. This person would serve as a direct contact for the specialist. This would improve the dissemination of information at the state level.

Appointing area agents to work across county lines where sufficient acreage does not justify a definite county program on soybeans would be beneficial.

The soybean specialist should concentrate on training agents and agri-business personnel at the county level. A one-day training session annually for the leaders would be adequate to keep these people abreast of the problems and recent research findings. Agri-business personnel, such as seedsmen, fertilizer and lime dealers, herbicide and pesticide dealers and other related agri-business people should be properly trained. The primary responsibility of the specialist should be to train the agent at the county level and not to conduct his meetings for him. A well trained agent is then capable of training the growers. A part of the agent's training should be toward projects that 4-H could use. Office conferences will be an important part of the agent training. Through the office conference, the agent can be brought up-to-date and many of his problems discussed.

Increased and broader coverage of farm orientated television and radio programs at both the state and county level would be initiated. Wider usage of local and statewide newspapers and magazines will greatly facilitate growers' education.

Additional support for on-the-farm test program would add emphasis and depth to getting approved production practices into the soybean producers' hands. Such tests and demonstrations as fertilizer rates, fertilizer placement, lime vs. no lime, chemical weed control, planting rates, row widths, planting dates, trace elements, inoculation vs. no inoculation, quality seed vs. home grown seed, nitrogen vs. no nitrogen, etc., can then be followed in depth across the total soybean producing area.

Program Results

In 1965, the soybean was harvested from 874,000 acres in North

Carolina with an average yield of 24.5 bushels per acre. The gross value of this crop to producers was approximately $56.3 million. By 1971, the acreage will increase to 1.3 million acres with an average yield of 27.5 bushels per acre for a gross value of production of $98 million.

SOYBEAN ECONOMIC DATA 1965 AND 1971

ITEM	1965	1971
Number of production units (acres or other units)	874,000	1,330,000
Yield bu/A	24.5	27.5
Total production	21,407,600 bu.	36,500,000
Quantity sold	21,407,600 bu.	36,500,000
Price/bu	$2.63	$2.68
Value of sales	$56,302,000	$97,819,110

TOBACCO

Present Situation

Since tobacco has a high acre value return and is a major source of income on most farms on which it is grown, many growers follow reasonably close the best known production and marketing practices. When new practices are proven the tobacco grower is quick to adopt them in pursuit of increased net return. The shift to the use of more nitrate nitrogen in the fertilizer to improve quality and the rapid adoption of the practice of adjusting fertilizer where excess leaching has occurred are two examples of the rapid adjustments to new practices by tobacco growers. Many growers have a good understanding of the technical information as it relates to tobacco production and, consequently, are very adept to change as new information becomes available. In the past, growers have generally placed more emphasis on producing maximum pounds than on producing better quality, since his returns were directly related to his pounds. The change in the control program from acreage to acreage-poundage accounts in part for the shift in emphasis to quality.

Since growers have accepted practices that increase yield relatively fast, one major part of the tobacco Extension program has been directed toward the accumulation of new and improved, practical production and marketing techniques. This has been done by close cooperation with the research groups, close observation of procedures followed by successful growers, and an extensive on-the-farm testing program.

The state Extension program has consisted of a number of techniques for keeping county personnel up-to-date on tobacco production

practices, such as field days at experiment stations, demonstrations, on-the-farm tests, agents' training programs, winter meetings, and mass media.

The 4-H program has consisted of four parts - the demonstration program, the grading contest, the tobacco show and sale and the tobacco production projects. However, there has been a decline in interest among 4-H students in recent years.

Tobacco was making very satisfactory progress toward the 1966 goal established in the 1, 6 in '66 Program until the reduction in acreage or acreage poundage in 1965. In fact, many counties exceeded their 1966 goals in 1964. With a slight increase in price per pound in 1966, and a good growing season, the tobacco goal could possibly be reached in spite of the reduced production quotas. The expected price per pound and yield per acre for 1966 were reached in 1965.

Barring any unforeseeable major change in the control program and association of smoking and health, tobacco production in North Carolina should increase at the rate of about 1 to 3 percent annually during the next 5 years due to increased consumption. Domestic use and exports of flue-cured and burley are expected to increase slightly. As the loan stocks are reduced under the acreage-poundage program, production quotas will likely be increased.

Major Problem Areas

Government Programs: Since the quantity of tobacco produced and to some extent, the sale price are dependent upon government programs, the extent and type of government programs can greatly influence tobacco during the 1967-71 period. The current program restrictions tend to encourage the production of a quality tobacco that gives higher net returns per pound.

Smoking and Health: Associations of smoking and health have some influence on the consumption of cigarettes and, consequently, have caused a reduction in the production of tobacco. This association will probably be made again, but when it will be made and the lasting influence it will have on smoking habits are impossible to predict.

Quantity of Exports: A considerable quantity of flue-cured tobacco and some burley tobacco are exported. At the present time, the quality of United States tobacco is considered superior to that produced in other exporting countries, but the price of United States tobacco is relatively high. This high price as well as certain international trade regulations restricts the exports of United States tobacco. The political situation in Rhodesia also poses some uncertainties in future exports of United States tobacco.

High Labor Costs: About 500 man hours of labor are required

to produce an acre of tobacco. During recent years labor has become increasingly scarce and more expensive. This trend of more expensive labor will likely continue during the next 5 years. Increased labor costs may increase the rate of mechanization, especially during harvest.

Small Allotments: Even though renting, as well as lease-and-transfer, of flue-cured tobacco allotment is permissible, the small allotments under the present control programs constitute a problem in getting the total allotment planted and establishing economical size production units in an effort to keep production costs to a minimum, especially in relation to mechanization. A very large number of people derive a portion or all of their income from tobacco, but the small allotments cause the average income per family from tobacco to be rather low.

Lack of Interest on Part of Young People: There are apparent low levels of interest in tobacco production by young people in North Carolina, especially in the mountain and piedmont areas. This is likely due to size of allotments, cost of starting a tobacco production operation and availability of labor. In recent years many young people have found that they can make a better income from industrial wages than from operating a small tobacco farm.

Need for Better Use of Production Practices: For individual growers, most gains can be made by increasing net income per pound of tobacco allotment. This means striving for the production of tobacco of high quality which will sell for a high price per pound and keeping the per pound cost of production as low as possible. For one grower this might mean placing more emphasis on quality, for another grower it could mean reducing production cost, possibly by increasing the size of the tobacco operation.

All production practices can be expected to influence the yield and/or quality of tobacco. Although growers follow reasonably good production practices, some of the practices and grower training that would improve the yield or quality most are:

- Reduction of fertilizer injury by better placement of fertilizer
- Teaching growers basic information on response to fertilizer nutrients and nutrient movement in the soil
- Identification and control of tobacco diseases and insects
- Effects of spacing and height of topping
- Effects of chemicals and time of application of chemical sucker control
- Effective use of chemical weed control

- Effects of rotation on disease and insect control

- Economics of certain production practices, such as number of harvests, degree of replanting and number of leaves per acre

- Effects of degree of maturity at harvest, rate of harvest and rate and method of curing

- Effects of time of transplanting on the yield and quality of tobacco

Need for Cooperation of Total Tobacco Industry: There has been and still is a great need for all segments of the tobacco industry to work together in a cooperative effort. Growers, warehousemen, buyers and manufacturers need to work together in a program designed to help the overall tobacco industry. Considerable progress has been made in this area in recent years, but every effort should be made to develop close coordination between the different segments of the tobacco industry.

Tobacco marketing procedures have been a major concern to the farmer in recent years. There are problems of congestion at the market place due to an attempt to sell tobacco faster than the market can absorb it. More coordination is needed between growers, buyers and warehousemen.

Extension Program

The major overall objective of the tobacco Extension program is to increase the net income from tobacco to growers in an effort to improve the standard of living of the farm families. The first approach to this objective is to encourage the use of all allotments. Second, on all acreage planted, an attempt should be made to improve the quality and acceptability of tobacco through the use of recommended practices.

Emphasis will be placed on the continued use of the field testing program. This program has been very successful as a means of gathering information to supplement research findings, training agents and growers, farm suppliers and dealers and encouraging the adoption of sound production and marketing practices. The field testing program will include many aspects of fertilization, disease and insect control, spacing and height of topping, chemical weed control, chemical sucker control and curing. These tests will be helpful in collecting information and as teaching aids under disease, soil, management and climatic conditions not available on research stations.

Agent conferences, as a means of training the agents and keeping them up-to-date on production practices, will be a major part of the specialists' program. During the 5-year period, specialists will likely have less contact with growers, but more contact with agents who will

be better qualified to work with the growers.

Educational meetings will also be a major part of the tobacco Extension program. Meetings will be held to teach agents and growers production practices, as well as background or in-depth information. Also, meetings will be used to train and inform respresentatives of allied interests - dealers, manufacturers, distributors, policy making groups, and others.

Mass media - TV, radio, magazines, newspapers, circular letters, etc. will be used to strengthen the overall educational program. At least one statewide TV program per year will be given to help keep growers up-to-date on the best known production practices.

The "one-tobacco program" concept has been very well accepted in the tobacco educational program. This means having a well coordinated inter-departmental relationship to develop and carry out a well rounded tobacco program. A team of representatives from several departments might work on a single problem for the common good of all segments of the tobacco industry rather than each department working independently of each other. It is anticipated that this team approach will be continued and strengthened.

The four segments of the 4-H program will be continued with more emphasis being placed on the tobacco demonstration program.

Program Needs

The Extension Service should accept more responsibility in the area often referred to as applied research. In many cases the Extension group is equipped and qualified, except for financial support, to effectively fill the gap between "basic" research and growers' needs for practical information. As specialists' training is improved they should take a more active role in accumulating and interpreting information under farm conditions.

Agents designated to work with certain commodities should receive adequate training. To help agents specialize more, in counties with relatively small tobacco acreage, one agent might be assigned to work in two or more counties or as an area agent.

Specialists should follow closely the planning, carrying out and evaluation of all Experiment Station research in his subject matter field. All agents working with tobacco should attend one "in-depth" and refresher training school on tobacco each year. It would be helpful for all specialists and agents working with tobacco to have tobacco production experience.

A major source of information for growers is other growers. This being true, there is a need for training tobacco farm leaders as

fast and as much in detail as possible. Agents should take the lead in teaching this leader group, but specialists will also be used to give detailed training in this group.

The on-the-farm testing program could be increased in volume and intensity if additional resources were available. This is a very sound approach to solving many of the existing tobacco problems. With more help, more information could be collected from these tests and additional tests could be conducted. In addition to collecting information on the effect of certain treatments on yield and quality of tobacco, additional help would make it possible to collect information on labor required and general cost and net returns from one treatment compared to another. This would be most valuable to growers as they make the change in farming from a way of life to a business.

Additional technical as well as non-technical help would make it possible to spend more time interpreting and evaluating research information that is available. More leaflets and bulletins could be prepared and distributed as a ready source of information. There is a need for developing a series of short leaflets that can be used to give detailed information on timely questions, rather than using the large bulletins that cover a wide range of subjects and, therefore, must be rather general.

More resources would make it possible to do more program planning, especially at the county level. The specialists should meet with each county staff at least twice each year to help the county group plan and revise its tobacco program.

Also, additional resources would make it possible to use more mass media, especially more frequent and detailed use of TV. This means of getting information into the hands of growers has not been used as much as it should have because of the time required to develop the quality of program that is needed.

Additional personnel would make it possible to help train more 4-H tobacco leaders, and prepare more tobacco 4-H leaflets.

Program Results

Flue-cured sales in 1971 should be about 840,000,000 pounds which should sell for about 70¢ per pound, giving a gross value of about $588,000,000. Burley production in 1971 should be about 18,750,000 pounds, which should sell for about 71¢ per pound, and giving a gross value of about $13,312,500. This represents an increase of 33 percent in gross income for tobacco from 1965 to 1971. Income from both burley and flue-cured tobacco should total $601 million.

The average cost of production, excluding overhead costs, is estimated to be about 31¢ per pound. It is hoped that this cost of produc-

tion can be maintained or slightly reduced by 1971. It is anticipated that the hours of labor can be reduced, but the cost of labor will probably remain about constant because of increased wage rates.

Small, inefficient growers will be encouraged to secure additional allotment, adopt additional farm enterprises or seek off-the-farm employment.

TOBACCO ECONOMIC DATA 1965 AND 1971
FLUE-CURED TOBACCO

ITEM	1965	1971
Number of Production Units (acres)	375,000	441,000
Yield	1,883	1,925
Total Production	706,125,000	848,925,000
Quantity Sold (lbs.)	694,855,000	840,000,000
Price/100 lbs	$64.09	$70.00
Value of Sales	$445,332,570	$588,000,000

TOBACCO ECONOMIC DATA 1965 AND 1971
BURLEY

ITEM	1965	1971
Number of production units (acres or other units)	8,900	7,500
Yield	2,030	2,500
Total Production	18,067,000	18,750,000
Quantity sold - lbs.	18,067,000	18,750,000
Price/100 lbs.	$67.30	$71.00
Value of sales	$12,159,091	$13,312,500

HORTICULTURAL CROPS

CARROTS

Present Situation

Commercial carrot production has been a reality in the state only since 1959-60 when a demand was initiated by the Gerber Foods Company at Asheville. Initial plantings for commercial harvest in the Asheville area were not successful, and plantings were begun in Hyde County on a very limited scale. The early demand was for processing carrots only and, at this current date, there is no known acreage of carrots for fresh market.

The original processing contracts were let with farmers with considerable experience in production of other vegetable crops. These were established productive farmers operating up to 300 acres of land. These are the people with whom the crop started and, by and large, these are the general types with whom the crop remains today. The selection of individuals of this type has been purposeful, since they have by far the better machinery, land, and know-how to produce the type of crop desired by the contractor. Growers like the crop but will produce it only under contract.

Company, Extension, and research personnel worked together in the earliest years to determine some of the crop requirements and some of the varieties best adapted as well as the most profitable production practices. Past Extension activities have included plot work in the producing area with close visitation by nearby growers, grower production meetings, intensified farmer visits, marketing assistance through processor contacts and distribution of samples to processors in the United States, very close cooperation with company field men, publication and distribution of all data relative to plot work, and personal contact with processor's organizations.

Major Problem Areas

Processing Carrots: Problems related to carrot processing include the following:

- How to best handle the expansion of production should it occur
- How to improve cultural methods in order to keep pace with changing times and buyer requirements
- How to market effectively, especially as this relates to group action and bargaining
- How to farm intensive crops where minor farm operations are of critical importance

- An understanding by growers of the necessity of producing a quality product

- Information is needed on what insects attack carrots in this state and methods of controlling the insects

Fresh Market Carrots: There is a need to determine how to profitably produce fresh market carrots. In other words, can we produce a top quality fresh market carrot for sale at a marketing period when there is maximum demand? Marketing methods, potential market, package requirements, and quality prerequisites are items that need to be determined.

Another problem - not a major one however - is the relationship between purchaser's personnel and growers. Purchasers now exercise considerable indirect field control over the crop to provide themselves with the quality required and availability at a given time. The problem resolves itself into an area of understanding and communication between the buyer's personnel and the grower. An emphasis is needed to develop this relationship.

Extension Program

1. Assist growers and provide guidance in shaping an organization of understanding. Growers in contiguous areas with common interests and common markets should work together in order that they may prevent an escalation of labor costs, receive approximately the same amount for their product, and produce a continuous high quality product.

2. Work with growers as a group at improving intensive cultural practices and evaluating varieties. This will be a continuous process and is best accomplished by a working union between growers and professional agricultural personnel, utilizing field-plots in production areas as the major tool.

3. Emphasize quality requirements at all levels but particularly with the grower where it must originate. This is purely a matter of education and understanding, and is best done by personal contact, understanding of contract, definition of quality, and cooperation between grower and company personnel.

4. Provide constant surveillance for new market outlets by participating directly in this activity but gradually letting this become an activity of the growers' organization mentioned above.

5. Provide intensive instruction to individual growers utilizing all available facets which will aid them in producing high yields of high quality produce and in selling that product as a profit.

6. Conduct a survey of the insects associated with carrots and determine best methods of control.

Program Needs

Should production enlarge to counties other than those now involved, personnel in those new counties would need training and instruction in carrot production before they could reasonably attempt to assist growers with their problems. Plant pathology and entomology specialists might need to acquaint themselves with those pathogens and insects which trouble the crop. The primary training need would be, of course, with the new grower who would require intensive individual instruction in the early production years.

Should production expand into other counties, the logical place to look for a training specialist would be in the area of current production. Should talents of agents now working in this area be required to help train others, then a re-delegation of authority or a temporary re-alignment of duties would be in order.

Program Results

The present carrot program is founded on a firm basis. It is hoped that it will expand slowly but surely, continuing to remain on a firm basis and working in conjunction with financially sound, reliable purchasing companies.

Current processing acreage equals 95 acres, producing 950 tons which yields about $24,000 in annual gross revenue. This compares with 2 acres in 1960 and $600 in gross revenue.

Enlargement to 300 acres of processing carrots could occur by 1971 for a gross net revenue of $75,000 annually. With no current acreage of fresh market carrots, it is difficult to estimate production 5 years hence; however, 100 acres would produce another $30,000 gross revenue annually.

CUCUMBERS

Present Situation

Cucumbers, fresh market and pickling type, constitute the largest vegetable crop acreage grown in North Carolina. Pickling cucumbers is the largest crop grown exclusively for processing.

Acreage of fresh market cucumbers has remained about constant for the last ten years with only minor fluctuations. In 1965, North Carolina growers produced 748,080 bushels on 6,234 acres with a value of over $1.5 million. Usually, harvesting is stopped when only about 50

percent of the production is sold because of poor marketing conditions. Most of the production is shipped to northern areas where the early market is usually good.

Cucumbers for pickles have undergone a continuous increase in acreage for the last 10 years. However, the greatest increase has come about in the last 5 years. In 1960, only 14,600 acres were devoted to this crop, while in 1965, 21,300 acres were produced. Value of the crop has increased from $1.5 million in 1960 to about $4.5 million in 1965. North Carolina ranks first in acres produced with 19.5 percent of the national figure and second in volume produced with 13.5 percent of the national total. About 40 percent of the production is processed inside the state, and about 60 percent is shipped out-of-state either as green or brined stock.

Yields have not kept pace with increases in other areas. Statewide, the average is 110 bushels per acre compared to 100 bushels in 1960. Better growers average 200-400 bushels and a few produce 600-700 bushels per acre.

Traditionally, pickling cucumbers are produced in 1-2 acre units on small family farms. In recent years there is a slight trend toward larger size production units of from 5-10 acres. The crop has found wide acceptance on tobacco farms where most of the crop is harvested before tobacco harvest begins. This practice permits tobacco farmers to better utilize farm labor.

There are four pickle processors located in the state and at least two out-of-state processors procure practically all their production in the state. These processors are organized and programs affecting the industry are coordinated through this group.

The anticipated value and production for 1966 was exceeded in 1965. Predictions indicate additional gains in 1966, thus surpassing the goals set for production and value in the 1.6 in '66 program. The anticipated yields per acre did not meet the expectations although some progress has been made. Yields will be approximately 65 percent of anticipated yields.

Major Problem Areas

- Production of slicer type cucumbers offers limited opportunities at this time. There is no shortage of this commodity and any expansion in production should not exceed that required for normal population expansion.

- Production of cucumbers for pickles has real potential for North Carolina farmers. North Carolina's leading competing state, Michigan, had a reduction of 6,700 acres in 1965 because of labor shortages. This reduction has created a strong demand for North

Carolina production. To capitalize on this demand, North Carolina growers will need to increase yields greatly.

The increased emphasis on fresh pack pickles is causing northern processors to look to southern states where a supply of green pickles can be obtained 4-6 weeks before the northern crop is harvested.

It seems reasonable to assume that a processor will not continue to transport his raw product from North Carolina to northern areas for processing. If yields can be increased to the point that large volumes of raw products are available, other processors are likely to consider moving their operation to North Carolina.

Specific problems include the following:

Fresh Market Production

- Farmers unable to sell total production because of weakened market
- Growers getting reduced stands from improper fertilizer placement
- Need better disease control especially for downy mildew and nematodes

Cucumbers for Processing

- Failure of growers to recognize potential of the crop
- Lack of interest toward increasing yields
- Shortage of harvest labor
- Need organization of receiving station operators and processors for more rapid and complete dissemination of information
- Lack of interest and production skill of county Extension workers
- Need information on time for early insect control
- Lack of disease control, especially nematodes, anthracnose and downy mildew
- Failure on part of growers to adopt all recommended practices
- Rising labor costs greatly increasing the need for mechanical harvesting

Extension Program

1. Conduct training programs for county agents to better equip them to deal with growers' production problem.

2. Evaluate chemical weed control chemicals.

3. Conduct result demonstrations and applied research on fertilizer placement, spacing, depth of planting, nematode control, and fungicide application (foliar).

4. Expand the all-practice demonstration program.

5. Assist county personnel with educational meetings.

6. Provide county personnel with production slide sets for use in meetings.

7. Revise Horticulture Information Leaflet annually and include new production practices.

8. Assist research staff in developing once-over mechanical harvesting techniques.

9. Conduct surveys for 1967 and 1968 in April and May to determine percentage of fields infested and plants damaged. If infestations warrent it, method and result demonstrations will be conducted in at least three counties each year.

10. Prepare "Information Notes" on major diseases for hand-out material.

11. Test new chemicals for efficiency and ease of application for nematodes.

Program Needs

A coordinated training program between Extension horticulture, entomology and plant pathology is needed for county Extension personnel in culture and disease and insect control.

Program Results

Accomplishments: Measure increase in: Average yield per acre, acreage, and gross farm income. Compare level of production with that of other states.

Effectiveness of Methods: Review and publish results of all-practice program; determine increase in size of farm production units; and count, record, evaluate and summarize insect survey data and subsequent control data.

Goals: Goals for the fresh market are shown in the table below:

Year	Yield/A	Farm Value (1,000)
1965	120 Bu.	$2852
1971	135 Bu.	3360
Processing		
1965	2.81 Tons	5525
1971	3.50 Tons	8531

During the next 5 years production of cucumbers for processing is expected to rise well above the 1965 figure, acreagewise, and fall back to near the present acreage by 1971. This will be the result of mechanization by northern and western growers. Acreage for fresh market is expected to remain about constant during the same period. Through an expansion of result demonstrations, yields are expected to increase considerably over the 1965 levels.

IRISH POTATOES

Present Situation

The 1960 crop of 28,500 acres had a farm value of $7,606,000. By 1965 the acreage had decreased to 21,300 but its value had jumped to $14,662,000. This high value was due to a short crop in 1964 - so short that the supply in storage was exhausted by harvest time the following year.

Consumption per capita has averaged 110 pounds for the last few years with the exception of 1965 when it dropped to 103.9 pounds due to very short crop. Processed potato products are enjoying a steady increase. Approximately 40 percent of potatoes now grown are consumed in some processed form. The greatest percentage increase is in frozen french fries, followed closely by chips.

Until 1965, the acreage decreased in North Carolina. Also, the number of growers producing the crop declined. In eastern North Carolina the number of growers is increasing, as well as individual acreage. The average farmer is growing approximately 60 acres. Yield per acre has averaged 115-146 hundredweight per acre from 1960 through 1965 - far below the national average of 206 hundredweight.

In eastern North Carolina there is a trend toward complete mechanization - seed cutters, harvesting with combines, and handling in bulk bodied trucks.

Another strong trend in eastern North Carolina is towards contracting acreage for processing. It is estimated that 60 percent of the 1966 crop will be grown for chips.

Eastern North Carolina growers are well organized. They are working together and with government agencies more than ever before to solve common problems and to hold supply in line with demand. They are specialists in production and marketing. They have many commercial sources of information. They are tight-lipped, secretive for the most part in what they are doing and plan to do.

Growers are now investing $50 - $100,000 each in production and handling equipment. This indicates they expect to stay in potato production.

In the mountain area, growers are small and the land hilly to the extent they cannot use the latest mechanical equipment. The exception is a few large growers in Ashe, Henderson and Transylvania Counties. Most growers sell their product fresh and for seed in the areas of production.

The reduction in acreage experienced during the last 5 years was predicted but not the increase in value of the 1965 crop. The goal of $6,500,000 by the end of 1966 should be reached, and probably will be exceeded.

Some of the opportunities in Irish potato production are as follows:

Eastern Area: Chip manufacturers have changed their raw material procurement policy for storing most of their needs for the year, to buying from the field during harvest season and storing only for processing during winter and early spring months.

This outlet should permit a 10 percent increase in production and income during the period 1967-71. It is estimated that they will be growing 12,000 acres having a value of $9,000,000.

Mountain Area: There is an opportunity to expand acreage for processing. Chip manufacturers are talking now in terms of trying to get 1,000-2,000 acres produced under contract. This opportunity will exist for a few large growers that can produce the crop and handle it mechanically. This production will give the chip plants a supply of raw material during August, September, and October.

Major Problem Areas

- Growers take a high degree of risk in producing and marketing this crop.

- Growers in the east have limited market for their fresh produce.

- Growers do not have a variety and growing conditions that will produce satisfactory processed products except chips and frozen "french fries."

-Growers fail to produce and market a fresh product that will compete successfully with that from other areas.

-Growers need to buy and use mechanical harvesters (in the east).

-Eastern growers fail to see the opportunity to grow under control for processing.

-Yields are lower than national average.

-Growers need to cut unit cost of production and increase income.

-There are too many eastern marketing firms in proportion to number of buyers. This tends to reduce prices sharply.

-Growers fail to ship by federal grade standards.

-Growers are failing to treat seed pieces to prevent decay.

-Growers need an early, disease resistant, high solids variety for processing purposes.

-There is need to evaluate systemic preplanting and sidedressing treatments for control of early season insects.

Extension Program

Work with county agents and processors in production of raw material for chips and fresh market by:

-Conducting result demonstrations and doing applied research to determine best varieties for eastern growers

-Working with agents and growers in the area of fertilization. Growers are now using 2,500-3,500 pounds per acre and also are using a different ratio from that recommended. Specialists will check this out and determine the effect ratio and rates have on both yield and quality of the produce. Replicated tests will be conducted at two locations using several rates and analyses of fertilizer. Not only will yields be determined, but the effect of treatments on shipping as well as chipping quality will be determined. One treatment will be the application of nitrogen sidedressing.

1. Have a field day to show growers mechanical harvesting, using combines and handling the crop in bulk-bodied trucks.

2. Develop an all-practice demonstration outline. Initiate a program with sponsorship to motivate growers to increase per acre yields.

3. Conduct demonstrations to show growers the best practices in cutting and treating seedstock.

4. Obtain and publish "Cost of Production" figures.

5. Survey the growing areas and evaluate the effectiveness of the different systemic treatments for insect control.

Following one year's survey, set up three method and result demonstrations to evaluate the effectiveness of the materials registered for insect control. Also cooperate with research personnel on two field plot applications to compare registered and promising new products.

Program Needs

Seed cutting and seed piece-treating demonstrations will require coordination between northeastern district agents, Extension plant pathology specialists, and Extension horticultural specialists.

To get contracted acreage in mountain area there will have to be coordination between chip manufacturers, Extension workers, growers and the State Department of Conservation and Development.

Program Results

Total Irish potato acreage is expected to remain the same as at present; however, acreage for processing in the mountains will increase 1,000-2,000 acres. A decrease in value of sales from $10 million in 1965 to $8.7 million in 1971 is expected.

The commercial acreage in the east will remain about constant, or increase slightly. The acreage grown in the piedmont and coastal plain areas will probably decrease as much as other areas will increase, as most of this production is for home use and local market.

Those growers producing this crop will be more efficient than at present, and will increase their acreage and their net income.

LEAFY GREENS
(Turnips, Collards, Mustard, Kale)

Present Situation

County agents reported 2,664 acres grown in 1965 of which 300 were grown for processing purposes. Farm value was estimated at $314,412.

Fresh market - most growers are small, producing two or less acres each. They market their product to local stores. Due to its perishable nature, chain store management often allows the local store

manager to buy his needs locally. There are a few large growers with facilities to wash, pack and market in truckload lots. They are specialists in the truest sense.

Processed market - only a few large growers are producing for this type market. All are under contract. These growers are limited at present by their inability to get increased acreage for processors.

Major Problem Areas

Fresh: The product is perishable, growers are small, and the market is limited. Growers are using practices developed several years ago.

Processing: Research has shown that these crops offer growers in eastern North Carolina a real opportunity for added income if and when processing firms are established in or near the area of production.

Growers lack knowledge and experience in growing these crops and there is a need for up-to-date research data on variety adaptability.

Better production statistics are needed. Also needed are more outlets for products (processing firms).

Extension Program

1. Conduct on-the-farm test of varieties for adaptability for processing.

2. Conduct studies to determine how to grow higher possible tonnage of top quality product for processing.

3. If and when processors are ready to contract acreage, work with their representatives in acquainting growers with the opportunities offered through meetings, field days and demonstrations.

4. Gather statistics on cost of production.

Program Needs

Several processors are seriously considering North Carolina at present. Others are inquiring about opportunities. Should several locate in the area, more specialist help will be needed, or all other programs planned will have to be revamped considerably. Work will be needed to show growers when and how to harvest their crops, using a combine, and how to control insects and diseases.

Program Results

Increased acreage and income from the production of these commodities, fresh and processed, is expected as indicated in the table below. It is hoped that research data on yields, cultural practices and variety adaptability will be available that will result in processors locating in North Carolina.

	1965		1971	
	Fresh	Processed	Fresh	Processed
Acres	2,364	300	2,500	600
Value	$374,775	$52,500	$558,000	$168,000

PEPPERS (Sweet)

Present Situation

Pepper production for both fresh market and processing has shown a general increase since 1960. Much of this increase has gone to processing while acreage for the fresh market has remained about constant, except for some yearly fluctuations.

In 1965, county Extension personnel reported 5,078 acres grown for fresh market at a value of about $1.7 million and 2,500 acres grown for processing at a value of about $0.7 million.

During the period of harvest (late June-July), greatest competition comes from Mississippi and Louisiana. Growers usually experience 1-3 weeks of a good market before production areas to the north begin harvest. However, this varies from year to year.

Traditionally, the bulk of production is marketed along the eastern seaboard with smaller quantities moving into the midwest. Mountain area production is gradually increasing for fresh market and processing purposes. Yields of 12 tons and over per acre have been obtained when grown for processing.

Peppers for both fresh market and processing are generally grown in small units of 1-5 acres and usually compete with tobacco on the farm. Unlike many other horticultural crops, pepper production is concentrated mostly in two areas of the state, namely: the southeast (Sampson, Duplin, and Wayne counties), and in the western part of the state (Macon, Clay, Haywood, and Henderson counties).

Most of the eastern production moves through auction markets, while western production is sold through cooperatives or auction markets.

About a third of the processing production is located in the western area, with the remaining acreage located in the southeast.

It was anticipated that the value of peppers would reach $4.2 million by 1966. On the basis of the best estimates available, it appears that the 1966 figure will be about $1 million short of that anticipated.

Major Problem Areas

Since North Carolina presently supplies about 75-80 percent of the national consumption during the period of harvesting, no real opportunity exists in production expansion for the fresh market in the east. Western production can expand considerably, especially for marketing south of North Carolina. Western growers have a potential for dual marketing - selling early production to the fresh market and later production to processors. The quality of mountain-grown peppers is excellent.

Production for processing offers the greatest opportunities. One processor presently operating in the state processes peppers exclusively. Pickle packers continue to use a lot of peppers for their mix-pack items.

To realize the full potential of production for processing, growers will need to increase their yields considerably.

Fresh Market Production

- Limited markets do not permit growers in the east to sell their entire production.
- Farmers fail to accept proper practices in plant production.
- Growers in mountains lack production know-how.
- Growers and shippers often have a problem with soft rot diseases because of washing procedures used.

Production for Processing

- Growers are not producing sufficient yields.
- Poor plant production practices are common.
- Growers are not accepting recommended production practices - weed control, fertilization, etc.
- Growers have poor attitude toward production for processing.
- Cost of production figures are inadequate.
- Information on mechanical harvesting is lacking.

Extension Program

1. Assist the North Carolina Department of Agriculture and the Department of Conservation and Development in locating acreage for outside processors.

2. Provide present processor fieldmen with latest production practices.

3. Prepare All-Practice Demonstration outlines.

4. Conduct research and result type demonstrations on: spacing, fertilization, and plant production.

5. Collect applicable cost of production figures.

6. Prepare and print annually insect control recommendations (Pesticide Manual).

Program Needs

Much effort needs to be devoted to investigation and application of mechanical harvesting.

Production for processing is expected to increase greatly during the next 5 years while production for fresh market consumption will remain about constant. The greatest increase will take place in yield per acre for processing. This will result from greater emphasis on production for processing, higher plant population and better disease control practices.

	Fresh Market	Farm Value
Year	Yield/A	(1,000)
1965	160 bu.	$2,374
1971	175 bu.	2,808

	Processing	Farm Value
Year	Yield/A	(1,000)
1965	5 tons	$ 341
1971	7 tons	611

SNAPBEANS

Present Situation

Nationally, fresh market snapbean acreage has decreased continually since 1958 while acreage for processing has continued to climb. In North Carolina, fresh market acreage has declined only 700 acres over this same period. In 1958, North Carolina produced 12,700 acres

valued at $2,558,000. In 1965, the acreage was 12,000 and valued at $3 million.

Acreage for processing in 1958 was 4,400 acres valued at $968,000 while in 1965, the acreage had declined to 3,000 acres valued at $642,000. Acreage and value of the processing crop hit its lowest point in 1960 and since that time has been gradually increasing.

Though grown to some extent throughout the state, the greatest concentration of production is in the southeastern, northeastern and western counties. Yields have generally been low for both fresh and processed; however, processing yields are showing a gradual increase.

Fresh market snapbeans are most often produced by small farmers in units of one to five acres. This crop is largely grown for the early markets and more often the full production of the crop is not harvested because of a weakened market. A large part of the fresh market production is sold through aution sheds.

Most production for processing is under contract to in-state processors of which there are three. Some acreage is under contract to out-of-state processors and is shipped out in the green state. Contracting companies generally do not offer a contract for less than 10 acres and prefer to have larger acreage on any given farm if possible. The result of this is that the small farmer cannot enter into this type production.

It was anticipated that acreage for fresh market would remain about constant, but yields would increase by 50 percent. Acreage has responded as expected; however, yields have only increased about 15 percent. Production for processing was expected to increase 300 percent acreagewise over the 2,300 acres grown in 1960. Such an increase has not taken place and it is expected that the 1966 acreage will be about 4,200 acres.

On the basis of the best estimates available, it is expected that the total value of snapbeans, both fresh and processed, will fall short of the anticipated $5,313,000 by $800,000.

Failure to reach the 1966 goals is not because of lack of acceptance of recommended practices on the farmers' part, but rather the inability to secure a contract for production. Growers have demonstrated their willingness to produce by accepting contracts when offered.

Major Problem Areas

There are no acreage controls or support prices on snapbeans, fresh or processed. Consequently, the crop is produced strictly on a supply and demand basis. Some years early production for fresh market is sold at extremely high prices; however, when supply catches up with demand,

the result is a "busted" market. Such a situation often catches some growers with little or none of their crop harvested.

Growers who produce under contract for processing do not have this marketing problem. However, the number of growers who have an opportunity to produce for processing is limited. This is because of a limited number of processors and lower per acre yields as compared with competing areas. Compared to more northern states, North Carolina growers have certain advantages in production for processing. The relative long and varied growing season makes it possible to harvest snapbeans from about May 25 to October 15. To do this, a processor could begin spring harvest in the coastal counties and continue westward to the mountains and return for fall harvests.

The large fertile fields of eastern and southeastern North Carolina are ideally suited for mechanical harvesting and snapbean production. This area is the most logical one for expanded acreage.

Specific Problems

Fresh Market

-Because of limited markets, farmers can often sell only a limited amount of their present production.

-Growers need a high yielding, early variety.

Processing

-Data on heat unit for scheduling production for processing are not sufficient.

-Growers are unable to obtain contracts for production and need more processors either in or out of state.

-Growers can't supply irrigation during dry periods.

-Growers fail to recognize need for higher plant population.

-Growers are not utilizing chemical weed control which could reduce cost of production.

Insects and Diseases

-New insect control methods being used need to be evaluated.

-Growers need a control for fusarium root rot. It is becoming a limiting factor in the mountains.

Extension Program

1. Work with existing in-state processors in production of raw material.

2. Assist North Carolina Department of Agriculture and State Department of Conservation and Development in procuring raw material for out-of-state processors into the state.

3. Give county Extension personnel more training in snapbean production.

4. Conduct result and research type demonstrations on production for processing including variety evaluation, fertilizer placement, plant populations, and Fusarium root rot control.

5. Collect and assemble more data on heat unit requirements for scheduling planting.

6. Encourage more growers to utilize irrigation as a means of increasing yields.

7. Conduct grower meetings, stressing seed handling, fertilization, planting procedures and chemical weed control.

8. Update annually Horticulture Information leaflets on production practices.

9. Survey and re-evaluate the insect pest problems and control methods in use.

Program Needs

-Expand demonstrational type plot work. Work with processor fieldmen in this area of work.

-Conduct method and result demonstrations on insect control.

-To accomplish a high level of production efficiency it will require coordination of several departments and, more specifically, the departments of entomology and plant pathology.

-With the large number of horticultural crops, it becomes increasingly difficult to maintain a progressive program on any specific crop. The program on snapbeans, and other crops as well, may advance faster if area specialists could be located in high acreage areas or experienced county personnel could work across county lines.

Program Results

Because of the decline in fresh consumption, acreage devoted to fresh market production is not expected to increase over the next 5 years. Acreage for processing should increase by 100 percent. The increase in processing production will result from higher output by present processors and out-of-state processors procuring raw material from North Carolina. Increase in yields should result from changing attitudes and greater educational efforts directed toward the grower.

Fresh

Year	Yield/A	Farm Value (1,000)
1965	125 Bu.	$2,941
1971	135 Bu.	3,308

Processed

1965	2.0 Tons	901
1971	2.3 Tons	2,075

SWEET POTATOES

Present Situation

The purpose of commercial production is consumption. Per capita consumption for the United States continues to decline. It is 5.3 pounds now compared with 7.3 pounds in 1960. Consumption processed (largely canned) is increasing year by year, but not fast enough to offset the decline in the fresh market products.

North Carolina has been traditionally a producer for the fresh market. Processing is a new industry. In 1960, there were two canning firms producing annually less than 200,000 cases. In 1965, there were four firms canning approximately 800,000 cases. Flaking had its beginning commercially in this state. One plant produced approximately 1,000,000 dry pounds in 1965.

North Carolina ranks second in the United States in production of this crop. In 1965, the growers produced 5,400,000 bushels. This was 16 percent of the national crop and was produced on 10 percent of the national acreage. By contrast, North Carolina growers in 1955 produced 11 percent of the crop on 13 percent of the planted acreage.

Yield per acre has increased from 60 hundredweight in 1955 to 135 hundredweight in 1965. The state produced more bushels in 1965 on 22,000 acres than it did on 45,000 acres in 1955.

Traditionally, the product has been marketed along the eastern seaboard. Competition has forced North Carolina to seek new markets in the midwest.

Fifteen years ago the average acreage per grower was 0.5. Today it is estimated this figure is 10.0 acres. Very little is grown specifically for home use. Thus, the major concern is with commercial growers.

Production was scattered over most of the coastal plain. Gradually it is becoming concentrated in fewer counties where soils are ideal and near markets, fresh and processed.

Growers, shippers and processors are well organized at the state and national levels. Plans and programs are being developed to promote the consumption of their product at state and national levels.

Consumption has not increased as anticipated when the program was initiated. Acreage has remained rather constant with price fluctuating year by year, depending on production nationally. It is expected that income will be $1.5 million short of the $16.5 million anticipated.

Progress has been made in increasing yields, handling of the product mechanically in and out of storage, decreasing losses in storage, increasing amount processed, and in increasing the number of processing plants and market outlets.

There has been no breakthrough on mechanical harvesting, which is vital to increased acreage.

One of the potential opportunities is to increase production for processing. Consumption of the canned product is increasing each year. Flaking is in its infancy. One plant is in operation. Another will be in operation by fall of 1966. Consumer acceptance tests indicate the product is a good one and should sell well if competitive merchandising practices are fully utilized.

Production for processing requires real efficiency on the part of the grower. It will require considerable coordination between processor and grower. Many of the decisions formerly made by the grower will by necessity pass to the processor, such as variety, when to plant, when to harvest.

Development of the full potential of the processing enterprise will require larger operating units. Plantings will have to be made such as to provide an orderly delivery schedule to the plants. Acreage contracts will be required by most processing plants. The production processes will need to be fully mechanized.

The average per acre yield in the state ranks either first or second in the nation each year. North Carolina is closer to eastern markets

than most of the competing areas and as close to midwestern outlets as Louisiana. These two factors give the state a comparative advantage that is often voided by poor marketing discipline and response to consumer demands.

Approximately 90 percent of present farm income from sweet potatoes is derived from fresh market sales. The state has an opportunity to hold its present position and slightly increase its share of this market. It will require that North Carolina market a product of more uniform size with better appearance. Ability to do this will be based on off-sizes, greater coordination of sales and pricing, and better regulation of flow into the market.

Major Problem Areas

- Failure of farmers to recognize the opportunity to produce specifically for processing under contract
- Failure of shippers to market a product that meets consumer demand. However, more knowledge is needed about what the consumer does want.
- Failure of processors to produce a standardized and quality canned product
- Need for growers to cut unit cost of production to increase profit
- Need for a system to more nearly keep supply and demand balanced
- A national program for growers, shippers, and processors to promote consumption of their product - fresh and processed
- New growers producing the crop without sufficient knowledge of production and marketing
- Lack of a progressive attitude on the part of fresh market shippers
- Failure of growers to use disease control measures which would increase quality and yields
- Lack of a marketing program capable of capturing a larger share of the national market
- Lack of optimum organization and location of curing and storing facilities
- Lack of efficiency in storing, packing and processing plants
- Need for greater management skill at various marketing stages

-Need development, application, and enforcement of standards of quality which guarantee consumer satisfaction

Extension Program

1. Organize an advisory committee composed of growers, shippers, and processors to advise Extension and research specialists in program planning.

2. Assist the North Carolina Yam Commission and Sweet Potato Council of the United States in preparing and carrying out programs for promoting consumption on state and national levels - fresh and processed.

3. Assist county agents, processors and growers in production of raw material (fresh and processed) by conducting method and result demonstrations and applied research and holding field days as follows: variety testing; spacing tests; length of growing season as it affects total yield and size of roots produced; effect of chemicals to increase early as well as total sprout production; insect control with emphasis on those insects that are soil borne; general disease and nematode control measures; and storage house and container disinfection.

4. By demonstrations and tests, encourage shippers to use better marketing practices.

   -Determine what sizes the market can and will use and for what purpose. Make at least two sizes within U. S. No. 1 fresh market grade.
   -Modify or alter presently used equipment for grading, washing, and packing to reduce skinning and bruising of finished product.
   -Encourage shipping by U. S. grade standards. This will tend to improve the image of all North Carolina sweet potatoes in the eyes of the receivers.
   -Encourage a system by which we prevent cold and/or water damaged sweet potatoes from being sold fresh or to processors.
   -Determine interest of industry for reorganization of sales system and assist with reorganization if desired.

5. Conduct "All-Practice" demonstration program with 10 county agents per year. Administer the "700 Bushel Sweet Potato Club" program. Encourage 4-H members to participate in this program.

6. Encourage growers and shippers to build new curing houses using latest plans. Hold field day at new curing houses.

7. Emphasize the need for shippers to sell rather than take orders by using better techniques to improve buyer relationships,

servicing of accounts, and by using a more realistic pricing system.

8. Define and evaluate alternative market organization structures for processors and fresh market shippers.

9. Estimate the production for North Carolina that will maximize income.

10. Provide guides for regulating flow onto the market.

11. Assist firms and industry with market efficiency problems.

12. Conduct foliage and soil insect control demonstrations in three or more counties each year.

Program Needs

Test presently available equipment for use in sizing sweet potatoes. Equipment has been designed to size Irish potatoes and other vegetables that might be used if money were available to acquire the equipment, pay freight to get it here, and buy small items to adapt it. Insect control demonstrations should be expanded.

Program Results

By 1971, the best growers will produce 550 hundredweight (1,000 bu.) per acre, although the state average is expected to be only 150 hundredweight. This increase will eliminate the need for increased acreage and make for greater income for those growing the crop. These changes will force many small growers to some other enterprise. It is not unlikely that the average production per grower will be 50 acres by 1971.

Fresh market shippers will be forced to size and even package (consumer-size) their product. Much of it will be sold by count if not in consumer-sized packages. It will be labeled as to best usage - baking and boiling - moist or firm-fleshed types.

	1965	1971
Yield/Acre	135 cwt.	150 cwt.
Value of Sales	$12,981,824	$14,215,000

TOMATOES FOR PROCESSING

Present Situation

Attempts at production in the past have failed primarily because of low yields and poor quality. Introduction of newer varieties and new pests control practices now makes this crop appear to be a potential in

certain areas of this state. Numerous processing firms have expressed a desire to locate a plant in southeastern United States. Tomatoes are the core around which many canning plants operate. To attract some of the canning trade, it will be necessary to produce tomatoes for processing. It appears that this can be done; however, much new information is needed.

Field tests in 1959, 1960, 1961, and 1962 indicate that yields of up to 50 tons, mostly in the 20-30 range, could be obtained in the upper piedmont where the night temperatures are lower than they are in the east. Yields and quality of eastern grown tomatoes were low. However, these problems could possibly be overcome with a concentrated effort to do so.

Since this is a relatively new crop to North Carolina, the present Extension program is geared toward gathering information rather than disseminating it.

Major Problem Areas

The greatest problem areas are lack of sufficient information on production for processing in North Carolina, lack of information on economic feasibility of production for processing, and lack of knowledge on the part of agents and growers.

Extension Program

The Extension program will be coordinated with research to find some of the presently unanswered questions. This will be done through demonstrations and applied research in the field. The following procedure is proposed:

1. Take accurate records on the variety tests conducted in 1966. Fruits to be brought to the laboratory for quality evaluation.

2. Work closely with county staff and growers in Lenoir County to insure proper production practices are followed in 1966. Bring fruits into the laboratory for quality evaluation. Obtain records from growers on cost and returns.

3. Compile weather data, with respect to maximum and minimum temperatures, for areas of the state that appear to have production potential.

4. Conduct production tests at Shelby, Salisbury, Faison, Castle Hayne, and Plymouth. Tests will include all presently suggested production practices with variables being varieties, spacing, fertility, and number of harvests. Varieties will be selected on performance in other comparable areas as well as on recommendations of research workers and processing companies.

5. Extension specialists will visit tomato producing areas in the northeast, midwest and west to evaluate production practices followed in those areas and bring back to North Carolina all possible production ideas.

6. Processing firms will be kept appraised of the production progress being made with this crop.

7. Agricultural leaders have expressed interest in this project. These leaders will be brought together annually to be appraised of the progress being made, to get their guidance and suggestions, and for legitimization purposes.

8. Organization for commercial production should commence by 1968. However, this will depend on success in production as well as ability to interest processing firms to contract.

As information above is obtained, agents will be trained in the production of this crop by the use of demonstrations and in-service training. Information will be carried to growers by agents with specialists assisting.

Program Needs

This crop offers sufficient potential to warrant a "crash" program through team effort. A research program on tomatoes for processing, including all departments previously mentioned, could result in a substantial tomato industry in this state. Unless all departments are deeply involved, the success could be limited by the problems in any one specific area. Additional resources for such a crash program would naturally speed up the desired results.

Program Results

This program should result in successful production of tomatoes for processing by 1971. It is hoped that by 1971 at least one processing plant will be contracting tomatoes for processing. Two national processing firms that are now interested in the potential here are speaking in terms of a minimum of 5,000 acres of tomatoes for any one plant that might be located in this state.

OTHER VEGETABLE CROPS

Present Situation

This program plan consists of the vegetables other than those on which major emphasis will be placed for the next 5 years. Some of these crops represent sizeable income to North Carolina farmers, while others are, at this time, less important. The acreages and crop values are

taken from the 1965 county agent reports:

Crop	1965 Acreage	1965 Value
Cabbage	10,298	$4,253,977
Tomato (ground)	4,124	1,381,205
Sweet Corn	5,500	1,942,661
Lima Beans	2,000	444,883
Watermelons	11,535	1,473,645
Cantaloupes	2,500	492,665
Squash	652	357,600
Pumpkins	450	72,000
Beets	140	81,900
Onions	714	292,280
Southern Peas	450	195,550
Okra	165	53,475
Eggplant	350	41,000
Lettuce	500	213,550
Totals	39,379	$11,296,391

Except in the case of cabbage and watermelons, these crops are grown in small units of 1-5 acres. Only small quantities are produced for processing.

Watermelons were expected to reach a farm value of $1.7 million by 1966. It appears that this value will be short of the goal by at least $300,000. Cantaloupes were expected to represent $0.6 million in gross farm income by 1966. At the present time, it appears that this value will be reached.

Sweet corn goals, with respect to both yield and value, will be reached in 1966. Cabbage goals will be reached for value but not for yield.

None of the other crops was specifically included in the "1.6 in '66" Program, and consequently no goals were set.

Major Problem Areas

The bulk of these crops are grown largely for the fresh market and opportunities for expansion in this area are definitely limited to increases in population and ability to out-produce competitors.

In practically every case, food processors are asking for information on lima beans, squash, southern peas, and okra, when investigating possibilities for expanding their operations into North Carolina. If a multi-line food processor should decide to locate in North Carolina, the picture of the above mentioned crops would change considerably. Aside from production for processing, these crops offer limited opportunities for expansion.

Specific problem areas include the following:

- Limited potential for expansion in fresh market area

- Shortage of research data such as varietal performance, culture scheme for highest yields, and potential for processing

- Insects - Need for information on effectiveness of recommended materials to control cabbage pests, especially cabbage looper

- Insects - Lack of information on best control for onion maggot

Extension Program

1. Conduct variety evaluation trials as time will permit.

2. Collect heat unit summations on various varieties and crops for planting scheduled.

3. Evaluate effectiveness of recommended pesticides and application schedules for control of insects affecting cabbage and sweet corn.

4. Determine which insecticide gives best control of onion maggot.

5. Prepare and publish annually latest insect control recommendations.

6. Set up applied research plots to determine feasibility of production for processing. This will be carried out at existing research stations as well as with individual growers.

Program Needs

Because of limited research personnel, it will be necessary for Extension workers to find more of the answers to questions relating to the so-called "minor" vegetable crops. This will necessitate close coordination between research and Extension as well as between all departments involved.

Extension specialists will need to do much of their applied research on existing research stations as well as with individual growers.

Additional resources would make it possible to expand variety evaluation, establish best fertilization and plant population schemes for highest yields through plot work, and conduct method and result demonstrations to show effectiveness of insecticides and timing schedules on yield and quality of cabbage. Similar demonstrations are needed to show proper methods of application, proper timing, and effectiveness of

insecticides used to control onion maggot and watermelon insects. There is a need for a survey of damaging insects to watermelons.

Program Results

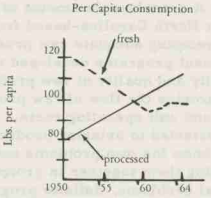
Through better and improved technology, growers will increase yields and net income as indicated.

	1965	1971
Acreage	39,279	41,822
Value of Sales	$11,296,391	$14,955,190

SPECIAL PROBLEMS IN PROCESSING FIELD GROWN VEGETABLES

Present Situation

Consumption: Per capita consumption of fresh vegetables has decreased from 115 pounds in 1950 to 99 pounds in 1964. Consumption of processed vegetables has increased from 84 pounds to 106 pounds in the same period. Total consumption of vegetables has increased 5 pounds per person from 1950 through 1964. These trends are expected to continue through 1971.



Production: North Carolina traditionally has been fresh market oriented. However, future expansion in production is expected to be in the area of processing. Crops most likely to expand in acreage for processing are: green beans, sweet potatoes, leafy greens, field peas, carrots and cucumbers. This does not imply that we should expand in processing at the expense of production for fresh market. Increased efficiency in production and marketing should be the keynote during this 5-year program.

Marketing: The total food and kindred products industry in North Carolina has been growing at the rate of about 8 percent per year over the past 5 years. This advance is just slightly below the growth of all manufacturing in the state. However, within the food industry the canned and frozen food processing has made more spectacular advances than foods in general and all manufacturing. The value added by manufacturer in the canned and frozen foods has grown at the rate of 38 percent per year during the past 5 years. Even though such spectacular developments may not continue, there is reason for considerable optimism.

Major Problem Areas

A major attitude prevalent among many North Carolina farmers is that processing is an outlet for that portion of a vegetable crop which cannot be sold on the fresh market. Even though this point of view is gradually changing, a great deal of educational work is yet to be done to foster an understanding that processing is big business and must be planned for a steady supply of high quality raw product.

While much progress has been made in the past few years, lack of an adequate quantity of high quality raw products is still one of the big problems of North Carolina based fruit and vegetable processors. Adding to this problem is the fact that, because of our favorable climatic conditions, many out-of-state processors are now beginning to use North Carolina as a source of raw material. Most of these out-of-state firms now use North Carolina as a supplemental source. But, if this trend continues, many of these firms may come to regard this state as a prime source of raw material.

A considerable amount of time has been devoted to a program to assist North Carolina-based fruit and vegetable growers and processors in developing adequate raw product procurement programs. The procurement programs developed were designed (a) to obtain adequate quantity and quality of raw products to meet plant needs and (b) to synchronize the flow of raw products so as to minimize plant down time and unit operating costs. Many techniques were used but each was oriented to bringing producer and processor together. In the past, each knew his own problems and tended to distrust the other. By bringing them together in groups or private conferences to discuss mutual problems, definite programs have been developed and much progress has been made.

North Carolina-based processing firms need assistance with efforts to improve inplant organization and efficiency. Since many of these firms are relatively small and the general level of technological development in the processing industry is moving at a fast pace, this area of work assumes a high priority in the current and planned Extension program.

Extension Program

The general program objective is to develop an educational program to make the general public and those interested in food processing more aware of the problems and opportunities within the food processing industry. A specific objective is to increase the efficiency of the existing food process industry in North Carolina and to develop planning data to assist new industry which may be interested in locating in the state.

The program methods to be used in achieving the program goals (objectives) are regular TV appearances to discuss topical problems,

writing of research reports and press reports dealing with critical problems, regular educational meetings at the county and area level, and personal contact with agricultural and processing industry people.

Program Results

A measure of progress in this area of Extension education will be partially objective and partially subjective. The objective measure will be the growth of the processing sector in North Carolina as measured by employment, sales, value-added, and capital expenditures. The subjective measure will come largely from observations of changes in attitudes towards processing in general, the improvement of grower-processor relations, and a better understanding of what is involved in producing for a processing market.

SPECIAL PRODUCTION AND MARKETING PROBLEMS OF FRESH FIELD GROWN VEGETABLES

Present Situation

Demand Situation: The total volume of fresh vegetables consumed in North Carolina's primary market, the eastern half of the United States, from 1960 to 1964 increased 3.6 percent. Thus, the primary market demand for North Carolina fresh vegetables is increasing at an annual rate of .9 percent. For the same period, population increased 5.3 percent in the Northeast and 7.7 percent in the South. Even though increased demand is just over half the increase in population, it provides for orderly expansion of production with no increase in the application of knowledge. With full application of increasing technology in both production and marketing, North Carolina's share of the primary market demand can be increased considerably.

Program Needs

Relatively few North Carolina producers of fresh market vegetables have adopted the most efficient production practices. Therefore, production specialists should emphasize efficiency of production during the next 5 years.

Adoption of the most efficient and effective marketing practices for fresh field grown vegetables has lagged far behind competing areas. A broad scope educational program will be required to close this gap.

Extension workers, farmers and vegetable marketers need to understand and adopt improved practices in the following areas of marketing:

-Grower financing - sufficient operating capital to eliminate the need for "crash" sales.

-Greater geographic concentration of optimum size producing units

to provide for efficient assembly of marketable volumes of uniform quality.

- More different crops or multiples of given crops to provide a longer marketing season.

- Optimal size packinghouses and management capable of obtaining maximum in-plant efficiency.

- Efficient pricing - fewer sales offices capable of allocating products in response to the demands of competing consumer centers without unnecessary intrastate competition.

- Adequate financing of capital goods and operating cost requirements of marketing facilities and programs.

- Institutional and organizational systems that are most effective in assembling, processing and distributing products to consumers.

INTENSIVE CULTURE CROPS

INTENSIVE CULTURE CROPS

With efficient management of production and marketing, intensive culture crops offer a high per unit return to land and capital for small and large growers. Government control programs do not encompass these crops, thus production will be largely governed by availability of labor and other resources, management efficiency, and market availability.

The present national trend to larger and more efficient farms and marketing firms will continue. The trend to larger scale will be accelerated by new technology, better management, and improved organization of farms and marketing firms. The utilization of resources in more productive ways will accelerate during the next 5 years. While the trends suggest an increase in returns per unit of resources used, the importance of technology and management will become more critical in determining net profit or loss.

During the next 5 years, the following will be emphasized:

1. Expansion potential for this group of crops is good; however, concentration of educational effort will be necessary to develop this potential. Increased emphasis will be placed upon the economic advantages of each specific recommended practice which will result in greater acceptance of these practices.

2. Growers will be encouraged to scrutinize price outlook information as well as enterprise budgets so that they can allocate resources to best advantage.

3. Growers will need to improve their record keeping to determine weaknesses and strengths in their farm organization, as well as to assist them in securing adequate financing for enterprise expansion.

4. Better marketing organization will be essential and greater investments in marketing systems will be necessary.

5. A shortage of labor is one of the greatest limiting factors to expansion. Steps will be taken to reduce the need for labor and to make available labor more efficient.

6. Extension specialists and agents must find more answers through applied research. This is particularly true for the many crops which have a limited expansion potential and full scale research programs cannot be put into effect. Private funds should be sought to supplement appropriated funds where necessary.

7. The "team" approach should be used to set priorities for work on commodities and problems in Extension and research. The

team would include the research, teaching, and Extension personnel from all departments directly concerned with a specific commodity. The administration should provide the mechanisms necessary to insure proper functioning of this team approach.

8. Advisory committees should be appointed to bring together growers, as well as research, Extension, teaching and commercial personnel involved with specific commodities. The purpose would be to review research and Extension programs, discuss problems, and to plan future work.

9. An area approach to many of the problems and opportunities with intensive culture crops would increase the effectiveness of the program.

FLORICULTURE

Present Situation

North Carolina floriculture today is an estimated $11 million industry. This figure represents the sale of greenhouse pot plants and cut flowers, outdoor flowers, and bedding plants. Approximately 2,000 persons are directly engaged in flower production. Five million square feet of glass and plastic structures are used for flower production. Approximately 3,000 acres are devoted to all field-grown flowers; i.e., gladioli, peonies, daffodils, chrysanthemum, etc.

Generally the greenhouse owners and managers in flower production are adequately trained - many have college training in floriculture. Short courses and speciality crop meetings have been instrumental in keeping growers informed of new techniques and research findings. Many of the employees are not well trained. Some growers are now hiring college-trained personnel to fill key positions.

Growers involved in bedding plant production have little formal training and, consequently, have little knowledge of marketing and the various physiological factors that affect plant growth and flowering.

Outdoor flower growers in the Wilmington and Brevard areas have many years of experience with bulbous crop production. These growers are quick to adopt appropriate research findings.

While there are many flower growers in North Carolina there are no counties, with the exception of New Hanover, where commercial flower growers occur in significant numbers. It has been most difficult to develop a county program under these circumstances, thus the specialist-grower program has been followed since the highly specialized plant culture requires continuous adoption of research findings. Many cultural problems are solved with applied research and with all-practice demonstrations that are conducted in commercial greenhouses by state specialists. Plans are under way to initiate and develop a county program in bedding plant production. Most counties have bedding plant growers.

Major Problem Areas

Most growers have inefficient operations. Present employees are not well trained and need constant supervision.

Due to the complexity of most greenhouse operations, many growers have little knowledge of production costs. Consequently, some crops are presently being sold below actual cost. Record keeping must become a standard practice in each greenhouse.

While the price of other consumer goods has continued to increase,

the wholesale value of floral products is essentially the same as it was years ago. With the increased cost of production, growers are in a cost-price squeeze.

Growers need a more efficient and practical system of marketing floral products. The feasibility of mass marketing of flowers in North Carolina should be investigated. A more realistic method of gladioli and peony distribution for the Wilmington and Terra Ceia areas is needed. Cooperative and other systems of marketing should be explored.

North Carolina flower growers now depend largely on insect control recommendations from other states. New insecticides need evaluation and periodic recommendations published.

Research must be conducted on the major plant diseases of floricultural crops. Presently, a significant number of plants and flowers are injured or rendered useless from plant disease organisms. New fungicides should be tested and evaluated and recommendations for plant disease control published.

Assistance is needed in the areas of efficient greenhouse cooling, ventilating and heating.

New structural coverings need to be evaluated under North Carolina conditions. Results of such studies should be made available. Plans for plastic structures need to be designed to meet the needs for both flower and vegetable production.

With the increased cost of labor and supplies, commercial growers need to adopt and put into practice all possible labor saving devices. Research in the areas of automatic watering, fertilizing, potting, planting, sterilizing, harvesting of flowers, and grading must be conducted for North Carolina growers to keep them competitive with other flower producing areas. Individual grower cost analyses are needed to indicate weakness in firm organization.

Work needs to be continued with photoperiod, fertilization, temperature and growth retardants. Emphasis should be placed on development of guidelines to produce quality floral crops.

In order to produce flowers economically, greenhouse workers need to be educated so that they not only know "how" but also "why." Few trained workers are available in North Carolina. In order to establish a sound floral industry, this situation must be improved.

Bedding plant operators are not trained in the fundamentals of plant growth management and marketing.

Agents need training in floriculture so they can help amateur and commercial growers with routine problems.

Extension Program

Quality is still the key to the sale of all florist products. To remain competitive, growers need to concentrate constantly on growing better plants and flowers. Many cultural problems can be solved with applied-type research conducted in individual greenhouses. Results of these replicated studies will be published in the monthly North Carolina Flower Grower's Bulletin.

Annual short courses and one-day commodity meetings will be held in order to keep the commercial grower up-to-date and aware of new technological developments.

Timely area meetings, field days and tours will be held in the different production areas of the state.

Timely information on flower production will be published in the North Carolina Flower Grower's Bulletin. In addition, worthy articles from other state bulletins will be reprinted.

Frequent visits to individual greenhouse ranges will be continued. Since floriculture is constantly changing, growers need advice and suggestions. The specialists will continue to offer individual consultation. Many cultural decisions need to be made early, and such planning requires considerable time and effort on the part of the specialists.

Emphasis will be placed on soil analysis and interpretation. Fertilization recommendations will be given for the various floricultural crops.

The annual flower garden trials at the Method Horticultural Station will be continued. Commercial bedding plant growers will be encouraged to attend these trials and evaluate the new cultivars. Special programs will be conducted to present information on culture and marketing of bedding plants. Field days will also be held for amateur gardeners. The results and performances of the annuals will be published for the bedding plant grower.

Horticultural information leaflets will be written for annual and perennial flowers.

Bulletins will be prepared for the major commercial floricultural crops. Emphasis will be placed on how to do it, rather than why. Leaflets and news articles will be prepared for the amateur flower growers. A bulletin for greenhouse cooling, ventilating and heating will be prepared.

Annual training sessions will be conducted during the summer sessions for greenhouse workers. Emphasis will be placed on fertiliza-

tion, disease and insect control, propagation, soils, and cultural practices of the major floral crops. The resident staff in Extension, teaching and research will be utilized in the training session.

Area meetings will be conducted in the counties to stress recommended cultural and marketing practices for bedding plants. An annual meeting will be held in conjunction with the bedding plant field day.

In-service training will be offered in district meetings to agents in the field of floriculture. Similar but more technical information will be provided the agents as outlined above. Formal training will be provided by the staff in floriculture and related departments. It is hoped that this training will assist the agent to answer routine questions of amateur and commercial flower growers.

The use of new and more efficient equipment will be promoted with commercial growers. The trade-fair at the annual May short course will be enlarged so growers can see latest labor-saving devices. New equipment will be tested at the University greenhouses and results published in grower bulletins. Where appropriate, new equipment will be emphasized at area meetings.

Program Needs

As outlined under "Extension Program" training should be provided for at least one staff member from each county. While it would not be expected that the agents become proficient in the field of floriculture, a basic knowledge and understanding of flower production (commercial and amateur) would be useful to the agent.

Program Results

The greenhouse industry will continue to expand in North Carolina. There should be at least 7,000,000 square feet of plastic and glass structures that will be used for flower production in 1971. The wholesale value of crops grown indoors should reach $10.25 million. There will be over 5,000 acres devoted to the production of outdoor flowers with a wholesale value of almost $4 million.

NURSERY CROPS

Present Situation

Registered nurseries total 1,024, of which more than 70 percent have an acre or less in salable stock. There are 3,460 acres in salable stock with about 12,000 acres involved in nursery crops production. On the average, 3.5 years is needed to produce a salable crop. Growing nursery stock is a supplemental or sideline business for many smaller producers.

Monetary evaluation steadily increases for the industry. In 1950, value was $3.5 million; in 1960, $10 million; and in 1965, about $13.8 million. The estimated value for 1966 could exceed $15 million, which was the goal.

Growing conditions are excellent for crop production. Available utilities, a good tax structure, and an above-average labor supply contribute towards a favorable environment for producing nursery stock.

Present demands for nursery stock are excellent, with a bright future ahead. Annually, 1.6 million homes are constructed. An increase to 2 million annually is predicted by 1970. Surveys of homeowners indicated 60 percent planned to do some landscaping. Backlog of unlandscaped, incompletely landscaped, and overgrown landscaped homes is large. Between $4 and $5 billion will be spent nationally for nursery stock by 1970. Highway beautification projects use $75 million annually for beautifying our interstate highways. Industrial buildings, civic buildings, streets, parks, recreational areas, arboreta, cemeteries and golf courses will require much nursery stock for their enhancement. A beautification program is just starting.

Major Problem Areas

The labor situation is critical and could result in reduced operations. Work is seasonal and requires long hours during peak periods resulting in overtime pay and need for additional, and often unavailable, labor. Rising cost of labor, minimum standards and unionization are threatening. Need for trained foremen and better management is great. Only unskilled, untrained labor is available. Training is at the nurserymen's expense.

Prices are unrealistic, not based on well-kept records. Wholesale prices in 1962 were only 10 to 15 percent higher than in 1950, whereas all other cost items increased by much larger percentages. All costs of production often are not considered in pricing. Poor management contributes towards this reality.

Growers need information on distribution costs, consumer demands and pricing systems. Small nurseries usually have higher costs of production yet they often sell at greatly reduced prices in cut-throat

competition. Cooperative buying and selling could help increase profits. A highly organized assembly and distribution system is needed to effectively service large accounts. Better communication and organization among nurserymen is desperately needed.

Much marginal land is used today which is entirely unsuitable for most other agricultural crops. Growers need to understand why good land is essential for efficient production of nursery crops, and how to manage this land.

Growers need to improve their production methods. Mechanization is essential. Hand labor is expensive, unpredictable, and increasingly hard to find when needed. Improved drainage, irrigation, fertilization and pest control practices must be adopted. Many new substances and methods are being used to regulate and control growth. Growers need to know what is available in their area and how it can be best used on their crops.

Extension Program

Our present program will be continued. Information will be disseminated to growers who must be made aware of recent research findings, new techniques and present demands. Newsletters, short courses, field trips and tours will be used to help inform and train nurserymen. Help with pest problems, interpreting soil tests and crop production for individual nurserymen will be continued. Information leaflets, slide sets and publications on specific subjects are greatly needed and will be prepared.

More field trials will be conducted. Statewide testing of varieties will be started. Adaptability of crops will be determined locally and for use in other areas. Testing herbicides, fumigants, insecticides, fungicides and nematocides in major production areas will be undertaken. At present, only a few scattered tests can be undertaken because of limited personnel.

All-practice demonstrations are needed throughout the state and will be initiated. Use of improved fertilizers, soil amendments and other soil additives will be a part of this program. New chemicals will be compared with standards used in production today.

Program Needs

Area in-depth training schools for county agents are needed. Several such district training sessions will be held every 2 to 3 years. County agents especially trained could serve two or more counties rather than one, like today.

More research and testing of new materials and methods should be undertaken statewide. A team approach is needed in related fields

to conduct trials on pest control.

Less time involved working with individual nurserymen and home owners would allow added time for a better training program for county agents. Faster means of travel is a necessity. Air travel is suggested to the mountain area with vehicles at the airport to go to the plot areas or to see the county agricultural agents.

A broadened educational program is needed to provide more training. Vocational or technical schools to give background training in nursery crops for those going into the business would help immensely. Special field days throughout the state on applying pesticides, other cultural procedures, and mechanization in production of nursery crops would help train individuals.

Schools to teach record keeping, values of cooperative marketing, location of markets, and grading stock would be of great help.

Use of computers and mechanization to produce crops with greater efficiency should be investigated and adapted to the industry. Training schools for county agricultural agents on production of nursery crops and plant materials with trips to major production areas would produce well trained agents, releasing specialists for development of a still better educational program. Use of telephone answering service should be considered to augment present resources.

Program Results

Greater specialization by specific plant types will occur. Azalea, Chinese and Japanese hollies, and camellias production will be mainly in the southern and eastern parts. Narrow-leaf evergreens, boxwoods and hybrid rhododendron production will be mainly in the northern and western areas.

Mass production with new and cheaper methods will be started. Especially designed labor-saving equipment is being developed and will be used more. Closer cooperation with agricultural engineers will be maintained.

Better marketing practices will be used. Cooperatives will be developed. Local or area associations will be increased.

Leasing of plants and maintenance of plantings is being done in some areas and will be done in our state. Business firms, apartments and other firms will pay monthly charges for use of plants in containers. Contractors will add, maintain, and replace plants as needed. Larger firms, golf courses and cities with extensive grounds will have trained horticulturists and a staff to maintain, and replace plants as needed.

Monetary and acreage increases are expected in the next 5 years. A 50 percent increase in salable stock, to about 5,000 acres, is expected. From the sale of nursery stock the total monetary value should reach about $21.8 million.

CHRISTMAS TREES

Present Situation

Current growers of Christmas trees range all the way from the untrained with limited financial resources to professional foresters and nurserymen. Lawyers, doctors, professional businessmen and retirees are also growing Christmans trees as a sideline or hobby.

After a meeting with growers and county agents, Extension helped organize the North Carolina Christmas Tree Growers Association in 1959. This group was instrumental in getting the North Carolina Division of Forestry to allocate the Penrose nursery in Henderson County to the production of Fraser fir planting stock.

Christmas-tree result and method demonstration plots have been set up in Watauga, Avery, Mitchell, McDowell, Jackson, Henderson, Burke, Cherokee, and Caldwell counties to show advantages of using cultural practices necessary to produce quality trees.

Extension personnel have worked closely with the Christmas Tree Growers Association in planning programs and field meetings.

One of Extension's programs has been to help increase the income of growers through the expansion of Christmas-tree planting. Eventually, it is anticipated that growers will be planting 4,000,000 trees a year, with a total of 20,000 acres in various-age classes. Another program has been to encourage growers to produce and market high-quality trees to compete with trees being shipped from northern areas.

In 1960, approximately 1,000 to 1,200 acres had been planted in Christmas trees. To date, nearly 6,000 acres have been planted with various species of Christmas trees.

One private nursery with which Extension has worked now has the capacity to produce 500,000 Fraser fir plants annually. Another private nursery (under construction) is planning to produce 1,000,000 Fraser fir annually, and lesser amounts of other species. Two private nurseries, plus the state-owned nursery, should provide landowners with adequate planting stock in the near future.

To the present date, most Christmas trees grown in North Carolina have been sold as "balled and burlapped" live trees. It is anticipated that this situation is not likely to continue because dug

stock will more than supply the demand.

Major Problem Areas

There is difficulty in getting growers to keep records and to adopt cultural practices to produce efficiently the maximum number of high-quality trees. There is a lack of organized marketing effort and little information about the demand for North Carolina-grown trees. There is difficulty in getting landowners to realize that growing Christmas trees requires a high degree of management skill, and is not a get-rich-quick scheme. Problems exist in getting newcomers to "grow into" rather than "buy into" the Christmas-tree business unless professional management assistance is secured. Additional efforts must be made in getting landowners to realize that they have many natural advantages enabling them to produce the finest Christmas trees in the world. There is inadequate knowledge on the part of prospective growers and landowners of the mutual advantages possible through leasing land or various rental arrangements. There is inadequate research upon which to base management recommendations.

Extension Program

In-depth training sessions will be provided for Extension personnel who will be working with clientele growing Christmas trees.

All-practice result demonstrations will be set up in each mountain county to show the comparative economic possibility of producing high-quality trees competitively. Small growers will be assisted in selling high-quality, brand-name trees in large enough quantities to attract wholesale buyers. This will be started in a small way by listing the number of trees to be available by each grower. Prospective buyers will then be furnished a list of the seller's names, addresses, number and species of trees for sale. Assistance will be given to the North Carolina Christmas Tree Growers Association in preparing this list. A market-demand analysis will be performed if possible.

Result demonstration stories will be published. Result of growers' successes will be reported. Result demonstrations showing cultural practices necessary to produce quality trees will be established. Leaflets to emphasize various cultural practices will be published.

Program Needs

Specialists in cooperating departments need specialized training in production and marketing problems. County and area personnel also need to collaborate to exchange experiences or information. Interagency cooperation will be required from the United States Forest Service, North Carolina Division of Forestry, and Tennessee Valley Authority.

Test plots need to be established in several geographic areas of

the state to determine species best suited to the area, fertilizing needs, and time of shearing various species.

Program Results

In 1965, about 200,000 Christmas trees were sold by North Carolina growers. These trees had a retail value of about $394,000. By 1971, it is anticipated that about 670,000 trees will be sold, with a retail value of $1,341,000.

Two nurseries are also expected to produce 1,500,000 Fraser fir Christmas-tree planting stock valued at $112,500.

SMALL FRUIT

STRAWBERRIES

Present Situation

Commercial strawberry production in North Carolina is presently confined to the southeastern counties, Pender, Columbus, Duplin, and fringe areas of surrounding counties. Operations vary in size. Most acreage is small with less than 5 acres per farm. Less than a half-dozen farmers grown more than 50 acres.

According to the United States Department of Agriculture Crop Reporting Service, there were 2,400 commercial acres of strawberries harvested in North Carolina in 1965. Yield per acre was 3,300 pounds. These figures represent almost a 10 percent increase in acreage and a 32 percent increase in yield per acre over the previous year. Acreage for harvest in 1966 will be about the same as in 1965.

There is no formal organization among strawberry growers as a commodity group. One marketing firm and three auction markets serve the commercial industry.

Even though on some farms strawberries are a major commodity, much of the production is on tobacco farms. Every economic and educational level is represented in this commodity group. Usually, however, strawberry growers are small farmers who depend on local or family labor. Generally, they haven't readily adopted recommended production technology.

Extension programs during the past 5 years have emphasized an "all-practice" approach on this crop. By adopting known technology, strawberry farmers could increase their net income per acre by 50 percent. Special effort has centered around an educational program designed to make farmers aware of the benefits of soil fumigation for nematode control, use of certified disease-free planting stock, supplemental irrigation, weed control, and proper fertilization. Extensive demonstrations have been conducted on strawberry farms using these practices. Concentration of effort has been centered in already established commercial areas and/or areas of greatest potential for strawberry production. A series of educational meetings led to the development of a non-auction shipping market in the Pender county area which has expanded into other producing areas.

In 1961, 1,300 acres of commercial strawberries were harvested in North Carolina. A goal of 1,800 acres and $3 million gross income was set for 1966. An increase in commercial production to the present 2,400 acres and almost $2.3 million sales has been achieved. In addition, there are over 1,000 acres of home garden and semi-commercial strawberries grown. Value of this fruit is estimated to be almost

$1 million.

Major Problem Areas

Much of the commercial strawberry acreage is grown by tobacco farmers. Attitude of these growers is extremely difficult to change and strawberries generally take second priority for needed care. In some areas, known technology has not reached the grower, and in many cases when technology is known, it is not practiced for lack of labor, capital, or an appreciation of the intensive nature of the crop.

Both production and marketing problems are evident in the industry. There is no grower organization and each farmer operates more or less as an independent unit. Assembly and distribution costs are excessive and grade standardization is needed.

Labor for harvesting has become scarce, less competent, and more expensive. Growers are finding it more and more difficult to hire seasonal labor at a wage competitive with factory employment.

Basic production problems remain with the industry. Even though some progress has been made during the past 5 years, many growers still plant on disease and nematode-infested soil, set inferior transplants, do not fertilize properly, fail to provide irrigation, and do not control weeds and other pests adequately. Materials currently available for chemical weed control are of limited value.

Extension Program

A concentrated effort to upgrade production and marketing in the already established commercial area will be undertaken. At the same time, work will be started to develop new areas in the state that show an enterprise advantage.

Field demonstrations and applied research will continue on the major problems. Information already available will be more vigorously disseminated to growers. Extensive training of county personnel in commercial strawberry production will be intensified. In these counties, a more vigorous program on this high income crop will be encouraged. Specific emphasis will be given strawberries in Columbus, Pender, Duplin, Wayne, Craven, Carteret, Watauga and Haywood counties.

Work toward developing new areas, especially the mountains and piedmont will continue. High yields, small farms, and local and/or family labor make the higher elevations with organization of growers ideal for this crop. A concentrated program to develop this industry in Haywood county is beginning. If successful, the industry will expand from this one county to surrounding counties, and hopefully, to the entire mountain area.

Pick-your-own and locally marketed strawberries will be encouraged in the highly populated piedmont area. If developed properly, at least 20 acres could be produced profitably in almost every piedmont county. If further expansion occurs, it will be encouraged to concentrate in a high density area to facilitate an assembly and shipping program.

Periodic training schools will be conducted for agents who are working with strawberry growers. In addition, field training by tours and visits needed to recognize and solve problems will continue. Specialists will keep up-to-date on the total national and international situation. Involvement of agents and specialists in practical research-type demonstrations will be the basis for any concentrated effort on this crop. These demonstrations will be conducted on farms and at research stations when feasible, and will involve disease, insect, and weed control, irrigation, site selection, variety testing, cultural system, and marketing.

Departments of Horticultural Science, Plant Pathology, Entomology, Economics, and Biological and Agricultural Engineering at N. C. State will work toward establishing commodity teams to set priorities on all these intensive crops, especially on strawberries, and to work together as a team to develop potentials mentioned earlier. These teams will work together to solve problems using the total resources of production and marketing.

In addition to this type of cooperation and coordination, these teams will closely consult with district agent teams and county personnel, and commonly agree on potentials, goals and methods.

Program Needs

In some instances, specialization will be emphasized. Counties with exceptional potential for strawberries should have agents designated to develop these potentials. These agents could work in one county or across county lines. In either case, these agents or area specialists should be given responsibility to develop crops on a priority basis, working only with one or two crops at a time until they are a commercial and self-sustaining entity.

In areas of high production possibilities and a reasonable labor supply, a processing strawberry industry could be developed if extension of an existing feasibility study so indicates. To develop such an enterprise, a full-time effort would have to be given by someone at the specialist level working across county lines and acquainted with both production and market development.

Program Results

Within 5 years, strawberry acreage will increase considerably. More significant than an acreage increase would be the increase in yield per acre to 5,000 pounds. Net income could be increased on this basis

by 100 percent.

In addition, the local or pick-your-own markets, fully exploited, could account for a half million dollars in the highly populated counties of North Carolina.

For many small generalized farmers, net income could be doubled by one or two acres of strawberries properly grown and marketed. The strawberry enterprise is a "tailor-made" crop for farmers in the low income level, who are limited in quantity of land, who have good management ability, and who have either family or local labor for harvesting. Total sales by 1971 could reach about $6,830,000.

BLUEBERRIES

Present Situation

North Carolina is the third largest highbush blueberry producing state in the nation. New Jersey ranks first and Michigan second. Commercial production in North Carolina occurs primarily in Pender, Duplin, Bladen, Jones, Craven and surrounding counties. There are also a few acres of commercial plantings in the mountains.

Accurate acreage and yield data are not available, but a recent estimate indicates about 4,000 acres with an annual production of over 10 million pounds of fruit. During the period 1961-66 acreage increased about 25 percent but average yield per acre remained about the same because the oldest plantings showed a decline in production.

Blueberry farming operations vary considerably in size but large units produce most of the fruit. Growers depend upon migratory labor, in most instances, to harvest the crop. A labor shortage has developed in recent years.

North Carolina blueberries reach the market before other major areas of production and consequently bring the highest prices. Earliness is our main advantage since yields and quality usually are not as high as in other areas. The industry appears healthy and reports indicate continuous expansion. Because of a strong demand, approximately 80 to 90 percent of the fruit is sold on the fresh market.

Two cooperatives and one privately owned marketing agency handle most of the fruit. A few growers market independently. Competition among the selling agencies is keen. Cooperative marketing efforts usually are lacking to such an extent that instability develops and prices decline unnecessarily.

Extension programs have been of the practical research, field demonstration nature. These have been supplemented by grower short

courses and problem surveys. Studies have been made to determine the cost and returns of alternative marketing programs in use by the industry. Prices and freight rates have been analyzed and compared for alternative consuming areas to assist in determining the optimum distribution pattern. Attempts have also been made to unify the growers and grower organizations. More plantings have been encouraged in western North Carolina with some success.

Growers continue to expand their acreage and many are utilizing available technology to increase efficiency. An estimated 3,000 acres in 1961 was predicted to increase to 4,000 acres in 1966. This goal has been reached. Yield per acre has not substantially increased because older plantings have declined in production. Gross income was projected to be $8 million; however, estimates in 1965 -- partially because of adverse weather and insects -- only amounted to $4.8 million.

Major Problem Areas

Basic problems have not changed materially during the past 5 years. Growers do not cooperate or coordinate operations sufficiently to adequately regulate marketing procedures. They have not adopted the best methods of handling and distributing the fruit. Uniform grades and standards are needed. Quality control standards are lacking and central packaging with automation must be developed to permit the use of such standards.

Because of peculiar cultural requirements, highbush blueberries are grown on low-lying, high organic soils. Often growers do not provide for proper drainage and adequate supplemental irrigation. Plantings sometimes are made on marginal soils low in organic matter. During adverse weather, a crop can be lost.

Insects, diseases, poor pollination, and weeds present a threat to the industry. Research to develop better controls and education to obtain wider usage are vitally needed in this area.

The basic problem, however, seems to be grower attitude, which results in lack of cooperation and coordination of efforts. Labor problems are becoming more intense; therefore, lack of mechanization of such key operations as pruning, harvesting, and packaging dominate the technical problems of the industry.

Extension Program

Most of the effort allotted to the blueberry industry during the next 5 years will be directed toward bringing about closer cooperation and trust among growers, among marketing concerns, and toward professional agricultural workers in the area.

Work toward establishing a state-wide promotional organization

will begin immediately. A grower committee has already been appointed to study the feasibility of such an organization.

At the same time, efforts will be continued toward increasing production and marketing efficiency by conducting field result demonstrations on pruning, fertility, pest control, use of spray equipment, irrigation, and site selection. Development of techniques to aid mechanization will begin immediately.

Training of county Extension personnel in commercial blueberry growing areas will be intensified by special training sessions, new publications, office visits and field tours. Agents in the southeastern counties will be encouraged to give blueberries proper attention and priorities.

Rabbiteye type blueberries have not been planted extensively. A commercial processing enterprise could be developed from this high yielding and widely adapted species. A program over the next few years will investigate the economic feasibility of this crop and demonstrational plantings will be established in suitable areas of the state.

Emphasis will be on cooperation and coordination of research and Extension from several subject matter departments, district agents, State Department of Agriculture, Conservation and Development and county personnel. Attempts to establish commodity teams from these agencies will be undertaken. These teams will have the responsibility of establishing priorities and to coordinate the entire blueberry program during the next 5 years.

Program Needs

Agents and specialists need additional training on this crop. Specialists need to tour other blueberry growing areas to study production practices, varieties, and harvesting techniques. Agents need to have training in production and marketing. This agent training mentioned under "Extension Program" will continue for the next 5 years.

Also under "Extension Program," cooperation and coordination of research and Extension were emphasized. The team approach, involving several subject matter departments, district agents, and other state agencies will be emphasized and exploited.

Program Results

By 1971 a statewide blueberry growers organization should have been formed. A processing industry should also have begun. People who are involved in the blueberry industry will have made economic gains and will have learned more about blueberry production and marketing. Gross sales by 1971 could amount to $7,285,000.

MUSCADINE GRAPES

Present Situation

Between 300 and 400 acres of commercial muscadine grapes are planted in North Carolina. This is a young and vigorous industry, with most of the acreage just coming into production. Interest is intense and new acreage is being planted as fast as plants can be propagated.

Most vineyards are family operations and vary in size from 1 to 15 acres. Some larger and older vineyards are in operation, but are not cared for properly.

The muscadine grape growers are well organized. About 90 percent of the acreage is owned by members of the New River Grape Growers Association. They work very effectively as a group and cooperate with professional agricultural workers extremely well.

Muscadine grape production is now centered in Onslow, Jones, Lenoir, Robeson, and Moore counties. Some production, mainly for local market, is found in all areas of the piedmont and coastal plain.

Extension programs have been and are being directed toward establishing an industry. Two general approaches have been used and have been very effective. First, organization of growers has taken top priority. Second, the concurrent development of production and markets has been emphasized.

In addition to this, field demonstrations and tours have been used quite successfully. It is estimated that now over half of the commercial growers are following virtually all Experiment Station recommendations, and practically all growers are working closely with Extension personnel in their respective counties.

In 1961 it was estimated that 500 acres of new plantings would be producing a half million dollar income by 1966. There are at present more than 300 acres in production providing over $200,000 income. Concentrated effort toward a few growers has been the trademark of the development of the industry. From these few successful growers, interest has spread and is growing as fast as planting stock can be obtained.

Major Problem Areas

Although markets are now adequate with large expansion of acreage, new outlets must be developed.

Disease and insects are becoming greater problems. Currently no control recommendations are offered.

Recently released varieties are not meeting the needs of the industry because of weakness in one or more characteristics, and failure to meet "Scuppernong" name requirement.

Mechanization is direly needed to reduce cost or production.

Extension Program

Because of limited markets it does not seem wise to recommend large or indiscriminate plantings of muscadine grapes. The growers will be encouraged to exploit fully the marketing facilities already available. This would enable the industry to expand enough to establish itself while gaining experience needed for greater expansion. Production and marketing should be developed concurrently.

Field research-type demonstrations will be continued on all aspects of grape production. These demonstrations will be established and continued in Onslow, Jones, Lenoir, Robeson and Moore counties. They will include such cultural aspects as disease control, propagation, pruning, trellis construction and type, fertility, variety, weed control, and cultural systems. Field meetings and tours will be conducted to educate agents and growers in grape production. Publications will be written and revised to give latest research information to growers.

During the next 5 years, extensive effort will be made to strengthen and expand the marketing system. Quality standards will be established as a buying and selling guide and possibilities for new market outlets will be explored.

Cost of production studies will be made to compare the feasibility of growing grapes in competition with already established enterprises. Labor and cost budgets will be reworked and revised so the growers might have the best available information on which to make decisions.

Work toward the development of new varieties that more nearly meet the demands of both the grower and processor will be continued. Testing programs will evaluate new selections and hopefully have at least one superior variety available before 1971.

Expansion of processing will be explored, and the possibility of new products developed from muscadine grapes investigated. The association will be encouraged to further explore fresh market opportunities based on results of a market test already completed.

Work will be closely coordinated with the New River Grape Growers Association, and any farmer who plans to grow grapes commercially will be encouraged to support this organization.

Program Needs

Greater emphasis will be placed on training those people already involved in an educational program, and especially agents in counties where production is concentrated.

Cooperation and coordination are urgently needed among the Horticulture, Plant Pathology, Biological and Agricultural Engineering, Food Science, Entomology, and Economics departments. A commodity team composed of members from all these departments should be organized to advise and coordinate all efforts directed toward building a muscadine grape industry.

Program Results

Within 5 years there should be 600 acres of commercial muscadine grapes in North Carolina. Practically all of these will be controlled by the organized group we now have. A gross income from these effective 600 acres would exceed one-half million dollars. A sound industry will be established that can furnish raw product for wineries, juice plants, and fresh market. Gross sales by 1971 should amount to over $658,000.

TREE FRUITS

APPLES

Present Situation

North Carolina apple producers are relatively young. They probably average 35-40 years old. An estimated 10 percent hold a college degree or advanced training. A high percentage own the orchard or are in partnership with their father. In a 1964 survey the average size orchard was 21 acres with 51.7 trees per acre.

There are three cooperative apple markets -- Western Carolina, Mt. Mitchell, and Brushy Mountain which handle about 400,000 bushels per year.

Approximately 15 out-of-state (Florida) packers operate in the apple area, mostly in Henderson County. They handle about 800,000 bushels per year. About 13 grower-owner-packer-operators are in Haywood, Henderson, Polk, Cleveland, Alexander, Avery, Yadkin and Yancey counties. They handle about 700,000 bushels per year.

About 20 percent of the North Carolina producers belong to the North Carolina State Apple Grower's Association and are active.

Research and Extension workers in the departments of Economics, Entomology, Horticultural Science and Plant Pathology contribute major emphasis and departments of Biological and Agricultural Engineering (buildings and equipment), Fish and Wildlife (rodents), Federal Crop Insurance Corporation, North Carolina Department of Agriculture (Marketing, Crop Reporting, Soil Testing) contribute periodically to the whole apple program.

Approximately half the growers (80 percent of acreage) attend the winter apple schools held at Spruce Pine, Waynesville, Hendersonville, Mt. Airy and Gastonia, Shelby, or Lincolnton annually. Approximately half the growers attend the preharvest tours held in early August. Result demonstrations are usually viewed at selected orchards.

County Extension agents and growers have participated in an out-of-state tour each year. Tours have been to the apple production areas of Georgia, South Carolina, Pennsylvania, Virginia and West Virginia.

A goal of 5 million bushels was set as part of the "1.6 in '66" Program and was met in 1965. A dollar value of $5 million was set and met by $7,762,917 in 1965.

Wider adoption and more complete use of the following prompted the achievement of the state goal in the "1.6 in '66" Program: Improved

insect and disease control with better equipment, better timing, milder insecticides and fungicides which increased yields of high quality fruit; better pruning of older trees has increased fruit color and quality; addition of boron to the soil or in the spray has reduced the incidence of boron deficiency; analysis of leaf samples has aided some growers to follow a better fertility program which is resulting in larger yields of better quality fruit; the spur-type trees, first set in 1958, are producing a heavy crop of highly colored fruit for the early market; a larger volume was packed in trays and bags rather than bulk; and better coordination and cooperation of growers helped to improve practices and gain better understanding of the market.

Major Problem Areas

For the fresh market, yields need to be higher. Present production is approximately 450 bushels per acre. Yields of at least 1,000 bushels per acre will be necessary to compete in the future.

More producers need to use the size-controlled trees set 100 to 200 trees per acre. These trees (mostly spur-type) produce earlier (4-5 years) and are better for a hedge row or tree wall. Growers have failed to realize that branch spreading will encourage early production. Growers have failed to use scoring to induce annual bearing. Some producers have failed to realize that insect, disease and weed control during the first 2 years is most important.

Quality of fruit must be improved. The 1965 crop was the best in years but still only about 15 percent graded US Fancy or Extra Fancy because of poor color caused by inadequate pruning and/or high nitrogen application; small-sized fruit brought about by over-cropping, weak trees or insufficient thinning; and over maturity due to late harvest or lack of refrigeration for holding quality fruit in prime condition.

Net return per bushel should be higher. Growers fail to see that production is one job and marketing another. The number of buyers is being reduced but the number of grower-salesmen seems to be increasing. Lack of adequate refrigeration causes quality deterioration and depresses prices early in the season. Growers have failed to standardize grading and packing on a state-wide basis as a means of stabilizing quality of the pack. Inadequate handling and grading equipment results in bruising in excess of desirable levels.

There are many problems in production for processing. More processing varieties are needed. Golden Delicious and Stayman, which compose about a fourth of the crop, are the only varieties acceptable to North Carolina processing plants. Rome Beauty is good for sauce but there is no plant. Fruit offered to a processor is often from the poorly cared for trees and size is often a problem. Processing prices paid in North Carolina are competitive with prices paid for processing apples in other areas. To compete North Carolina must have comparable

yields and quality. Figures on the comparative income from fresh versus processing outlets is needed to determine possible profit from each.

Marketing-organization problems are present also. Many low-volume packing houses are in operation. These have high operating costs compared with larger, more efficient packing houses. Most managers of packing houses and sales agencies are inadequately trained or inexperienced. Price increases sufficient to cover long-term storage costs is questionable with present apple quality and sales outlets. Pricing plans developed at the beginning of the season fail to reflect the expected crop in local, state and national areas. In 1965, North Carolina was $.30 per bushel below the average national price.

Extension Program

Extension plans to continue to assist county Extension personnel in production problems (fresh and processed) by conducting method and result demonstrations and applied research as follows: site selection (water and air drainage); soil preparation (lime and phosphate); nursery stock selection for size control; variety; tree size; tree spacing (hedge row or tree wall); trunk scoring; branch spreading; insect control (chemical or biological); disease control; chemical weed control (non-bearing and bearing trees); mulching; thinning (hand and chemical); fertilization (soil or foliar); maturity determination; three-level picking (ground, short ladder and top); handling (bulk boxes); storage (temperature, humidity, and stacking); and grading and packing (water dumper to reduce bruises).

Extension plans to assist the North Carolina Apple Growers' Association to carry out a program of improving and promoting North Carolina apples, and encourage attendance at the annual meetings. Plans are also being made to continue the five winter apple schools, including the North Carolina-Virginia meeting at Mt. Airy; preharvest apple tours of the five producing areas; and the out-of-state tour.

The Extension program will include office conferences (particularly with the agents in the counties designated to do the apple work); work toward more accurate and meaningful cost of production and marketing records (early harvest, short-term storage and long-term storage included); timely material for radio and news releases for use in the apple areas; and the present procedure of working directly with firms and associations to improve management.

Extension plans to encourage construction or leasing of refrigerated storage (for 1 to 90 days) at each pack house; encourage the Federal State Inspection Service to upgrade their personnel and in turn upgrade the apple pack; continue and expand the training of county Extension workers in the "why" and "how" of apple marketing; train and assist local apple sales and packing house managers to improve their grade and pack of

fresh apples; encourage the search for better apple products; and encourage 4-H members to participate (using apples) in 4-H demonstrations.

Program Needs

Closer coordination is needed in the search for additional apple processing facilities; assisting groups in bargaining attempts for processing apples from several states; and encouraging attempts to better train directors and personnel in North Carolina apple cooperatives.

It is suggested that the district agent assign apples (regardless of their importance in the county) to one county Extension agent so that he can keep a file of material as it is sent to the county. Also, this person could attend schools, training meetings or be contacted relative to the apple program.

A better method to determine apple maturity is needed. Information on irrigation is also needed.

Program Results

There are already enough apple trees planted, including the size-controlled type and highly colored strains, so that by 1971 North Carolina could have an annual production of 10 million bushels.

If the market demand changes rapidly and if only the highly colored fruit can be sold at a profit, some older trees might be removed earlier than expected. In this case, production in 1971 might be close to 8 million bushels.

In the event of severe winter weather, excessive drought, frost at bloom or an economic upset, yield and income estimates will not be realized. Total gross sales by 1971 should amount to about $14,180,000.

PEACHES

Present Situation

Of all production in North Carolina 75 percent of acreage is managed by 30 to 45-year-old growers. The remainder of the acreage is managed by growers over 50 years old. Most growers have attended college. About 60 percent of the acreage is grower-owned. About 40 percent of the acreage is controlled by diversified corporations.

In marketing, one large grower-owned packing company operates in Montgomery, Richmond, and Anson counties and handles 30-35 percent of the North Carolina crop. About 10 growers have packing sheds and hydrocoolers. Each sells independently. They handle about 50 percent

of the North Carolina crop. The balance of the producers either sell tree run, use their own grader, or sell fruit through another grower-packer. Grower-owned and independent roadside stands dot the Sandhill area; poor quality fruit is often plentiful at such stands. About 75 percent of the North Carolina producers work with the North Carolina Mutual Peach Growers' Society. County Extension personnel act as advisors to this group.

A recent change placed the county Extension chairman of Montgomery County in charge of the peach program in Montgomery, Richmond, Moore and Anson counties. He spends about half his time on peaches. Through this change the Extension peach program in the four-county area will be strengthened by sending newsletters relative to insect and disease or cultural problems; acting as the distribution point for peach information from Extension specialists and other agencies; planning and assisting with result demonstration on pruning, weed control and insect and disease control; assisting with peach promotion by providing the public information relative to the crop, volume, varieties and condition.

All departments with research at the Sandhill Research Station, plus Food Science and Economics departments at North Carolina State University contribute to an annual program. The winter peach meetings and the summer field day at the research station at Jackson Springs have been very worthwhile. The research workers have cooperated very well and have worked hard to prepare and present their material; however, grower attendance has been low.

Fruit schools in the Cleveland, Lincoln, Gaston area and at Mt. Airy have included peaches in their annual program. Most producers in the area attend.

Major Problem Areas

Production for the fresh market is handicapped because of low yields. Growers fail to realize or accept the fact that peaches increase in size 20 to 25 percent in the final swell. Picking prior to firm ripe results in lower total production. Producers often lose 1 to 5 percent of their trees before the first crop through mechanical injury during cultivation. Many growers ignore good sanitation practices and usually have excessive insect injury. Producers often select undesirable sites and thus experience excessive frost damage to blooms. Growers have been slow in accepting a package of all the approved practices. They seem to prefer to gamble on a short-term basis rather than spend the time and money to produce the high quality necessary to make the crop profitable over the years.

Quality of the fruit is low because producers pick prior to the final swell and ship fruit that does not ripen properly. Growers often pack fruit which barely meets a specific grade.

Net returns are low because growers have failed to produce quality

in volume. Repeat sales have been limited by poor grading. Growers have continued to sell as small independent graders and packers while the buying trade seems to consolidate more, for bargaining advantages, each year. Producers and packers fail to realize that riper peaches under refrigeration would solve many consumer acceptance problems.

In production for processing, varieties are a limiting factor. Canners don't accept fruit that is red at the pit. This eliminates many presently grown varieties except the Elberta type. Most of the canners in other areas use the cling-stone type. Early peaches are cling type but do not have an acceptable flesh quality. Yields are low. Prices paid for fruit used in processing is based on prices paid in other parts of the United States where production and yields are much higher than North Carolina's present reported yields. Variety and cultural practices need to be adjusted for maximum production for processing.

Information on the relative income in producing for fresh versus processing markets is needed.

Extension Program

Extension will assist county Extension personnel with production problems (fresh and processed) by conducting method and result demonstrations and applied research as follows: site selection; soil preparation (lime, phosphate and fumigation for nematodes); nursery stock selection (rootstock, variety, tree size); disease control; chemical weed control (non-bearing and bearing trees); thinning (hand and chemical); maturity tests; nutrition (soil and foliar); handling (bulk boxes); grading and packing; and storage and transportation (refrigerated).

Extension will assist groups to carry out a program of promoting North Carolina peaches for local market. Also planned is an approved practice demonstration in Richmond County in conjunction with the one now in Montgomery County. Both have been planned to show growers that it pays to use all the approved practices.

Extension plans to expand the number of county and area meetings held at sites of result demonstrations; consider an out-of-state tour to a competing area; and encourage better grower attendance at winter and summer peach meetings. Specialists in the various fields will encourage conferences relative to problems and potential with county personnel assigned to do peach work.

Other work will include the following: plan programs on timely topics for state and local use; present TV programs in the state on peach production, harvesting and marketing; prepare and distribute commodity letters and news releases relative to different phases of the peach industry; encourage better cooperation between growers and areas in respect to solving production and marketing problems; continue to search

for better peach products; and work toward more meaningful cost of production records.

Through review of research station records and result demonstration plantings, the piedmont will be studied as a possible peach producing area for higher yield and longer lived trees. In-service training in marketing economics for Extension workers and economic analyses for firms will be provided. Extension will respond to any revival of interest in reorganization of the industry for better assembly and distribution of the crop.

Program Needs

Training is needed at all levels. County Extension workers need more training in peach marketing, and local sales and packing house managers need more training so as to improve their grade and pack of fresh peaches. Extension must continue and expand method demonstrations of pruning, fruit thinning, and fruit maturity and increase firm efficiency. Result demonstrations of chemical weed control and insect and disease control also should be continued and expanded.

The district agent should assign peaches (regardless of their importance) to one county agent so that he can keep a file of material as it is sent to him, attend schools and training meetings and advise on the peach program.

With additional resources we would attempt to give added emphasis to chemical thinning and seek better methods of determining fruit maturity.

Program Results

The peach trees are in the hands of the better growers. Therefore, even with the tree number dropping (fewer trees per acre) it is possible with favorable weather conditions and steady economy for this crop to slightly increase in total production and sales. Total sales by 1971 should reach about $4, 927, 000.

PECANS

Present Situation

The pecan orchards vary widely in size. Most growers do not grow the nuts as a business but as a hobby. Very few trees are well fertilized or properly attended. Pecans have had little emphasis in past programs. When problems arise the county Extension personnel try to find an answer from the tree fruit specialist, Extension entomologist, Extension plant pathologist, or others.

Major Problem Areas

Many production problems exist. Producers have no planned program to keep the orchards in high production. Producers either do not have or can not rent adequate spray equipment for insect and disease control. Varieties with some resistance to some diseases ("scab" in particular) are not always planted. Producers fail to apply adequate fertilizer. Failure of producers to prune newly set trees results in excessive limb breakage. The present industry doesn't have large producers, or a group of producers, willing to invest in mechanical shakers or gathering equipment. Marketing problems exist because producers fail to market nuts by size and grade.

Extension Program

Extension plans to conduct method and result demonstrations and applied research as follows: site selection; soil preparation prior to planting; variety selection; tree spacing for increased production per acre; insect and disease control; chemical weed control; balanced nutrition; and grades and grading.

Cost of production records will be obtained.

Program Needs

It would be helpful to assign one member of the county staff as coordinator for pecans. He should file material obtained from the specialists, attend training meetings, and know the industry in the county. All involved will need to try to upgrade this crop in counties where it has potential. A change in attitude, plus adequate nutrition and spraying, can be sufficient to increase the yield considerably.

Training at the county level by Extension specialists will include: consultation with agents interested in this crop; insect identification and control; pruning and training of young trees; variety identification; and site selection, tree spacing and tree starter.

A study of harvest and storage procedures and work with mechanical harvesting and gathering is needed.

Program Results

The yield of pecans can increase 10-15 percent with more care. Total sales should increase from $726,000 in 1965 to $928,000 in 1971.

PEARS

Present Situation

Pears are an intensive income crop similar to apples. There are

only a few trees of the improved varieties now planted in North Carolina, thus it will be 1971 and later before any volume can be expected.

Present plantings are being made with the younger, better-educated apple producers. Acreage is low; no crop is expected for another few years.

The Extension program in pears is very limited at present. Several counties plan to set trees in the fall of 1966.

Blight was the limiting factor until the recent introduction of newer varieties, thus no 1.6 in '66 goals for this crop were formulated.

Major Problem Areas

Fire blight has made pear growing of high quality varieties uneconomical. With the new varieties released from the United States Department of Agriculture, commercial production of this fruit now seems possible.

Processors (already in the state) indicate they can use several hundred tons per year. Fresh markets could absorb an estimated half million or more bushels.

There are only a limited number of new trees planted. Potential producers are still hesitant to plant pears near apples for fear of spreading blight disease into the apple plantings. Frost is a problem because trees do bloom early. At present inadequate information is available on pear culture.

Extension Program

Extension plans to assist county Extension personnel in production of raw material (fresh and processed) by conducting method and result demonstrations and applied research as follows: site selection (frost is a factor); soil preparation, lime and phosphate (soil testing); tree selection; tree spacing; insect and disease control; weed control; branch spreading; optimum maturity for harvest; handling (processor or fresh market); and storage.

Plans are also being made to obtain cost of production records; study harvest and storage procedures; and coordinate marketing with production.

Program Needs

Pears are similar to apples. Thus in counties now growing apples it would be well for the person assigned to apples to also work with pears. Method and result demonstrations will have to be designed in order to teach the production practices necessary to make this crop profitable.

Training is needed at all levels. It should include: consultation with agents interested in this crop; slides and pictures for possible producers; plans and material for method demonstrations; plans and material for result demonstrations; spray program for insects and diseases; needs for processing quality; and possible fresh market sales; methods and know-how.

Program Results

Planting will increase but no volume can be expected until after 1971. It takes 10 years for young trees to produce maximum yields. Gross sales by 1971 should amount to about $7,500.

VEGETABLES

TRELLISED TOMATOES

Present Situation

Approximately 2100 acres were grown in 1965, valued at over $3.9 million, with an average yield of 10 tons per acre. Acreage was concentrated in the mountain district with scattered plantings throughout the state. Western counties have natural advantages (soils and climate) to produce high yields and high quality with a fairly long marketing period.

Most farmers have small tomato acreage averaging 1.2 acres per farm. Tomatoes have doubled the farm income of numerous small growers. The high labor requirement limits production to those having available labor. Labor income is good (about $2-$5 per hour). Most growers lack basic understanding of factors affecting plant growth -- namely temperature, moisture, nutrients, and pests. However, they have adopted most of the recommended practices readily as they become acquainted with them and as they understand the need for such practices to reach a high production goal.

Those counties having concentrated educational programs geared to expansion of this enterprise have been successful. However, coordination of production and marketing has been a major problem and continues to be so. Counties with potential should exert a concentrated educational effort in production and marketing. Agent training schools; grower meetings; result demonstrations on varieties, fertility, cultural practices, disease control, and weed control; as well as field tours are being conducted.

A goal of $1,460,000 was set for 1966. This goal was surpassed in 1965 with gross sales amounting to over $3.9 million. Average yield did not increase, however. This was probably due to the many new and inexperienced growers that added this crop to their enterprise as the acreage has increased.

Major Problem Areas

The two greatest problem areas are (a) lack of organization, particularly for marketing and (b) high labor requirements. Growers lack a full understanding of the necessary requirements for successful marketing. This problem is complicated by the large number of small producers involved.

Production problems center around the lack of knowledge, on the part of the growers and agents, of the basic and fundamental factors affecting plant growth. Growers (and agents) need in-depth training in fertility; plant production; disease, insect and weed control; irrigation; and proper selection and use of spray equipment. Spray equipment especially designed for this crop and cropping system is needed to reduce the

high cost of pest control.

Extension Program

Concentration will center on the "why" rather than the "how" aspect of production and marketing. Specialists will concentrate on training agents, rather than holding numerous grower meetings. Specialists and service agencies will use the team approach to agent training. Production training (of agents and growers) will be pinpointed to "tomatoes" rather than being broad in nature with respect to "all vegetables." Training of agents in marketing will be broad in scope, with special emphasis on problems that are unique to tomatoes.

Result demonstrations will be held to pinpoint specific problems; namely, fertility, plant production, pest control, use of spray equipment, use of irrigation, safe use of pesticides, and varieties.

Research-type demonstrations will be conducted, on research stations as well as with growers, geared to reduce labor requirements, reduce losses due to disease and insect pests and to determine maximum yield and quality potential.

Consultative work will be carried out with existing western North Carolina tomato marketing firms, those that propose new firms, and new areas of production in the development of: efficient structure of the industry; efficient operation of the packinghouses; efficient distribution of packinghouses in terms of assembly costs; capable management teams; optimum allocation to consuming centers; and better bargaining methods.

Program Needs

More research-type demonstrations will be needed to get at some of the basic production problems. This will mean additional training, on the part of the specialists and agents, in research planning and analysis. Agents will need in-depth training on basic knowledge that cuts across commodities as well as that which is specific for major commodities.

Specific agents should be designated to develop the potential that exists with this crop. These specially trained agents may work across county lines or only in one county. In either case, this agent (or area specialist) should be given a responsibility to develop this crop on a priority basis.

Program Results

The program will be geared toward having people know more about production and marketing of tomatoes so that they can apply and integrate this information, resulting in a higher standard of living and a fuller life. Gross sales by 1971 should amount to about $7,390,000.

GREENHOUSE VEGETABLES

Present Situation

In 1965, growers received over $1/4 million from vegetables grown in greenhouses. Essentially all production is in low cost plastic covered structures. Tomatoes offer best potential with 1965 production estimated at about 300,000 square feet. Production of vegetable plants for sale is rapidly expanding. Limited production of lettuce, cucumbers, and green onions offer some potential.

Present growers lack knowledge of the proper environmental controls necessary for economic production of this crop. Growers also lack the necessary knowledge of cost-of-production and marketing. Many units are smaller than the 4,000 square feet deemed necessary for a minimal economic unit. Many growers treat this enterprise as a sideline venture, thus not having sufficient investment to produce and market efficiently.

This enterprise has received only minor attention in Extension programing due to the high degree of specialization necessary and the lack of production concentration in any one county. County Extension workers are not sufficiently trained in the production of greenhouse crops.

No specific numerical goals were set for 1966. Production has been gradually increasing. Agent training schools were held in 1963 to give in-depth training for those counties having production potential. Some of the much needed research in this area is now underway and should provide us with some of the answers not available at present.

Major Problem Areas

The three greatest problem areas are: lack of knowledge of the potential that exists in this area; lack of knowledge of production requirements with respect to buildings, environmental control, fertility, and pest control; and lack of an organized marketing system.

Extension Program

County agents and agricultural leaders will be appraised of the potential of this enterprise. This will be accomplished through mass media, discussions with agricultural leaders at area development association meetings and, through periodical news releases.

In-depth training schools will be conducted for county agents in those counties having greatest potential. Tours will be conducted to greenhouses of growers who are doing a good job of production and marketing. One-day short courses will be held for growers, in areas having potential, to teach environmental requirements and control. Extension, research and commercial personnel will be utilized to teach

the latest findings in the specialized areas of construction, ventilation, heating and nutrition.

As the volume of these commodities becomes large enough to exceed local market demand, it will become necessary to instruct growers on the requirements for distant shipping of these commodities and to parallel the work outlined for trellised tomatoes.

Program Needs

There are only a few county personnel trained in greenhouse production. Two approaches are suggested: (a) Designate one agent, in each county having potential, as responsible for greenhouse production. These agents should be trained in-depth on greenhousse production. (b) An alternative to the above would be to designate area agents in certain portions of the state for this commodity. These area agents would be given special training in greenhouse production.

The area of roadside marketing has been neglected in North Carolina. Production in plastic greenhouses lends itself to marketing through roadside markets.

Program Results

This program should result in people who understand what is required for successful greenhouse production and can apply this knowledge. Gross sales in 1971 should be at least $565,000.

POLE BEANS

Present Situation

Approximately 2,700 acres were grown in 1965, valued about $1.9 million, with an average yield of about 200 bushels per acre. Acreage is concentrated in the mountains with very limited production in the southeast. Present production is for fresh market. Processors in the United States are paying premium prices for Blue Lake pole beans which they procure from the west coast. They are willing to contract this variety in North Carolina but can't get enough acreage to warrant an operation here. Tests at the Fletcher and Castle Hayne stations indicate a potential yield of 4-6 tons of Blue Lake beans per acre. Contractors are willing to pay $200-$220 per ton for this variety.

Eastern North Carolina could expand production for fresh market to fill the gap between Florida and western North Carolina. Eastern counties could also produce pole beans for processing since mechanization could more easily be accomplished in that area.

Present growers lack an understanding of the potential that this commodity can offer them. Growers are not now organized for production or marketing. Growers now fall into two categories: (a) small growers with sufficient family labor to harvest their crop, (b) large growers who use transient labor for harvesting.

Only three counties, Henderson, Ashe, Transylvania, have an extensive program on this crop. Acreage in other counties has been too small to warrant emphasis. Henderson County has conducted demonstrations on varieties, fertility, all-practice, and root-rot control.

Major Problem Areas

Growers lack a full understanding of production and marketing practices necessary for success with this crop. Bean root-rot in the mountain area is becoming a limiting production factor.

Growers are not organized. Potential growers lack an understanding of the potential this crop offers. Labor requirements are high. The western states are utilizing numerous labor saving devices, very few of which are used in this state.

Extension Program

Growers need to gain a better understanding of production requirements. This is to be accomplished through all-practice demonstrations in the leading producing counties, pole bean tours, and annual pole bean schools.

Growers will be apprised of the value of an organization and assisted

in forming organizations in the leading production areas (Henderson, Haywood, Ashe and Brunswick counties).

Growers in counties with production potential will be apprised of this potential. This will be accomplished through educational meetings with county study groups, development associations, and county agent conferences.

To reduce labor requirements information on labor saving devices is needed. Equipment used in other states will be evaluated.

Variety demonstrations will be initiated in counties with Blue Lake production potential (Henderson, Ashe, Rutherford, Brunswick, Washington and Hyde). Once production potential is firmly demonstrated, efforts will be concentrated on organization for production and marketing in these areas.

The marketing system for these beans seems to be reflecting market value to growers at this time. Increased production or market system failure will require an effort parallel to that for trellised tomatoes.

Program Needs

Agents in counties with potential need in-depth training on production and marketing. This will be accomplished through in-service training schools.

This program would move at a more rapid pace if area production specialists were located in the western and southeastern Extension districts. The area specialist would conduct variety tests, all-practice demonstrations, as well as work with labor saving equipment.

Program Results

This program will result in people who understand what is necessary for successful pole bean production and are capable of applying this knowledge in the production and marketing of this crop. Value of sales in 1971 should be at least $1,804,000.

OTHER VEGETABLES

Several other intensively grown vegetables are not grown to a great extent but appear to offer some potential. This is particularly true in the western counties where farms are small, alternatives are not as numerous, and family labor is more available. Trellised cucumbers, bibb lettuce and head lettuce, appear to offer excellent potential.

Area specialists could in conjunction with research personnel, investigate the feasibility of expansion of these crops. Without assistance of area specialists, applied research will be initiated where possible.

Until volume is greatly expanded, growers of these crops will be encouraged to utilize existing packing and shipping facilities and personnel and to fully satisfy local demand. As volume increases to meet the requirements of distance shipping, it may be necessary to parallel the efforts outlined for trellised tomatoes.

HOME GARDENS

Home gardens are not income producing, but they do contribute substantially to better family living, and to the total value of our entire agri-business complex.

The North Carolina 1965 Farm Census Summary reported that 130, 312 acres of vegetable gardens (excluding 3 counties) were grown for home use in 1964. These are the latest official statistics available and do not include urban gardens, those grown on farms under 5 acres, or fruit gardens. With an estimated gross value of $400 per acre, this would result in a total gross value of $52, 124, 800 for the farm gardens listed in the farm census.

County agents estimated a gross value of $20, 359, 240 in 1965; however, only 65 percent of the counties reported this item. Assuming values in the non-reporting counties to be similar to those reporting, the total gross value for 1965 would then be $31, 349, 000. This adjusted figure, although somewhat low, will be used as the 1965 estimated values. There should be no appreciable change by 1971, since the decrease in acreage will probably be offset by the increase in value per acre.

Value of supplies used for home gardens is estimated at $70 per acre, totaling $9, 121, 840.

LANDSCAPE HORTICULTURE

This is the fastest growing segment of the horticulture industry.

Practically all vocational agriculture departments and technical institutes are initiating courses in this field. Its effect on agri-business is terrific and growing by leaps and bounds. On a national basis landscape horticulture is estimated at a $5 billion industry.

It is estimated that each of the 1,204,715 household units in North Carolina spends annually an average of $25 on landscape. This amounts to $30 million.

Based on a survey made by the Turf Grass Times, publication of turf industry, North Carolina spends on the maintenance of golf courses, cemeteries, industrial plants, roadside and home landscape a total of $92 million annually.

This makes a total expenditure of $122 million annually on landscape horticulture.

EVALUATION

Each phase of this program will be evaluated by the personnel responsible for the specific areas of work. The evaluation will include the following:

1. A comparison of the numerical goals that were set with the progress that actually occurs. This will involve measuring and comparing increases in income, yield, number of growers, and size of operations.

2. Keeping a constant check to determine the proportion of growers who are following recommended practices.

3. Determine rate of adoption of new approved and/or recommened practices.

4. Compare cost of production figures in 1971 with those of 1966.

5. Compare agents' ability to carry out an effective program, in this field in 1971, with their ability in 1966.

6. Compare attendance at educational activities (meetings, tours, field days) in 1971 with 1966.

7. Compare number of requests for information in 1971 with 1966.

8. Compare number of demonstrations and applied research projects in 1971 with 1966.

9. Review teaching methods constantly to determine which are the most effective.

The Extension annual reports will be utilized to the fullest extent for recording accomplishments, as well as progress, and will serve as guideposts for measuring progress in each area of work from year to year.

NATURAL RESOURCES

NATURAL RESOURCES

Introduction

"Before the nations of this earth can realize their noblest aspirations, they must first learn to manage wisely their natural resources. Before nations can develop sound and enduring political structures and achieve freedom of the individual, the citizenry must first be freed from hunger. Before a nation can successfully industrialize, it must first develop a sound program of resource management to feed industry and accommodate the mass of its people who depend upon the fruits of the land. Cultural development and worthwhile uses of leisure cannot be realized until the basic needs of man have been satisfied, and he is free to enjoy these pleasures. Even in the space race, man must first have its feet solidly on the ground."1/

A continuing upsurge in population, the expansion of industry, and the prospective growth of the state's economy all point toward greatly increased demands for food, wood, water, recreation, minerals, wildlife, and all the other goods and services that forest, range, wild lands and the sea can supply. These demands must be met in spite of continuing encroachment upon natural resource areas by cities, industries, highways, airports, reservoirs, and other development. If the needs of the future are to be satisfied, the recent rate of progress in natural resource management, substantial though it has been, will have to be greatly accelerated.

The sea, forest, range and related lands provide a variety of commodities and services that are of increasing importance to the state's economic and social welfare. Water for vital agricultural, domestic, industrial and municipal uses; wood for lumber, paper and kindred products; habitat for wildlife; minerals for basic industries; and space for outdoor recreation are in growing demand. This trend provides many opportunities. It also poses increasingly complex problems in correlating these products and uses with each other.

Most types of use can be accommodated on waters and forest lands because of their complementary or compatible nature. Some uses, however, are strongly competitive. In such instances, land managers should consider long-range projections of consumer needs when they prepare plans for optimum combinations of land use. The priorities and plans they establish should be reviewed periodically as changing conditions and public needs require.

1/ Dr. J. Whitney Floyd, Utah State University

FOREST MANAGEMENT

Present Situation

Clientele: The Extension forestry program has been broadened to include rural-farm, rural-nonfarm, and urban groups. The major portion of the population growth has been among the rural-nonfarm and urban groups. Based on the 1960 census, these two groups make up 82.3 percent of the total population in North Carolina. The greatest population growth has been in the rural-nonfarm group.

Of the total land area of the state, 66 percent is commercial forest land, and 92.4 percent of the commercial forest land is privately owned. The major part of these lands is owned by the rural-farm populace.

The forest management program is designed to increase the growth and quality of wood fiber on forest lands and improve the efficiency of harvesting techniques and equipment. To accomplish these objectives, work will be carried out with corporate as well as individual landowners, and with corporate and individual business enterprises. The logging industry plays a major role in the forest economy, and this is one segment of the wood industry complex that forestry specialists can help to develop better technological and managerial skills.

Current Activity: The Forestry Extension program continues its responsibilities in upgrading the technical and communicative skills and broadening the vision of public and private foresters working with private landowners in the state, and in developing stronger cooperation between these various professional groups. In-service training schools are being held for county Extension workers to provide them with knowledge to strengthen lay landowner leadership and the need for sound forest management practices necessary to maintain a strong forest economy.

Cooperation is being given to local and state organizations, trade and private associations to keep all segments of the society informed (1) of the investment opportunities, (2) the relationship of the forest and wood to the state's economic growth, and (3) the part each individual can contribute to enhance North Carolina's development through its natural resources.

A graduate training program to develop competencies in several major areas has been completed. Personnel on the Extension forestry staff are better prepared to serve a broader clientele with a higher level of managerial and professional skills. Areas of specialization are: forest entomology, forest soils and reforestation, forest economics, hardwood management, watershed management, forest recreation, program administration and publications, and logging.

Each specialist is now located in Raleigh and has been given state-wide responsibility for his subject-matter specialty. All of the staff are engaged in general forest management activities.

The Christmas-tree production and marketing program is being continued, with emphasis on the cultural and managerial practices.

Studies on bottomland hardwood management are being continued with individual and corporate landowners.

A program has been initiated with the logging industry to study and develop new technological and managerial skills that will increase efficiency in harvesting wood and the per capita income of those engaged in this segment of the wood industry. A program to promote safety in logging operations has been developed.

Review of 1.6 in '66 Program

Small changes in forest ownership patterns have developed since 1962. There has been an increase in forest ownerships by wood-using industries and corporations, and by rural-nonfarm people. However, the change is not significant in relation to total commercial forest land ownership. These changes are significant in terms of capital investments and forest management practices.

In 1961, it was estimated that income from the sale of forest products would reach $100 million by 1967. From a reported income of $83.9 million in 1961, it had increased to $97.7 million in 1965. It is expected that this figure will exceed the $100 million mark in 1966.

Planting activity has fallen below the estimated level of reforestation. Since 1961, approximately 158.6 thousand acres of land have been planted, or about 39.7 thousand acres per year.

Major Problem Areas

Most forest lands suitable for developing a commercial timber-growing enterprise are not producing the quality and quantity of forest products they are capable of growing. Many landowners investing in timber production do not know the productive capacity of the forest soils and the management practices necessary to grow a tree crop on an economically sound basis.

Woodland owners are oriented toward annual cash-income enterprises, and their attitudes toward timber production are difficult to change since it is a long-time investment. Most of them have invested very little money or time in the woodlands under their ownership.

Hardwoods have been considered undesirable, with little distinction being made between those species that can be grown profitably

and those that only interfere with the production of quality and salable timber. Recognition of the hardwood industry, its needs, and those species that should be grown on certain soil sites should be made.

Problems are evident in the logging industry. Labor to harvest timber has become more difficult to hire and more expensive. Many man-hours are lost because of on-the-job accidents that could have been prevented. Because of increased mechanization, there is a need for careful planning before investing in expensive equipment. The operator of a logging enterprise has to keep better files and cost accounting records today, but has not received the training to meet these demands placed upon him.

Forest insects and diseases continue to take their toll of timber resources. Each year, new insect outbreaks occur in various sections of the state and young stands are discovered infected with diseases.

There is a need for marketing of forest products according to log grades. Most timber is sold on a one-unit price quotation, with all grades inclusive. The landowner and buyer would profit if stumpage values were established by grade and harvested accordingly.

Wildlife management is an integral part of forest management. It is of increasing value because of its importance to a growing mobile human population seeking recreation. Because of this, the management of fish and wildlife must be given a higher priority than in the past within the multiple-use concept. Many states now have cooperative agreements with private landowners under which the states agree to manage the wildlife and to help protect the property from fire or vandalism provided the landowner permits public hunting. Such activities should be expanded as rapidly as possible. Under proper regulations hunting should be considered as a tool of management by owners of large forest holdings.

Forest managers recognize that production of timber can be compatible with wildlife production. Nevertheless, damage to forests by wildlife is, in many areas, costly and detrimental to sustained yields of timber and to watershed values.

Extension Program

Landowners investing in timber production should have a knowledge of the productive capacity of the soil and the management practices necessary to grow a tree crop. An intensive educational program will be used to inform woodland owners, and those planning to make capital investments in forest lands, of the opportunities for profitable returns from producing a timber crop and the cultural and managerial practices necessary to obtain these profits. Through meetings, demonstrations, and news media, the importance of wood to our economy, and to the

individual, will be stressed.

In-depth training for county Extension workers will be continued in an effort to increase their knowledge in the economics of timber production. Seminars and short courses to upgrade professional workers and foresters will be held each year.

Information will be given to the logging industry on proper harvesting techniques and utilization of trees removed from the stump so that larger profits can be realized by the logging operator and increased income can accrue to the timber owner. The logging operator will be assisted in establishing good cost accounting systems and efficient use of his labor and equipment.

Case studies with selected logging operators are underway and will serve as result demonstrations for this segment of the wood industry.

Through meetings and personal contacts, the owners of forest and other type land will be encouraged to make these lands available for recreational activities which are not detrimental to the major management objective of the owners.

Through meetings, personal contacts on the job and training films, the individual laborer will be made aware of the importance of safety. One 30-minute film has been completed for this purpose and will be used extensively.

Research and studies on hardwood management will continue, and the results will be published and distributed to individual and corporate woodland owners.

Efforts to obtain more information on the prevention and control of insects and diseases will be intensified. The public will be kept abreast of knowledge obtained in this field through meetings and news media.

The 4-H forestry program will be conducted at two levels.

For clubs made up largely of members not likely to become commercial farmers or landowners, teaching materials and methods will be developed to create in them an awareness of the importance of forestry to their state and in their individual lives and an understanding of forest conservation dynamics.

For clubs made up largely of potential farmers and forest owners, present teaching materials and methods emphasizing timber-growing procedures through the project approach will be broadened and improved.

Program Needs

The forestry specialists should be continually involved in seminars, symposiums and other opportunities that will enhance their own competencies.

Extension Forestry, Extension Farm Management, and Extension Marketing Economics will need to work together in developing analysis of forest investment opportunities.

Programs on insects and diseases will need to be coordinated with the Departments of Extension Forestry, Extension Entomology, and Extension Plant Pathology, the United States Forest Service, the Southeastern Forest Experiment Station, and the North Carolina Division of Forestry.

There are increasing demands by industry for quality hardwoods, and there are suitable areas in every section of the state for producing desirable hardwood species. Additional effort, with emphasis on regeneration and cultural practices, is needed.

A realistic level of applied forest wildlife research by appropriate public agencies is needed on: (1) the relations between forest management practices and wildlife protection; (2) factors limiting the production of wildlife on those lands; (3) potentialities for damage to forest and range resources by overpopulations of certain wildlife species; (4) techniques for controlling wildlife damage or populations when necessary, to the end that wildlife populations may be maintained at appropriate levels consistent with the multiple-use concept of land management.

Program Results

Increased demands for roundwood pine products will result from the expansion of the pulping mills and softwood plywood industry. The requirements for pulpwood will increase by 5.4 percent annually over the next 5-year period, and will bring the total production of pine pulpwood to over 2,100,000 cords. The production of hardwood pulp will increase by 12 percent annually for a total of 860,000 cords in 1971. The total production of all species will reach 2,960,000 cords in 1971. Pulpwood stumpage values for all species sold in 1971 will exceed $15,000,000.

Lumber production is expected to increase 3 percent annually, and hardwood plywood, 15 percent. These increases in production requirements, coupled with better harvesting and utilization techniques of graded forest products, will raise the estimated total income to North Carolina woodland owners to over $125,000,000 in 1971. (Pulpwood is included in this total.)

WOOD PRODUCTS MARKETING AND UTILIZATION

Present Situation

Clientele: The North Carolina wood products industry currently has an annual value of shipments estimated at $1.1 billion. While large in total scope, it is made up of 2,600 predominantly small independent firms representing 34 percent of the total manufacturing establishments in North Carolina. These wood products firms employ 97,000 persons - 17.3 percent of the state's industrial work force.

During 1965, the wood industry in North Carolina and the Southeast experienced phenomenal increases in production. Both hardwood and pine lumber production increased 8 percent. The softwood plywood industry experienced accelerated growth in the South with 14 plants completed since 1963 and 13 additional plants scheduled for 1966. National softwood plywood consumption has increased 8.6 percent. Hardwood plywood nationally has increased 18 percent, mostly in prefinished wall panels. The Southern furniture industry experienced growth in sales of 8 percent. Pulpwood consumption in North Carolina has risen 6 percent to an estimated 2.3 million cords in 1965.

While the regional and national situation indicates heavy growth, continued expansion of the state's wood products primary and secondary processing segments will depend on each individual firm's ability to compete with other materials and products in the market place. Labor shortages, the cost-price squeeze, limited available capital, and lack of managerial technical skills have been responsible for lower profits with many firms and failures or liquidation with others. The remaining firms, along with the new companies locating within the state, are replacing and expanding facilities as rapidly as available raw material, capital, markets, and planning permits.

Current Activity: The Extension Wood Products Marketing and Utilization staff has concentrated its efforts on providing educational opportunities to managers and key personnel of primary and secondary wood-processing firms and the consumers of wood products. These opportunities allow clientele to develop their knowledge and skills and to further effect improved efficiency in the assembly, processing, and distribution of wood products.

Educational efforts have continued with individual firms and existing associations to develop information and techniques on improving managers' ability to make better long-range and short-run decisions. These decisions require a better understanding of the market structure, internal performance of the manufacturing facilities, price behavior, expectations for inputs and products, and modern technology. Efforts also have been directed towards improving the knowledge of the consumer, designer, and specifier of wood products to efficiently

utilize wood products.

To develop maximum program effectiveness, personnel on the staff are developing high degrees of individual competencies in specific technological problem areas. These skills are being developed to complement rather than duplicate efforts. Many marketing problems are too complex to be adequately approached individually. Such problems demand a "team approach" which is organized from within the Extension staff, between Extension departments and/or the University teaching and research staff.

Review of 1.6 in '66 Program

During the last 5 years, the North Carolina wood industry has improved its competitive position both regionally and nationally as evidenced by an increase exceeding $500 million in value of annual goods and services for the period. This has been accomplished through modernization of equipment, development of new markets and existing markets, improved utilization of available raw materials, marketing new products, vertical and horizontal integration of firms, and a reduction in the number of small single proprietorships.

Major Problem Areas

Excessive Raw Material Costs: Marketing and utilization firms in each segment of the North Carolina wood products industry--example, harvesting, pulp and paper, lumber, dimensions, preservation, plywood, novelties, pallet, etc.--must reduce raw-material costs. This is necessary if industry is to compete inter-regionally with wood products and nationally with competitive materials.

Excessive costs are largely associated with the inability of firms to: (1) locate desired material, (2) establish least-cost inventory levels, (3) make marginal value analysis of alternative materials, (4) develop effective specifications and grade requirements, (5) develop adequate costs for managerial purposes, (6) evaluate alternative methods, equipment, and technologies, and (7) cooperate with other firms in purchasing economical lot sizes.

Non-Competitive Manufacturing Cost: With the exception of pulp and paper, processing in the wood products industry has historically been labor intensive. To compete in the long run, firms in all industry segments must develop more knowledge and skills to improve: (1) availability of realistic and comparable input-output data, (2) proficiency level of technical personnel, (3) adoption of improved technological methods, processes, and equipment, (4) quality-control practices, (5) plant layout, (6) materials-handling methods, (7) methods of collecting and analyzing data to develop cost and labor standards, (8) use of cost and labor standards, (9) production control, and (10) decision criteria on whether to increase or eliminate product lines.

Failure to Exploit Existing Markets: Due to a lack of knowledge of product availability, consumer demand and market forecasting on the part of wood products firms and consumers, the maximum potential market for existing wood products is not being realized.

Specifications and Grades: Due to lack of knowledge on the part of both manufacturers and consumers concerning specifications and grading of products, excessive costs to the consumer are incurred. Three areas of educational opportunities exist. These are: (1) better knowledge of existing grades, (2) standardization of grades and specifications on products having similar end uses, and (3) changing grades and specifications of existing products having new end uses.

Excessive Timber Growth versus Drain Ratios: Growth is exceeding drain in certain areas especially associated with specific timber species, sizes, and grades. This unused resource offers significant opportunities to improve the over-all economic returns to the state. A lack of knowledge on the part of firms, financial institutions, and community action groups prevents development of certain potentials here. These potentials include: (1) expansion and/or relocation of existing wood products firms, (2) locating new wood products industry, and (3) development of new markets and products for the industry.

Extension Program

Major emphasis will be directed toward the problems of: (1) excessive material costs in the pulp, lumber, preservation, pallet, and furniture industry segments, (2) non-competitive processing costs in the lumber, preservation, pallet, and furniture industry segments, (3) specifications and grades in the lumber, preservation, and pallet industries, (4) expanding present industry in the lumber, preservation, and pallet industry segments, and (5) developing new markets and products for all primary and secondary industry segments.

Through meetings, demonstrations and news media, the importance of wood and the wood-processing industries to our economy, and to the individual, will be emphasized.

Extension personnel will be given awareness-type training concerning the role of Extension and methods used by educators working with the wood products industry.

The Extension wood products staff will continue to enrich its technical and communicative knowledge and skills by self-study, attending on-campus courses as well as short courses presented by other universities and industry.

The staff, using and interpreting existing research and conducting applied research where necessary, will develop in-plant problem studies, prepare publications and case histories, and

prepare training aids. These materials will be used to enrich the knowledge of personnel with individual wood-processing firms and thereby improve the firms' competitive position. Personal contact, university-held short courses, local-area-held short courses, and mass media will all be used in this effort.

Program Needs

Continued effort will be made to use personnel from many Extension departments and research and teaching staffs throughout the University to effect the "team approach" to industry's problem solving. Departments most frequently rendering assistance and cooperation are: Extension Wood Products, Wood Science and Technology, Forest Management, Biological and Agricultural Engineering, Economics, Food Science, Mathematics, Statistics, School of Engineering, and School of Business at Chapel Hill.

The problem of increased demands for quality hardwood lumber and the general availability of more low-grade lumber on a percentage basis has created a vast economic need in the furniture industry to develop both knowledge and skills on how to minimize finished products raw material cost. Tremendous reductions in these costs can be obtained through improved yields and correct selection of alternative grades of lumber.

There are over 400 furniture plants in the state. On the average, raw material accounts for 35 percent of the costs of furniture manufacturing. The normally quoted yield of finished furniture from rough lumber input is 46 percent. An educational program directed at the furniture industry would help reduce excessive raw material costs.

Program Results

The general 5-year outlook for the wood products industry indicates increased production in every segment. Lumber production is expected to increase 3 percent annually, mostly in hardwoods. The number of sawmills is expected to decrease. Softwood plywood national consumption will increase 10 percent annually. Hardwood plywood will attain 15 percent annual increases, primarily due to prefinished panels. Furniture is expected to increase 7 percent annually. Increased demands for low-grade furniture woods will be tempered by the industry using alternative low-cost products such as particle board, hardboard, plastics, and metals. Pulp consumption increases will come primarily from roundwood products and are predicted to be 5.4 percent per year in North Carolina.

All of these predictions assume wood products will maintain or increase their competitive position in the local, regional, national, and world markets. An effective education program will permit

industry to obtain or exceed these predictions.

Bench-mark indicators of the wood products industry's growth in the next 5 years will be: (1) the number of employees, and (2) the value of shipments as indicated by the United States Department of Commerce statistics. The number of employees is expected to increase at the rate of 1.3 percent per year, indicating the industry will employ by 1971 some 103,000 persons. The value of shipments, it is anticipated, will increase 3.5 percent annually, resulting in the wood-processing industry having annual shipments of $1.3 billion in 1971.

OUTDOOR RECREATION

Present Situation

A large segment of North Carolina's gross economy is generated from its natural outdoor recreation resources. The miles upon miles of bumper-to-bumper traffic, in the summer and fall, of recreationists traveling to and from the mountain environment is evidence of the impact on our economy of forest-oriented recreation. Also, the makers of specialized equipment, such as tents and trailers, guns and ammunition, boats and fishing gear, are all enjoying the economic benefits of the state's diverse recreation resources. Add to these the many services the travelers require, such as food, lodging, and vehicular needs.

With continuing prosperity, there will be a substantial increase in the demand for outdoor recreation and the allied resources. Where outdoor recreation complexes are well developed, these amenities to local life are inducement factors in attracting needed industry.

Extension recognizes outdoor recreation as an area offering opportunities for further developing North Carolina's environmental and human resources.

Extension's clientele includes public groups, agencies and private organizations, and groups and individuals who are seeking knowledge required to develop forest-oriented recreation facilities on a sound basis. With the backing of the total resources of the land-grant university, there are sources of information for almost any outdoor recreation problem.

At the adoption of the 1.6 in '66 program, many of the government projects and assigned responsibilities in the area of outdoor recreation did not exist. There has been an effort made, however, to fill Extension's educational obligation in this area. Individuals, public agencies, community organizations and large corporations have requested and received assistance in developing forest environment recreation facilities.

Major Problem Areas

A major problem involves the difficulty of assessing the income-producing feasibility of many private outdoor recreation facilities due to: (1) seasonal nature of most outdoor recreation, (2) extreme weather conditions, and (3) high week-end, low week-day patronage.

Other problems concern the coordination of the many competencies and agencies with interest in outdoor recreation, and the many gaps in research, especially in those areas which concern the social scientists.

Also needed is a better understanding of the responsibility of the user of outdoor recreation resources to both private and public providers.

Evaluation of returns of outdoor recreation to the provider, user, community and entire economic structure is difficult to assess.

Extension Program

Various governmental programs of low-interest-rate loans, subsidies and technical assistance have encouraged landowners to consider outdoor recreation enterprises. Instruction in good economic planning methods as an integral part of these programs is needed. There is merit in stimulating the potential developer to become as well informed on his project as possible. Extension's educational responsibility is to advise the developer of knowledge and resources available.

The area of outdoor recreation is so diverse that one person could not be expected to have all the competencies needed to solve its many problems. Economists, social scientists and natural scientists can provide guidelines. These guidelines in the outdoor recreation program will be the result of a team effort.

An understanding of responsibilities and cooperation among the various other agricultural agencies with interest in recreation should exist. The contributions to outdoor recreation of other agencies, such as North Carolina's Wildlife Resources Commission, Recreation Commission, and the various social and civic organizations, will be recognized.

Special activities and projects to enhance the appreciation and understanding of our outdoor resources will be a part of the 4-H program.

Program Needs

The Agricultural Extension Service is the logical agency to

promote an educational program in outdoor recreation. Also available are the entire resources of the land-grant university. This includes the staff of the Department of Recreation and Park Administration, plus staff members in the School of Forestry knowledgeable in forest recreation research.

It is desirable that there be a better-organized team effort of all interests in the area of outdoor recreation. A coordinator, with team members from economics, sociology, agricultural engineering, 4-H wildlife, home economics and forestry, could better present a unified approach. Application of their specialty to the recreation field would require little additional training for most of those assigned to the team effort. The support of the administration and department heads is essential for success of a team approach for the outdoor recreation program.

Program Results

This statement has identified the major problem areas and outlined the coordination and personnel required to carry out a program. However, there are no committed personnel with primary responsibility to conduct a specific program in recreation in the Extension Service. Thus, our only goal should be the initiation of such a program by 1971.

SOIL AND WATER RESOURCES AND CONSERVATION

Present Situation

Conservation of soil, water, and plant resources is defined as the protection, use, maintenance, and improvement of these resources to best serve both private and public interest in providing adequate food, fibre, forest products, recreation, fish, and wildlife. It applies to both agricultural and non-agricultural land.

Effective conservation of our soil and water resources must be planned. It is necessary to make plans for the proper use of all parcels of land, large or small. The importance of the overall plan lies in the fact that the needed land use changes, and conservation practices seldom will be applied in the right way and in the right sequence without a sound plan. Wise planning paves the way for systematic decision making based upon logical evaluation of the alternatives for land use and treatment. It involves a careful inventory of the soil and water resources, and the collection of data in systematic form. This is necessary to determine not only the best practices from a conservation viewpoint but also the economic consequences of all practical alternatives of use and treatment of the land.

Livestock and cropping programs should be adapted to a sound

program of utilization of the state's soil resources. Data available in the soil conservation needs inventory prepared by the United States Department of Agriculture provide the basis for a more detailed and meaningful look at the state's soil resources and their use.

Most agricultural land is in farms or woodland tracts where major land uses are cropland, pasture, hayland, rangeland, woodland, wildlife land, and outdoor recreation. Non-agricultural land is used primarily for purposes other than the production of agricultural crops. It includes lands used or in immediate prospect of being used for such non-agricultural purposes as rural, suburban, and urban fringe residences, residential estates, industrial sites, roadways, and publicly owned land such as school, hospital grounds, parks, and recreational sites.

Major Problem Areas

One problem is lack of knowledge or lack of concern on the part of the owner or user of the resource.

The one most important major problem area is the upper coastal plain section. In this section, a greater percentage of the population is dependent on farming, and the land is in continuous row crops, with little likelihood of much change taking place except as people are educated to make better use of the land.

The lower coastal plain needs to be better drained in order that pressure may be relieved on the upper coastal plain.

While erosion is a serious problem in the piedmont, industry and urbanization are taking a toll on agricultural land to the extent that the erosion problem is diminishing as a result of land use.

Extension Program

Conservation of these natural resources encompasses many things. It includes: (1) increasing agricultural income and efficiency through proper land use, (2) protecting land against all forms of soil deterioration, (3) rebuilding eroded and depleted soils, (4) building up soil fertility, (5) stabilizing critical runoff and sediment-producing areas, (6) improving grasslands, woodlands, and wildlife lands, (7) developing recreation resources, (8) conserving water for agriculture and municipal as well as other uses, (9) proper agricultural drainage and irrigation, and (10) reducing floodwater and sediment damages. The planning of complete units of land with all treatment necessary to best utilize the resource is the modern concept.

In the future, more emphasis will be placed on the following practices: (1) land smoothing, (2) land shaping and grading,

(3) parallel terraces with contour tillage, (4) adequate drainage utilizing both underdrains and properly protected open ditches, (5) storage of water, and (6) field layout to provide longer rows and the elimination of unnecessary turn areas to increase the efficient use of equipment needed in a mechanized agriculture.

The Extension program will remain educational in nature, and will be closely allied with that of the action agencies. At the same time, University personnel will conduct teaching demonstrations to present the most up-to-date information and to adapt the findings of fundamental research to local conditions.

A sound conservation program involving soil and water must be directed toward the citizenry of the entire state. It must involve those who own no land, as well as landowners. Extension is responsible for the educational program conducted by the United States Department of Agriculture as a federal agency, and as a division of North Carolina State University, it is responsible for extending the campus throughout the state in its teaching program. Each Extension specialist will play an important part in the conduction of soil and water conserving demonstrations, and will assist in the teaching and training of county personnel.

Program Needs

Some organizational changes are required to effect a team approach here. Indications are that in many areas the research worker dealing with fundamentals, the teacher who is closely allied to this fundamentalist but doing more of the actual teaching, and the Extension specialist will form a team. This team will do over-all planning and through the efforts of the Extension specialist will supervise area specialists who will concentrate their time and effort in conducting applied research-type demonstrations. This will require upgrading personnel at all levels.

Such a team approach within any department will be easily coordinated with a corresponding team in another subject-matter area. On this level, over-all planning and decision making will be handled.

Program Results

The results of this program are of a continuing nature. It was through the efforts of the Agricultural Extension Service that early teaching of the need for soil and water conservation came into being. The early demonstrations of Extension paved the way for the original Soil Erosion Service, and the County Terracing Associations became the foundation of the Soil Conservation Districts.

The Extension educational program will produce changes in

attitudes that will effect changes in the behavior of people. Inventory-type reports should and will be made annually by the action agencies of the United States Department of Agriculture, and these will reflect the effectiveness of the Extension educational program.

SEAFOOD

Present Situation

Salt Water Fisheries: Nature gave North Carolina a long coastline with many bays and capes and vast inshore areas with numerous sounds and estuaries. Nature also provided the "natural boundary" of the Atlantic - Cape Hatteras - with its teeming overlap of northern and southern fish species. Coastal waters are a source of income in 25 North Carolina counties. Seafood taken from these waters currently has a dockside value of approximately $9.5 million and a total value after processing of about $20 million (1965 estimate).

While current income from commercial fishing is significant, the income potential is much greater. A few examples will indicate the extent of North Carolina's fisheries potential.

In 1956, the catch of blue crabs was 8.3 million pounds. In 1964, the catch was 24.0 million pounds.

In 1961 and 1962, the catch of flounder was 1.8 million pounds. In 1965, the catch was 4.7 million pounds.

Landings of sea bass increased from 41,000 pounds in 1959 to 1.2 million pounds in 1962.

Commercial quantities of calico scallops were noted off the North Carolina coast as early as 1949. Some 112,000 pounds were landed in 1960; some 871,000 pounds were landed in 1965.

Within the last three years two new fisheries products were developed. Landings of swordfish first occurred in 1963, with the catch amounting to 1,228 pounds. By 1965, the catch of swordfish had grown to 524,000 pounds. Sea scallops appeared for the first time in 1965, when 91,630 pounds were harvested.

Red snappers offer another immediate fishing possibility. Some 225,000 pounds were landed in 1957, but since then catches of red snapper have been only incidental to catches of other species.

The rapid expansion in harvest of certain species of fish and the harvesting of large quantities of entirely new species indicate that the seafood industry has great potential for expansion simply by expanding the harvest from the sea. However, the potential for

expansion of seafood processing is even greater. Employment in North Carolina seafood processing plants doubled in the last 10 years and payrolls increased 250 percent. Yet, only 15 percent of the catch is currently being processed, while 85 percent of the national catch is processed.

The increase in value of products added by processing over the period 1956 to 1965 was approximately $7.9 million. A ratio of 1:1 between dockside value and value added by processing existed during this period, reflecting a low level of processing activities. An annual increase in value added by processing during the next 5 years of a half to $1 million or 5 to 10 percent is a reasonable expectation.

Fresh Water Fisheries: Although not generally discussed or promoted except in an exceedingly small group, a tremendous potential lies in fresh water farm pond fisheries.

Currently, 40,000 ponds covering 100,000 acres exist in North Carolina. It is reasonable to expect 400 pounds per acre per year production (and up) of edible fish. Production costs of raw products are reasonable, but harvesting and processing techniques need considerable development before this can be encouraged greatly for commercial operation.

Recent developments in farm pond production of catfish have brought increased emphasis on not only production technology but marketing technology as well. Work in this area involves the coordinated efforts of a Wildlife Specialist on production and a Food Processing Specialist on processing and marketing.

Another interesting potential is beginning with one operation in mountain trout production. Although a presently small effort, this can be developed into production of 1 to 2 million trout per year for processing for the consumer market.

Major Problem Areas

Inefficient technical level of management is a major problem. Processing plant managers have very little understanding of such things as: cost-control, quality-control, financial planning, market development, etc.

Another problem concerns the lag in seafood product development, with a reluctance to move from a fresh-market orientation to a processed seafoods market orientation.

Other problems involve lack of grades standards and specifications in quality control and sanitation procedures.

Extension Program

The first major objective will be to improve the current level of management and expand the size and efficiency of operations. The specialist in seafood marketing and utilization will work directly with seafood harvesting, processing, distributing and marketing groups, and with associated service and regulatory personnel in accomplishing these objectives.

The second major objective will be to improve product quality and sanitation. This will require applied research on such problems as microbial spoilage effects on the quality and sale of seafoods. In addition, through workshops, conferences, and short courses the seafood specialist will help train industry personnel in (1) cleanliness in handling practices, (2) equipment cleaning, and (3) the latest techniques for improving the quality of products and the image of the industry,

Program Needs

Early in 1966, the magnitude of the opportunities awaiting the seafood industry prompted those state agencies working with the seafood industry to develop a coordinated program for the development of the industry. This coordinated program would augment the resources of the Extension Service devoted to seafood work. It should also bring about the improved quality, expanded markets, increased employment and increased income. Agencies cooperating in this coordinated program are:

--The Division of Commerce and Industry and the Division of Commercial and Sports Fisheries of the Department of Conservation and Development

--The Institute of Fisheries Research of the University of North Carolina at Chapel Hill

--The Department of Food Science and the Department of Economics, School of Agriculture and Life Sciences, North Carolina State University at Raleigh

--The Division of Community Colleges of the State Board of Education

Program Results

Value added by processing, increased levels of processing as dollar investment in plants and facilities, increased employment, and increased value of processed foods will be used in measuring objectives.

COMMUNITY RESOURCE DEVELOPMENT

COMMUNITY RESOURCE DEVELOPMENT

Present Situation

During the past 5 years, Extension has expanded and intensified its efforts in Community Resource Development. Major emphasis has been placed on four types of educational assistance: (1) expanding and strengthening organizations, (2) increasing understanding and appreciation of the planning process, (3) providing educational materials, and (4) coordination with agencies providing services to communities. Probably the greatest accomplishment of Community Resource Development during this period has been the development of leadership among Extension and lay people.

Organization: Extension has assisted local leaders in organizing and strengthening community, county and area development groups. The emphasis in this activity has been on helping local leaders understand the value of an organized group approach to solving local problems in resource development. Once organized, leadership training is provided local leaders to help them gain a better understanding of the principles of group dynamics and how to effectively participate as an individual in group activities.

Community and area development as a major method has been used at the community, county and area level to develop and carry out action programs developed by local people within a particular area or areas. It has also been used to carry out certain Extension educational programs and to promote activities of youth. Many of the programs, projects and activities carried out have been on a short-time basis. However, many communities, counties and areas have action programs based on long-time goals with emphasis placed on certain activities for a particular year.

There are twelve organized area development associations in the state including ninety-seven counties (see map on last page of this section). In 1965, there were approximately 1,100 organized communities that involved over 105,000 families in community programs.

Eleven area development associations are organized with four basic divisions: industrial development, agricultural development, travel and recreation, and community development. One area has only two divisions as such -- agricultural development and community development -- but they work closely with industrial and travel and recreation committees sponsored through other organizations, making it comparable to the other areas in the total overall program. Two areas have a fifth division called educational development. Another area has two additional divisions -- one called youth and educational development and the other economic development. Home Economics has been added to another.

At present community development is organized with one division

in each of the twelve areas. In all areas, the division of community development has at least two categories with several areas having as many as four categories. The breakdown by categories are: farm, rural, non-farm, small villages, small towns, and urban communities. In some cases, the rural communities are broken down according to size: for example, number of families rather than farm and non-farm. Some areas divide villages and small towns according to unincorporated and incorporated groups. Presently organized communities range in size from 28 families to a population of 5,500.

Organizational-wise, the communities up until this year (1966) were of two types, straight-line and council type communities. This year one area added a category of urban communities, or communities inside city limits. In this case the organization will involve committees or block leaders rather than straightline or council type organizations.

Planning: Planning is a very vital element in a total resource development program. Extension has provided educational leadership in helping local leaders understand the value of a development plan as a "road map" to chart their future course of developmental activities. The planning process has consisted of helping local leaders: (1) gain a better understanding of recent social and economic trends and the current situation in their area pertaining to population, employment, income, education and community facilities; (2) identify and analyze the major problems which are created by changes in social and economic forces and which serve as barriers to future development; (3) make an inventory of the human, capital and natural resources available to support a sustained development program; (4) appraise the best potentials for development; and (5) initiate action programs to help the area more nearly realize the potentials for development available to them.

Extension has provided leadership in assisting 35 counties prepare a long-range plan for economic development. An economic base study of the Northern Piedmont Area was completed in 1964. Other area studies have been made for the Northwest Area and the five-county French Broad Area around Asheville. Currently, studies are being made regarding the potential for food processing in the Southeastern Area and the industrial and economic interrelationships and developmental potential in 35 counties of the North Central and Northwestern Areas of North Carolina.

Educational Materials: Numerous educational materials have been prepared and disseminated to local leaders through county Extension offices. A publication on Planning a Development Program for your County has been used widely by local leaders in planning their development programs. A publication on Community and Area Development in North Carolina discusses the organizational structure, functions and

progress made by county and area development groups as well as delineating potential activities for development in agriculture, industry and travel and recreation.

The Human Resource Development Program which was initiated in 1965 has been used widely by county Extension workers with local development groups, home demonstration clubs, 4-H clubs and numerous civic groups. This packet of educational materials included a set of slides and tape, a brochure on People Our Most Important Resource, six educational leaflets, a county Extension guide and two publications which depict changes in major economic and social forces in North Carolina by county and area development association.

Educational materials on different types of federal and state programs which can be used to supplement local resources have been disseminated to county Extension personnel and local leaders. Some of the major programs include the Area Redevelopment Act, the Manpower Development and Training Act, the Public Works Acceleration Act, the Economic Opportunity Act and the Appalachian Regional Development Act.

Continuing efforts have been made to keep people appraised of developments in agricultural and general economic policy. Numerous publications have been prepared over the last 5 years on public policy issues. Special materials have been prepared on such crucial agricultural policy issues as feed grain, wheat, cotton, and tobacco referendums.

A series of leaflets have just been released on problems of communities in adjusting public institutions in response to economic growth. The topics discussed in this series include:

Public Institutions and Services in a Growing Economy: An Introduction to a Series of Leaflets by E. Walton Jones

Local Government in a Growing Economy by Paul Wager

Good Schools for Small Communities by John K. Folger

Changing Health Facilities in a Changing Society by Edward W. Hassinger

Welfare Programs in a Growing Economy by James Callison

Land-Use Planning in a Growing Economy by Silas B. Weeks

Financing Public Facilities and Services in a Growing Economy by Waren J. Wicker.

Coordination: In its Community Resource Development program, Extension cooperates with many agencies. The director of Extension

serves as chairman of the North Carolina Council of Community and Area Development which consists of representatives from each state and federal agency concerned with resource development, the presidents of each area development association and representatives from major private industries. Extension also serves on the state, area and county technical action panels consisting of representatives from each USDA agency and other related federal, state, district and county agencies. A special effort is made to maintain close working relationships between Extension and other agencies at all levels which administer and conduct Community Resource Development programs.

As noted earlier, Extension has worked closely with local development groups and other public agencies in preparing economic development plans. Since passage of the Economic Opportunity Act, Extension has cooperated with local groups and assisted them in organizing, developing and initiating community action programs designed to meet the needs of low-income families. Extension had 14 assistant county agents employed with OEO funds, as of July 1, 1966. These included three assistant home economics agents and 11 assistant men agents (five in horticulture, four in community development and two in marketing).

Extension has received funds to staff three positions in the 29-county Appalachian Region. One of these positions is for a specialist to work in resource development. Another recent development in North Carolina has been the establishment of regional offices by the State Department of Conservation and Development. These offices are designed to give more assistance to local development groups in their industrial development efforts. Extension anticipates a close working relationship with these offices.

Major Problem Areas

In planning a program in Community Resource Development over the next 5 years, Extension is concerned with the problems of people and institutions resulting from forces of economic and social change. It is also basically concerned with those problems that can be solved only by group decision and action. Thus eliminated from primary emphasis are those problems that are solved on an individual decision-making and action basis. The planning for Community Resource Development in the 1.6 in '66 program probably placed more emphasis on decisions by individuals than the present committee feels appropriate at this time.

The types of problems requiring attention at the community level vary widely from community to community across North Carolina. In this statement no attempt will be made to list or to describe all of the various types of problems with which Extension workers across the state are likely to be concerned in their Community Resource Development efforts. Instead, emphasis will be on a few of the problems that seem to be almost universal across the state, though the specific nature and urgency of the problem may vary somewhat from community to community.

Education: Among the problems most universal in scope are problems associated with education. The school dropout rate in this state is notoriously high as is the rate of functional illiteracy among adults. Similarly, a new approach to vocational and technical training has developed and there is an upsurge in opportunities for such training. The question of what is the appropriate size school is still a problem and struggles over consolidation continue. Increasingly many of the basic problems of school children are found to relate to preschool experience and training. Thus, there is a growing concern for provision of good daycare and of well-planned kindergarten and nursery school experience for preschool children. Not only is there concern for education for the youth but large numbers of adults have returned to school either for basic adult education or vocational training. Providing adequate educational opportunities and making community residents aware of the opportunities that are available are problems that every community in the state now faces.

Community Facilities and Services: Another problem area of wide concern across the state is that of providing adequate community facilities and services. Increasingly, communities are facing problems of how to provide adequate pure water and how to dispose of water. Many communities are re-examining their sewage and water facilities; and increasingly, two or more communities are joining to provide more adequate services. This is a problem not only with sewage and water but also with streets, garbage disposal and other public services.

Land and Water Resources: Only a very few communities in the state have systematic planning procedures for land and water resources use and development. Rather, the development which takes place is haphazard. Incompatible developments are taking place side by side. Too often land-use patterns have developed that are completely inadequate and inappropriate before the communities decide that action is necessary. With a growing population and with a growing rate of industrialization, adequate planning for the use and development of land and water becomes increasingly imperative. Consideration should be given to maintaining and improving the quality of the living environment as well as making the most efficient use of resources for production purposes.

Health Care Facilities: Health care facilities are still inadequate in many North Carolina communities. North Carolina had a remarkable record in taking advantage of the Hill-Burton funds to aid local communities in the construction of hospitals during the late '40's and the '50's. However, with the major shift in the pattern of care for the aged and with the growing aged population, nursing homes are a new type of facility that has come into being. Nursing homes are desperately short in many areas. With the implementation of Medicare, the demands upon present facilities will be so heavy that only a small proportion of those needing care are likely to find it. This growing need for nursing home facilities and other facilities for the care of the chronically ill reflects the fact that so many of our people live to the age at which they are subjected to such chronic diseases. It also reflects the changing

pattern of employment and labor force participation. Often the care of the chronically ill requires that one family member give up productive employment to provide such care.

Jobs and Income: The search for jobs and additional income continues throughout North Carolina. Efforts to accelerate the rate of industrialization must continue. A major push is now getting underway to expand tourism and commercial recreation. Increasingly, communities are becoming aware that these offer a very real source of jobs and income. However, the development of such sources of income usually requires the cooperation of large numbers of people over a large area. Agricultural and national economic policy are important determinants of the job and income situation in every community.

Poverty and Welfare: Problems of poverty and welfare have been in the forefront during the last 2 to 3 years. This has been especially true since the nation has explicitly decided that a major national goal shall be the eradication of poverty. However, the eradication of poverty cannot take place without intensive efforts at all levels of government and of the community. In a state such as North Carolina which has a very high proportion of its population who are poor, intensive efforts are underway and more efforts must be undertaken if the problem is to be attacked effectively.

Extension Program

Extension's program in Community Resource Development will concentrate on the following objectives over the next 5 years:

- Develop and improve community organization as a technique for solving group problems.

- Create an understanding of the forces of economic and social development and of implications for changes in community structure.

- Provide an understanding in depth of the problems generated by growth and change and the relevant alternatives for effecting solutions in the following areas: education, public facilities and services, planning land water resource use and development, health care facilities, jobs and income, and poverty and welfare.

- Promote a clearer understanding on the part of (a) Lay leaders as to resources and services available from the various state and federal agencies to assist in total development; and (b) Agencies as to the needs and desires of community and area leaders and how their efforts can be coordinated more effectively through the community development organizations.

- Provide the leadership and basis for comprehensive planning at

the community, county and area levels.

The major objective is to stimulate and assist people to analyze thoroughly their situations, problems, and potentialities, and to develop some action programs. To carry out this objective, relevant educational materials must be prepared in each of the major problem areas. These materials will be comprehensive in nature, moving from the broad and general problems to the specific situation in the state and the tangible alternatives for dealing with the problems. Educational materials will be designed to take local leaders to the point at which they would be prepared to call in technical assistance from action agencies in analyzing different alternatives in greater detail.

The educational materials prepared at the state level can be described as a "smorgasboard." A comprehensive set of materials will be developed in each of the problem areas from which the counties can choose, depending on the priority of the development needs in their given community. Each educational package will be self-contained with a minimum of additional work to localize it prior to presenting it to community development groups and other groups in the county with an interest in developing this aspect of their community.

The major legitimizing and promotion agency for Extension's program over the next 5 years in this area will be the State Council for Area and Community Development and the 12 area development associations within the state. County and community development groups will be used extensively in carrying out the actual program. Special attention will be given to planning at the county level.

Preparation of this comprehensive program will strain resources at the state level and probably will be impossible to carry out in its entirety. The program within itself may be viewed as a goal of personnel involved in this area of work. It will be scaled down to conform with the resources that can be mobilized while retaining the same basic approach and techniques.

Program Needs

Policies: The administration should continue to emphasize and to delineate the nature and the priority of the Extension Service's commitment to Community Resource Development. Administrative efforts to clarify commitments to work in this area have had considerable impact throughout the Service. Most Extension workers at both the state and county levels appear to recognize the commitment to a major effort in this area of work.

A continued effort to further delineate the appropriate roles of specialist groups in working with CRD is desirable. Again the progress in recent years has been dramatic, and many specialists are making

greater contributions to planning groups at the area and county levels. Such role definition and clarification is essential if local, county, and area groups are to continue to make most effective use of Extension resources. This is especially true since the role of the Extension specialist in this area is somewhat different from many of the more traditional functions. Here the specialist concentrates upon assisting planning groups in determining the most promising alternatives rather than concentrating upon moving individual decision-makers through the total decision-making process and action.

The expansion of services of the other extension arms of the University provides important new sources of assistance for development groups. Such organizations as the Industrial Extension Service and the Division of Continuing Education will play an increasingly important role in the educational and economic life of the state. It is essential that the Agricultural Extension Service coordinate its activities closely with such organizations. Frequently joint efforts will be necessary and the arrival at commonly understood definitions should prevent unnecessary misunderstandings and conflict. Similarly, the role of personnel in the School of Forestry and in the Department of Recreation and Park Administration at N. C. State University should be clarified.

Organizational Changes: At present, personnel in the Department of Economics, the School of Forestry, and the Department of Sociology are working in the area of Community Resource Development. More effective coordination at the state level should be brought to bear as a means of giving definitive program leadership to this area, to enhance the work in the various departments of the Agricultural Extension Service, and to coordinate Extension efforts with other arms of the University and with other state agencies.

Current departmental functions and personnel assignments should be examined. At present the community development specialists in the Department of Sociology work with agents and community groups on developing and maintaining appropriate organizational structures at the small community level. They also work with program planning and program content at the local level. The specialist-in-charge of community development, in addition to over-all leadership, concentrates his efforts at the area association level.

The Extension economist, area development, works with county groups in over-all economic planning on a state-wide basis. Secondly, he concentrates upon summarizing and developing understanding among agents of various federal legislation and programs directed toward development activities. He also is primarily responsible to Extension administration in providing leadership in the resource development phase of community and area development. The Extension economist, public policy, devotes his efforts to developing and carrying out broad educational programs in public policy.

To fully implement this program Extension needs competencies

in the following areas: recreation and tourism; natural resources development; human resource; organizational principles and leadership development to concentrate upon developing materials for use by agents and by lay groups; federal and state legislation and programs; natural economic policy; health and sanitation; and feasibility analysis in production and marketing of agricultural products.

This program might require additional personnel as well as some reassignments of present personnel. Currently Extension is competent and working in most of these areas.

Training Needs of Extension Personnel: An effective, comprehensive, and continuing training program is needed for Extension personnel in Community Resource Development at the county, area, and state levels.

At present most Extension personnel that are associated with this area of work need a better understanding of:

- The changing structure of society and the changing cultural, economic, and social interrelationships between rural farm, rural non-farm, and urban residents

- The principles and theoretical concepts of structure of social systems; group dynamics; social action processes; learning; leadership selection, training, and development; and effective organizational structure(s)

- The use of the problem-solving approach as a method of formulating, planning, implementing, and evaluating resource development programs

- The principles and theoretical concepts of economic growth:
  a. Conditions necessary
  b. How the growth potential of an area is affected by state, national, and international monetary and fiscal policies; national increases in the levels of income, changing consumer demands, and technological developments; and national and regional interindustry (agriculture, manufacturing, and service industries) structural changes
  c. Role and interrelationships of human, capital, and national resources in the process of sustained economic growth program

- The availability and effective utilization of different types of educational, technical, and financial resources available from public and private agencies that can be used to supplement local resources

- The role of and rationale for Extension involvement in Community Resource Development

An effective and comprehensive training program which will provide Extension personnel a fundamental understanding and working knowledge of these principles and the concept of Community Resource Development will require graduate training, in-service training, workshops, and individual counseling and guidance.

In order to provide the expertise and back up the program that is proposed, considerable training will be needed in specific functional and problem areas such as education, public facilities and services, planning land water resource use and development, health care facilities, jobs and income, and poverty and welfare.

GOALS

The specific goals in Community Resource Development include:

- Organizing 500 additional communities of the approximately 900 communities that now have no effective organizational structure. This will be about one additional community per county per year.

- Promoting and assisting in the development of action programs in each organized community on a 5-year and annual basis. The goal would be to have every organized community with a 5-year planned program in 1967 to carry through 1971 with action elements for each year.

- Promoting better understanding by state and local organizations and agencies of the program in area and community development and of the benefits that might be derived from coordinating their work through these organizations

- Involving a minimum of 150,000 families per year in comprehensive educational programs in one or more of the following areas: education, public facilities and services, beautification, planning land and water resource use and development, health care facilities, jobs and income, and poverty and welfare

- Encouraging comprehensive development plans in each area association and each county that did not have one in 1965. Increase number of area plans completed by five and number of county plans by 35 from 1965 to 1971.

Extension in cooperation with other governmental agencies and private organizations and the people of the state should achieve the following goals during the course of this program:

- Reduce the number of families with incomes under $3,000 from

405,579 in 1959 to 310,000 in 1969, a reduction of 95,579 or 24 percent. Reduce the proportion of families with incomes under $3,000 from 37 percent in 1959 to 21 percent in 1969, a reduction of 43 percent in the proportion of total families with incomes under $3,000.

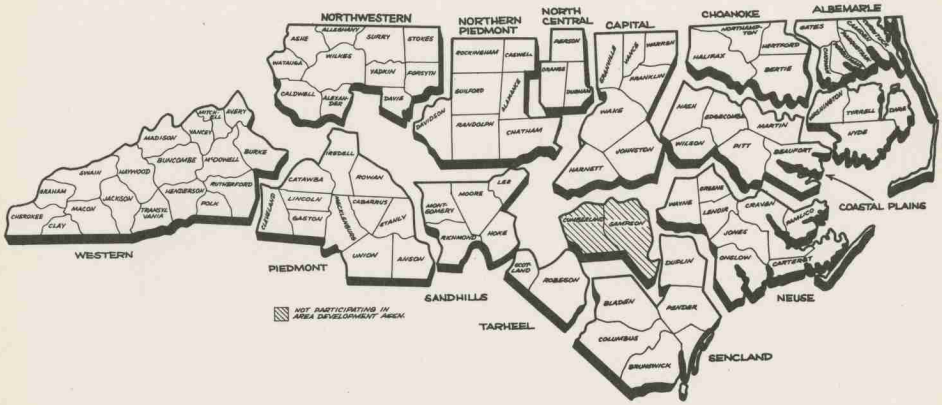
-Increase the number of non-farm jobs to 1,730,000 in 1971 which is an increase of 314,400 or 22.2 percent from 1965.

-Increase per capita income from $2,028 in 1965 to $2,760 in 1971, an increase of $732 or 36 percent.

-Increase median family income from $3,956 in 1959 to $5,800 in 1969, an increase of $1,844 or 46.6 percent.

The implementation of this program during the next 5 years should be regarded as a primary goal of the Agricultural Extension Service.

Area Development Associations in North Carolina



FAMILY LIVING

FAMILY LIVING

Present Situation

The clientele of home economics Extension includes all of North Carolina's 4,822,568 people. A study of Extension's record reflects the phenomenal progress made when North Carolinians have taken advantage of the educational programs offered by home economics Extension. Technological changes of the 60's have brought new challenges of adjustment to families and indications of new areas of emphasis for Extension programs. In addition to meeting the requirements of feeding, clothing, and housing the family, family members have recognized the impact outside influences such as mobility, automation, mass media, urbanization, and affluence have on these basic aspects of family living. Families seek ways of coping with resulting changes to achieve maximum satisfaction and well-being. By learning how to work together, families strive to reach such goals as home ownership, adequate education for children and continuing education for parents with enough resources left to enjoy new leisure time opportunities. Parents continue to assume other responsibilities which remain unique functions of the family as a social system. These include procreation, transmissions of attitudes, values, and aspirations for the good life, and socialization of the individual for effective interpersonal relationships and social responsibility.

By 1970 North Carolina will have 983,000 young people between the ages of 10 and 19. One of every two marriages in 1964 involved a teenager. One of every nine babies born during 1964 has a teenage mother. In the next 5 years, 890,000 more young people will reach the marriage age group. Extension educational efforts must be directed toward teaching both youth and young adults the responsibilities of the early years of marriage and parenthood for researchers increasingly emphasize the significance of the home environment and the quality of parental concern during the first 4 years of a child's life.

Over 40 percent of all married women in North Carolina work outside the home. As more communities actively seek new industries, women workers will be increasing in demand. When one adds the single women workers who maintain a household, this clientele group becomes even more significant.

The life span for men and women is increasing significantly. By 1970 North Carolina will have 416,000 people aged 65 or over, an increase of 33.5 percent from 1960 to 1970. Couples today can expect to spend about 25 years of married life together after their children leave home. The Extension program will provide information to help older people make wise adjustments in living to enrich these later years. Programs developed will relate to national and state plans for work with the aging.

According to the 1960 census one-third of North Carolina's

families have incomes below the accepted minimum standards for adequate family living ($3,000). Many of these low-income families are not now reached with the usual Extension programs. With the national and state spotlight on poverty, Extension has an opportunity to initiate some programs which limited resources and lack of public interest have delayed in the past. Added emphasis will be given to programs for low-income families through the coordination of Extension projects with those of other agencies and organizations. As an educational arm of the University, Extension's primary role will be that of consultant and teacher of sub-professionals and low-income homemakers in groups, rather than in rendering service to individual families. Although Extension work with low-income families will continue at all stages of the family life cycle, special emphasis will be given to young couples with children and to the aging. Since many of the employed homemakers are working because of economic necessity, some of the poor will be reached through program efforts for this clientele.

Extension home economists will continue to work with families now actively participating in the many phases of the educational program of the Extension Service. Organized groups of homemakers and youth will continue as a core clientele for home economics programs. Training of subject matter leaders for Home Demonstration Clubs and 4-H Clubs will be given special program emphasis so that they may continue to improve their competence as lay teachers. In summary, then, key audiences of home economics Extension during the coming years are lay leaders, adolescents, young families, employed homemakers, the aging and low-income families.

Major Problem Areas

Many North Carolina families are not experiencing optimum satisfaction from family living. In part, this may be because they: (a) may not be aware of the changes within the economic and social environments as they relate the human needs such as feeding, clothing and housing the family, and protection, sufficient for mental and physical health, (b) may not understand the importance of developing purposeful goals and values and transmitting them to future generations, or (c) may not have adequate family and community resources and may not be making optimum use of available family and community resources.

Following is a detailed analysis of each of these areas.

NORTH CAROLINA FAMILIES TO BECOME AWARE OF AND TO ADEQUATELY COPE WITH THE CHANGES WITHIN THE ECONOMIC AND SOCIAL ENVIRONMENT AS THEY RELATE TO HUMAN NEEDS SUCH AS FEEDING, CLOTHING AND HOUSING THE FAMILY, AND PROTECTING THE MENTAL AND PHYSICAL HEALTH OF THE FAMILY.

Feeding the Family

Psychological, physical and social factors influence the quantity, quality and types of food a family consumes. Provision of food usually accounts for a significant expenditure of income, time and energy. It is a determining factor in the health, social adjustment and economic life of the family members and the community. Technological advances in processing and distribution of food continue to increase the shoppers' choices at the market place. The value system as well as time, money, energy, know-how, and personal satisfaction must be considered in providing for an adequate family food supply.

Extension Program for All North Carolina Families: Extension workers will develop educational programs geared toward helping North Carolina families increase their knowledge and understanding of the relationship of food to health.

Extension workers will assist North Carolina families in acquiring knowledge of the market system, managerial and decision-making skills that will aid them in using family resources to plan, prepare, and serve a well-balanced diet throughout the year.

Where feasible Extension workers will work with farm families, encouraging them to increase their technological information, competency and skill in the production and conservation of food to improve their home food supply and their eating practices.

Teenagers - Situation: Teenagers may represent North Carolina's greatest nutritional problem. A study made in Greensboro of 6,000 youths, grades 7 through 12, indicated that: three out of four ate the recommended amount of food in the meat group; one out of four consumed the recommended four glasses of milk daily; fruits and vegetables were often omitted from the diet; and few teenagers failed to consume the needed amounts of breads and cereals. Barely one out of five reported eating any dark green or deep yellow vegetables each day, while one out of two had eaten no foods rich in ascorbic acid (vitamin C).

Boys ate more foods from the meat, milk and bread groups than girls. Girls tended to consume more green and yellow vegetables. Fifteen percent missed one or more meals a day, ranging from 25 percent in grade 12 to 10 percent in grade 7. Another study revealed that a fourth of the teenager's total caloric intake was derived from snacks.

Extension Foods and Nutrition Program for Teenagers: In the next 5 years members of the North Carolina Agricultural Extension Service will plan educational programs to help teenagers understand the relationship of food to health and physical fitness. A desired result will be the increased consumption of milk products and foods

containing vitamin A and ascorbic acid. Teenagers will be encouraged to select nutritious snacks that will improve their dietary intake. Through increased enrollment in 4-H foods and nutrition and food preservation projects, boys and girls will be encouraged to improve their food selection, buying, planning and preparation skills.

Young Families - Situation: Nutrition studies conducted in various parts of the United States show that the diets of young mothers as well as the diets of preschool children, are frequently poor. There seems to be general consensus among researchers that the nutritional status of the mother has a definite relationship to the health of the family.

This takes on added significance when we realize that one of the best indices for determining the nutritional status of people is their infant and maternal mortality and prematurity rate. North Carolina has one of the highest rates in the Nation. [1]

	U. S.	N. C.
Infant	24. 2	30. 2 per 1, 000 births
Maternal	3. 4	3. 7 per 1, 000 deaths

The problem becomes acute when national statistics reveal that 40 percent of all brides are teenagers and most first births occur with mothers under the age of twenty. Girls are becoming mothers when their bodies are not physically fit and when they are not psychologically stable because of traditionally poor food habits. These factors affect their health and that of the infant.

Extension Foods and Nutrition, Program for Young Families: In the next 5 years Extension programs will be developed to help young homemakers increase their appreciation and knowledge of the relationship of adequate nutrition to their health and to the health of the infant. They will encourage the young homemaker to understand information on the wise use of the food dollar and will help young women develop skill in planning nutritious meals for all family members. Where feasible, Extension workers will encourage young families to produce and conserve food.

Employed Homemakers - Situation: Employment of the homemaker outside the home often necessitates serving quickly prepared meals using more expensive convenience foods, and the eating of many meals away from home. It is estimated nationally that over $21 billion was spent for food eaten away from home in 1964. About 75 percent of this was spent in restaurants, with vending machines accounting for the largest share of the remainder.

One North Carolina study of Home Demonstration Club members indicates 44 percent of these homemakers did plan meals ahead. This

[1] Data for Health 1964

study revealed that many working homemakers, in recognizing and assessing their food problems, stated that planning meals ahead was one of their best devices for saving time.

Extension Foods and Nutrition Program for Employed Homemakers: Since many employed homemakers lack time, energy and skill in preparing satisfying and nutritious meals, Extension workers will strive to help working homemakers develop skills in planning, buying, preparing and serving quick, nutritious meals. They hope to create within working homemakers some skill in the decision-making process as it relates to time, energy, and personal satisfaction gained from selecting and using convenience food. During the next five years, Extension staff members also plan to help the working homemaker develop knowledge in and recognize the nutritional requirements of family members.

The Aged - Situation: In 1960, 6.8 percent of North Carolina's population was 65 years of age or older. A greater incidence of chronic illness is seen among this age group and increased emphasis is being placed upon the state of nutritional health as related to their chronic illness.

Foods consumed by the aged are influenced by their economic status, state of health, living conditions, cultural and educational factors. Aged citizens often eat diets high in calories and low in proteins, minerals and vitamins. Many are food faddists. This often endangers their health rather than improving their nutritional status. Obesity remains a major problem for this age group. It is estimated nationally that 20 to 30 percent of the adult population is overweight.

Extension Foods and Nutrition Program for the Aged: To help improve the nutritional status of the aged an educational program will be developed aimed at helping this clientele become aware of and develop appreciation for the necessity of consuming an adequate diet throughout the life span. An effort will be made to help them recognize and resist food faddism. Extension programs will be planned to help the aged become knowledgeable in food selection so food may be nutritious, palatable and digestible.

Low-Income Families - Situation: Studies show that rural nonfarm families of 4 members in the South in 1961 with incomes between $2,000 and $3,000 spent 33 percent of their income for food. This would suggest that low-income families have a hard time meeting the nutritional needs of the family on the amount of money available for food.

Several federal programs are designed to improve the nutritional status of low-income families. Currently, there are 69 counties in North Carolina participating in the donated foods program with five of these on a part-time basis. In addition, 14 counties participate in the food stamp program.

A decreasing number of farm families, coupled with the growing

tendency towards specialized farming has resulted in a decline in the number of families who produce and conserve food for home use. However, since the welfare department no longer includes food grown at home as part of family income, more low-income families should be encouraged to grow and conserve their own food supply.

Extension Food and Nutrition Program for Low-Income Families: Since it is believed that low-income families lack sufficient funds, knowledge and skills to meet the nutritional needs of family members, the Extension staff will design educational programs to help low-income families understand the value of growing and conserving nutritious foods. They will attempt to teach families to spend the family food dollar wisely. In addition, they will strive to develop an appreciation among low-income families for existing federal food programs and to help homemakers develop some skill in preparing and serving donated foods in an acceptable form.

North Carolina counties not already participating in federal programs will be helped to understand the economic and health values that may accrue to families if the counties participate.

Clothing the Family

Per capita clothing expenses have risen noticeably. Part of this increase is undoubtedly a result of rising family income, for as family income increases, the quantity, quality, and unit price paid for garments increases.

Clothing has a social and psychological effect on each family member. How a person dresses, his grooming, care of his clothing and himself tells much about his self-image and may affect his acceptance by and of society.

In our democratic society there is a certain similarity at all class levels but there are also important differences. There are no sharp breaks between various classes, but a continuum with a great deal of mobility within the continuum. Our way of life has also changed considerably from that of the days when clothing was either for dress or work, with somewhat worn-out representatives of each category serving as leisure clothes.

Today it is not easy to distinguish the rural or urban dweller by the type clothing he wears. However, there still seems to be a difference in attitude toward and interest in clothing related to the size of the community. Individuals in urban areas seem to put more emphasis upon clothing than do those from rural areas. One reason is that city people meet strangers daily and often judge and are judged largely by first impressions. Greater interest in clothing among urban dwellers is also due to better shopping facilities, great opportunities to view fashion trends, and a better selection of clothing.

Another factor that influences clothing choices is the type of employment of family members. Families of white-collar workers spend more on clothing and have larger wardrobes than do families of blue-collar workers. There are also large groups of individuals such as policemen, nurses, and waitresses whose type of clothing is regulated because of their business or profession.

Because leisure time has been increased by the shortened work week and labor saving devices, there is a greater demand for casual clothing designed for comfort and easy care. The trend toward informal patterns of social living also adds to the demand for this type of clothing.

Another factor affecting family clothing demands is the changing composition of the population.

Extension Clothing Program for all North Carolina Families: There is increased attention by manufacturers and retailers to styling and promotion of men's clothing. Since men are taking a greater interest in styling, fabrics, and care of their wardrobe, increased program emphasis will be given to buymanship and care of men's wear.

Many homemakers lack knowledge to determine the factors for consideration in making maximum use of the clothing dollars. They need to learn how to evaluate their time, energy and skills in determining whether to buy or to make certain garments for their families. During the next 5 years, Extension clothing specialists will:

- Develop programs to help homemakers evaluate time, money, energy and skill resources for making the decisions about buying or constructing clothing for the family.

- Assist homemakers who make decisions to construct, with clothing programs that will emphasize care and use of the sewing machine, pattern and fabric selection, fitting and alteration of patterns, application of efficient management in fitting and construction to get the professional look, simplified sewing methods, construction techniques for special problem fabrics and alteration and remodeling of handmade garments.

- Help homemakers purchasing garments for the family, with programs developed to emphasize evaluation of material, construction, styling, suitability and fitting of clothing; interpretation of garment labels; alteration and remodeling of ready-made garments.

Teenagers and Young Families - Situation: Today's teenagers possess greater purchasing power than teens in any time in history. By 1970 it is predicted nationally that teenagers will spend $20 billion annually. Fifteen to twenty percent of the teenage budget is spent on clothing.

Teenagers are often given the responsibility of doing their own clothing shopping as well as much of the family shopping. Even if they do not shop for the family, these youth have a strong influence over their parents' buying habits at a stage in the family life cycle when income reaches a peak.

The proportion of the clothing dollar going to clothe these younger citizens has been increasing at the expense of the adults' clothing allowance. As young children become an even larger proportion of the population, one may expect clothing demands for this segment to increase proportionally. Nationally, the largest outlay for clothing is among families with older children and among young adults in families without children.

The importance of the teenage market is being recognized more and more by businessmen. Teenagers are the target of millions of dollars worth of advertising, while sales campaigns are also directed to the youthful consumer. In many cases, stores will extend credit to the teenager without adult approval.

Extension Clothing Program for Teenagers and Young Families: In the next 5 years, Extension workers will place great emphasis on helping these young consumers develop sound buying habits and to learn decison making through a program of clothing buymanship. Major emphasis will be placed on an educational program to teach the value of caring for wardrobes. An important segment of the program will be devoted to having mothers of young children gain knowledge of buying and constructing children's clothing.

Employed Homemakers - Situation: Clothing requirements increase for employed women while time available for construction and care goes down. Since time is a premium, these homemakers are less likely to be constructing family garments and more likely to need knowledge in selecting and caring for clothing. In addition, the increasing number of working homemakers will continue to place more responsibility for buying and caring for their own garments on individual family members.

Extension Clothing Program for the Employed Homemaker: Extension workers will direct increased effort toward helping the employed consumer understand and become acquainted with the application of information about easy care fabrics in home sewing and ready-mades. Special emphasis will be placed on quality, proper fit, and price suitable for given occupations. Also this clientele will be provided with programs to improve their knowledge of the correct interpretation of label information such as fiber content, finishes and care.

The Aged - Situation: Increased longevity because of advances in medical technology has resulted in a growing number of senior citizens. They spend less for clothing than do younger citizens, but this older

group has its own clothing needs. Since the bones are not as flexible, it is harder to move with ease. Therefore garments with self-help features are better suited. As a person reaches 65 years, the body proportions shift which makes it more difficult to get a good fit in clothing. Skin color also changes, thus making some colors previously worn less becoming. The senior citizen may place more stress on fit and comfort than on style, color, or price.

Extension Clothing Program for the Aged: The Extension staff will put emphasis on buymanship, since money is often limited for the purchase of clothing. When selection of suitable garments is limited, senior citizens will be encouraged to make their wants known to store personnel, garment manufacturers and designers.

Low-Income Families - Situation: Presentable clothing boosts morale. Fewer school drop-outs among the teenagers of this group may be a result of their having attractive and appropriate clothing. Many of the garments purchased by low-income families come from second-hand sources and are selected with little attention to quality, fit or suitability.

Extension Clothing Program for Low-Income Families: In co-operation with welfare workers, public health nurses, housing administrators and others working in similar programs, a clothing program to affect all low-income families will be developed. The Extension staff will help low-income families realize their desire for acceptance by helping them construct, select or renovate garments to enhance their confidence and self-esteem.

Programs will be developed in the selection of used clothing to get the best in quality, suitability and fit.

Programs will be developed to teach mending, remodeling and restyling of garments, and their care.

To help low-income homemakers present a better appearance, special emphasis will be given to selection and fitting of under garments and supportive garments.

To further the building of self-esteem and confidence, programs will be developed to improve grooming and personal appearance.

Housing the Family

Housing is one of North Carolina's chief assets and also one of its major problems. The term housing also includes furnishings, and the adequacy of the two is usually synonymous. For most families housing, including furnishings, constitutes major expenditures and an investment which reflects the management of family income.

To maximize social and physical satisfactions, the house, its

furnishings and surroundings should provide for family needs at all stages of development and all income levels. As income and level of living rises, the demand increases for more quality housing, services and innovations. This trend has been accompanied by a gradual rise in cost of labor and building materials as well as the introduction of a variety of new materials and construction techniques for both furniture and housing. A United States Department of Agriculture report shows that only 11 percent of the houses in the South built in the last quarter of 1964 cost less than $12,500. Because of the high cost of housing and the availability of credit, nationally 95 percent of all housing is financed.

While a large segment of the population is demanding better housing, more than two million, 44 percent of the people in North Carolina, live in substandard homes compared with 23 percent nation-wide. Thirty-seven percent of the families have an income of less than $3,000 which indicates that a substantial proportion of the inadequately housed are too poor to improve their housing without aid or subsidy. (In 1960, North Carolina had 250,172 white families and 155,407 non-white families with incomes in this group. In addition, 368,462 white and 183,865 non-white have less than $4,000.) Housing standards vary according to location, people and the time. Minimum standards for present-day North Carolina families should generally be those outlined by the Federal Housing Authority.

There is increasing interest in beautifying private and public grounds. National and state beautification programs are stimulating interest in this field. One major problem in beautifying North Carolina is lack of motivation. Dump heaps are increasing in number and trash is often indiscriminately discarded. To further the beautification program Extension workers will conduct programs directed toward stimulating interest in beautification and will work closely with the Governor's Commission on Beautification. The greatest immediate need is for better appreciation of beauty by underpriviledged groups in town and some of the tenant farmers in eastern North Carolina.

Extension Housing and House Furnishing Problem Areas and Program for all North Carolina Families: Unfortunately, suitable credit is not available to all families for housing. Through educational programs, Extension workers plan to inform the public about available commercial and governmental credit in an effort to promote the wise use of credit.

There is a need for the development of new and improved housing units and house plans. Extension specialists will try to keep house plans up-to-date in relation to technical development, new materials, and changing family needs.

Housing supply is not always consistent with job opportunities nor is it always located in relation to factories, recreation areas, and

farms. Coupled with this, communities often do not have an appreciation and knowledge of land-use planning. Extension workers will strive to make communities, townships and districts aware of land-use planning for all segments of the population, especially as it relates to the location of industry, housing developments, recreation, and labor supply. Extension plans to cooperate with the Department of Conservation and Development in locating new industry and expanding existing industry as it is related to the housing supply and job opportunities.

Many families do not plan to furnish their homes to fit their particular family needs. There has been a general lack of awareness of what constitutes adequate furnishings and equipment and little research to establish guidelines. However, minimum furnishings might be considered as those essential to the performance of the families' basic activities.

Families may invest all of the money in a new house and have little left over to invest in furnishings and equipment. Programs will be designed to motivate and educate families to develop an awareness of the importance of planning for needed furnishings and equipment and to acquire these items according to their needs and resources.

Many families lack knowledge and confidence needed to select and use furnishings and household equipment effectively. They lack knowledge and experience needed to plan and acquire furnishings to satisfy their aesthetic and cultural needs; to coordinate furnishings, design and color within rooms and from one room to the other. Extension specialists will prepare educational materials that will help families select and use furnishings and equipment effectively.

An increasing number of homemakers are taking advantage of in-the-home buying and custom service for a variety of house furnishing items. Also, an increasing number of women are using professional decorator services. Extension home economics personnel will work with these homemakers so they will be able to communicate their wants to these professionals.

Many families lack an understanding of how to make the best use of furnishings on hand and how to develop skills in making some furnishing items. They may not recognize the value and potential of furnishings already owned or how to select good used furniture. They may be reluctant to discard furnishings that have passed their usefulness. Extension home economics personnel will help homemakers and other family members develop skills needed to refinish and upholster furniture, make draperies, slipcovers and bedspreads.

Life and beauty of furniture depends on proper care. Extension home economists will encourage families to learn how to care for furniture and furnishings properly in order to extend their life and beauty.

Teenagers and Young Families - Situation: With the trend toward lower age marriages, the number of beginning families is rising sharply. Young families forming new households often have limited money to invest in housing and house furnishings and equipment. In many cases the best method for acquiring adequate housing for these families may be renting a house, an apartment, or mobile housing.

Extension Program For Teenagers and Young Families: Special emphasis will be placed on working with youth groups in preparation for marriage and home ownership. In addition, the Extension staff will try to create an awareness of the need and a public concern for adequate housing for young people.

Extension will try to help mobile home builders and park owners understand the relationship of mobile home quality and park management to public acceptance and help those who buy mobile homes to have an understanding of quality, rate of depreciation and cost of financing the mobile home.

The Aged - Situation: Elderly people have a conservative attitude toward going into debt to acquire good housing which they have not known previously. Many older families face two obstacles when they plan housing: they have an increasing need for comfort and convenience and they have less money to spend for housing and furnishings and less physical dexterity to maintain what they already possess.

Extension Program For The Aged: Extension workers will help elderly people to acquire a favorable attitude toward home improvement loans, especially the program of the Farmers Home Administration. Extension employees will also make an effort to bring about a public concern for adequate housing for elderly persons.

Low-Income Families - Situation: Government, civic and community leaders and the poorly housed lack an understanding and knowledge of the plight of the poorly housed and how it is related to good citizenship and health. In fact, these leaders may have an attitude of despair toward home improvement for the poor.

The limitation on the amount of money welfare clients can earn keeps their total income down and kills incentive. Income is limited and suitable credit for housing purposes is not readily available; in fact, commercial creditors require a 30 percent down payment. Farmers Home Administration credit, although often available is not widely known and understood.

Extension Program For Low-Income Families: Extension agents will attempt to help civic and community leaders have an understanding of public housing and its availability.

Extension workers will encourage housing specialists to develop

new house plans that are socially acceptable for low-income families. In addition to having suitable house plans, better quality workmanship is needed. Extension workers will encourage low-income families to accept and use new materials and good construction techniques. They will help contractors understand the opportunities and large market for low-cost homes. Extension also will encourage young people to work in residential construction by assisting in the organization of classes in bricklaying, carpentry, and other building acts as may be taught through Industrial Education Centers.

Low-income families that are highly mobile will be taught to adapt furnishings and equipment to mobile living. Since their budget is limited, families will be encouraged to make wise buying decisions when selecting household furnishings and equipment. They also will be encouraged to make the best use of furnishings on hand and to develop skills for making and repairing some items.

Protecting the Family

Each family unit has the responsibility of health and safety of each family member. Included here is the responsibility of providing each member with safe foods that provide the nutrients needed to maintain optimum health, adequate clothing to protect each member from heat and cold, and adequate and safe housing.

In addition, the family unit is responsible for providing an environment conducive to the good mental health of its members and for preventative and curative medical care.

Even though the family unit provides for health and safety measures it cannot survive without concern for the health of the total community. Of increasing importance is the necessity to plan for sufficient and safe supplies of water and air.

It is estimated while 3 quarts of water are needed daily for physical consumption, the technology that has brought us indoor plumbing, automatic clothes washers and air conditioning has increased our daily use of water to some 720 quarts to satisfy our cleanliness and sanitary needs. Many additional uses for water, important to the family, include irrigation, manufacturing and producing of electricity. No one knows precisely the present per capita need for water, but the increasing awareness of water shortages, of water pollution will become a family concern. As knowledge necessary to safeguarding our farm and municipal water supplies becomes more accessible, the family should become aware of the part they may need to play in protecting and conserving water supplies.

Technology, too, has renewed our awareness of exhaustibility of the air we breathe--and the need to plan safeguards against the undesirable pollution that auto exhausts, home heating plants, and industrial

plants bring about. Increasing loss of vegetation through building highways, industries, cities and housing decrease the potential plant life that is essential to the production of the oxygen we need for life.

Extension Program for Protecting the Health of the Family: Extension agents will work with family members in such areas as how to reduce tension, personality needs and how to meet them, family strengths, and the relationship of feeding, clothing and housing to mental health.

Through planned programs families will be encouraged to set aside money for physical examinations, dentists, and specialists, as well as for hospital and clinical care.

During the next 5 years Extension home economists will develop, with the assistance of specialists in the field of safety, programs to help families realize their health and safety obligations to family members.

While this generation may not be in danger of exhausting its water supply or of losing the "breath of life" it is not too early for the family as a unit and as individuals to be concerned about their role in protecting these resources and in joining with other members of the greater community in planning for the future. Programs to help families to become aware of these needs will be developed during the next 5 years in cooperation with specialists in related fields.

NORTH CAROLINA FAMILIES TO UNDERSTAND THE IMPORTANCE OF DEVELOPING PURPOSEFUL GOALS AND VALUES AND TRANSMITTING THEM TO FUTURE GENERATIONS.

Relationships in the Family

The family is the most important influence in the development of individuals and their relationship to the community and society. In it is vested (a) the continuance of the human race, not only in terms of procreation, but also in the transmission of family values, goals and aspirations for purposeful living (b) meeting the basic needs of family members for physical and mental health, and (c) socialization of the individual to live effectively with himself and others.

Also generated and nurtured primarily in the family setting are attitudes. Educators recognize that attitudes are basic to all changes and that they are one of the most dynamic factors in social behavior since they are linked with the key processes of motivation, learning, and perception. Since an attitude is a fairly consistent learned tendency to behave in a certain way toward persons, objects, or situations, attitudes are dynamic and tend to pass into behavior. Attitudes thus influence the values and goals of individuals.

North Carolina families find themselves facing new situations.

In addition, certain external factors are creating increased impact on some existing circumstances. Today's family finds itself in a highly interdependent social system, as the final decision-making unit through which experiences, goods, and services are channeled for its ultimate use and well being.

There is some mobility from one social class to another and increasing mobility from one region to another. New exposures from living and working with people from different backgrounds, values, and goals, call for a clear sense of identity and integrity which families are finding hard to achieve and maintain. Innovations in customs, food habits and patterns of living have resulted from this more cosmopolitan way of life.

Families in the rural-urban fringe struggling between two worlds, urban and rural, are experiencing difficulty in identifying with the community in which they live. Such identification is highly essential to family solidarity and stability.

Urban families are also caught in rapid social change which has created situations of stress. The anonymity of urban and automated living makes the development of a strong identity quite difficult. The increasing pressures of the fast pace and crowded interdependent working relationships, however, demand that we learn to accept others as individuals with feelings and unique contributions to be considered. It is becoming increasingly difficult to achieve the various stages in personality development.

Family patterns are changing rapidly. We find the transition from a father-dominated to a more democratic family has caused family member roles to be less specific. The paternal role appears to be in need of redefinition so that the American father may better understand his influence in the stability of the home, and the socialization of the child, in cooperation with, not in competition with, the mother's role. For example, in many families both husband and wife earn wages, discipline children, spend the family income, and perform home-making tasks. All family members share in decision-making.

North Carolina Families - Situation and Program: In North Carolina there is much mobility--from one area to another, from rural to urban areas, and some mobility from one class to another.

Extension home economics agents will help families understand opportunities in moving and how to adjust in a new environment. Extension will help families learn to accept newcomers and help newcomers to be acceptable.

Home economists will stress North Carolina career and educational opportunities to youth. They will also help families see the long-range values of having new industries in the community.

More social life will occur outside the home. Home economists will develop programs designed to help family members as individuals and as a group evaluate social life opportunities. They will assist families in recognizing the importance of being together in value systems, goals and emotional ties. In addition they will help family members expect and understand the impact of social changes on personality development and teach the principles of getting along with one another.

Teenagers and Young Families - Situation and Programs: Babies of the post-war boom are now reaching the marriageable age. There will be an increased number and proportion of families in the child-bearing stage. Therefore, Extension home economists will provide brides and grooms with information concerning various phases of homemaking. They will develop programs related to preparation for the role of parenthood and will plan more educational programs for parents of young children.

Such basic learnings assume additional significance when we recognize how early they are incorporated into the life of the individual. Various sources indicate that the general intelligence of an individual develops as much from conception to age 4 as it does during the 14 years from 4 to 18.

Changing times have forced theologians and social scientists to take a searching look at our value system. Youth will demand concrete and realistic reasons for maintaining traditional values.

Extension agents working with family relations programs will help families focus attention on the increasing number and complexity of today's problems facing society. Families may gain greater insight into these problems by being assisted in carefully evaluating their goals and values in light of today's world.

Employed Homemakers - Situation and Program: While the increase in numbers of those aged 18 to 34 years at work has kept pace with the growth of their number in the population, nationally it is the women over 35 who have increasingly been looking for jobs. Extension home economists will help these women evaluate the advantages and disadvantages of working outside the home. Extension home economists will stress the need for family approval and for having all family members share in the duties of the home. An attempt will be made to inform job seekers of the opportunities available, especially in services.

The Aged - Situation and Program: In the next 5 years, Extension home economists will develop programs to help citizens adjust to aging. They will point out the need for more educational and recreational activities for the aged and the need for more health and institutional care for these persons.

Since senior citizens have a need to feel they are useful, Extension

employees will help senior citizens develop as resource persons and teachers. They will point out areas where senior citizens can make contributions--service organizations and similar opportunities. Extension personnel will also assist in informing senior citizens of new government programs and their meaningfulness.

Federal and Local Educational Programs

A more prosperous economy, emphasis on education, and governmental programs designed to assist families are making possible some goals previously unattainable. Also, there are more opportunities for youth and adults to receive industrial, technical, and college training near home. Extension home economists will help young people learn what and where the opportunities are and the implications for the future.

Federal and local programs are making it possible for some families and individuals to rise above the level of poverty. Social mobility is becoming easier for youth. In addition to teaching social graces, Extension home economists will help youth recognize differences in rural and urban living and develop satisfactory ways of adapting.

The federal government is becoming more and more concerned about job opportunities for young people. Extension staff members will help in informing youth about the Peace Corps, VISTA, work-study program and similar aids.

In addition, the government is taking an interest in the pre-school child. Extension workers will encourage parents of needy children to enroll them in the HEADSTART program. Parents will likewise be encouraged to engage in some type of formal and/or informal continuing education.

NORTH CAROLINA FAMILIES TO STRIVE TOWARD PROVIDING FOR MORE ADEQUATE FAMILY AND COMMUNITY RESOURCES AND MAKING OPTIMUM USE OF AVAILABLE FAMILY OR COMMUNITY RESOURCES.

Managing Family and Community Resources

Basically, most families have the same type of human resources and similar non-human resources available to them. Resources differ among families in quality and quantity. The development of the potential within each family unit is dependent upon the recognition of available and attainable resources, and the decisions made relative to the use of all resources for the achievement of family goals.

Through effective management, families can attain a meaningful balance in the use of all their resources for the optimal development of the individual and for productive family functioning within society. Toward this aim, programs for the management of specific resources are developed.

Income Management

At all levels of income, some North Carolina families have trouble managing their resources. For many families, there is the problem of stretching an inadequate income to cover the necessities of family living. Even when money income is considered adequate, there is the problem of making the wisest choices for use of money, and fulfilling financial obligations on time. The pressures of advertising, and desires of acquiring or keeping social status, lead to overspending and excessive use of credit without regard to the costs involved.

A lack of information on qualities of consumer goods, poor shopping habits, and failure of families to examine their values and motives in buying goods are basic to some family money problems.

Extension home economists will encourage families to study their own needs and values and to set goals for use of present and future income. They will teach the decision process as a means of using income to reach desired goals. Basic information will be provided to help family members plan day-to-day spending for more satisfactory living. Families will be encouraged to take a long look at their changing needs over the family life cycle, to plan for meeting financial emergencies, such as illness or the death of the "head of household," and to plan for educational expenses and retirement.

Information on types and sources of credit, and costs of each, and the use of credit in relation to other available resources will be taught.

Extension home economists, with specialist's assistance, will provide information to help family members evaluate consumer information and to judge knowledgeably the qualities in goods and services they plan to buy. Homemakers will be taught to be discriminating shoppers, not only checking the initial costs of goods, but requirements for use to provide satisfactory service, and to reduce the cost of maintenance.

Time and Energy Management

The majority of family members regardless of their position in life-- full time, gainfully employed, or retired homemaker; student; employed or retired male -- face the problem of using their time and energy in the most meaningful manner.

Extension home economists can help individuals or family groups determine the most satisfactory use of their time and energy (based on their goals) for work, leisure, recreation, and public or civic affairs. Therefore, through planned programs families will be encouraged to make maximum use of technological developments and

other resources such as community facilities for carrying out homemaking responsibilities, and taking advantage of cultural developments for personal growth.

Management of Interests, Abilities and Skills

The development of interests, abilities, and skills will be encouraged for productive homemaking, personal satisfaction, increased income, and community development.

Management and Use of Community Resources

Community facilities such as parks, recreational areas, health services, schools, libraries and other educational and cultural programs can be provided only when they receive the support of the families living in the communities. Extension home economists will cooperate with community development specialists to help people to become aware of the quality of these services as they are related to personal, family and industrial contributions and to taxation. These specialists will encourage the maximum use of such community facilities as an important factor for promoting more effective living.

Program Needs

Rapid development of new knowledge in all areas of family living reflects the necessity of greater specialization. The most serious problem for the professional is managing to keep up-to-date with emerging developments and their implications.

Emphasis will be directed toward identified problem areas. Designated agents will be trained and retrained to conduct educational programs in these problem areas. Non-professionals will be further trained to meet the increasing demands from all segments of the population for certain aspects of family living information.

Specialists will have the opportunity to attend formal classes. They will also attend professional meetings and workshops, and participate in seminars and other activities designed for professional improvement.

State, district, and/or area schools and individual assistance on special problems will be conducted by specialists to provide competency for county staffs in areas of greatest need. Programming for county clintele will be the responsibility of the county Extension staffs.

Further interdisciplinary coordination and cooperation will be directed toward problem-solving. Interagency cooperation will be emphasized in appropriate activities.

Industry recognizes the need for in-service training of employees who deal with the public in supplying goods and services. Specialists have

an opportunity to counsel and assist with such training programs. On the other hand, well-trained specialists from industry and trade organizations will be invited to participate and contribute to Extension programs.

It is imperative that close programming relationships be maintained between county staff members, district supervisors and specialists. There will be constant re-evaluation of problems of the people and programs directed toward their solution in order to maintain program flexibility and effectiveness.

There is a continuing need for more and better-trained professional and/or non-professional workers in all areas of family living.

Present professional staff: In order to keep informed of new developments and how to relate these to problems of people, county and state staffs should engage in a continuing program of formal and informal training. Because of pressures of the job, it is felt that sabbatical leave should be granted those interested in additional formal training. Informal training may be provided through attendance at professional meetings, seminars, workshops, training school, reading, lectures, tours, and other methods.

Because of the magnitude and the increasing complexity of the Extension home economists' job, it is felt that most workers need additional training in the sociological and economic aspects of family living. They need to understand the problem-solving approach and the social action processes through which change is activated.

Increased specialization at the state and county level could result in programs with more depth and continuity. This can best be accomplished on a county level through more area home economics agents. These may be present employees with special interests and skills, operating within the framework of a revised job description.

With 40 percent of married women in North Carolina in the labor force, it is obvious that many of these working homemakers are not reached with family living information under our present system of operation. Consideration should be given to adjusting the work schedule of professional personnel to provide shifts where and when needed.

Program Results

The family living phase of the Extension program deals with people - their goals, values, and aspirations. These intangibles are difficult to measure. Attitudes are often a barrier to the individual or family in accepting and activating needed tangible changes.

In order to have some method to determine the effectiveness of

an educational family living program, some yardsticks were formulated by the Family Living Committee. A copy of these was sent to each county to be completed in an effort to show the extent families are now being reached (1965) and the number that it is anticipated will be reached after a 5-year educational effort (1971). An aggregate of the county goals follows.

GOALS - PROGRAM FOR FAMILY LIVING

Item:	Current--1965 Number	Anticipated--1971 Number
EXTENSION EDUCATION (Disseminating Information):		
Families reached through H.D. Clubs	65,318	100,190
Others reached (Non-Club activities)	228,561	310,790
Workshops and special interest meetings	3,280	5,762
Radio and television programs	17,895	25,000
News articles, news letters, etc.	22,995	48,203
FAMILIES REACHED WITH PROGRAMS IN:		
Food budgeting	58,619	144,939
Nutrition - food selection & preparation	201,624	381,945
Food conservation	82,761	138,309
Clothing selection and buying	79,760	133,570
Clothing construction	53,967	85,165
Clothing care	62,480	108,690
New and remodeled houses	56,180	102,228
New and improved furnishings	150,000	175,000
Use of family resources	144,130	370,039
Selection, care and use of major appliances	48,428	123,168
Making and marketing crafts, foods, etc.	37,272	45,000
Concept of the 8-stage family cycle	35,388	106,406
Achieving wholesome family relationships	55,770	127,788
CULTURAL OPPORTUNITIES		
Adequate recreation facilities	29 yes 71 no	48 yes 52 no
Library	82 yes 18 no	82 yes 18 no
Bookmobile	87 yes 13 no	84 yes 16 no
Museum	27 yes 73 no	35 yes 65 no
AGENCIES WORKED WITH		
Health Department	97 yes 3 no	90 yes 10 no
Welfare Department	97 yes 3 no	90 yes 10 no
Farmers Home Administration	94 yes 6 no	87 yes 13 no
Department of Public Instruction	91 yes 9 no	86 yes 14 no
Social Security Office	89 yes 11 no	85 yes 15 no
Public Housing	33 yes 67 no	53 yes 47 no
Recreation Department	43 yes 57 no	60 yes 40 no
Office of Economic Opportunity	73 yes 27 no	74 yes 26 no

4-H AND YOUTH

4-H AND YOUTH

Philosophy and Objectives

The 4-H and youth program outlined in this document is based on these principles:

1. The 4-H and youth program is an integral part of the total Extension program.

2. Basically, 4-H is a method used by Extension to provide learning experiences to bring about desirable behavioral changes in youth.

3. The development of the individual is paramount. Therefore, projects, demonstrations and other activities in the 4-H program are avenues through which the individual achieves this growth and development.

4. The broad objective of the 4-H program is to assist young people to acquire knowledge, skills and attitudes. This would include competency in democratic leadership and working cooperatively with others. The goal is to enable young people to develop a healthy personality, accept and discharge responsibility, and make wise decisions.

Present Situation

Over one million North Carolinians--that's the potential target audience for 4-H and youth programs of the Agricultural Extension Service by 1971.

Today there are over 996,000 youth 9-19 years of age in the state. And the growth to over a million by 1971 will be an increase of 2.8 percent. In 1966 approximately 70 percent are white and 30 percent are non-white.

While North Carolina is still considered a rural state, only 20 percent of its people live on farms. About one-third of the families live in cities and towns and 44 percent of its residents are classed as rural non-farm. In eleven counties more than 50 percent of the people live in cities and towns. In 51 counties, 50 percent or more of the residents are classed as rural non-farm. There are 23 counties in which farm people represent only 10 percent or less of the total population.

The impact of the place of residence of North Carolina's people is further emphasized by the fact that farm population is likely to decline continually and by 1971 represent only about 10 percent of the total population.

The state has a relatively large proportion of low-income families. A total of 37 percent--over one third--of the families have incomes of $3,000 or less per year.

The Extension youth program bases its success on an agent-to-leader-to-youth concept. Leaders are adults. In North Carolina in 1960, 51 percent of all adults 25 years of age or older had 8 years or less of formal schooling. Only 19 percent of these adults--the pool from which 4-H leaders are drawn--graduated from high school and only 13 percent attended or graduated from college.

What are some of the characteristics of North Carolina youth? Many fail to see the relation of formal schooling to real-life situations. Many are not motivated to stay in school through completion of high school, as evidenced by the number of school dropouts, which though decreasing, continues to be a major problem in the state. The high school graduating classes of 1958-59 represented only about 48 percent of the students in the fifth grade seven years before. By 1963-64, the percentage of these starting fifth grade and graduating had increased to 56 percent.

A considerable number of youth are also plagued by problems of poor health. Young people in North Carolina have the highest draft rejection rate in the country. North Carolina youth also have a high rate of veneral disease. Both national and state studies show that four out of 10 boys and six out of 10 girls have poor diets. People are marrying younger and bearing children at a younger age than in the past. With the infant mortality rate in North Carolina higher than in any other state, implications for health programs aimed at improving health practices are even greater.

Youth are caught up in a rapidly changing society that calls for social and psychological adjustments on their part. Many must adjust to moving from the farm where they lived as children to the city where they will live as adults. Fluid job opportunities make families geographically mobile--again calling for adjustments by our youth. New jobs are being created and old jobs are becoming obsolete--again indicating change for which there must be personal adjustment. Also, higher percentages of mothers are working leaving youth to their own care or in the care of possibly indifferent individuals, relatives or institutions.

The 4-H enrollment in 1965 in North Carolina was 50,780--or 5.1 percent of the youth between 9 and 19 years of age.

In 1965 over one-half--54 percent--of the members were 12 years old or less and only 11 percent were in the 16-19 age bracket. This distribution of club members by age groups has been fairly consistent over the years both locally and nationally.

A total of 52 percent of 4-H members were from farm residences,

37 percent from non-farm and 11 percent from urban, in 1965. There has been no significant change in these percentages since 1961.

The number of leaders involved in the 4-H program in North Carolina in 1963 and 1965 is shown in the table below:

Type Leader	1963	1965
Junior	3421	2343
Sponsoring Committee Members	7243	9128
Community 4-H	6982	6123
Project	4235	4923

Also, although there were 2,828 clubs organized in North Carolina in 1961, there were only 2,410 in 1965.

As indicated, over one million youth will make up our potential audience.

It is estimated that a majority of the boys and girls in the state do not belong to any non-church youth organization. Hence, there is opportunity for involvement of a great number of youth in a beneficial program such as 4-H.

North Carolina will continue to have a significantly high proportion of low-income families, thus indicating a need for possible adaptation of existing youth programs to meet the needs of this special clientele.

Gradual increases in levels of formal education attained by North Carolina people will increase the number of potentially effective adult leaders and should have some favorable impact on attitudes toward involvement in volunteer youth programs.

Special Areas of Emphasis

The situational factors outlined above indicate many problem areas in which Extension can intensify its efforts to more effectively meet the needs of youth in North Carolina. In selecting the problem areas to receive priority during the next 5 years, consideration was given to the importance of the problem facing youth as well as Extension's competencies to plan and implement programs directed toward the solution of the problem. Areas chosen for emphasis are:

-INCREASED PARTICIPATION
-STRENGTHENING THE LAY LEADERSHIP PROGRAM
-ADAPTATIONS TO MEET NEEDS OF DISADVANTAGED YOUTH
-ADAPTATIONS TO MEET NEEDS OF YOUTH FROM THE NON-FARM SEGMENTS OF SOCIETY
-SCIENCE IN PROJECTS AND EXERCISES
-HEALTH IMPROVEMENT

In the pages that follow each of these problem areas is analyzed

and a plan of action presented. The plan outlined on the following pages gives only minimum attention to subject matter. This is not to overlook subject matter. It is assumed that plans developed in each of the respective subject matter areas will treat 4-H as an integral part of the Extension program for that area.

INCREASED PARTICIPATION

Present Situation

As pointed out in the statement of the present situation, involvement of youth in the 4-H phase of Extension's program is relatively low. Implications which might be drawn are that there exists a lack of awareness and understanding by youth and their parents of opportunities afforded by 4-H and that 4-H may not be geared to the felt needs of potential membership.

Major Problem Areas

Awareness: Youth and adults need to become aware of and understand the opportunities and values of 4-H to the point that a greater percentage of the eligible youth will become involved in 4-H.

Adapting to Felt Needs: 4-H staff and subject matter specialists must adapt 4-H to the felt needs of youth through involvement of lay leadership and utilization of research techniques, thus, more nearly insuring greater participation by all segments of the youth population.

Recognizing Responsibility: All Extension employees must recognize their responsibility to all youth and continuously seek to develop and make available meaningful and needed projects, activities and events of interest to all youth.

Extension Program

The overall program content in 4-H will be modified and adapted to meet the needs of youth among all segments of society. Lay leaders and youth will be involved in making these adaptations.

Greater emphasis and new approaches will be placed on all phases of mass media in an effort to have youth and adults become aware of opportunities in 4-H.

The 4-H staff, subject matter specialists and Department of Agricultural Information will work together to evaluate and restructure publicity and subject matter approaches to meet the interests and needs of today's youth.

Program Results

Results in overall youth participation in 4-H will be assessed by comparing present and 1971 statistics with respect to: number of 4-H members, number of active 4-H clubs, number of special interest groups worked with, and number of youth participating in special interest activities. These data will be obtained from county reports.

STRENGTHENING THE LAY LEADERSHIP PROGRAM

Present Situation

The effectiveness of the 4-H Club phase of the county program is largely contingent on the quantity and quality of voluntary leaders functioning in the youth effort. Based upon these assumptions, the 4-H phase of the program is not operating at its maximum potential as illustrated by the following evidence: Numerous significant leader positions at all levels are now unfilled, and many leaders currently functioning within the leadership framework are deficient in knowledge and skills necessary for effective leadership.

Positions are vacant because the potential leader has not been identified and motivated to assume leader positions. Persons occupying current leader positions are not as effective as they could be because they have not been involved in a systematic developmental process to include orientation to the expectations of the position, training in human behavior and subject matter, efficient utilization of the leaders' talents, recognition for job performance and evaluation of the leaders' efforts.

Major Problem Areas

Motivation: Individuals, both youth and adults, who have leadership potential, must become motivated to assume 4-H leadership positions.

Developing Knowledge, Attitudes, Skills: Individuals, both youth and adults, occupying present 4-H leader positions, must acquire knowledge and develop attitudes and skills that will improve the quality of their performance in leader positions and thereby the quality of work by youth.

Extension Program

To strengthen lay leadership, Extension will:

- Conduct an audit of all tasks for which leadership is required.
- Identify individuals who have potential leadership abilities in relation to the task to be performed.
- Express through mass media, group and individual contacts the

values and satisfactions that may be derived from serving in a leadership role.

-Provide those individuals who have been identified and motivated with the opportunity to assume a leader position.

-Orient new leaders to the expectation of the job.

-Train leaders, new and old, in subject-matter leader skills and understanding human behavior.

-See that leaders are given the opportunity to work.

-Recognize sound leader performance.

-Evaluate leader performance.

-Prepare a complete leaders' handbook.

Program Results

Evaluation of attainment of objectives will be accomplished by analyzing data relating to changes between 1966 and 1971 relating to leader positions filled, utilization of the leadership development process by professional staff, percent of the membership reached by leaders in project completions, and changes in the quality of work by members.

-Goals for 1971 include: A minimum of two organizational adult leaders and two junior leaders per club (estimated number in 1971: Adults--8000, Junior--8000)

-A minimum of one project leader for each 10 members enrolled in the project

-A minimum of one leader per special interest group

ADAPTATIONS TO MEET NEEDS OF DISADVANTAGED YOUTH

Present Situation

It is an accepted fact that the more than 37 percent of North Carolina's young people between the ages of 9-19, who belong to families that have an annual money income of under $3,000, participate less frequently in all types of formal organizations and groups. Four-H is no exception. Several factors may account for this low participation. Anthropologists, sociologists and others who have studied the culture of the disadvantaged agree that many of the disadvantaged have strong sentiments of self-disparagement, and they mistrust outsiders, especially those in positions of authority. Because of their deep-rooted feeling of helplessness they often have minimal motivation,

making them less likely to participate in programs such as 4-H.

A higher percentage of young people in the disadvantaged group live in broken homes where there is usually less parental support than is normally found in middle and upper class homes. Thus, lack of participation in 4-H may result from a lack of interest on the part of parents. Also, lack of adequate finances may be a stumbling block to participation.

Major Problem Areas

Awareness of Opportunities: Youth from low income families need to become aware of opportunities offered by 4-H.

Acquiring Knowledge, Attitudes, Skills: Youth from low income families must acquire new knowledge, attitudes and skills in order that they may live a more satisfying and productive life.

Unique Needs: Extension personnel and adult volunteer leaders must become aware of the unique needs of this sector of our youth population to the end that 4-H activities will be adjusted, adapted and developed to meet these needs.

Extension Program

Special competencies needed by Extension personnel who are involved in planning, developing and executing this phase of 4-H work will be included as part of the training program.

Emphasis will be placed on useful work projects involving some physical skill where possible.

Relatively more emphasis will be placed on group projects and activities.

Relatively more emphasis will be placed on group awards rather than on individual recognition.

-Extension also will: Work through other existing organizations and agencies to reach these young people.

-Involve leaders from this sector of the population.

-Adapt appropriate present projects to fit the situation and needs of this segment of the population and develop new projects where a need exists.

-Give relatively more emphasis to short-term projects.

-Develop techniques and methods for giving immediate reinforcement to achievements and desirable changes made by the boys and girls.

Program Results

The change in participation in 4-H by youth from low income families will be measured by statistical data gathered from the counties in 1966 and 1971. The degree to which the program has been adapted to fit the needs of this group will be determined by an analysis of the materials available in each subject matter area.

Goals for 1971 include:

- 40,000 4-H members from low income families
- 10,000 other youth from low income families reached through special interest groups

ADAPTATIONS TO MEET NEEDS OF YOUTH FROM NON-FARM SEGMENTS OF SOCIETY

Present Situation

The youth population in North Carolina is rapidly changing from farm to rural non-farm and urban. As stated earlier in this plan, 80 percent of the youth of the state do not live on farms. A majority of these youth and their parents are not aware of opportunities available to them through 4-H work. Also, traditionally, projects--especially projects in which boys participate--have been heavily oriented toward agriculture.

Many of the rural non-farm and almost all of the urban youth can not carry "farm" projects. And yet, these non-farm boys and girls will benefit from the training in self-discipline and other learning experiences afforded through the 4-H project.

Specifically, rural non-farm and urban youth and their parents are not aware of opportunities offered by 4-H; rural non-farm and urban youth and adults look upon 4-H as a "farm youth" organization.

Extension, as an organization working with youth in urban, rural non-farm areas, has these problems:

- Lack of trained volunteer leaders
- Projects and exercises, especially those normally carried by boys, not adapted for non-farm youth
- Lack of organized 4-H clubs and groups through which learning experiences are available

Major Problem Areas

Gaining Knowledge and Favorable Attitude: Youth, parents and other members of the urban and rural non-farm segments of society must acquire knowledge about and a favorable attitude toward 4-H work.

Appreciation, Understanding of Role of Agriculture: Urban and rural non-farm boys and girls need to gain an appreciation for and an understanding of the significant role that agriculture plays in society.

Growth and Development of Youth: Urban and rural non-farm boys and girls need to experience the growth and development available through participation in 4-H projects and activities.

Development of Leaders: Adult volunteer leaders need to experience the personal growth and development that is possible through work with boys and girls.

Extension Program

Through mass media, community and neighborhood meetings and personal contact, Extension will provide urban and rural non-farm people an opportunity to improve their knowledge, attitude, and understanding of what 4-H has to offer boys and girls.

In each county Extension will provide the guidance, materials and educational assistance needed to help the leadership, parents and boys and girls create a favorable understanding of 4-H; train the necessary leaders and organize a good, effective 4-H club; use this effort as a demonstration; follow the same procedure in other urban and rural non-farm communities.

Extension will develop projects and exercises for individual club members that will be appropriate, interesting, educational, and acceptable to urban and rural non-farm boys and girls such as clothing, room improvement, plant growing, dog care, leadership and automotive care.

Extension will develop and place emphasis on community projects and activities that will benefit the non-farm club members and be worthwhile and acceptable to the community at large such as community beautification and civic improvement.

Extension will provide ample activities and facilities where club members will be allowed to show, compete and receive awards for project accomplishments.

Extension will place emphasis on recreational programs.

Extension also will provide opportunities for club members'

visitation, where club members can be weekend guests of other club members; clubs may visit clubs in other communities, counties or states, in order that members may observe and learn from other members under similar situations.

Extension must provide adequate training for leaders, both organizational and subject matter, by conducting regularly planned leader training schools at least semi-annually, for 4-lesson duration, in each area needed.

Finally, urban and rural non-farm segments of society must be represented on the county 4-H subcommittee.

Program Results

The extent to which objectives are met will be determined by: number of boys and girls involved; number of new clubs organized; number of individual projects conducted and completed; number of community projects started and completed; extent of cooperation received from business and civic leaders; number of communities where the needs of youth were studied and work initiated; and number of new leaders recruited and trained.

Goals by 1971 include: an increase in the number of organized clubs and special interest groups (among the urban and rural non-farm clientele) to approximately 3,200 with a total of about 83,000 youth participating.

SCIENCE IN PROJECTS AND EXERCISES

Present Situation

The increased emphasis on science in American society has created a trend toward interest in scientific matters among youth. However, traditional 4-H projects have been oriented primarily to "how, when, and what to do" rather than to "why" a phenomenon exists. In addition, leaders, parents and professionals have not emphasized science relating to 4-H Club work.

Major Problem Areas

Opportunities in Science: Youth, leaders parents and professional staff must become aware of opportunities for learning offered through science exercises.

Understanding: Youth need to acquire knowledge and understanding that come from participating in science exercises.

Extension Program

Extension will utilize mass media, such as 16mm films and brochures,

to bring about awareness among parents, leaders and agents.

Subject matter specialists will develop complete materials explaining the theory and principles of science as it relates to a particular area for use by agents and leaders. Also they will provide training for agents so they may develop knowledge and skills in leadership training in this area.

The 4-H staff will provide guidelines to agents for planning, implementing and evaluating program efforts relating to science.

Agents will train and utilize parents and leaders to assist with 4-H science efforts.

Overall, Extension will teach and inspire youth to focus their natural collecting tendencies on rocks, gems, soil, plant leaves, fabrics, etc., as stimulators to further explore scientific phenomenon.

Program Results

The interest in the science effort will be evaluated by determining increase in number of youth participating in the 4-H science activities. The goal for 1971 is a 60 percent increase from 1966 in youth participation in science exercises.

HEALTH IMPROVEMENT

Present Situation

The relatively poor health status of youth in North Carolina--as indicated by a high draft rejection rate, a high rate of venereal disease, the incidence of mental health problems among youth, high incidence of infant mortality--is no doubt caused by many factors. That improper and inadequate diet would rate high among the many causes is easily surmised. Studies show that 4 out of 10 boys and 6 out of 10 girls have poor diets. Thus, it is assumed that one of the causes of poor health among youth relates to nntrition. Furthermore, poor nutrition stems from: (1) lack of knowledge about what constitutes an adequate diet among youth and (2) lack of an awareness of the association between diet and good health.

Lack of physical exercise, poor living conditions and other factors also contribute to poor health among our youth. Also, failure of many families to take advantage of available health services at least partially accounts for the relatively poor health status of our youth.

Major Problem Areas

Awareness: Youth must become aware of the association between diet and health.

Knowledge: Youth must acquire knowledge about adequate diet.

Abilities: Youth needs to develop the abilities to meet individual social and psychological needs.

Relationships Between Health and Environment: Youth must acquire knowledge and understanding of the relationships between health and environmental conditions.

Health Services: Youth and parents need to become aware of health services that are available and to use such services.

Extension Program

In order to meet the health needs of youth, Extension will:

- Increase emphasis on the health project and incorporate health into all appropriate projects and activities.

- Revise health project materials to meet developmental needs of youth.

- Emphasize health through special interest activities and programs. (This type of programming would be especially appropriate for community clubs, special interest groups and mass media.)

- In addition, at lease one, and preferably two, programs a year should be devoted to some phase of health in every community 4-H club.

Program Results

Accomplishments will be evaluated in terms of: number of 4-H members enrolled in health project; statistics taken from 4-H health project records; participation in health activities such as health pageants; and number of health demonstrations and health exhibits staged. Goals for 1971 include a 100 percent increase over 1966 in participation in health demonstrations and activities.

ORGANIZATIONAL CONSIDERATIONS

In order to implement the plan as outlined in the preceding sections of this report--and thus most effectively meet the needs of youth--Extension must consider certain organizational matters. These matters are listed and briefly discussed below.

Policy

Extension will continue to give major emphasis to the 4-H phase of its program; however, some modification of existing policies of the

organization with respect to this phase of the program seems desirable. Some of these changes or modifications are suggested below.

1. Responsibility for the 4-H program in the county lies with the Extension chairman. Although he may delegate certain duties to other members of the county staff, the responsibility for its success or lack of success is in his hands. Programs must be planned and conducted accordingly.

2. The concept of "professional worker-to-lay-leader-to youth" for carrying out 4-H work must become a part of the philosophy of all members of the Extension organization.

3. The Agricultural Extension Service must continue to exert efforts to up-grade the status of the 4-H staff positions in the counties. Opportunities for salary advancements and promotions must be open equally to all county staff members regardless of their area of responsibility. Too, all such staff members must be afforded equal opportunities and incentives for professional improvement. Likewise, the tendency to assign the "newest" Extension worker to the 4-H area of work should be minimized.

4. Competencies required of persons conducting the 4-H phase of Extension's program are such that individuals filling these positions need considerable training (undergraduate, graduate and in-service) in the social sciences. Thus, the policy of employing agricultural technology majors who have had little formal training in the behavioral sciences should be carefully reviewed. In fact it is suggested that agricultural technology undergraduates, who may be anticipating Extension employment, should be advised and permitted to take electives in the behavioral sciences. In the long run, consideration should be given to modifying the agricultural technology curriculum to include the behavioral science training needed by Extension workers.

   (It is recognized that curricula in home economics have behavioral science orientation to a greater extent than do agricultural technology curricula.)

5. A merit awards system similar to that in the scout program should be incorporated into the 4-H program. Every boy and girl participating in 4-H should have the opportunity to "reach the top"--in so far as his ability and potential will permit. This would not require a de-emphasis of the state awards program but would complement it.

Organizational Changes

During the ensuing 5 years the role of the county 4-H coordinator will be more clearly defined. Also, the roles of other county staff

members in the 4-H program will be more clearly delineated. The policy of assigning a member of the state 4-H staff to work in each Extension district should be continued.

Training Needs

The nature of training programs for professional staff members involved in the 4-H phase of the Extension program is indicated by the competencies required of the individual in this role. These competencies include, besides those in agricultural technology and home economics, a basic understanding of theories and concepts in:

- Interpreting social and economic trends
- Group dynamics
- The learning process
- Leadership dynamics
- Motivation
- Programming

Thus, pre-service (undergraduate and graduate) and in-service training programs must include courses--formal and informal--that will help workers acquire abilities associated with the behavioral as well as the natural sciences. This is not to infer that in-service training in subject matter is to be ignored. (It is assumed that plans for subject matter training will be included in other phases of the Extension long-range program.)

A systematic in-service training program for county 4-H staff members should be made a part of Extension's on-going operation. It is recommended that such a program be planned and conducted by an interdisciplinary committee with representation from Departments of Adult Education, Sociology, Psychology, and other appropriate departments. Periodic short courses (of two to three-weeks duration) should be offered and annual two or three-day area workshops for all county 4-H staff members should be held. Because the needs of individuals differ (inadequacies in certain competencies), short course and workshop programs will need to be of varied levels and orientations.

It is anticipated that state level 4-H personnel will continue to take advanced graduate courses in the behavioral sciences and also participate in short courses, workshops, and professional meetings as appropriate.

Coordination and Cooperation Among Departments and Personnel at Various Levels in the Organization

Members of the state 4-H staff will continue to serve as coordinators of efforts in the various subject matter departments in the area of project development and modification. Likewise, the state 4-H staff, in consultation with district agents and with representation from county

staffs, will identify projected program needs and changes.

Guidance afforded local agents in the area of lay leadership, identification and training in the organizational phase of the program will be coordinated by the state 4-H staff but will involve support from sociology, education, psychology, and other appropriate departments. Subject matter leader training support for county workers will be the function of subject matter departments but will be coordinated by the state 4-H staff. The actual training of leaders at the county level will be the responsibility of county personnel. All members of the county Extension staff, regardless of their area of responsibility, should assist with the training of leaders in accordance with their individual competencies.

The preparation of printed materials and other teaching aids will be the function of state Extension staff members (4-H staff for organizational materials and subject matter department staff members for subject matter materials) after consultation with appropriate departmental research staff members and in consultation with Department of Agricultural Information staff members.

Program Expansion

The 4-H Planning Committee suggests that any additional resources which may be available during the next 5 years be used for strengthening the existing 4-H program rather than for expanding into new areas. This does not mean that no modifications should occur.

It is suggested that additional resources should be used to itensify training programs for county staff members. The need for short courses for county personnel is indicated. Also, annual workshops on an area basis for all county 4-H staff members would strengthen the program.

Use of sub-professionals, now being used to assist with details of the program in some counties needs further study.

PLANNING PROCEDURES

The planning process from which the 4-H and Youth phase of the Extension program evolved included these steps:

1. The 4-H and Youth committee made a comprehensive analysis of the current and past operation of the 4-H phase of the Extension program in North Carolina. This analysis included a review of educational objectives, methods and results obtained.

2. Societal factors and trends which have bearing on the needs, interests and aspirations of youth in North Carolina were carefully examined. Primary consideration was given to trends which the committee felt had greatest implications for youth-

oriented programs.

3. Based on the findings in (1) and (2) above, a comprehensive list of problems facing the youth of the state was developed by the entire committee.

4. Based on the significance of the problem and the resources of the Agricultural Extension Service, six problem areas were identified for emphasis during the next 5 years.

5. Six sub-committees, made up of members of the original committee, more completely analyzed each problem area and developed a comprehensive plan for dealing with each problem.

6. At the same time the state committee was working, committees were at work in each of the 100 counties developing county program statements. Each of the 100 county plans was reviewed by members of the 4-H and Youth Committee. The plan which is presented in this report is a modification of the preliminary state report based on review of these county statements.

NUMERICAL GOALS - 1971

Criteria	1965 Farm	1965 Rural N-farm	1965 Urban	1971 Farm	1971 Rural N-farm	1971 Urban
1. Number of 4-H members	26,034	18,333	3,900	37,107	32,735	12,319
2. Number other youth	3,556	2,919	3,335	11,135	17,871	18,948
3. Number of 4-H clubs	1,434	658	140	2,134	1,279	568
4. Number of special interest groups	171	117	90	606	619	705
5. Total youth reached		58,077			130,115	
6. Percentage number reached is of total youth population (9-19)		5.8%			12%	
7. Leaders (number in program):						
a. Junior		1,941			4,767	
b. Adult: (1) Sponsoring Comm. Members		7,846			15,035	
(2) Organizational		5,515			9,170	
(3) Project		4,494			11,381	
(4) Special Interest		548			2,455	
(5) Resource		2,050			2,889	
(6) Other		233			385	
8. Number of community service projects conducted by youth groups		1,816			4,393	
9. Number participating in demonstration program[a]		6,741			13,868	
10. Number different members participating in out-of-county 4-H events[b]		11,355			19,183	

a/Includes those participating in county and/or district program plus others who put on demonstrations before civic clubs, etc.

b/Includes camp, 4-H Club Week, district demonstration day, citizenship short course, leadership conference, etc.

SUPPORTING PROGRAMS

BIOLOGICAL AND AGRICULTURAL ENGINEERING

The Extension Biological and Agricultural Engineering Department is responsible for teaching county agricultural agents and home economics agents, and through them, farmers and homemakers of North Carolina how to make the best possible use of labor, power, and equipment. This program is being expanded to meet the needs of an ever-changing population as cities spread into the country and division lines become less distinct. This educational program is necessarily broken down into different areas with Extension biological and agricultural engineering specialists responsible for different phases.

Biological and agricultural engineering cuts entirely across the field of agriculture. For this important reason the program of this department is intimately involved with the programs of every other department. This makes it rather difficult at times to plan definitely the engineering program because it will be so affected by changes and needs in other subject matter areas. Because of this many sections of this report will appear in detail in other sections of Extension's 5-year program. Since little would be accomplished by a program appearing in two different sections, where the emphasis is in another area, mention only will be made in this report with a very brief synopsis.

SOIL AND WATER RESOURCES AND CONSERVATION

Conservation of soil, water, and plant resources is defined as the protection, use, and improvement of these resources to best serve both private and public interest in providing adequate food, fibre, forest products, recreation, fish, and wildlife. It applies to both agricultural and non-agricultural land.

Effective conservation of soil and water resources must be planned. These plans must be directed toward the proper use of all parcels of land, large or small. The importance of such a plan lies in the fact that the needed land use changes, and conservation practices seldom will be applied in the right way and the right sequence without a sound plan. Wise planning paves the way for systematic decision making based upon logical evaluation of the alternatives for land use and treatment. It involves a careful inventory of the soil and water resources and the collection of data in systematic form to determine not only the best practices from a conservation viewpoint but also the economic consequences of all practical alternatives of use and treatment of the land.

For a more comprehensive coverage of this section, refer to section of this program covering Natural Resources.

IRRIGATION

Present Situation

Irrigation is being used to some extent on practically every crop

grown in North Carolina. Tobacco is the major irrigated crop, accounting for approximately 30 percent of the irrigated acreage. Irrigation operations range in size from the approximately 1,000-acre operation of Eastern Dehydrating Company to nurseries and trellis tomato operations of less than a half acre. The average irrigation operation is approximately 10 acres.

This department has attempted to keep track of the progress of irrigation by years since 1956. The source of information for this compilation is confidential sales reports from irrigation dealers. The cumulative figures show that approximately 95,000 acres could have been irrigated in 1965. This is a 1.25 percent increase over 1964. This small increase is rather startling when compared to a 7.92 percent average increase from 1961 through 1965. Acreage-poundage control on tobacco was the major contributing factor to this very drastic decrease in growth.

A great deal of help is furnished to the educational program of irrigation by the North Carolina Irrigation Society, which is a formal organization of distributors, dealers, and people in education.

A great difference exists in the know-how of our irrigating farmers. It ranges from expert irrigators engaged in growing flowers where cooling is employed along with other irrigation practices, to a great number of farmers who so lack in basic irrigation fundamentals that in general they do a very poor job of irrigation.

Extension programs during the past 5 years have been directed toward gaining information on the response of corn, cotton, and peanuts to irrigation. Programs have also been aimed at raising the educational level of sellers and users of irrigation and promoting the use of irrigation on more crops and larger acreages of these crops. Since 1962 the irrigated acreage has increased approximately 30 percent with irrigation now being used on crops that were considered marginal for irrigation in 1962.

Major Problem Areas

Rising costs of labor, shortage of labor, and the non-availability of or refusal of growers to accept mechanized irrigation equipment pose a definite threat to the growth of irrigation in this state.

Farmer attitude toward the use of irrigation is another serious problem. Many irrigators rate irrigation as an insurance policy against dry weather rather than a crop production tool. Non-irrigators are willing to take lower net profits than to invest in irrigation equipment.

Growers are slow to adopt new irrigation technology. Frost and freeze protection of strawberries, using sprinkler irrigation, has been

practiced in Louisiana for 10 years or longer. Until 1966 there was little interest in frost and freeze protection on the part of strawberry producers even though they have lost a sizable portion of their crop each spring to frost and freezing temperatures.

Many irrigation dealers are not sufficiently trained in the fundamentals of irrigation. This includes basic soil moisture relationships, system design, and system use.

Extension Program

A concentrated educational program will be undertaken to build a favorable climate for irrigation. This program will seek to change the attitude of progressive farmers toward irrigation and encourage them to adopt new irrigation technology. This will be done through applied research demonstrations and field trials, new and revised literature, magazine and newspaper articles, radio and television programs, better trained irrigation dealers, and better informed agents.

In-depth agent training on an area or district basis will be conducted during the next 5 years. Irrigation dealer training will be continued and stepped up. An effort will be made to encourage every seller of irrigation equipment in North Carolina to become a member of the North Carolina Irrigation Society.

Field studies on the response of vegetables and some fruit crops will be conducted. Field studies of chemigation and fertigation will be conducted. Studies on trellised tomato irrigation and strawberry irrigation in western North Carolina will be conducted in cooperation with the Tennessee Valley Authority.

Studies will be begun in cooperation with the Soil Science and Crop Science Departments on furrow or surface irrigation in eastern North Carolina.

Studies on response of corn, cotton, and peanuts will be continued at least through 1967.

Program Needs

Indications are that the number one need is for one agent in each county, or at least on an area basis, be designated as the irrigation agent. He should serve as the resource person on irrigation for the county or area, and his background should permit him to participate and be given in-depth training.

A continuing series of area or district schools is needed in order that irrigation agents may be trained in depth. Irrigation suppliers, distributors, and dealers need periodic training. Growers need both "why" and "how" demonstrations of irrigation. These demonstrations need to

cut across subject matter department lines and be directed toward teaching and motivating the adoption of the practice.

In attempting to meet these basic needs, area and district schools will be held for irrigation agents. Field studies will be conducted which will be interdepartmental. District agents and county personnel will be contacted so that they may furnish guidance concerning special problem areas and areas where emphasis is needed first.

There is a definite need for research in many areas of irrigation for this state. Too little is known about the response of most vegetable and fruit crops to irrigation. Studies are needed on soil compaction and soil aeration under the application of water. Many field trials are needed on chemical and fertilizer application with the sprinkler irrigation system. Research is needed on methods of water application other than through sprinkler systems.

The North Carolina Irrigation Society plans to step up its educational program, and an ever-closer coordinated approach with all people involved in the irrigation practice will be the objective.

Program Results

Solid set sprinkler irrigation will be adopted during the next 5 years by the more progressive commercial strawberry and trellised tomato growers. Many of these growers will include frost and freeze protection, fertigation, and chemigation, along with crop cooling. This is irrigation at its best, and the proposed program will be built around applied research-type demonstrations.

The acreage of irrigated corn and peanuts should increase five times, from about 2,500 acres to 12,500 acres. The acreage of vegetables under irrigation should increase at least three times from the present 5,000 acres to approximately 15,000 acres. Sprinkler irrigation will be more mechanized and automated, with fewer man-hours required per acre to irrigate. The adoption of surface irrigation will be extremely slow, but there will be a number of such demonstrations in eastern North Carolina by 1971.

The entire irrigation program will be evaluated in terms of increased irrigated acreage, increased irrigation efficiency, the number of in-depth agent training meetings, and the increase in know-how of irrigation sellers and users.

HOUSING

Housing is one of North Carolina's chief assets and also one of its major problems. While a large segment of the population is well housed, 44 percent in 1960 lived in sub-standard houses. This 44 percent compares with 23 percent nationwide. Thirty-seven percent of

the families had incomes of less than $3,000 in 1960. This indicates a need for assistance to these families.

Too few low-cost houses are being constructed. In 1964 only 11 percent of the houses built cost less than $12,500.

As income and the level of living rise, the demand increases for better quality houses. The price of houses and labor rises accordingly. Housing costs have been increasing at about 4 percent per year since 1960. The rising cost makes housing even more difficult to obtain for low income families.

This department has conducted a special housing program since 1950. The main feature of this program has been teaching and motivating through result housing demonstrations. For the complete program on housing, refer to the section of this 5 year program on Family Living.

PLAN SERVICE

One of the major contributions of this department over a long period of time has been furnishing free plans to citizens of the state. Plans include farm residences, farm buildings, and farm-made equipment. Typical plans are availabe in practically every area of need - from well designed residences to simple pieces of equipment. Each year approximately 20,000 plans are distributed by specialists of other subject matter departments, county Extension personnel, and the specialists of this department. Needed changes in plans are made by the department draftsman or student draftsmen under the supervision of the buildings specialists. Many new plans are furnished and added to the list for distribution by the Cooperative Plan Exchange. Through this system the better plans designed by specialists in other states are used. Other states in turn use North Carolina plans.

It is difficult to evaluate the benefits of this program. Based on the demand of other subject matter department specialists, their programs would certainly be greatly handicapped without this plan service. To meet the needs of the future, even higher quality plans will be required.

FARM BUILDINGS

In the area of farm buildings, major emphasis will be given to livestock and poultry structures and, their design and application to North Carolina conditions.

The current and projected opportunities for animal agriculture in this state demand greater emphasis on the engineering phases of teaching, research, and Extension for such productions. To meet the demands of today requires the utmost in efficiency of production. It is the responsibility of engineering to provide designs that will

maximize output per animal at a minimum of labor in accordance with the economics of capital cost. To make the most of needed facilities requires that the structures, equipment, and management practices be considered as a unified system. Waste disposal has recently emerged as a necessary factor to take into account for a successful design.

The complexity of the problem requires effective coordination of all available resources. This means team work among personnel with competencies in heat transfer, structural mechanics, electrotechnology, systems engineering, and adult education - all in the context of teaching, research, and Extension. Within the past few years the principal emphasis in biological and agricultural engineering research in the area of animal production has changed from the mechanical and civil engineering problems of livestock shelters to automatic control of environment and mechanization of materials handling processes. Many new tools are available to the farm buildings specialist. There are more complicated machines and devices now possible within the economic framework of agriculture, and more must be provided by and through research.

No exact outline for the proposed program can be set down at this time, but the following proposal will disclose the type program that will be carried out.

A highly trained agricultural engineer will be selected. He will be qualified to give leadership in research, teaching, and Extension on needs, development, and effective programming. Members of the team will come from all areas with interest in animal production. With the assistance of this team, the Extension specialist in farm buildings, through carefully planned research type demonstrations, properly located, will train area agents and specialists in depth. These area people will disseminate the information from the applied research demonstrations throughout their area. Demonstrations will be strategically located within the state. The number of such demonstrations to be conducted will necessarily be limited. The effect of such demonstrations should greatly multiply the number of growers affected.

FARM MACHINERY AND MECHANIZATION

Present Situation

More than 142,000 tractors are now owned by North Carolina farmers. Fewer tractors are being sold annually, but most sales are for larger, more powerful units. This trend prevails in other machinery such as plows, harrows, planters, cultivators, sprayers, and combines. The 4- and 6-bottom plows are replacing the 2- and 3-bottom sizes. Four and 6-row planters and cultivators are rapidly replacing the 2-row units. Large self-propelled harvesting machinery is taking an ever-increasing share of the market. More powerful tractors and wider swathe machinery are ways to improve farmer efficiency, and are a

partial answer to a constantly shrinking and more expensive farm-labor supply.

Commercial agriculture is on the move. Farms are continually falling into the hands of younger, more aggressive, technically trained farmers. These operators are not satisfied with mediocre results but are constantly seeking better and more efficient means of production.

Extension Program

Proposed Extension programs in power and machinery involve continued training in more efficient use of machinery through reduced tillage methods; more accurate application of fertilizer, herbicides, and other pesticides, including low-volume concentrates; and closer row spacing including problems of planting and harvesting. Emphasis will be placed on the use of specialized machinery and on the solving of associated technical problems. Programs will be geared toward preparing farmers to become more highly skilled in the use of these new machines as they move toward fewer enterprises and become more dependent on machinery for automation. Better planned field demonstrations will be conducted as the need justifies. Programs will be designed to tie farm equipment distributors and suppliers with the educational program.

As the need arises in specialized undertakings, available equipment will be adapted to meet these new needs. Distributors will be relied on to promote new practices.

The machinery and mechanization program of this department is involved in all the various crop production programs. As in other engineering programs, machinery too cuts across the entire field. Changes in available sprayers are required in properly using certain insecticides, pesticides, and herbicides. Closer cooperation with the research workers will be employed in conducting applied type demonstrations.

CROP PROCESSING - TOBACCO

Present Situation

Labor problems are becoming more acute on North Carolina tobacco farms. Many fear that in the near future seasonal labor for harvesting will not be available at any price.

A look at the number of hired workers on North Carolina farms during tobacco harvest season and the low labor winter months shows that these fears are not unfounded. A survey in 1960 showed 8.4 times as many hired workers on farms in July and August as in December and January. Also 1.9 times as many family workers were employed during the July-August period as the December-January period. This seasonal labor load amounts to nearly a half million people, over half

of which are hired workers.

Mechanization technology is available and techniques are established to reduce the seasonal labor requirements of tobacco harvesting by a half or more. The proper application of bulk curing facilities and techniques has reduced harvesting labor required per acre from 230 hours to 88 hours.

Biological and agricultural engineering's Extension program in bulk curing has been one of caution. Extension has advised agricultural workers and farmers on the proper application of the new techniques and conferred with equipment manufacturers on proper design. Educational meetings for farmers have been conducted at the request of agents. This new processing technique has been kept in the public eye by newspaper and magazine articles and radio and TV shows.

Major Problem Areas

The chief deterrents to the widespread adoption of bulk curing techniques are:

- Investment required for machinery involved
- Fear of marketplace discrimination against any new or different tobacco practice
- Lack of understanding of fundamentals of tobacco curing and how these basic curing phenomena are accomplished in bulk and/or conventional curing
- Lack of enthusiasm on the part of tobacconists who prefer the status quo
- Uncertainties in the tobacco economy such as diminishing allotments and health scares

Extension Program

The proposed program for "Major Problem Areas" listed above is as follows:

1. In helping to reduce investment costs, biological and agricultural engineering has a unique opportunity. Extension biological and agricultural engineers will work closely with industry in designing, improving, and simplifying bulk curing machinery. They will keep manufacturers keenly aware of research results related to basic curing fundamentals and to applied research tests of feasibility and practicality at the farm level. They will conduct or supervise applied research to aid in machinery simplification

and automation. Engineers will advise other Extension specialists and county Extension workers on the feasibility of "do it yourself" equipment and techniques in various farm situations and management practices.

2. While time and experience will solve this problem, Extension will hasten the solution by objective observation and reporting. The percentage of successes to failures will be emphasized rather than the isolated or extreme example in either case.

3. Extension's greatest contribution will naturally be in education. Processes can best be mechanized and controlled only when they are understood. In teaching county Extension workers and farmers curing fundamentals, biological and agricultural engineers, again, have a unique opportunity. Since curing is best explained in engineering terminology, engineers can best explain this process. Extension biological and agricultural engineers will instruct other Extension specialists and county Extension workers through training schools. They will conduct meetings for farmers to explain curing variables and their effect and control.

CROP PROCESSING - CORN

Present Situation

In 1965 as in the past several years, approximately 25 percent of North Carolina's corn crop was sold at harvest and shipped out of the state. And North Carolina is corn deficit - consuming more than is grown. Corn imported, chiefly in the summer months, is purchased at prices ranging 30 to 50 cents per bushel higher than those received by our farmers at harvesttime. Thus, the need for more storage facilities in North Carolina.

Expanding livestock operations in North Carolina further accentuate the need for storage space. Farmers in North Carolina are establishing storage and drying facilities at an increasing rate. Livestock farmers in particular have a keen awareness of the need for storage facilities.

Extension's role of advising farmers on storage and drying facilities has been difficult due to the wide range of harvesting and drying practices in the state. Biological and agricultural engineers have endeavored to educate and advise county Extension personnel regarding equipment and practices appropriate for each area.

Major Problem Areas

A lack of understanding in drying fundamentals and equipment capabilities is the major problem. Engineering terminology necessary to explain processes and equipment is not readily absorbed by some Extension personnel and by most farmers.

Need does not necessarily constitute want or desire. Many farmers who could profit by storage of grain do not want storage facilities because of (1) lack of awareness of the need, or (2) fear of something new and alien to his operation and understanding.

Extension Program

To create an awareness of the need for storage and drying facilities, biological and agricultural engineering will work with specialists in other departments and with county Extension personnel in conducting training schools and farmer meetings. News articles will be written, and radio and TV programs will be conducted on the advantages of storage.

To educate Extension workers on equipment requirements and usage, Extension biological and agricultural engineers will prepare a circular or grain drying manual. Efforts will be made to simplify and illustrate facility requirements and operational techniques for various area and management regions. The economics of in-storage drying will be contrasted with the speed and convenience of batch and continuous flow drying.

This proposed publication will be used and explained in training schools for agents and will be further demonstrated in advising farmers on equipment requirements and layouts at the request of agents who do not feel qualified in drying and storage requirements.

Through these educational efforts agents should gain confidence in advising farmers on equipment and techniques. In cooperation with other specialists and agents farmers will be made more aware of the need for storage facilities. It is hoped the volume of corn stored in North Carolina will be increased by 10,000,000 bushels in the next 5 years.

CROP PROCESSING - PEANUTS

Present Situation

Mechanization of peanut production, harvesting, and marketing has progressed at a rapid rate over the past 10 years. Production units are becoming larger with a definite trend away from sharecrop operations. The cost of equipment for mechanization of production, harvesting, and curing has increased over the past few years; however, producers have invested in harvesting and curing equipment until an estimated 80 percent of the peanut crop was mechanically harvested and cured in 1965.

In this rapid shift to mechanization, many growers have operated their equipment beyond its intended capacity, resulting in increased damage and lower quality to the crop. Many growers have also adopted

mechanization faster than they have acquired the knowledge for properly operating the equipment.

In 1964 the Pure Food and Drug Administration placed a no-tolerance limit for aflatoxin (mold) on peanuts. This had not been considered a problem; however, with the new regulation almost all of the processing research was concentrated on aflatoxin at the expense of the other quality factors.

Major Problem Areas

A major problem in peanut curing is to make the operator aware of proper equipment for curing and its proper use and operation. Another problem is that some of the equipment being sold for curing was designed for other uses and lacks proper peanut curing specifications.

The price received for peanuts does not reflect the qualities that can be altered by improper curing. A major problem in the peanut industry is the fact that the grading and pricing system does not pay producers for the production of peanuts with all the qualities desired in the market place. There are no marketing grades to measure factors such as flavor which can be altered by improper curing.

Extension Program

The Extension program for the next 5 years will seek to maintain and improve peanut quality as affected by curing, such as flavor, milling quality, and prevention of mold. The program will be conducted through meetings for operators and special training sessions for agricultural agents. A comprehensive bulletin on peanut curing will be prepared, and special emphasis will be directed towards improving available equipment through educational work with the equipment manufacturers.

The program will also be strengthened through cooperation with the Peanut Growers Association and the agronomy peanut specialists.

Program Results

The program should result in higher quality peanuts being marketed. In 5 years there may be a grading system that could distinguish high quality peanuts which are properly harvested and cured. If this is done, it would be worth $2,362,500 to North Carolina growers by 1971, assuming that higher quality could result in only 1/2 cents per pound.

RURAL ELECTRIFICATION

Present Situation

All North Carolina farms have electric power available today.

Many of the farms are not using the potential electric power to as full advantage as possible to increase their income. Of the farms that have expanded their barnyard mechanization and other electrical laborsaving devices, many have not updated their wiring to carry and distribute the electric load. This results in improperly operating equipment, burned out motors, and fire hazards.

Almost all old homes are underwired. Home appliances have been added to practically all old homes over the past few years to the extent that if they are 15 to 20 years old the present electric system is not adequate for the appliances being used today. This results in overloaded electric circuits which are a definite fire hazard.

Major Problem Areas

The major problem is a lack of awareness on the part of most home owners and farm operators of the safe use of electricity and its potential hazards.

Extension Program

The program for the next 5 years will consist of both 4-H youth work and adult work. The youth program will consist of continuing and expanding the 4-H Electric Project. The 4-H Electric Project manuals will be re-written and new manuals added. Promotional work for the project will be conducted through county Extension agents power suppliers, and mass media. The project will teach basic principles of electricity, wiring, motors, and electrical safety.

The adult program will emphasize proper wiring and distribution systems for farms, along with electrical safety. The program will be conducted through meetings, bulletins, and mass media.

Special emphasis will be on training power company advisors and keeping them abreast of current research developments that affect electrical use, such as crop processing.

Program Results

Expected results are more efficient use of electricity, higher production through more labor-saving devices, and fewer electrical fires and accidents.

RURAL CIVIL DEFENSE

Present Situation

It is the direct responsibility of the Agricultural Extension Service to fully inform all rural people of North Carolina about rural civil defense. This includes farm families and people living in rural

areas and in towns up to a population of 10,000. They should be informed about:

- Nuclear disasters and family survival planning and preparations
- Emergency supplies and equipment
- Planning and preparing for livestock survival and handling livestock and livestock products post-attack
- Production and preparation of safe food and feed after fallout
- Responsibilities, organization, preparations, of the various government agencies and functions before, during and after nuclear disaster

Extension also has an important responsibility through membership on state and county United States Department of Agriculture Defense Boards.

Carefully organized educational programs have been developed in depth through a series of meetings conducted with 4-H clubs, home demonstration clubs, organized community groups, and/or all leader county groups during the past 3 years in 30 counties. Groups in these counties have made much progress in planning and preparing for nuclear disasters. In other counties some work has been done and some progress has been made in civil defense. Other counties have made no effort and no progress.

Groups such as civic clubs, farm organizations, USDA defense boards, county agricultural workers' councils, and schools have been worked with to varying degrees. This has been done mainly in counties where concentrated work was also conducted with the four groups already mentioned. Good use has been made of radio, TV, news articles, and circular letters in these counties. Visuals and mimeographed and printed materials have been developed, used, and made available to all counties covering areas of needed knowledge. More and improved materials are being developed and made available to agents.

Three-hour county staff training conferences and/or some concentrated work has been conducted by the rural civil defense specialist in 99 of the 100 counties. While work is progressing quite well in some counties, a considerable number have made little or no progress. Thus most rural people remain uninformed.

Major Problem Areas

Most rural and small-town people are uninformed on rural civil defense. They do not face up to or understand the dangerous world

situation and possible outgrowths of this situation. They do not know the true facts about survival possibilities or the need for or availability of Extension rural civil defense information and training programs.

Extension Program

The program in civil defense will be aimed at training county Extension personnel in subject matter and ways to get it to the people. The program will require a readily available supply of adequate, easy-to-use visuals and printed and mimeographed materials. It also requires that agents find and use sufficient time to pursue this educational effort efficiently.

The county approach may be through in-depth training of 4-H members, home demonstration club members, county organized community groups, and groups of leaders from all organizations and walks of life. Agents may also include pertinent information on rural civil defense in livestock, field crops, nutrition, housing, horticulture, home furnishings, and soils; meetings, circular letters, radio programs, TV programs, and exhibits. Programs in schools would also be very effective.

The objectives of this educational program will be to:

1. Convince rural and small town people of North Carolina of the need for and usefulness of rural civil defense knowledge, training, and actions

2. Bring the level of knowledge of the people to a high plane on the following:

   a. What a nuclear disaster situation would be like

   b. What dangers are created in the target area and outside; how the dangers work; how they affect people; how people can plan, prepare, and protect themselves; what supplies and equipment are needed; and how they can best be used

   c. The situation that would exist with respect to livestock; how they would be harmed, and the effect on cells and body systems; how people can use and improve present facilities for livestock protection, feeding, and watering; safe butchering procedures; cooking methods to remove radio-active materials; and the need for and methods of efficient planning

   d. Radiation and fallout effects on crops and soil, recommended preattack soil treatments; mechanisms of entry and movement of radio-active materials through the

leaves and roots of feed and food crops and on through the food chain to man; crops absorbing large versus small amounts; effect of soil types and nutrient levels; procedures to keep radio-active materials out of crops; and how to mechanically reduce the amounts through food preparation and cooking procedures

Program Needs

Agents need to be encouraged to study and more fully accept their rural civil defense assignments. The county Extension chairmen should, in conference with their staff, assign special responsibilities and see that adequate time is allotted to the rural civil defense educational effort.

A few key leaders should be involved in the planning process. Discussion-type staff conferences with the rural civil defense specialist should be conducted where county programs are lagging. Training sessions for agents on a district basis are strongly needed.

Program Results

The results will be a multiplying of the speed with which North Carolina people gain vital understanding and knowledge, and consequently the rate at which they make needed plans and preparations.

RURAL SAFETY

Present Situation

Each year approximately 3,000 North Carolinians die because of accidents. It is normal for more than 25 percent of these deaths to be the result of home and farm accidents. While this loss of life is terrific, perhaps even more terrible are the untold thousands of accidents that do not result in death but cause terrible physical and mental anguish. Thousands of hardship cases are produced every year because of lost time and hospitalization. The cost of accidents is reflected in both extra cost and loss of income.

Major Problem Areas

Among the major problems involved are lack of awareness of the seriousness of the problem; lack of emphasis given the problem in existing educational programs; and insufficient facts on farm and home accidents occurring within the state.

Extension Program

The Extension program is designed to bring about a change in people's thinking and work habits with respect to safety. The program includes all ages of rural people, and the general publicity will be

directed to all citizens. The involvement of ever-increasing numbers of citizens will be given major consideration.

In the safety segment of the total biological and agricultural engineering Extension program, major efforts will be through close cooperation with the North Carolina Rural Safety Council. This Council is a coordinating organization of agencies, organizations, and individuals conducting safety programs. Through this coordination of efforts, every group within the state should be affected.

A member of the Department of Biological and Agricultural Engineering serves as executive secretary for the Council and is chairman of the executive committee. Through this group the efforts of the Agricultural Extension Service and other groups are greatly multiplied.

GENERAL STATEMENT

There are a number of engineering subjects, vital to the overall Extension program, that require considerable time and effort of the engineering specialists. Many of these subjects merit greater attention than time of present personnel permits. Among them are water systems, fencing, engineering phases of soil conservation, farm ponds, lightning protection, area zoning, and many others.

As special needs arise and as opportunities present themselves, these subjects will be given attention and special programs launched. For example, the engineering phases of soil conservation may take on added significance.

Land is still being retired from production. However, population pressure and appreciation for proper land use point toward land forming for more efficient crop production in the future. Phasing in such a program demands a favorable climate. The climate at present is anything but favorable.

COMMUNICATIONS

Present Situation

Extension, many people say, is communication and Extension workers are communicators.

One could argue that such a definition is an over-simplification. Yet, this description of who we are and what we are should not be dismissed lightly. It is both easy and logical to fit Extension into the communication model of SOURCE - MESSAGE - CHANNEL - RECEIVER.

The great land-grant university system has been Extension's traditional SOURCE of information. Farm people have been the traditional RECEIVER. The task of Extension workers has been to CHANNEL educational MESSAGES from the SOURCE to the RECEIVER.

Thus, Extension workers operate at the very heart of the communication process. They are charged with transferring knowledge from one person to another, which is another way of saying that the job of Extension workers is communication.

It is up to Extension workers to select from many possible MESSAGES found at the SOURCE and to structure these MESSAGES so that they might be acceptable to the RECEIVER. But Extension workers do not call them MESSAGES; they call them programs. Neither do they speak of MESSAGE recipients as RECEIVERS: they are clientele.

Extension workers are not completely "free agents." They must carry out their communication duties within an environment governed largely by what the SOURCE is willing to offer and what the RECEIVER is willing to accept.

Extension's traditional SOURCE of information, the land-grant university system, is bigger, more complicated and better equipped to offer more information on a wider range of subjects than ever before. Additionally, Extension has recognized commercial firms as a legitimate SOURCE of information. And where college and commercial SOURCES of information have proven to be inadequate, Extension has attempted to fill the gap through its own program of applied research. In short, Extension's SOURCES of information are more varied than ever before.

Much of the same thing can be said about the RECEIVERS of Extension information. They are more numerous. Their informational needs vary more widely. They range from the highly motivated to the completely indifferent. There is more competition for their time and attention, which means that MESSAGES must be presented more professionally.

Here, then, is the communication environment in which Extension workers must operate. On the one hand, they must deal with increasingly complex SOURCES of information. On the other hand, they must deal with increasingly complex RECEIVERS of information. To bridge this gap, Extension workers simply must become better communicators.

The Department of Agricultural Information has a dual role in the total Extension communication picture. It must shoulder directly a sizeable portion of the communication load, and it must provide materials and know-how that will help other Extension workers shoulder their communication responsibilities.

Traditionally, mass forms of communication have received the most attention from department editors. Group and person-to-person communications have ranked second and third in departmental priorities.

Diffusion research has pretty well defined the role of each of these types of communication in the adoption of new ideas and practices.

Major Problem Areas

Communication planning: Editors do not feel that there is enough coordination between them and subject matter specialists. The manner in which editors and specialists work together varies according to the channel of communication involved. Requests for publications, exhibits and other visual materials almost always originate with specialists. Suggestions for news releases and radio tapes, on the other hand, are more than likely to originate with editors. Neither of these two extremes is satisfactory.

Editors feel that many specialists do a poor job of helping them to stay abreast of major subject matter developments. As a result, communication efforts frequently fall into the category of "too little too late."

At other times, editors feel that specialists and administrators consult them after all of the decisions have been made, leaving them little opportunity to help build sound communication principles into programs.

Agents, and specialists to some extent, are slow to adapt communication channels to meet the needs of changing audiences and subject matter information. The farm page, for example, may be obsolete as a channel for reaching urban women with information on nutrition. Yet it is still used for such purposes.

Communication training: Most Extension workers are trained in the traditional subject matter areas. Yet, experience has shown that

subject matter training is not enough. Agents and specialists must be able to communicate their subject matter knowledge to others in order to be effective.

Present communication training is sparse and fragmented. Experience has shown that the agents and specialists who need training the most are the least likely to ask for it. Experience has also convinced editors that supervisors give communication training low priority when compared to subject matter training.

Training sessions are usually organized on the basis of geography or sex. Little attention is paid to selecting training participants on the basis of general communication development or on the basis of specific media interests.

Extension has made rapid progress in moving away from the subject matter generalist. Yet, nearly every county worker is still expected to be a communications generalist, which is unrealistic.

Communication production: Audiences (receivers in the communication model) are becoming more complex. They have different subject matter needs, comprehension abilities and motivational levels. This raises questions about how much longer Extension can afford to direct its messages toward the mythical "average" reader, viewer and listener.

Not only is Extension information becoming more voluminous, much of it is becoming more perishable. It must be gotten to potential users within certain time limits or it is of little or no value.

Knowing when to emphasize or de-emphasize communication channels to reflect changes in sources and audiences is always a problem. One thing is certain, however, increased attention must be given to the public mass media as a means for conveying family living information to homemakers.

Use of public mass media is economical since private companies share the cost of transmitting the information. But there are disadvantages, too. Extension workers have little control over the messages once they are given to the mass media, and sometimes media relationships can be difficult.

Extension Program

Communication planning: Editors will strive to coordinate their efforts more closely with those of subject matter specialists. Periodic (annual or semi-annual) conferences between editors and specialists representing the major subject matter areas are planned. The purposes of these conferences will be to delineate "communications goals" within the major "educational goals" being sought by the specialists. Editors believe they can aid specialists by helping to focus attention on the

4. By keeping the IDEA DISTILLER attuned to the immediate communication needs of Extension workers

5. By holding workshops whenever feasible

6. By urging new agents and specialists to tour the department to see what services and training aids are available

Communication production: Extension home economists must make better use of mass media if they are to achieve their objectives. There is no more effective way to reach the mass audiences to which Extension has obligated itself.

Fortunately for Extension, home economics information is well suited for mass communication. It is general in its application and it appeals to broad audiences.

Additionally, the public mass media are constantly striving to make their product more useful to their readers, listeners and/or viewers.

But usefulness is not enough. Extension information must be professionally presented to be acceptable to busy homemakers.

Here is how the Department of Agricultural Information plans to contribute to the new 5-year program:

-Home economics work in radio and television will be strengthened, and an experiment to see if the mass communication effectiveness of county home economists can be increased will be launched.

-A search will be made for speedier and more economical systems for conveying Extension information to the public. Consideration might be given, for example, to standardized leaflets that can be rushed to highly motivated segments of Extension's clientele. These leaflets would not require the elaborate planning and art work that is now required for publications going to readers with average motivation. Educational television offers other possibilities for conveying highly specialized, in-depth information to selected audiences.

-Experiments will be conducted to see if it is desirable to structure the same message in several different ways in order to reach different segments of Extension's audience. A publication, for example, which is written for the average audience might also be rewritten for a low-income audience. Or the same information that might be presented in written form to one audience might best be presented to another audience in the form of an exhibit or slide set.

-A review of county and state program statements reveals that direct mail (newsletters) is becoming increasingly important as a channel for transmitting Extension information. The department plans to help agents and specialists with their newsletter problems by: (1) developing special commodity related headings for newsletters; and (2) designating one editor as a newsletter advisor.

Program Needs

To meet its 5-year program objectives, the Department of Agricultural Information needs the close cooperation of administrators, specialists, and agents. Also more resources in the area of home economics will be needed to take full advantage of opportunities in mass media.

Program Results

Communications efforts of the department will be more closely related to the subject matter goals of Extension. Extension workers will have a better appreciation of good communication principles. Information disseminated by Extension will be better geared to the needs of the people.

ENTOMOLOGY

Introduction

Each year the farms get fewer but larger. Consequently, the margin of profit per unit may be low but when multiplied by a larger volume may be very significant. The Extension entomologist must therefore be better trained to evaluate critical commercial situations and make current recommendations.

Each year the Extension entomologist becomes more involved in programs of public health importance because of the emphasis on pollution of the environment by chemicals and other environmental health problems.

Some entomology programs involve many areas. Each area takes little time and effort but when taken together much work is involved, for example, soil pests. Small programs are operated in tobacco, cotton, peanuts, corn, and lawns.

Agri-business or post-harvest insect problems are demanding more attention. There are problems in such areas as warehouses and processing plants.

Because of the complex legislation relating to pesticides and pesticide usage more time is demanded by the agricultural chemical industry. In this area the Extension entomologist must attempt to read and evaluate results from other states and counties, since less applied research is being carried out at land grant universities.

The greater part of the Extension entomology program was described in the commodity statements. What follows are the areas not covered in the commodity statements which deserve attention. These include: area fly control, 4-H and youth, safe and proper use of pesticides, non-farm entomology, and pest control in recreation areas.

AREA FLY CONTROL

Present Situation

With an expanding livestock industry and an urban housing sprawl, area fly problems are increasing. Each year more problems are created because housing developments have engulfed established livestock and poultry operations. Therefore, the problem of insect control involves the lagoons for waste disposal, the actual livestock housing area, the community surrounding the livestock operation and even individual home owners.

Major Problem Areas

Most people will not tolerate even a low level fly infestation.

Extension Program

Acceptable control programs will be developed in cooperation with county and state agencies such as dairy fieldmen, Dairy Herd Improvement Association testers, public health workers, and water pollution personnel for distribution by mass media and in working on specific problems.

Program Needs

Emphasis should be placed on preparation of educational materials for specific groups. Schools involving all agencies could be held on an area basis. Livestock producers should be informed of potential problems.

Program Results

Area fly populations will be reduced, thus minimizing disease and pest problems.

4-H AND YOUTH

Present Situation

The 4-H entomology enrollment decreased when the program was taken from the schools to the community centers. This was anticipated since most lay people are hesitant to advise 4-H members on entomology. The enrollment is now, however, increasing.

The 4-H project and demonstration work lends itself well to metropolitan and non-metropolitan areas. Also many of the low-income families have found the 4-H entomology program for clothing and garden insect control attractive.

Each year more attention is given to youth programs at elementary and high schools. At the elementary schools the information deals with such things as insects, their structure, life history, metamorphosis, and habits. At high schools the information is directed so as to explain the field of entomology. Occasionally it is directed more specifically to the uses of insects to probe outer space or methods of insect control in North America.

In most of the project and demonstration work in entomology the extra "step" from Extension agent to 4-H member through the community leader has allowed considerable old, unreliable information to creep into use.

Major Problem Areas

There is a shortage of trained 4-H leaders in entomology and

materials for their use in working with 4-H youth.

Extension Program

State or area meetings will be held.

A manual of Insect Collection and Study has been revised. Record books for all ages will be prepared to go with the manual. It is planned to prepare a manual on Insect Biology and Control. When this manual is prepared the record books will be needed for this area, too. A manual on insect biology and control and beekeeping, along with record books, will be prepared. Leaders training manuals and slide sets will also be prepared.

Program Needs

It would be advisable to accelerate the present proposed program. There is a continued demand for youth work at summer camps, elementary and high schools, community and junior colleges.

Program Results

The 4-H entomology program has now taken root in community clubs. It is anticipated that after a low of 1,500 members in project work in 1963 and 2,000 in 1965, there will be 4,000 in 1971.

SAFE AND PROPER USE OF PESTICIDES

Present Situation

As a result of the controversy over the cranberry incident, Rachel Carson's well read book, Silent Spring, and the pesticides-in-milk situation, the public is demanding information regarding insecticides. Farm people in particular know the need for pesticides and the part they play in producing a marketable product. An adequate food supply would be impossible without pesticides.

Major Problem Areas

Many people do not understand the necessity for using pesticides safely and properly. Also there is a lack of understanding concerning the need for pesticides in modern agriculture.

Extension Program

Extension will present factual and practical information that will encourage safe and proper use of pesticides as an agricultural tool. Regional meetings are planned with county Extension personnel and pesticide dealers.

Program Needs

More educational materials will be needed. There is a greater need for cooperation among such agencies as Public Health, Medical Society of North Carolina, and Vocational Agriculture teachers.

Program Results

There will be a reduction in the number of cases in which pesticides were used improperly.

NON-FARM ENTOMOLOGY

Present Situation

Because of the demand for a package program for the householder, material relating to household, structural, tree, shrub, flower garden and lawn pests is being developed.

A leaders training manual for household pests, a set of slides and hand out material have been developed. A slide set on ornamental and garden pests, without leaders training manuals, has also been prepared.

These programs tended to be separate ones but when combined into one program they have been well received.

Major Problem Areas

There is a lack of reliable and understandable information for the householder on lawn, house, and garden pests.

Extension Program

It is planned to prepare a package of information on lawn, garden and household pests for distribution through mass media and local leaders. It will be channeled through all county Extension offices.

The package will contain slide sets and scripts, leaders training manuals and other aids, as well as hand out materials for individuals.

Program Needs

This program should be developed into a cooperative program, not only with county agents but also with pest control operators, garden clubs, pesticide dealers, etc.

Program Results

Initiation of a package program for the householder will be part

of the on-going program in entomology.

PEST CONTROL IN RECREATIONAL AREAS

Present Situation

With the emphasis on more leisure time, the development of recreational areas and the commercial development of efficient economical camping equipment, more attention is directed to pest control in recreational areas.

This can be all the way from the control of pests of beachgrass on the coast to blackfly control on humans and tree pests in the mountains. For example, a camp site at Umstead State Park requires treatments for housefly and other nuisance pests around the tent areas, the picnic tables, and other facilities. Termites attack buildings and tables; mosquitoes, ants, bees, and wasps are a nuisance to people. They contaminate food and may even spread disease.

Trees around a camp site are very valuable and must be protected at all cost from the ravages of insects.

Grass areas must be treated to control ticks, grubs, and soil pests destroying the ground cover.

Major Problem Areas

There is a lack of reliable and understandable information on pest control in recreational areas.

Extension Program

Training meetings will be held annually for park supervisors.

Since this is a specialized area, manuals and other literature would have to be prepared. Slide sets would also aid at training sessions and also for teaching new personnel.

Program Results

An upgrading of knowledge of pest control will be effected among park superintendents.

MANAGING THE TOTAL FARM BUSINESS

Present Situation

North Carolina's agricultural industry is going through a period of dynamic change. The pace is likely to accelerate. Farms are being reorganized as a result of restrictions on the historically important cash crops and changes in market conditions, farm structure and agricultural resources.

Therefore, emphasis on organizing and managing the farm business is essential in a comprehensive Extension program. The question of what to produce logically precedes the need for information on how to produce given commodities. Inclusion of such a program will assist farm people in making the best uses of their resources.

Several specific changes affecting farmers accent the need for farm management education.

- Specialized production is occurring on many farms. Because of the diversity of the state's agricultural resources, specialization is resulting in many different types of farms.

- Ownership and tenure patterns are shifting. While the number of share-croppers is decreasing rapidly, many owner-operators are renting additional land and/or are working in informal partnership arrangements with others.

- Capital requirements for agriculture are increasing, thus necessitating careful attention by farm operators to financial management.

- A large number of farm operators are in the older age groups. Yet, with farm consolidations, the number of farm-reared youth exceeds the number of replacement opportunities in agriculture.

- Farm operators find themselves on a "technological treadmill." Increased labor costs provide an incentive for increased mechanization and capital expenditures on farms in order to compete with other farmers. At the same time, this increased mechanization requires a larger volume of business to justify the expenditure.

These changes and the ensuing problems which face farmers emphasize the importance of work in the organization and management of the farm business.

Extension Program

Educational work in farm management is directed at analyzing problems and providing information on: (1) the economics of production for a type of farm or commodity and (2) the organization and management of the total farm business.

Commodity Economics: Work on the economics of production for a particular commodity includes the following subject matter: enterprise budgets, enterprise records, enterprise financing, commodity outlook, commodity programs, and economics of practices.

Interdepartmental coordination between economists and production specialists at the state level is required. This would help to provide farmers specializing in a particular commodity with the comprehensive program they need. To facilitate such cooperative work, part of the program of the respective farm management specialists is informally concentrated on a particular type of farm (dairy, livestock, poultry, field crops and horticulture).

Educational work on the economics of producing particular commodities is a necessary prerequisite to the problem of organizing and managing the total farm business.

Economics of the Total Farm Business: The work in organization and management of the total farm business deals almost exclusively with economic subject matter and includes:

Total farm planning; total farm records; agricultural outlook; farm finance; family farming agreements; leasing arrangements; government farm programs; taxes, insurance and social security.

The importance of these subjects is emphasized by the following types of questions which a farmer faces in organizing and managing the total farm business:

1. What combination of crops and livestock will pay best on my farm?

2. What are appropriate business procedures for my farm in record keeping, credit, financial management and tax reporting?

3. How can I obtain additional resources with which to farm and how should these resources be combined?

4. How will public policies affect my farm business?

Most of these problems to which farmers direct inquiries are over and above those questions of how to produce commodities. They relate to how resources are employed.

Methods: The following methods are used by Extension economists in farm management to conduct an educational program in organizing and managing the farm business:

- Training activities to improve the competence of county agricultural agents and other professional agricultural workers to teach the

skills necessary in organizing and managing the farm business

- Preparation of educational materials in farm management for professional and farm audiences, maintaining and updating agricultural statistics and conducting feasibility studies

- Providing leadership to key statewide groups

Appropriate activities in farm management by county staff include:

- Conducting systematic county farm management meetings with farmers facing organizational problems. This technique has proved highly successful where a series of meetings have been planned either for consecutive nights in a week or one meeting per week for several weeks.

- Specialist assistance to county agents as necessary on some farmer meetings and consultations on management problems

- Distribution of materials by county agents to create interest in and disseminate current information on various aspects of farm management

- Farm planning and record keeping projects. Such projects would provide farmers with the information they need to analyze the business and to make sound management decisions.

Program Needs

There are several organizational features of the Extension program which would facilitate the needed emphasis on the organization and management of the farm business.

The following suggestions relate to programs:

More use of modern farm planning techniques should be considered at the county level. A substantial number of county Extension workers have had training in simplified programming and other farm planning techniques. County staffs could develop enterprise budgets and resource situations on either individual or typical farms. The results should be useful in Extension educational programs for farms with similar resources. Due to the increased complexity of many farm businesses and the tedious computations necessary for developing comprehensive farm plans, University computer facilities should be used more extensively. Additional resources would be needed for this activity.

Farm record programs, such as the dairy farm records program, should be adopted as rapidly as feasible for additional types of farms. This requires commitment of production specialists and farm management specialists, as well as agents, to the activity. Additional

prerequisites are farmer interest and means of financing records processing costs.

The need for farmers to acquire an adequate bundle of resources should be emphasized if farmers are to earn a reasonable livelihood from agriculture. Educational programs should be conducted on alternative methods to increase the size of operating units and the evaluation of these alternatives (credit, leasing, inheritance and contractual agreements).

In order to implement such educational programs, the following methods should be considered:

1. At the state level, interdisciplinary teams of specialists should continue to be encouraged to conduct a comprehensive educational program related to given types of farms.

2. At least one Extension agent in each county should receive intensive training in "Farm Decision Making" to teach him the skills necessary to assist farmers in farm management. At least one agent per county would then be able to deal with questions involving the total farm business.

3. Some of the division of responsibilities among a county's farm agents results in a commodity specialization. At the minimum, such specialization should include responsibility for the full array of technical and economic questions for a given type of farm. This implies cooperative work between the specialized agent and county co-workers who have had training in economics, area agents, where available, and farm management specialists. Assistance should be provided in organizing a particular type of farm along with education on production technology.

4. Some use of the area approach may be effective in dealing with some farm management subject matter.

5. Whole-farm demonstrations offer additional educational opportunities to illustrate the results of applying farm management principles. This technique would complement the all-practice demonstration which illustrates the effect of production techniques upon productivity of a single enterprise.

6. The organization of county farm management associations would establish a closer rapport between farmers and Extension workers. Such organizations would encourage the development of a farm management program dealing with pertinent management and organizational problems in a timely manner.

MARKETING AND UTILIZATION

Present Situation

Agriculture has traditionally been production oriented and our marketing system has grown to serve the diverse interests of farmers. As competition has increased, the role of the consumer in our marketing system has become more important. As a result, marketing firms have had to pursue more aggressively the goals of serving specific consumer needs. Meeting consumer needs has required adding many services and altering characteristics of the raw agricultural products, or in other words, the development of many additional types of business firms to perform these functions. These functions are often categorized under the broad title of Marketing and Utilization. Thus, agriculture has had to become more interested in, and understanding of, the workings of the marketing system. The willingness of some agricultural marketing firms to look outside of agriculture for raw materials has heightened this interest.

As the marketing and utilization functions (such as procurement, assembling, processing, storage, transportation, wholesaling and retailing) have increased in number and scope, there has been an increased need for assistance in understanding these functions by training and management personnel and in adapting economic and technical information to improved efficiency and innovations in the market place. Marketing practices and the workings of marketing systems have had to change. Also, individual firms within a marketing system have special demands made upon them because innovations in products and methods require rapid adjustments to new situations.

While these changes in the marketing systems have been underway for many years and there is considerable difference in the complexity of the systems used for various farm products, there is no question but that the pace of change has increased greatly since World War II. Greater demands have not only been made on the private sector of the economy but also on the public one. As a result, North Carolina State University has responded to this need by placing greater emphasis on research and Extension programs to serve the marketing needs of agri-business firms. However, there is much more work to be done.

Major Problem Areas

Understanding agricultural marketing: Farmers, processors, agricultural leaders and consumers need to have a better understanding of the role that marketing plays in the economy and the manner in which the markets for agricultural products function.

Efficiency of marketing systems: Many of the marketing industries are organized or function in a manner which is not optimum for full development.

Efficiency of firms: Individual marketing firms need to increase their efficiency in order to be more competitve with firms in other areas and to increase the total market for their products.

Developing new markets: Additional markets need to be developed for North Carolina products.

Extension Program

The audience groups for this program will include farmers, owners and operators of marketing firms at all levels, consumers, personnel in public agencies and the public at large. Emphasis will not be placed upon work with all these groups to the same extent. Resources do not permit Extension to work with marketing firms at all levels for all commodities in the same way. However, the purpose will be to establish working relationships with all these groups to the greatest extent practical.

Producer and Consumer Marketing Decisions: Emphasis will be placed upon teaching the marketing system to farmers and consumers, both adults and youth. The decisions of these groups are affected by their understanding of the manner in which prices are made and the role of the marketing system. Prices in guiding production will be emphasized. The nature and cause of seasonal variations in prices will be explored for both producers and consumers and the implications of these price movements for individual decision making will be developed. Emphasis will also be placed upon projecting prices and outlook for agricultural products. A greater understanding of the importance of production efficiency, as well as marketing efficiency is needed, along with a better understanding of the mutuality of interests of producers and marketeers. This work will be conducted primarily through contacts with large numbers of people, through newsletters, radio and television programs, newspaper releases, and publications. The information generated in this program will be useful to county Extension staffs in working with their audience groups on the local level.

Industry Efficiency: Work will be carried on with industry groups in matters relating to the efficient functioning of total industry segments. These include work relating to the way industries are self regulated and regulated within a public-legal structure and how well marketing groups can modify institutional arrangements to better serve new situations. Attention will be given to how well marketing systems are reflecting demand characteristics and to changing relationships in demand and supply. Also included will be the relationships between and among firms within the industries as they affect the functioning of the market system, the providing of marketing services and the adoption of certain market practices. The role and functioning of cooperative business firms will be involved in improving market structure. The relationship between the efficiency of marketing systems and public policy will receive close attention. This work will be carried on through work with industry leadership groups and by work with public agencies.

Efficiency of firms: Individual marketing firms need to increase their efficiency in order to be more competitve with firms in other areas and to increase the total market for their products.

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Firm Efficiency: Work will be carried out with farm marketing and supply firms on problems of firm efficiency. This will encompass the adoption of new technology, the use of the optimum combination of resources within the firm, the optimum size of firms, and the optimum combination of activities within the firm. The rate of change of technology places increased emphasis upon this work. This work in firm efficiency will be carried out through work with firm managers in workshops, in trade association meetings, in communications with groups of firm managers by newsletters, and by personal visits and contacts.

Special emphasis will be placed upon developing the pool of management talent available to owners of marketing firms in the state. This will involve teaching the functions of management to broaden the scope of managers and potential managers in the decision-making process. Special attention will be given to training directors of cooperative associations. The role of the tools of economic analysis in firm management will be integrated into the functional approach to management. The role of technology in operational management will be woven into this management training. This work will be carried on through regularly scheduled workshops and seminars with various groups of managers in the state.

Market Development and Expansion: Emphasis will be placed upon area and regional analysis as a means of developing new products and new markets for these areas. It is important to identify and teach the adoption of new technology in processing new agricultural products. Economic feasibility analyses also will be made for areas emphasizing those products which seem best suited. An integral part of this will be the effect of transportation in the development of areas. Competition between regions, means of increasing trade between regions and nations, and the effect of national policies will be related. The importance and means of improving and controlling product quality will be emphasized. This kind of work will be carried on through many forms of contacts with firms individually, in trade groups, through workshops, newsletters, and publications.

Program Needs

Management Talent: Probably the most crucial shortage in the development of North Carolina's resources is the shortage of management and technical talent. Although this problem was discussed in other sections of this program, it deserves special attention here. Effort will be made to inform young adults about possibilities for developing their talents and the opportunities for employment in the growing agri-businesses. To this end efforts will be made to recruit high school graduates and uncommitted freshmen and sophomores on this campus to consider majoring in curricula which can lead them into important positions in marketing businesses.

In-Service Training for Extension Personnel: A coordinated program of training in the economics and technology of marketing will be developed for Extension personnel at both the county area and state level. This program will start with a basic training program in the economics of marketing. With this basic background, attention will then be given to commodity marketing problems including both technology and economics. Initial emphasis will be on training county workers who have specific responsibilities requiring knowledge of marketing agricultural products. Special adaptations will be made, however, to make this training available to specialists on campus with primary responsibility for leadership of broad commodity programs. This will build into their understanding a greater knowledge of marketing functions and the total requirements for developing a total production-marketing complex in an area.

Coordination With Other Departments and Agencies: Departmental coordination with other departments on campus and agencies with common purposes needs to be improved and strengthened. Too often the programs in production, utilization and economics are uncoordinated and at times, conflicting. For some commodity programs, there is a high level of coordination. In others improvement is needed.

Program Results

The results expected of this program in the next 5 years will be more efficient marketing firms that reflect consumer demands back to the production level more effectively. Many industries in the agribusiness sector will be characterized by fewer and larger firms and the marketing system will more readily adjust to market forces. Producer groups will have a greater appreciation for the role of markets in handling their products and in reflecting the reaction of consumers to them. Great strides will be made in more fully utilizing the products of our farms in terms of new foods and industrial uses. Also, increased employment opportunities will be made available for North Carolinians. In short, the marketing system, through more efficient operation, will better serve the needs of farmers, processors, and consumers.

PLANT PATHOLOGY

Present Situation

One of North Carolina's greatest assets to farm and non-farm people is its wide diversification of climate, soil types and crops. At the same time, the varied climatic conditions, the numerous soil types and the wide variety of agricultural crops grown are collectively more conducive to a wide variety of destructive plant diseases than are found in many areas of lesser diversification.

In 1960 it was estimated that plant diseases cost North Carolina producers nearly $100 million (or an average of more than $10,000 per square mile of cultivated acreage) even though more than $10 million was spent on known and approved disease control practices.

Growers in the past have made progress in saving millions of dollars through the use of disease control practices. For example: (1) Annual losses from nematode diseases in tobacco were reduced from $14 1/2 million to $6 million during the 5-year period 1957-1961; (2) $2 million additional return annually to peanut growers has been realized through nematode control practices since 1962; (3) Strict disease-control programs adopted by growers have been one of the biggest factors in insuring successful establishment of the new trellised tomato industry in western North Carolina. While these and other examples of reductions in plant disease losses can be cited, there are big gaps to be filled.

Major Problem Areas

In many instances growers of field grown crops, both under acreage controls and otherwise, may generally be in better position to use land selection, crop rotations, cultural practices and chemicals more efficiently for disease control as individual units become larger and more acres are available for better management. On the other hand, high costs of mechanization for specific crops may tend to push some farm operations into a reduced number of crops grown and complicate the use of adequate crop rotation systems designed for reduction of plant diseases. Smaller farm units will require more custom or "cooperative" use of mechanization in disease control operations in light of high cost of mechanization equipment and the shortage, high cost, and attitude of labor. In all operations, judicial use of known useful technology must be adopted to maintain these enterprises at the highest level of efficiency.

Much emphasis is being placed on more economical maintenance of old enterprises and on the sound establishment of new enterprises in the horticultural field. Demands of processing and fresh market enterprises, together with increased marketing and consumer education programs, is focusing attention on the fact that growers are constantly facing a situation of more competitive and quality-conscious markets.

Too frequently plant diseases prevent growers from producing commodities profitably and from satisfying the demands of the fresh market and processing enterprises with a dependable supply of high quality products.

Establishment and maintenance of profitable intensive culture crops enterprises is frequently jeopardized because: (1) Intensified production of crops in relatively small areas without benefit of proper land management practices increases the severity of already existing major diseases and previously considered "minor" diseases tend to become "major" disease problems; (2) Many growers continue to introduce disease organisms on imported plants not grown under proper disease-control programs and/or they fail to carry out proper disease control in their own plant-bed operations; (3) Proper types of pesticide application equipment are not always available to many growers for their special needs and/or many growers may not use adapted equipment properly; (4) There is sometimes a tendency for some growers to cut corners by omitting certain pertinent disease control practices which seem to them to be "expensive" or which "do not fit in well with their present production practices."

Technical advancements and competition within the agricultural chemical industry results in a continuous stream of new pesticides for plant disease control. Consequently, it becomes difficult for Extension specialists, agents and other advisors to keep abreast of the latest developments, not to mention rural and urban users. Many farm and non-farm users of fungicides and nematocides, through confusion, may apply materials on the wrong plant, on the wrong schedule, in improper dosages or in wrong combinations with insecticides, etc. On the other hand, many producers refrain from using needed chemicals because of undue publicity on the evils of the use of pesticides in recent years. A lack of basic training in plant diseases and control measures on the part of field staffs, presents a serious problem in channeling properly interpreted information to the ultimate user.

Extension Program

Plant Pathology is an integral part of the total production program for all commodities. The primary objective is to promote grower adoption of better methods of plant disease control measures designed to aid in more economical production of quality plants and plant products. To reach this objective, the specialists seek to provide, through the assistance of a wide range of audience groups, channels through which growers can be reached with properly interpreted information on the correct application of known workable disease control measures to reduce losses in seed bed, in field, in transit and in storage.

While the "primary" audiences, through which plant disease specialists channel information to the grower, may be considered to be commodity subject matter specialists and county Extension agents

the efforts of this group alone would be futile without the assistance, support and encouragement of many other groups. Cooperation of and with public agricultural agencies and associations is vital. In addition, it must be recognized that many private agencies are directly concerned with and somewhat dependent upon the growers' judicial and profitable use of disease control practices. These include: commercial field representatives of pesticide manufacturers; formulators and dealers; food and feed processors; commercial dealers and distributors of seeds, plants, pesticides, and pesticide application equipment; seed processing and chemical treatment operators; seedsmen's associations; commodity associations; farm management services; chambers of commerce; civic clubs, and others.

Since many audience groups are involved and are dependent on efficient operations from producer to consumer, the obligation of Plant Pathology Extension is to keep all groups informed and to utilize their assistance in channeling information on plant diseases and their control to the best use for profitable high quality production.

Work toward development of a workable plant disease manual for agents is being initiated. Preparation of printed and mimeographed publications, circular letters and visual aids will emphasize those areas most concerned with the 5-year program. All assistance possible will be given in conducting method and result demonstrations including all-practice demonstrations.

Improvement in diagnostic services rendered in the Plant Disease Clinic at North Carolina State University will be better assured by changes currently being made. However, the success of this program will depend greatly upon sound judgment and cooperation given by those submitting specimens for diagnosis. Assistance with local clinics and with individual "trouble shooting" will be given by specialists as the need arises and time permits.

General surveys, from time to time, are basic needs in a plant disease control program. Situations may arise in any season when emergency surveys on new disease occurrences or unusual outbreaks of known diseases occur. In addition, cooperation with the United States Department of Agriculture, Plant Disease Warning Service, will be maintained.

The Extension Pesticides Education Committee has and will continue to do an outstanding job of creating a proper image on the part of the general public on the need for, and judicial use of, agricultural and household pesticides. It will also continue its intensified educational program, with major emphasis on safe, proper use of pesticides to be used in major enterprises.

Program Needs

While significant contributions are being made by the present

force all production areas cannot be adequately covered. The biggest gap lies in pathology of horticultural and forestry enterprises and in 4-H and youth programs. From a long-range point of view the inclusion of formal, basic training in plant pathology for prospective Extension employees should be included.

Intensification of in-service training for agents and leaders is encouraged.

The need for training dealers and custom application operators is greater than ever through such media as the North Carolina Pesticide School, county or area pesticide schools, schools on basic plant disease behavior and control methods, efficient distribution of printed recommendations, individual conferences, etc.

While applied research activities by Extension specialists is a must, especially as regards chemical evaluation tests, it must be remembered that it doesn't take many field plots, statistically sound in lay-out, to drain heavily on specialists' and agents' time. Provision for sub-professional assistants, training of personnel, and utilization of the area specialist concept would help to alleviate this problem. In addition, perhaps some compromise between what is statistically sound and what is "practically" sound needs to be considered. Applied research activities will center around those enterprises most concerned with the 5-year program.

Program Results

Results of this program will be evaluated by use of the following criteria:

1. A qualitative appraisal of attitudes and general interest. This can, in part, be accomplished during tours and through observations and questionnaires.

2. Gain in efficiency of the subject matter area which is now different from areas of specialization by agents and leaders. This can, in part, be evaluated by correlating disease incidence, yields, and quality of plant products obtained with the methods employed, through production records, market grades and prices, tours and questionnaires.

3. Quantitative reduction of disease losses and increase in farm income for given area of county

PRODUCTION AND MARKETING GOALS

Farm Income Goals by Commodities

Commodity	1965	Anticipated by 1971
Feed Grains:		
Barley	1,997,028	2,399,810
Corn	89,012,686	104,294,610
Oats	3,219,043	3,826,922
Sorghum	2,254,723	2,483,853
Wheat	8,766,747	24,000,000
Rye	971,833	1,048,360
Mixed Grain	32,000	32,000
Total Grain	106,254,060	138,085,555
Forages:		
Silage	473,650	784,750
Hay	8,695,185	9,534,235
Straw, etc.	240,500	275,000
Coastal Bermuda	0	375,000
Sorghum Molasses	244,550	258,325
Lespedeza Seed	833,109	692,994
Fescue Seed	41,250	38,850
Total Forage Crops	10,528,244	11,959,154
Livestock Products:		
Beef Cattle	48,981,138	64,571,800
Other Cattle	12,878,309	13,353,355
Total Cattle	61,859,447	77,925,155
Milk	81,602,232	96,415,707
Swine	95,044,761	121,569,830
Meat	5,411,555	6,414,535
Sheep	503,951	518,913
Honey	1,401,992	1,509,450
Wool	68,628	59,245
Total Livestock	245,892,566	304,412,835
Poultry Products:		
Broilers	135,860,011	192,929,600
Turkeys	20,485,235	40,617,450
Other Fowl	13,195,331	14,503,320
Hatching Eggs	48,576,405	48,894,648
Table Eggs	55,476,877	53,799,165
Turkey Eggs	692,500	6,380,100
Total Poultry Products	274,286,359	357,124,283
Field Grown Crops:		
Cotton, including seed	42,062,565	55,570,000
Peanuts	44,839,625	56,665,801
Soybeans	56,713,767	97,819,110
Tobacco	457,428,227	601,312,500
Total Field Grown Crops	601,044,184	811,367,411

Farm Income Goals by Commodities (Cont.)

Commodity	1965	Anticipated by 1971
Tree Fruit:		
Apples, fresh market	7,035,417	11,757,525
Apples, processing	727,500	2,422,000
Peaches, fresh market	4,114,421	4,796,000
Peaches processing	53,000	131,200
Pears	-	7,500
Pecans	726,244	928,310
Other Fruits & Nuts	90,923	140,979
Small Fruit:		
Blueberries	4,841,876	7,285,400
Grapes	244,025	658,140
Strawberries	3,108,282	6,829,991
Other - Dewberries	126,580	658,400
Total all fruit	21,068,268	35,615,445
Vegetables:		
Cucumbers, fresh	2,852,172	3,360,000
Cucumbers, processing	5,522,048	8,531,000
Green Peppers, fresh	2,374,087	2,808,000
Green Peppers, processing	341,100	611,000
Potatoes, Irish	10,486,600	8,672,000
Potatoes, Sweet, all	12,981,824	14,215,000
Snapbeans, fresh	2,942,859	3,308,000
Snapbeans, processing	901,990	2,075,000
Greens	427,275	726,000
Tomatoes, Greenhouse	222,220	564,816
Tomatoes, Trellised	3,954,141	7,389,700
Pole Beans	1,976,315	1,804,200
Squash	357,600	596,200
Lima Beans	444,883	481,300
Mixed Vegetables	491,263	736,088
Other Vegetables:		
Cabbage	4,253,977	
Cantaloupes	492,665	
Green Peas	79,280	
Sweet Corn	1,942,661	
Watermelons	1,473,945	
Lettuce	213,550	
Egg Plant	41,000	
Onions	292,280	
Okra	53,475	
Field Peas	195,550	
Field Grown Tomatoes	1,381,205	
Total Other Vegetables	10,419,588	12,836,563
Home Gardens	20,359,240	31,349,000
Total Vegetables	77,055,205	100,063,867

Farm Income Goals by Commodities(Cont.)

Commodity	1965	Anticipated by 1971
Ornamentals:		
Bedding Plants	978,200	1,721,500
Field Grown Flowers	3,746,675	3,954,700
Greenhouse Flowers	6,798,523	8,423,900
Nursery Crops	7,431,257	15,000,000
Total Ornamentals	18,954,655	29,100,100
Natural Resource Products		
Forest	95,968,879	125,000,000
Christmas Trees	393,750	1,340,550
Seafood	15,602,700	19,002,700
Other - Recreation	480,200	966,000
Fish Bait and/or Ponds	177,000	277,000
Total Natural Resource Products	112,622,529	146,586,250
Total all Commodities	1,467,706,070	1,934,314,900

Farm Supply Purchases by North Carolina Farmers -- Crops

Item	Feed Grains			Total feed grains	Forage crops	Field Crops				Total field crops	Horticultural crops	Total all crops
	Corn	Sorghum	Small grain			Cotton	Peanuts	Soybeans	Tobacco			
	(thousand dollars)											
1965												
Seed	3,032	41	1,180	4,253	2,781	932	1,848	2,622	1,000	6,402	6,661	20,097
Fertilizer	38,284	523	3,030	41,837	2,314	5,520	2,790	4,633	24,120	37,063	5,557	86,771
Pesticides	2,554	84	181	2,819		6,364	2,935	924	18,600	28,823	3,859	35,501
Buildings and equipment	16,398	1,205	11,950	29,553	40,274	14,813	9,525	23,813	73,933	122,084	8,225	200,136
Marketing Expenses						3,352			13,820	17,172	4,296	21,468
Other						660			25,010	25,670	14,540	40,210
Total	60,268	1,853	16,341	78,462	45,369	31,641	17,098	31,992	156,483	237,214	43,138	404,183
1971												
Seed	4,574	65	1,946	6,585	2,813	420	3,990	3,990	1,050	9,450	8,257	27,105
Fertilizer	59,230	908	9,813	69,951	3,375	6,165	3,575	12,815	29,650	52,205	6,340	131,871
Pesticides	2,825	179	509	3,513		8,160	4,604	6,279	23,480	42,523	6,050	52,086
Buildings and equipment	19,211	1,112	15,408	35,731	37,774	12,420	10,946	31,974	81,750	137,090	9,612	220,207
Marketing Expenses						6,336			18,080	24,416	5,895	30,311
Other						810			27,490	28,300	22,672	50,972
Total	85,840	2,264	27,676	115,780	43,962	34,311	23,115	55,058	181,500	293,984	58,826	512,552

Farm Supply Purchases by North Carolina Farmers -- Livestock

Item	Beef		Dairy		Swine		Poultry		Total	
	1965	1971	1965	1971	1965	1971	1965	1971	1965	1971
	(thousand dollars)									
Feed processing costs	452	646	631	811	7,638	9,525	10,647	15,539	19,368	26,521
Extra feed above N. C. production	*5,941	*649	5,664	2,426	11,669	10,319	32,505	32,824	55,779	46,218
Vet., medical & testing	506	640	1,391	1,591	2,609	3,241	3,110	5,461	7,616	10,933
Supplies, breeding, bedding, etc.			2,744	3,417	1,299	1,620	54,381	80,874	58,424	85,911
Marketing expenses paid by farmers	449	651	4,547	6,058	522	590	2,120	2,834	7,638	10,133
Building and equipment	4,401	4,961	33,225	36,437	13,249	14,580	21,344	31,176	72,219	87,154
Other			4,328	5,010			547	698	4,875	5,708
Total	11,749	7,547	52,530	55,750	36,986	39,875	124,654	169,406	225,919	272,578

*Including Sheep

Value Added by North Carolina Marketing Firms

Commodity	1965	1971
	----------(thousand dollars)----------	
Field Crops		
Feed and Cereal Grain	46,387	94,373
Cotton	572,207	605,864
Peanuts	28,339	35,813
Soybeans	6,016	12,215
Tobacco	1,300,000	1,600,000
Horticultural Crops		
Fruit	10,534	21,218
Vegetables	83,091	110,185
Ornamentals	8,296	11,404
Natural Resource Products		
Forestry	1,378,000	1,875,000
Seafood	15,600	38,004
Livestock and Poultry		
Beef Cattle	23,515	26,075
Milk	70,944	99,847
Swine	52,121	63,498
Poultry	385,400	613,900
Total	3,980,450	5,207,396

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