AGRICULTURAL
EXTENSION
SERVICE

North Carolina State University
School of Agriculture and Life Sciences

Agricultural Extension Service
Office of the Director
Box 5157
Raleigh, N. C. 27650

April 5, 1982

TO: Department Heads with Extension Faculty, SALS (Except 4-H and Home Ec)

FROM: D. G. Harwood, Jr. and Joseph A. Phillips, Assistant Directors

SUBJECT: Plan of Work for FY '83

A new Plan of Work covering the period from October 1, 1982, through September 30, 1983, is due on or before August 1, 1982. Please submit one copy of your departmental Plan of Work to J. D. Dodson, one to Joe Phillips, and one to D. G. Harwood.

Attached are listings for ANR and CRD of specific problems to receive attention during FY '83 as identified by county staffs with input from Specialized Study Committees and/or Program Committees of the County Advisory Leadership System. You will recall that the focus of the Extension program is at the county level. Departmental Plans of Work should reflect these priority needs as perceived by our clientele who have reviewed the background information you provided to them earlier.

The Plan of Work for your department must include the following items:

1. Title page (Plan of Work for FY '83), department name and code and period covered (October 1, 1982 - September 30, 1983).

2. Narrative statement:

   a. Describe the clientele problems to be addressed (brief statement of the nature of the problem situation and why it is important for Extension to make inputs into its solution). Tie to the long-range plan (4-Sight) and use supporting documentation and rationale. Identify affected clientele and involvement of groups.

   b. List the overall Extension objectives for FY '83 for your department related to the solutions of clientele problems. Focus on a few key objectives that are stated in specific terms so results can be assessed. Identify whether these objectives represent a continuing activity, redirection or a new initiative.

   c. Expected results - what short and long run clientele changes are expected to be made as a result of the work planned (changes in life styles, reduced use of energy, increased efficiency, etc.). Major emphasis should be on expected actions of people rather than skills taught and knowledge gained.

d. Describe the methods planned to achieve the objectives identified in item b. above -- include staff development and training.

e. Describe how the expected benefits and effectiveness of the methodology will be measured. Describe how a cost effectiveness statement can be developed.

This narrative statement should encompass the state's entire program to be carried out by state, area and county staffs as it relates to your department's program area. Include work planned in both agriculture and natural resources and community and rural development program areas.

3. List your specific tasks as planned for FY '83.

The enclosed FY '82 Plan of Work of Extension Dairy Husbandry was considered an excellent document. You may wish to scan it for ideas.

The Plan of Work for Fisheries-Wildlife Extension Programs will be developed by a committee chaired by Dr. Gary San Julian.

Refer to your copy of a letter of March 2, 1982, from Dr. C. D. Black requesting agent training proposals by April 15. The attached training needs identified by county staffs will be helpful to you in preparing these proposals.

cc: Dr. Chester Black
Dr. Dan Godfrey
Mr. J. D. Dodson
Dr. Martha Johnson
Dr. Don Stormer
Specialists in Charge, ANR and CRD

Brenda

June 15, 1982

MEMORANDUM TO: ~~Barker~~ Koehler
~~Beasley~~ Rubin
~~Cox~~ ~~Sneed~~
~~Driggers~~ ~~Sowell~~
~~Glover~~ Watkins
~~Graham~~ Young

FROM : Frank Humenik F. H.

SUBJECT : Plan of Work for FY 1983

We have received from D. G. Harwood and J. A. Phillips an extensive listing of specific problems to receive attention during FY '83 as identified by county staffs with input from Specialized Study Committees and/or Program Committees of the County Advisory Leadership System. The listing will be available from Brenda for review by each specialist. The forwarding memo noted that Departmental Plans of Work should reflect these priority needs as perceived by our clientele who have reviewed the background information you provided to them earlier.

Additional instructions for the Plan of Work forwarded are:

a. Describe the clientele problems to be addressed (brief statement of the nature of the problem situation and why it is important for Extension to make inputs into its solution). Tie to the long-range plan (4-Sight) and use supporting documentation and rationale. Identify affected clientele and involvement of groups.

b. List the overall Extension objectives for FY '83 for your department related to the solutions of clientele problems. Focus on a few key objectives that are stated in specific terms so results can be assessed. Identify whether these objectives represent a continuing activity, redirection or a new initiative.

c. Expected results - what short and long run clientele changes are expected to be made as a result of the work planned (changes in life styles, reduced use of energy, increased efficiency, etc.). Major emphasis should be on expected actions of people rather than skills taught and knowledge gained.

d. Describe the methods planned to achieve the objectives identified in item b. above--include staff development and training.

e. Describe how the expected benefits and effectiveness of the methodology will be measured. Describe how a cost effectiveness statement can be developed.

This narrative statement should encompass the state's entire program to be carried out by state, area and county staffs as it relates to your department's program area. Include work planned in both agriculture and natural resources and community and rural development program areas.

The attached FY 82 Plan of Work from Dairy Extension was forwarded as an example of what Administration is requesting. We need to make progress in making our Plan of Work conform to the directions and example Plan of Work distributed this year.

Please have your streamlined narrative statement, task listing and summary format to Brenda by July 16.

attachments

Dr. Humenik

AGRICULTURAL EXTENSION SERVICE

North Carolina State University
School of Agriculture and Life Sciences

Office of District Program Leaders
Box 5097 Zip 27650

They are too late! BB

July 23, 1982

TO: Specialists-in-Charge, ANR

FROM: Joe Brooks Joe T. Brooks

SUBJECT: Small Farm Work Planned (1982-83)

As you plan your work for 1982-83, would you ask that each specialist designate each task primarily directed to small farmers (gross farm income $20,000 or less) with an asterisk (*) and use Project Code 4 in the SEMIS summary sheet.

Please note that when reporting (SEMIS), you do not have to report all of your time for a small farm task as Project Code 4. When working with "large" farmers on that same task, use Project Code 0 for the number of hours you work with "large" farmers. In other words, you might have two lines in your summary sheet with the same task number, same area of emphasis, same subject, etc., the only difference being the Project Code -- either 0 or 4.

If you have questions, please call. Thanks for your help.

cc: Dr. Chester Black
Dr. R. C. Wells
Mr. D. G. Harwood, Jr.
Department Heads, ANR

JUL 2 8 1982

July 29, 1982

MEMORANDUM TO: J. D. Dodson
D. G. Harwood
J. A. Phillips

FROM : Frank J. Humenik

SUBJECT : Plan of Work for FY '83

Please find enclosed a copy of our Plan of Work covering the period from October 1, 1982 through September 30, 1983.

If further information is desired, please contact us.

enclosure

cc: F. J. Hassler

PLAN OF WORK FOR FY-83

Biological and Agricultural Engineering Extension

Code #905

October 1, 1982 - September 30, 1983

Specialists

Dr. F. J. Hassler, Department Head

Dr. F. J. Humenik, Associate Department Head, In Charge

Mr. J. B. Atkins, Extension Specialist

Dr. J. C. Barker, Extension Associate Professor

Mr. E. O. Beasley, Extension Professor

Mr. B. N. Cox, Extension Assistant Professor

Mr. S. A. Dressing, Extension Specialist

Mr. L. B. Driggers, Extension Professor

Mr. J. W. Glover, Extension Professor

Mr. L. F. Graham, Extension Specialist

Mr. F. A. Koehler, Extension Specialist

Mr. J. M. Kreglow, Extension Specialist

Mr. R. P. Maas, Extension Specialist

Dr. A. R. Rubin, Extension Assistant Professor

Dr. R. E. Sneed, Professor

Dr. R. S. Sowell, Professor

Mr. R. W. Watkins, Extension Professor

Ms. B. A. Young, Extension Specialist

OVERVIEW

The composite Engineering Plan of Work addresses continuing production agricultural training and technical assistance needs as well as current situations resulting from recent and developing needs and opportunities. Energy efficiency, production cost-effectiveness, soil and water conservation, environmental quality and computer techniques are touchstones of the overall systems approach taken to optimize results for the many compatible elements of the Engineering Plan of Work. Concept and programming similarities between each specific work activity verify the potential efficiencies possible with the total systems approach under the integrated farmstead engineering program.

MECHANIZATION

SITUATIONAL STATEMENT

Escalating costs of production inputs including machinery, fuel and labor combined with static or declining commodity prices have pushed many farmers into a crisis situation. Tractor and equipment replacement have had to be postponed in many cases, necessitating increased emphasis on maintenance, repair, and operational management of existing machinery to extend its useful life and preserve its effectiveness. U.S. retail unit sales of farm tractors have declined from 138,990 in 1979 to 103,835 in 1981, with a further decrease to 102,800 forecast for 1982. Self-propelled combine sales have decreased from 32,246 in 1979 to 26,831 in 1981, and corn header sales have dropped 30 percent during the same period. Similar decreases have occurred in sales of disk harrows, field cultivators, chisel plows and other equipment items. The situation in North Carolina follows the national trend, with the net result that the average age of equipment in use has increased substantially in the past three years.

The cost-price squeeze has occurred at a time when there is an increasing awareness of the soil and water losses from agricultural lands due to intensive row-crop farming without adequate water control practices. Conservation practices have not been viewed by farmers as cost-effective in the short run, and thus have been implemented largely in response to government-provided cash incentives. These incentives have been drastically curtailed and this fact coupled with the increased utilization of marginal land for row-crop production and the trend toward larger machinery has resulted in soil losses which are estimated to average more than 9 tons per acre per year, many times the rate at which new soil is formed. Productivity decreases due to soil depletion, particularly on more sloping fields, thus represent an additional loss of income which has been estimated at an average of $18 per acre per year in North Carolina. Farmers need to be made aware of these facts and shown better tillage and land management practices which would improve water availability for crop production and reduce erosion due to runoff. Applied research and on-farm demonstrations aimed at reducing soil erosion and compaction are already underway and need to be intensified.

Clean tillage and/or excessive tillage have been shown to be factors contributing to increased runoff, soil compaction, and erosion. Motor fuel requirements for producing corn and soybeans, which account for most row-crop acreage subject to severe erosion in North Carolina, are in the range of 5 to 6 gallons per acre for conventional tillage and can be reduced to 3 or 4 gallons per acre for minimum tillage and to 1 to 2 gallons per acre for no-tillage. In addition, the reduction in tillage results in less soil compaction and less wear and tear on equipment. The potential annual fuel savings of 8 to 10 million gallons on North Carolina's nearly 4 million acres

of corn and soybeans, in addition to the reduced labor, improved timeliness of operations, and soil conservation aspects of optimal tillage practices make this a high priority area for 1983 and succeeding years.

North Carolina produces a variety of fruit and vegetable crops, many of which would have better market acceptability, less spoilage, longer shelf life and possibly higher cash value if pre-cooled prior to shipment and kept cool during shipment and handling through marketing channels. Increased market acceptability and more reliable quality will be important keys to expanding acreage and sales of fresh fruits and vegetables as an alternative to tobacco. Refrigeration techniques, facilities and equipment of a capacity and type suitable to these diverse crops are needed as an integral part of the production system.

Short seasonal use plus the need for high capacity make it difficult for most growers to justify the cost of pre-cooling and refrigerated storage, particularly when no direct compensation in the form of a price premium is assured. Reduced losses, fewer load rejects, increased market range and more consistent quality are benefits of pre-cooling which will have positive implications for higher prices and improved marketability of North Carolina fresh fruits and vegetables. It has been estimated, for instance, that the monetary loss from rejected loads of blueberries is about 20 percent of potential value, and recent tests have indicated that they can be pre-cooled for as little as 3 cents per pound, essentially eliminating losses from rejected loads. Thus for about 3 percent or less the fruit value, 20 percent loss can be eliminated, resulting in a seven-fold return on investment. Similar situations exist for other perishable commodities although the higher-valued crops will yield greater returns on cooling investment. Broccoli and strawberries are two potentially profitable crops for western North Carolina and both require pre-cooling if they are to be marketed through other than local outlets. Tomatoes, apples, grapes, squash and peppers are other commodities which may show increased profitability from pre-cooling.

EXTENSION OBJECTIVES, METHODS AND EXPECTED RESULTS

Informational programs will be developed and delivered to extension agents and farmers on maintenance and servicing to extend the life and increase the reliability of aging farm machinery. Fuel-saving operational techniques for tractors will be stressed, as well as the fuel-saving aspects of reduced tillage.

Equipment and methods for reduced-tillage and no-tillage production of grain crops, cotton and peanuts will be emphasized through news articles, publications, meetings and demonstrations. A reduced tillage and planting equipment field day will be held to acquaint farmers and extension agents with the tools available for conservation farming. On-farm tests involving water and erosion control, reduced soil compaction, and energy savings through crop residue management and conservation tillage methods will be continued. Assistance will be given to equipment manufacturers in developing more suitable equipment for optimum tillage of specific soil types.

Training will be provided to approximately 30 agents in the basics of fruit and vegetable cooling, equipment and methods available, selection and management of cooling systems, and economics of cooling. Assistance in

selecting and sizing cooling equipment will be provided to individual growers on request. Meetings, workshops and training sessions will be held to assist new fruit and vegetable growers with equipment and methods for planting, cultural practices, pest control and harvesting.

Publications and computer programs on cost analysis and selection/matching procedures for farm machinery will be updated and revised. Continued emphasis will be given to cost containment through optimization of machine numbers, sizes and retention periods. Proper adjustment and operation of harvesting equipment to minimize losses will be stressed.

CROP PROCESSING

TOBACCO

Situational Statement

About half of North Carolina's crop production energy is used in curing tobacco. At current prices fuel for curing is a major crop expense. Extension's on-farm tests have demonstrated a potential savings of at least one-third of the estimated 126 million gallons of fuel used each year in curing tobacco.

Extension Objectives, Methods and Expected Results

Farm tests in 1980 and 1981 have demonstrated the practicality of curing tobacco with an alternate fuel--wood. In those tests the convenience of thermostatic temperature control in modern bulk barns was maintained. Tobacco quality was maintained and "firing" effort was monitored. While wood curing presently appears practical for many farms, many improvements in machinery and method would seem possible. Extension efforts in 1982 will include monitoring improvements and keeping tobacco agents apprised of developments. Educational efforts--including TV and radio programs, magazines and newspaper articles, and dozens of farmer meetings--are planned to encourage widespread implementation of the energy saving practices used in Extension's tests.

As a result of Extension's efforts in efficient curing, tobacco farmers in North Carolina are expected to save 30 million gallons of curing fuel in 1983, with about two dozen farmers using no fossil fuel at all for curing. These farmers who have installed "wood-curing" facilities will enjoy an approximate $200 per acre crop expense reduction.

GRAIN DRYING

Situational Statement

There has been a rapid increase in grain storage capacity in North Carolina in recent years. North Carolina has approximately 200 million bushels of grain storage capacity. Approximately 75 million bushels of this storage capacity is located on the farm. Much of the on-farm grain drying is done in the storage bin (in-storage or layer drying). Because of weather risk and the thrust of mold damage in the field, growers are attempting to harvest the grain earlier. This puts a strain on the capacity of the grain drier, especially the in-storage drying method. If the grain, especially corn, is not dried in a reasonable time, it may mold and develop aflatoxin in the bin. High aflatoxin levels are detrimental to livestock, especially swine and poultry.

Extension Objectives, Methods and Expected Results

In 1981-82 an on-farm study was begun to determine if the Extension Service's drying and storage recommendations were adequate to prevent the development of aflatoxin under North Carolina conditions. This study was conducted in 16 grain bins on 11 farms in 6 counties. The preliminary results indicated that the recommendations are adequate; a continuation of this study is planned. The study includes taking a base sample of the corn at harvest, going into storage, during storage, and coming out of storage. These samples are analyzed for aflatoxin. Equipment and supplies for this project are being furnished by the North Carolina Corn Growers Association.

PEANUT CURING

Situational Statement

Fuel costs for crop drying and processing continue to increase. Methods of reducing fuel requirements are needed. The Extension Service must cooperate with the research worker to find methods for reducing fuel requirements and take them to adoption.

The extension agricultural engineer is cooperating and assisting in a research project on recirculation of the drying air to conserve energy in peanut curing. The results of this study will be incorporated in the Extension Service's educational program.

The harvest period for peanuts is very short. Because of this there is a tendency to dry the peanuts too fast which can reduce quality. Proper curing procedures to preserve quality will continue to be stressed.

Extension Objectives, Methods and Expected Results

A one-day training workshop is planned for county agricultural extension agents on the principles of crop drying and storage. The latest information and recommendations will be stressed.

AUTOMATIC PROCESSING CONTROLS

As a way to reduce labor and conserve fuel, more automatic processing controls are appearing on the market, especially for tobacco curing. A bulletin is planned explaining the function, operation and use of these controls for tobacco curing.

ALTERNATE MOTOR FUELS

The high price of petroleum fuel has sparked an interest in alternate motor fuels. Because of the present high cost of alternate motor fuels, the extension agricultural engineer will furnish information on request to persons desiring information on alcohol and vegetable oils for motor fuels.

ENERGY

SITUATIONAL STATEMENT

Production agriculture uses about 3 percent of the nation's annual energy consumption. This amounts to over 2000 trillion BTU's each year and is

equivalent to about 16 billion gallons of gasoline. North Carolina's production agriculture consumes around 56 trillion BTU's annually or 450 million equivalent gallons of gasoline. Thus North Carolina's agricultural energy consumption is about 2.8 percent of the nation's, or about .08 of 1 percent of the total. This is a fairly low percentage but amounts to over $450 million worth of energy. More important than cost, however, is its value in processing crops worth billions. Without adequate supplies of energy in practically any phase of production agriculture, the actual fuel costs are pale in comparison.

EXTENSION OBJECTIVES, METHODS AND EXPECTED RESULTS

Farmers in North Carolina face both economical and technological problems in their farming energy use. It is misleading to offer advice on the technical feasibility of alternative energy sources without adequately addressing economic implications. Thus any energy related recommendation must be accompanied by sound economic incentives. Under grants from the North Carolina Energy Extension Service and the North Carolina Alternative Energy Corporation work will be conducted to stress both the technological and economical aspects of energy use and alternative energies for agriculture in the State.

Energy Audits

Tobacco--

On-farm energy audits will be conducted for tobacco farmers in North Carolina during the coming year. Past work in this area has generated considerable farmer and county agent enthusiasm. Results of these audits have shown hundreds of farmers low-cost or no-cost ways of cutting curing costs. On the average, audits of bulk tobacco barns have shown ways of cutting curing costs by 15 percent. Predicted savings of up to 40 percent are not uncommon. For example, if a farmer has 10 bulk barns and can save 15 percent on his yearly curing fuel cost, this would amount to around $3500 per year. Savings due to replacing worn or missing door gaskets, using a wet bulb thermometer, and caulking hot air leaks are very low-cost ideas with very rapid pay backs. Even barn insulation, being a more expensive endeavor, usually shows pay back periods of less than 4 years. All of this audit information becomes an integral part of the farmer's decision making tools.

Swine and Poultry--

Swine and poultry energy audits will also be conducted for North Carolina farmers. Emphasis will be placed on energy conservation through better management. Partial room brooding, replacing inefficient heaters, better record keeping, better scheduling, building insulation, and proper ventilation are a few of the areas that will be addressed. For example, ventilation fans with very dusty, wet or stuck louvers may have their ventilation efficiency reduced by 30 percent. This means the farmer must ventilate longer to maintain the desired environment, thus resulting in significantly higher electric bills. If a farmer has a $2000 per month electric bill in the summer, he may be able to reduce it by $300-500 per month by this very inexpensive cleaning chore. Electrical load management and time-of-day energy use may also provide the farmer a way of saving money. The energy audits will help farmers by making these and other simple improvement suggestions, as well as addressing the more complicated questions such as adding additional insulation. Efforts will be aimed at keeping all energy saving recommendations in agreement with sound and proven management schemes, with special emphasis on maximizing production.

County Agent Training--

Emphasis will be placed on organizing audit data taking procedures, computing complicated routines and equations, and in training the county agents in performing audits in their county. This will be accomplished through county meetings, state conferences, and in-the-field exercises. The goal is to afford any interested extension agent in North Carolina the opportunity to learn more about energy use and conservation in agriculture through the on-farm energy audits.

Alternative Energy Sources

North Carolina has 20 million acres of woodland, producing up to 75 million tons of biomass annually that is not currently being used. Wood can replace some fossil fuel requirements. For instance, 35 million gallons of fuel oil could be saved annually if only 30 percent of the State's tobacco crop was cured with wood. Wood currently offers the best technological and economical alternative fuel available to most North Carolina farmers. It can dry crops or heat greenhouses. Work will be conducted on wood utilization in agriculture with particular emphasis on utilizing and designing wood fueled hot water systems.

The methane potential from livestock in North Carolina is impressive if one looks at gas production only. Current livestock and poultry production practices would amount to approximately 2.85 trillion BTU's of energy or 170 million kwh of electricity per year. However, the cost of generating this gas or co-generating electricity is tremendous, a fact often overlooked by enthusiastic farmers. Work will be done to provide a focal point for information on methane production. Serious evaluation of state-of-the-art technical information will occur with particular emphasis on economics. Farmers will be advised of new developments by the utilities on rates paid for co-generated electricity and new technological advances in this area. Close cooperation will be maintained between NCSU and the State's electrical utilities.

Energy consumption and alternatives in many other phases of agriculture will be addressed. Tillage practices, most fuel efficient cultural practices, electrical load management, energy conserving automatic control devices, solar energy processes, vegetable oil, etc., will be monitored as to their potential on individual farms and a few demonstration farms across the State that incorporate one or more of these energy related practices will be established. These demonstration farms will offer many farmers a chance to observe these ideas in practice. The "energy integrated farmstead" is becoming a reality on many U.S. farms, thus making it important for North Carolina farmers to stay on the cutting edge of this emerging trend.

Work will be done to coordinate research and extension activities and help bridge the gap between the experimental and the readily applicable. TV, radio, and other mass media events will help publicize demonstrations and advances. Continued assistance with computer programs will be given to both county agents and farmers while continuing to develop new and useful energy related computer programs. Publications will be developed for farmers to study these developments and procedures on their own.

STRUCTURES

SITUATIONAL STATEMENT

To maximize swine production output, proper housing facilities coupled with good management must be practiced. It has been demonstrated that 18 plus pigs per sow per year is reasonable, but North Carolina and the nation as a whole averages about 13 pigs per sow per year. With housing costs averaging $2000 per sow in a farrow-to-finish operation, it is evident that proper planning and management are keys to success. Coupled with the high capital costs are high interest rates, and many producers or potential producers do not possess the management skills to be successful resulting in failures other than those due to poor marketing conditions.

EXTENSION OBJECTIVES, METHODS AND EXPECTED RESULTS

Because of the supply and demand situation, it is not anticipated that a large number of new production systems will develop this year. However, with the improved marketing situation, a great amount of remodeling and renovation of existing facilities is anticipated. Direct consultation with producers and extension agents along with printed subject matter including recommended designs will be the primary teaching method.

Improving the environment in swine production facilities is a major emphasis area. Too much attention has been focused on electrical and gas costs without assessing the relationship of these energy costs to productivity. Studies show that feed constitutes about 85 percent of the variable costs of production with electricity at 1.8 percent and fuel at 2.4 percent. Other costs amount to 10.8 percent of the variable costs. With this data base, it is easier to advise producers of cost-effective changes if their records adequately partition their costs of production. Therefore, good records are essential if good management decisions are to be made. It is awfully difficult to recommend a change unless there is a good understanding of the existing situation.

Energy costs are real, absolutely essential and are rising. However, there are many ways to conserve and they will continue to be emphasized. The most promising substitute for L.P. gas on swine and poultry farms is a wood-fired, hot water heating system. Preliminary studies show that this system can reduce energy costs by 50 percent and maintain drier litter conditions in turkey brooding houses. A plan for this system will be added to the Plan Service and farm installations will be evaluated.

Waste management is an integral component in poultry and swine production systems and cannot be separated from the housing design. Emphasis will be placed on frequent removal of wastes from buildings so workers and pigs are not subjected to gases from anaerobic decomposition. Studies linking housing environments to human respiratory problems and pig performance is the stimulus for this effort. Evidence points to improved growth rate and faster gains in houses where waste is not allowed to accumulate for long periods of time. Several installations will be evaluated.

The educational program in farm structures with emphasis on controlled environment, waste management, energy conservation and labor reduction demands

extensive Extension input. Information gathered from previous programs and studies provide the foundation for improving this educational program.

At least three new plans for swine housing with emphasis on frequent waste removal and energy conservation will be added to the Plan Service in addition to a plan for the wood-fired, hot water heating system for turkey, broiler and swine houses. These plans along with other printed material, personal assistance and appropriate training sessions will be used to keep extension agents aware of current technology and recommendations and thus improve their professional competency.

The emphasis areas in this Plan of Work include requested assistance from county plans but is not limited to those areas only.

LIVESTOCK WASTE MANAGEMENT

SITUATIONAL STATEMENT

In 1980 North Carolina farmers spent 225 million dollars to purchase 1.8 million tons of commercial fertilizer. Approximately 1.25 million dry tons of livestock manure and poultry litter were recoverable from confinement operations worth an estimated 55 million dollars in fertilizer nutrient value. After subtracting the storage, pretreatment, and field nutrient losses resulting from today's manure handling practices, it is estimated that only 30 million dollars worth of nutrients actually became plant available from the land spreading of collected manure. This leaves 25 million dollars of lost manure nutrients that could be economically recovered through improved waste collection and handling, and land application practices which are agronomically sound. A 5 percent improvement in manure land application practices could mean 1.25 million dollars in fertilizer savings to North Carolina farmers.

EXTENSION OBJECTIVES, METHODS AND EXPECTED RESULTS

An in-service training session is planned to update agents on techniques whereby animal wastes can better be utilized as crop fertilizer supplements.

One technique which seems to be gaining in popularity among North Carolina producers consists of a liquid manure storage system for storing up to a six-month accumulation of wastes. These systems not only conserve more nitrogen during storage but allow the flexibility of manure application when the crop can best utilize its fertilizer value. Labor efficiency is also maximized. Earthen storage basins, where site and soil conditions permit, can save a 100-cow dairy farmer approximately $20,000 in construction costs when compared to alternative liquid manure systems. Emphasis will be placed on proper design, location and construction of these liquid manure storage systems in conjunction with the Soil Conservation Service. Meetings will be held with agents, producers and cooperative agency representatives relative to selection and use of manure storage and handling facilities.

Dairymen in high-rainfall and sloping or mountainous regions often encounter severe difficulties regarding compliance with existing stream pollution regulations. An estimated 25-30 percent of the Grade A dairies in North Carolina are located in the mountain regions of the State. Many of these dairies are small farmers in the 50-75 cow range, having been in operation for a number of years, and may not feasibly be able to utilize the same waste handling and

pollution abatement technology as their newer and larger counterparts. Conventional no-discharge wastewater collection and treatment system requirements and costs fall heaviest on those small farms since a minimum baseline investment is required regardless of size. Pollution abatement systems may cost upwards of $200 per cow on those small farms where, in fact, they can physically be located. Those farms where conventional systems are physically impossible may be eventually forced out of business. An innovative technique currently being evaluated for wastewater treatment from small to moderately sized dairy farms consists of a shallow manure solids settling basin coupled with a grassed waterway or overland flow vegetative filter. It is estimated that this system would cost only $50 per cow for the 50-cow dairy and would have a wider range of adaptations than conventional systems. A vegetative filter currently in place in Buncombe County will be monitored and evaluated with the hopes that 25-30 dairymen could utilize this system within the coming year to meet stream pollution regulations.

Technical assistance will continue to be provided for resolution of livestock or poultry odor-nuisance conflicts. Based on past years requests, approximately 40-50 producers will receive assistance either by phone, correspondence, or one-on-one contact regarding the preservation of environmental quality.

The 1.25 million dry tons of recoverable livestock manure and poultry litter produced in North Carolina in 1980 represents roughly 2.85 trillion BTU's of energy in the form of methane gas or the equivalent of 170 million kilowatt-hours of electricity per year. This process has not yet proven to be a profitable addition to a commercial farming enterprise; however, the on-farm technology has not yet been fully developed. It has been proposed that a commercial methane digestion-electrical cogeneration system will be installed within the year on a poultry farm in Wayne County. Specialists in energy and waste management will work conjunctively with researchers to monitor and evaluate the performance of this system in order to have first-hand information with which to advise other livestock and poultry producers in North Carolina.

WATER MANAGEMENT

SITUATIONAL STATEMENT

North Carolina has a water management problem. Yield reductions occur each year due to both excess soil moisture and deficit soil moisture conditions. The average annual rainfall in the State is 48 inches, but over a 25-year period variations of 25 to 30 percent have occurred. Rainfall is not equally distributed across the State with averages varying from approximately 35 inches to as much as 80 inches. Distribution is also not uniform throughout the year.

The State has about 6.2 million acres of cropland of which about 2.25 million acres or 36 percent requires artificial drainage. Only about 20 percent of these poorly-drained soils have subsurface tile drainage systems. Most of the remaining acres have open ditch surface drainage systems that provide only marginal drainage during wet years. Of the 16.8 million acres of forest lands, more than 5 million acres are on wet soils that require some amount of artificial drainage.

Some 0.6 million acres of cropland is classified as droughty soil, which mean that short duration droughts can severely reduce yield. On many of the remaining 5.6 million acres of cropland, even to include some of the wet soils, extended droughts can reduce yields.

Farmers in North Carolina are installing water management practices, such as irrigation, drainage, and erosion control practices such as grassed waterways, terraces, strip-cropping, field borders, sediment basins and minimum tillage. However, the low grain prices and high costs have slowed the installation of some of these practices. Several years of below average rainfall spurred interest in irrigation development with a growth in irrigated acreage of more than 10 percent in 1981. Installation of subsurface tile drainage systems have greatly decreased.

Installation of water management practices will depend heavily on weather patterns, price of commodities and cost of money. Growers will continue to install irrigation systems, but a wet year like 1982 has significantly reduced purchases.

Growers are concerned about the profitability of their operation. To increase profitability they need either higher yields, higher commodity prices or reduced inputs. They need to know when to irrigate to obtain maximum returns with minimum water, they are interested in lower pressure irrigation systems and also systems that minimize runoff. From the standpoint of drainage, they need to know which soils will generate the greatest return from installing subsurface drainage systems. They are concerned about erosion control and will install systems that will conserve soil and water if they can also see some yield benefits.

Water management is an opportunity that concerns all North Carolina farmers. However, for some the opportunities are greater and it is to this group that much of the Extension program will be directed.

EXTENSION OBJECTIVES, METHODS AND EXPECTED RESULTS

Educational programs in water management will place major emphasis on installation and utilization of well designed, properly operated and energy efficient irrigation systems. An irrigation system is only one component of water management; however, water conservation, energy conservation, erosion control and drainage must be considered when installing these systems. This is a continuing objective but with some redirection.

To accomplish this objective, a combination of teaching methods will be used. A series of six, one-day in-service training sessions for agricultural extension agents are planned. A two-day irrigation conference is scheduled. This conference will be attended by irrigation dealers, distributors and installers, farmers, related agri-business representatives, extension agents, university personnel, and Soil Conservation Service employees. Proceedings of this conference will be made available to attendees and to county extension staffs. Additions will be made to the Irrigation Handbook. Some time will be spent with individual growers. Presentations on irrigation will be made at commodity meetings and also at workshops sponsored by the several Extension Coordinating Committees on horticultural crops. Some time will be spent working with the North Carolina Irrigation Society, a group interested in the promotion of better irrigation practices. A computer program on irrigation design will be developed for a mini-computer. Emphasis will be placed on irrigation scheduling using soil moisture devices and bookkeeping methods. Assistance will be provided to specialists and research personnel in other departments on irrigation equipment and designs for demonstrations and research projects.

Drip irrigation, which is a low-volume, low-pressure system, offers a method to significantly reduce water and energy consumption. While it is not practical for many farming operations, it does have a place in some specialized operations and some time will be spent in developing materials on this system and working with growers to ensure that they install workable systems.

The results of these efforts should be an increase in net income (the amount dependent upon the crop being irrigated and the rainfall distribution), a savings in water consumption for irrigation of 10 percent or more, a reduction in fuel consumption per acre for irrigation of 15 percent or more and reduced erosion on irrigated fields.

It is difficult to measure the results of these programs. However, contacts with growers, irrigation dealers, SCS personnel and other extension specialists, and requests for information and meetings will indicate acceptance and installation of these practices. An irrigation survey will show the growth of irrigation, the crops being irrigated, the types of systems being used and the water sources. Changes from 1982 will indicate if some of the practices are being installed.

WATER QUALITY/QUANTITY

WATER SUPPLY AND WASTEWATER TREATMENT

Situational Statement

Adequate water supply and safe environmentally sound wastewater and wastewater residuals management schemes continue to be problems throughout much of North Carolina. The development of agricultural, industrial, and municipal resources requires sound management policies with regard to water, wastewater and residuals management.

During 1981-82, North Carolina experienced below normal rainfall and several small communities faced serious water supply problems. The rainfall situation for 1982-83 appears to be significantly better than for the past several years; however, the rate at which water is being removed from underground storage sometimes exceeds the recharge. This may cause serious problems in the Coastal Plain of North Carolina. In areas of the Central Coastal Plain in particular water table levels are falling at a consistent rate of approximately 2-3 feet per year. As the water table falls, the quality of water pumped from underground storage deteriorates. The need for improved water management and conservation programs is clear.

Over one-half of North Carolina residents rely on septic tanks for treatment and disposal of domestic wastewater. The suitability of North Carolina soils for treating this wastewater varies markedly. In every area of the state, the soils will range from suitable to unsuitable for the operation of conventional septic tank/soil adsorption systems. In areas with unsuitable soils, alternative on-site wastewater treatment and disposal options are necessary. The need to develop these alternatives was clarified when a pilot county-wide alternative on-site wastewater treatment and disposal plan was funded under the State's EPA Construction Grants Program. An entire mountain county has now been designated an on-site wastewater management district and alternative on-site wastewater treatment options developed by North Carolina State University and other universities will be the primary means of wastewater treatment and disposal in this county.

Discharge limitations on municipal wastewater treatment and disposal plants are becoming more and more stringent. Many wastewater treatment plants are now required to remove over 95 percent of the pollutant load for various constituents in the waste stream. Conventional wastewater treatment plants may have difficulty in achieving these limits consistently. Further, many of the constituents which must be removed are plant nutrients. These plant nutrients can be utilized very productively by the plant soil system. The major focus of the Agricultural Engineering waste management project has been and will continue to be utilization of waste rather than disposal of wastes.

As the wastewater treatment plants remove constituents from the waste stream, the concentration of these constituents in the wastewater residuals (sludges) increases. These sludges produced by operating wastewater treatment plants may create tremendous disposal problems. There is the potential for utilization of sludges for agricultural production. Again, utilization is the key to waste management schemes.

Operator training is a continuous problem. No certification or training program exists for the operation of land treatment systems. Some of the problems encountered to date may have been averted if effective operator training and certification programs were in effect. An extensive operator training program will begin in August 1982. The operator training program will address disposal of wastewater and wastewater residuals on the land.

Extension Objectives, Methods and Expected Results

Extension objectives for 1982-83 will include water management training for municipal, county, and state level agency personnel. Water management will continue to be a major problem for these government agencies for many years to come. With the water table falling at a constant rate in many Coastal Plain areas, the need for precise water management strategies is clear. A series of workshops have been conducted for water supply personnel throughout the Coastal Plain and these workshops will continue in cooperation with the water supply branch of the North Carolina Department of Natural Resources and Community Development. Recent changes to the State ground adsorption laws and rules now puts the responsibility for septic tanks with the local health department. Until such time as all local health departments are "comfortable" and qualified to design large scale on-site wastewater treatment and disposal systems, a series of workshops must be accomplished. Three workshops are planned for local health departments in the northeastern and central Piedmont region of the State. These workshops will address the siting criteria, sizing criteria, design criteria, and maintenance standards for large scale on-site wastewater treatment and disposal systems. These workshops are being conducted in cooperation with the North Carolina Department of Public Instruction.

Proper management of wastewater and wastewater residuals will require an extensive operator training and certification program. At present the operator training and certification program adequately addresses conventional wastewater treatment processes. Unfortunately, there is no training or certification program for operators of land treatment systems. Many of the operational problems encountered with land treatment systems to date could have been eliminated through operator training. A series of operator training programs will be conducted by the training branch of the North Carolina Department of Natural Resources and Community Development and the Agricultural Extension

Service. These workshops are scheduled to start in August, 1982 and will continue throughout the entire year. At present there are 16 land treatment systems in the later phases of design, the early phases of construction, or actually in operation. The operators from these systems will be receiving the training.

To facilitate this training an operator certification/training manual is being prepared. A major goal will be the final preparation of the operator training and certification manual and approval by the State's Operator Certification Board.

AGRICULTURAL NONPOINT SOURCE CONTROL PROGRAM

Situational Statement

North Carolinians use an estimated 1.5 billion gallons of water each day for purposes ranging from municipal water supply to irrigation. A much larger quantity is also utilized for nonconsumptive purposes such as recreation and fish and wildlife habitat. The quality of those water resources affects the daily lives of all North Carolinians and, therefore, is an important concern from both an economic and environmental view.

Water quality can be degraded from a number of pollution sources including agricultural nonpoint source (NPS) pollution. On a national scale agricultural NPS pollutants are the largest type of NPS pollution, affecting 68 percent of all the watersheds within the U.S. With 42 percent of North Carolina's land area used for agricultural purposes and 6.2 million acres (19 percent) being cropland, the State has a high potential for NPS inputs from its extensive agricultural areas.

NPS pollutants of agricultural origin include sediment, nutrients, pesticides and animal wastes and enter receiving waters during intense rainfall events. This pollution can result in lowered water quality in surface and ground supplies and also represents a significant loss to a farm's resource base. Specific concerns associated with NPS losses include the following areas.

Sediment--

Erosion of sediment from North Carolina's cropland totals 49 million tons annually accounting for 65 percent of the State's gross erosion. Sediment inputs to streams can result in increased flooding, higher dredging costs, increased water treatment costs, reduced recreation and destruction of aquatic habitat. Soil erosion also lowers in-field soil quality making production expenses higher and thereby reducing farm profits.

Nutrients--

Based on research from across the nation, nutrient losses from cropland average 5 lb/ac/yr for nitrogen and 1 lb/ac/yr for phosphorus. However, losses can be much higher on soils with high fertility and without adequate conservation practices. Using these average values for North Carolina's cropland yields annual loadings of 31 million lbs/yr and 6.2 million lbs/yr of nitrogen and phosphorus, respectively, entering North Carolina's receiving waters. Excessive nutrient inputs can result in eutrophic conditions in lakes and estuaries resulting in fish kills, reduced recreation, and taste and odor problems in drinking water supplies. Significant problems have been noted in the Chowan

and Neuse Rivers and adjacent coastal nursery areas in the past few years. The loss of these nutrients also means a loss to a farm's soil fertility which can decrease yield potentials and increase fertilizer costs. At 1981 nitrogen and phosphorus prices, it would cost North Carolina producers approximately $9 million to replace all the nitrogen and phosphorus fertilizer lost as NPS pollution.

Pesticides--

In 1976, 22 million pounds of pesticides were applied to North Carolina's cropland. An unknown percentage of these pesticides enter our waters each year and can result in fish kills as well as toxic effects on aquatic ecosystems. The loss of pesticides through improper application or overuse can also be expensive to individual farms, especially given the present cost of these materials.

Animal Wastes--

North Carolina's animals produce 18.4 million tons (wet basis) of manure annually (1980 estimate). There exists a high potential for a part of this manure to enter streams, especially from areas of dense animal confinement. Water quality problems associated with animal waste inputs include eutrophication, deoxygenation of waters resulting in fish kills and pathogenic bacterial contamination. Improper manure management also results in reduced farm efficiency since plant available nutrients are lost and unavailable for crop uptake.

Objectives, Methods and Expected Results

The North Carolina Agricultural Extension Service will continue to provide educational leadership and coordination for the North Carolina Agricultural NPS Pollution Control Program. In conjunction with the North Carolina Agricultural Task Force agencies and other specialists at NCSU, major program objectives are to: (1) increase awareness and knowledge among county agricultural agency personnel, county leaders and producers about the costs of agricultural NPS pollution; (2) increase the voluntary implementation of best management practices (BMP's) in production agriculture to reduce NPS pollution; (3) provide quantitative data based on field and watershed studies on the losses of NPS pollutants from agricultural lands in the State's three geographic regions; and (4) assess the level of participation in the voluntary compliance program for NPS reduction. BMP's will be encouraged for the dual benefits of water quality protection and increased production efficiency. These BMP's include (1) soil and water conservation practices ranging from contour plowing to no-till; (2) fertilizer management techniques such as soil testing; (3) integrated pest management; and (4) animal waste management practices including proper storage, handling and utilization.

To meet these objectives, a number of methods will be utilized. First, a total educational package is planned and will be available to county agricultural agencies during 1983. Components of the package include (1) a logo and theme, (2) a number of water quality and BMP brochures, (3) slide/tape sets, (4) magazine article reprints and (5) mass-media commercial spots.

Second, this package will be presented at a number of meetings and training sessions. These will include the Annual Extension Conference, Soil and Water Conservation District fall area meetings and County Rural Development Panel meetings. Individual staff and county leader development will be

incorporated into county programs as needed. Through this effort, it is projected that 20 percent of the counties will adopt water quality concerns into their on-going annual and long-range programs during the coming year.

Third, a number of pilot demonstration farms will be established in critical water quality areas including the Chowan River area and mountain region. These farms will serve to enhance and tie together educational programs of the Extension Service, SCS, Soil and Water Conservation District, and ASCS into an integrated farm management program. The establishment of seven demonstration farms with annual educational events is projected for 1983.

Fourth, data being collected on BMP effectiveness at the Wake County demonstration farms will continue during calendar year 1983. This data will be utilized as part of the total educational package and should demonstrate to producers the water quality and on-farm economic benefits of BMP's. Preliminary results indicate BMP removal effectiveness of >90 percent for runoff water and pollutants including sediment, nutrients and organic matter as compared with the control site without BMP's. An economic evaluation is also planned to assess BMP cost effectiveness.

Fifth, ongoing research and demonstration projects in 11 agricultural watersheds across the state are providing detailed information on nutrient, sediment and organic loadings to surface waters from agricultural activities. With field studies concluding in 10 of these areas in 1983, long-term project results and conclusions will assist efforts of county, regional and state planners in assessing agricultural NPS impacts and developing appropriate control programs. Also, the detailed yearly surveys of producer agronomic activity and use of conservation practices in two project areas will allow evaluation of how successful the voluntary BMP implementation program has been. It is expected that data obtained during these projects will benefit North Carolina agricultural and environmental planners since it is specific to regions of the State and reflects current production practices.

NATIONAL WATER QUALITY EVALUATION PROJECT

Situational Statement

Water pollution from agricultural lands is a major problem in the United States. There are large costs, both to society and farmers. It has been estimated that $250,000,000 per year is spent on removing sediment from streams, harbors and rivers. Loss of storage capacity in lakes and reservoirs is equally costly. Approximately 50 percent of this sediment comes from agricultural land. The costs to farmers is equally high. Almost one billion tons of soil in excess of tolerable limits are lost from cropland each year. Estimates of the value of this topsoil and associated nutrients range from thirty cents to two dollars per ton. Thus the cost to farmers of excessive erosion may range from 300 million to two billion dollars per year. Perhaps more importantly loss of topsoil can reduce yield potential. A recent USDA study indicates that at present erosion rates, corn and soybean yields in the Cornbelt states may drop by 30 percent in the next 50 years.

These costs represent only a fraction of the total due to runoff from agricultural lands. Loss of recreational and aesthetic value because of eutrophication, health hazards from pesticides and bacteria from animal wastes

are some of the other costs society bears. From the farmer's viewpoint savings could be realized from reduced use of fertilizer and pesticides through better management. A 1977 estimate for North Carolina indicates that five million pounds of P_2O_5 in excess of crop needs are applied yearly. This translates to a potential savings of over one million dollars yearly for one plant nutrient for one state. Obviously the potential savings nationwide for all fertilizers and pesticides would be manyfold greater.

Extension Objectives, Methods and Expected Results

There are numerous agricultural nonpoint source control projects currently underway that address the problem of reducing loads from farming and livestock operations. A majority of these programs are funded under the Rural Clean Water Program, enacted by the Federal Congress to assist in this cleanup effort. As part of the enabling legislation, an evaluation of the water quality benefits of this program was mandated by Congress. Approximately 50 projects with total budgets in excess of 100 million dollars will be included in the evaluation.

The experimental Rural Clean Water Program, a joint USDA-EPA effort, is the largest single program in agricultural nonpoint source control. Twenty-one projects are located nationwide and address a variety of water quality problems. The total acreage encompassed in these projects is 2,213,422 acres. Those farms designated as critical sources of pollutants number 4,827. Of these, 4,126 are projected to employ Best Management Practices, applied to approximately one-half million acres.

The North Carolina Agricultural Extension Service was selected to conduct this evaluation under a joint USDA-EPA cooperative agreement, "Rural Nonpoint Source Control Water Quality Evaluation and Technical Assistance." The agreement calls for consultation with and training of personnel from many agencies connected with agricultural nonpoint source control projects, an evaluation of the water quality benefits of these activities and preparation of associated educational materials.

A primary thrust of the project will be overall evaluation of recommended Best Management Practices (BMP's) to reduce the impact of agricultural runoff. Farmers are increasingly being asked to implement these practices without having sufficient information to formulate sound farm management strategies. Results from this project will provide the basis for technically sound recommendations for including water quality considerations into overall crop and livestock production guidelines.

To accomplish project objectives a tremendous volume of data must be collected, organized, analyzed and evaluated from the many projects across the country. Extension specialists at North Carolina State University working on this special project will have responsibilities for coordinating the analysis and evaluation of results leading to the national evaluation of agricultural nonpoint source control projects. Results will be reported periodically to appropriate accountability groups, submitted for publication in technical publications and presented as educational materials for use by Extension personnel and other USDA agencies.

Three state-of-the-art reviews of Best Management Practices were published late in Fiscal Year 1981. Two more will be published in Fiscal Year 1982. These are being distributed by USDA agencies at the national and state level.

Additional distribution is to national, state, regional and local environmental agencies. Approximately 1,000 copies of each of the five publications will be distributed in Fiscal Year 1982. These publications will be updated and revised as research and demonstration results become available.

A collaborative study conducted in conjunction with the Economic Research Service will assess the socioeconomic factors involved. Results from that study will be combined with results on water quality effects. The end products will be (1) water quality cost-effectiveness data for Best Management Practices, (2) on-farm cost-benefit calculations for using such practices, (3) social cost-benefit calculations for achieving measured water quality results, and (4) a methodology for determining the least-cost solution for a given water quality problem.

RESIDENTIAL HOUSING

SITUATIONAL STATEMENT

Presently there are over 2 million households in North Carolina. It has been estimated that the annual residential energy consumption in this State exceeds 190 trillion BTU's. This equates to $2,784,500,000 of electricity at 5¢ per kilowatt-hour. If only 10 percent of the residential energy could be saved, about 19 trillion BTU's of energy could be saved statewide.

Due to high interest rates, both mortgage and savings, care must be exercised not to invest more in energy saving techniques than can be justified. If the interest on the money invested is more than the energy savings, then people cannot and should not be encouraged to make the investment. However, there are a number of low-cost and no-cost energy saving measures residents can use. The investment recovery time will vary somewhat for each particular situation, but most are relatively short when compared with major investments for energy conservation or alternate energy sources.

The high cost of money also makes it difficult if not impossible for young families to consider first home ownership. It is necessary for the residential construction industry to make every effort to reduce construction costs while continuing or bettering the energy efficiency and quality of construction.

OBJECTIVES, METHODS AND EXPECTED RESULTS

Educational Programs

Education of agents with housing responsibilities in the area of residential energy analysis and construction cost-saving techniques will be carried out at Annual Extension Conferences and on an area basis when opportunities are available. Emphasis will be placed on low-cost, no-cost energy conservation techniques and construction cost-saving ideas. These will include, but not limited to, residential energy consumption awareness, computer energy analysis of residences, infiltration reduction, and in conjunction with Home Economics the effect of human behavior and living habits on residential energy consumption.

Continued work with the North Carolina Home Builders Association will be carried on to educate the home building industry to make builders aware of

construction cost-saving techniques presently available to them. Also, they will be advised to the energy conservation aspects of various systems such as the underfloor plenum heat distribution system, whole house ventilation for cooling, and alternate insulation methods.

Publications

Complete an Extension publication on residential insulation, produce one on whole house ventilation and one on selecting a residential heating system.

Develop cooperatively with Home Economics a publication on factors affecting human comfort.

House Plan Service

Work will continue to upgrade the House Plan Service. Individual plans will be upgraded to an energy efficient standard at the rate of three per year, and low-use plans will be dropped from stock where appropriate. New plans will be added that display unusual cost-saving and energy-saving techniques.

Other Activities

Work will continue to include construction and energy cost-saving techniques such as the wood foundation system and insulated headers in the North Carolina State Building Code.

A computer program for residential energy analysis will be developed to help agents make energy conservation recommendations based on user data inputs.

A realistic objective is to hold the increase in total residential energy consumption to zero which would be a net reduction of about 16 trillion BTU's based on the projected 8 percent increase over the next 5 years. This would equate to a savings of about $200,000,000 if all this energy was electricity at 5¢ per kilowatt-hour.

ELECTRONIC DATA PROCESSING

SITUATIONAL STATEMENT

Interest in the applications of microcomputer technology in agricultural production and family management is increasing rapidly as hardware costs decrease and/or capability expands and appropriate application of software becomes more readily available. The North Carolina Agricultural Extension Service has a responsibility to provide its clientele with educational programs that will make them aware of the potential benefits of utilizing microcomputer technology, that will help them in making decisions regarding the acquisition of microcomputer hardware and software, that will help them more effectively utilize computer hardware which they have purchased, and that will keep them abreast of the rapidly changing state of development of microcomputer hardware and software for agricultural production and family management. Also microcomputer technology has the potential to provide Extension personnel with a tool that can help them to be more efficient in the delivery of educational programs in subject matter areas.

EXTENSION OBJECTIVES, METHODS AND EXPECTED RESULTS

Microcomputers in the hands of specialists and in county extension offices make it possible for Extension to educate its clientele and to increase efficiency of its own educational delivery system. Microcomputer hardware is currently available in 17 of the county extension offices in North Carolina and many specialists have access to microcomputers. Funds are expected to be available to purchase additional hardware for counties (5-8 counties) and specialists during the coming year. However, hardware is but one of two components of a microcomputer system which are necessary if it is to be effectively utilized by Extension as described above. The other component is software. The Biological and Agricultural Engineering Department will provide coordination and resources to develop software and assist in documentation preparation for software to be used on county computers. Distribution and maintenance of county software is also the responsibility of the Biological and Agricultural Engineering Department. Specialists in this department will provide direction for developing standards for software, and documentation, and policy for software distribution.

It will be necessary to continue to provide training for Extension personnel who have access to the microcomputer systems. Training sessions have been provided for the counties which currently have computers. Similar training programs will be provided for counties (5-8) which get computers during the year and for other county staffs desiring microcomputer training. Training sessions will also be provided for specialists groups (2-3) who obtain computers during the year.

There is likely to be a continuing demand to present programs to clientele interested in microcomputers. It is anticipated that 8-12 such programs will be delivered contacting 200-300 persons.

By the end of FY 83 it is expected that 22-25 of the county extension offices will have a microcomputer with 20-30 software programs provided by specialists at North Carolina State University and obtained from other Agricultural Extension Services. County personnel, in those counties with computers will be much better prepared to advise clientele on the purchase and utilization of microcomputers. At least one and in some cases up to five agents will know how to use the computer and will use it routinely in working with their clientele. The number of specialists utilizing microcomputer technology in delivering their programs to county personnel will probably double by the end of FY 83. The effectiveness of this project will indeed be measured by the number of Extension persons utilizing microcomputers and the resulting improvement in their efficiency both in terms of numbers of persons contacted and impact they have on actions taken by clientele.

4-H

The engineering 4-H projects include the Automotive Project and the Electric Project. All ongoing work will continue including the 4-H Electric Congress which is conducted in cooperation with the electric power companies, district and state demonstration program in the Electric Project. North

Carolina will also cooperate and assist in the Eastern Regional 4-H Engineering Contest (auto skill driving, tractor driving, and small engine demonstrations).

The 4-H Petroleum Power Program will be expanded with the addition of a compact tractor operator contest to the small engine demonstration, and a "Learn to Earn" component to the small engines project.

SEMIS REPORTING DEPARTMENTAL TASK CODE

0 - 9	Water Management
10 - 19	Structures
20 - 29	Crop Processing
30 - 39	Machinery
40 - 49	Energy
50 - 59	Safety and Civil Defense
60 - 69	Waste Management
70 - 79	Water Quantity and Quality
80 - 89	Residential Housing
90 - 99	4-H
100 - 109	Nonpoint Source Programs
110 - 119	Electronic Data Processing

WATER MANAGEMENT

Task Definition		Estimated Man Days
(001)	To provide assistance to county extension agents in conducting an educational program on irrigation. This includes preparation of articles and update of articles for the Irrigation Handbook, in-service training on irrigation for agents, assistance with workshops conducted by Extension coordinating committees, participating in meetings of Extension coordinating committees, speaking at commodity meetings, making on-farm visits to discuss purchase and use of irrigation systems, assisting some growers with irrigation scheduling, planning a two-day irrigation conference, planning one or more irrigation tours and seminars, and preparation of a computer program for irrigation system design.	105
(002)	To provide technical assistance to professional staffs in other departments in design and selection of irrigation systems for projects and on-farm tests that include irrigation.	7
(003)	To provide leadership and technical assistance in an educational program for manufacturers, suppliers and installers of irrigation equipment and to serve as technical advisor of the North Carolina Irrigation Society. This includes serving as member of a Specifications and Standards Committee that reviews standards for irrigation equipment and also a Certification Committee that certifies irrigation designers.	15

Task Definition		Estimated Man Days
(004)	To provide assistance to growers, other specialists, and state agencies in the design and selection of irrigation systems for land application of wastewater.	7
(005)	To provide assistance to state and federal agencies in the specifications and selection of irrigation equipment.	5
(006)	To provide technical assistance in the selection of water quality control equipment and water pumps and accessories for farm and home water systems.	5
(007)	To be a resource person on surface and subsurface drainage systems, erosion control and sediment control. This includes serving as technical advisor of the North Carolina Chapter of the Land Improvement Contractors of America and assisting the Soil Conservation Service with selected training for their personnel.	10

STRUCTURES

Task Definition		Estimated Man Days
(010)	To provide information and assistance in environmental and structural design of buildings and in systems development.	90
(011)	To study and provide information on energy usage, conservation and alternative energy sources.	40
(012)	To study production facilities for swine and poultry in which the environment can be partially controlled.	20

CROP PROCESSING

Task Definition		Estimated Man Days
(020)	To provide leadership in the development of equipment or methods for crop drying and processing. Work with tobacco curing, grain drying and storage is included in this task.	140
(021)	To provide leadership in the design, selection, care and operation of crop drying and processing equipment. Work in grain drying, tobacco curing, and electric power reduction for curing farm crops is included in this task.	99

MACHINERY

Task Definition		Estimated Man Days
(030)	To develop, obtain, and disseminate information on new equipment and methods for crop production. Work on tobacco mechanization, other field crops, and horticultural crops is included in this task.	117
(031)	To provide information and assistance on machinery and equipment selection, installation, care, adjustment, calibration, and operation. Automotive, field and other power equipment is included in this task.	47
(032)	To provide information and training for chemical applicator's certification or recertification for an applicator license.	8
(033)	To provide leadership in the selection, care and use of electrical equipment for the farm and home.	5

ENERGY

Task Definition		Estimated Man Days
(040)	To investigate on-farm energy usage and needs for up-dating energy data base and programming direction.	35
(041)	To assemble and provide information on alternate motor fuels.	10
(042)	To provide information and assistance on developing or integrating alternative on-farm energy resources while making technological and economical evaluations in these areas.	70
(043)	To provide information and assistance on energy conservation in agricultural production systems.	30
(044)	Electrical usage in agricultural production systems with emphasis on lowering peak demand.	20
(045)	On-farm energy audits for tobacco, swine, and poultry.	75
(046)	To serve on and provide technical assistance for local and governmental energy related committees.	2

SAFETY AND CIVIL DEFENSE

Task Definition		Estimated Man Days
(050)	To provide educational materials on rural home and farm safety.	50

Task Definition		Estimated Man Days
(051)	To promote safety in the use of farm machinery and equipment. Information on pertinent state and federal regulatory actions will be a part of this task.	30
(052)	4-H Safety activities.	50

WASTE MANAGEMENT

Task Definition		Estimated Man Days
(060)	To disseminate information on agricultural waste management. Emphasis will be on the utilization and disposal of animal wastes that will provide effective methods of pollution control.	143
(061)	To study various materials handling procedures, treatment processes, and field application methods for animal wastes.	20
(062)	To monitor the performance of agricultural waste treatment techniques and their environmental impact on receiving water quality.	71

WATER QUANTITY AND QUALITY

Task Definition		Estimated Man Days
(070)	To participate in state areawide water quality planning program.	64
(071)	To monitor water quality changes in selected watersheds and assess reduction in agricultural runoff due to the application of best management practices.	194
(072)	To conduct a statewide educational program for control of agricultural nonpoint sources under the 208 Areawide Water Quality Planning Program.	107
(073)	Interact with federal and state environmental quality regulations and monitoring strategies.	60
(074)	To continue studying various water supply alternatives available for both individuals and small rural communities and to disseminate those findings to Extension workers and Extension clientele.	25
(075)	To continue and evaluate various water conservation practices, products and management schemes and to disseminate the results of those findings to Extension workers and clientele.	28

Task Definition		Estimated Man Days
(076)	To continue studying and evaluating various alternative and innovative on-site, cluster and small community wastewater treatment systems. Further to study the problems associated with this disposal of hazardous and toxic waste.	41
(077)	To plan, develop and implement an educational program for local land treatment plant operators and to develop such a program in concurrence with the State Department of Natural Resources and Community Development and to continue the planning, designing, and implementation of educational programs for local and federal agencies on water supply, water conservation and wastewater treatment alternatives.	70

RESIDENTIAL HOUSING

Task Definition		Estimated Man Days
(080)	To provide engineering input into the overall cooperative residential housing program.	20
(081)	To update the house plan service.	20
(082)	To provide information and present educational programs on cost-saving residential construction techniques.	50
(083)	To provide information and conduct educational programs on residential energy conservation measures for dwellings.	50
(084)	To evaluate new energy and construction systems to determine their appropriateness for residential use.	50

4-H

Task Definition		Estimated Man Days
(090)	4-H Automotive Project and activities.	5
(091)	4-H Electric Project and activities.	25
(092)	4-H Petroleum Power Program and related activities (tractor and small engines projects and demonstrations).	20

NONPOINT SOURCE PROGRAMS

Task Definition		Estimated Man Days
(100)	Consult with and advise personnel directing agricultural nonpoint source control subjects nationwide.	60
(101)	Design and make operational a data management system to collect, store and analyze large volumes of information from numerous water quality projects nationwide.	100
(102)	Analyze and interpret data provided by individual projects and synthesize national or regional similarities.	410
(103)	Prepare assessments of Best Management Practices or systems of practices including agronomic, animal, economic, social and water quality factors.	200
(104)	Submit reports on overall project progress and accomplishments to appropriate accountability groups.	60

ELECTRONIC DATA PROCESSING

Task Definition		Estimated Man Days
(110)	Develop technical applications software and documentation for software to be used on county computers.	30
(111)	Develop procedures for software and documentation standardization and for distribution and maintenance of software and documentation.	25
(112)	Advising and training specialist, county agents and clientele in the utilization of microcomputers in agriculture.	25

ANNUAL PLAN OF WORK SUMMARY FORMAT

Year 1982-83 County Code 905

TASK	AREA OF EMPHASIS	PROJECT CODE	PROGRAM COMPONENT	PRIMARY SUBJECT	PRIMARY AUDIENCE TYPE	PRIMARY DELIVERY PROCESS	DAYS PLANNED
001	1	0	23	08	02	0,1,2	105
002	1	0	23	08	12,13	0,1	7
003	1	0	23	08	01	0,1	15
004	1	0	23	08	02,12,21	0,1	7
005	1	0	23	08	21	0,1	5
006	1	0	26	16	02	0,1	5
007	1	0	23	08	01,02	0,1,2	10
010	1	0	04	03	12,02	1,0	60
010	1	0	05	03	12,02	1,0	30
011	1	0	04	48	02	0	20
011	1	0	05	48	02	0	20
012	1	0	04	03	02	9	12
012	1	0	05	03	02	9	8
020	1	0	09	48	02	3	120
020	1	0	13	48	02	3	10
020	1	0	09	09	02	7	10
021	1	0	10	09	02	3	40
021	1	0	13	09	02	1	10
021	1	0	14	09	02	1	15
021	1	0	15	09	02	1	10
021	1	0	09	13	02	3	24
030	1	0	19	09	02,12	2,3,0,9	37
030	1	0	20	09	02,12	2,3,9	29
030	1	0	10	09	02,12	7,9	22
030	1	0	14	09	02,12	2,3	19
030	1	0	23	09	02	2	10
031	1	0	23	09	02	7,2,3	14
031	1	0	33	09	12	1,2	28
031	1	0	14	09	02	3	5
032	1	0	33	09	02	2	8
033	1	0	33	09	02	1	5
040	1	0	05	48	12,02	9,8	18
040	1	0	04	48	02	8	3
040	1	0	09	48	02	8	3
040	1	0	33	48	02	8	3
040	1	0	33	58	12	8	3
040	1	0	33	60	12	8	5
041	1	0	23	48	02	1	10
042	1	0	33	09	02	7	5
042	1	0	04	48	02	0	8
042	1	0	05	48	02	0	14
042	1	0	09	48	02	0	8
042	1	0	33	48	12,13,02	8,2,1	35

TASK	AREA OF EMPHASIS	PROJECT CODE	PROGRAM COMPONENT	PRIMARY SUBJECT	PRIMARY AUDIENCE TYPE	PRIMARY DELIVERY PROCESS	DAYS PLANNED
043	1	0	04	48	02	2	8
043	1	0	05	48	02	2	9
043	1	0	09	48	02	2	8
043	1	0	33	48	12	3	5
044	1	0	04	48	13	2	5
044	1	0	05	48	13	2	5
044	1	0	09	48	13	3	5
044	1	0	33	48	13	9	5
045	1	0	04	48	02	0,2	20
045	1	0	05	48	02	0,2	20
045	1	0	09	48	02	0,2	20
045	1	0	33	57	12	8	3
045	1	0	33	60	12	8	7
045	1	0	33	62	12	0	5
046	1	0	33	48	13	2	2
050	1	0	23	61	02	0	20
050	1	0	33	61	12	0	20
050	1	0	33	57	12	1	10
051	1	0	23	61	02,12	0	20
051	1	0	33	57	12	1	10
052	4	0	31	61	15,14	0	40
052	4	0	31	57	14	1	10
060	1	0	01	42	01,02	0	5
060	1	0	02	42	02,01	0	43
060	1	0	04	42	01,02	0,1	64
060	1	0	05	42	01,02	0,1	21
060	1	0	23	49	19	2	10
061	1	0	02	42	01	3	5
061	1	0	04	42	01	3	5
061	1	0	23	42	02,12	0	10
062	1	0	23	49	12	0	10
062	1	0	23	42	02	0	10
062	1	0	02	42	02,21,12	8,9,2,1,4,0	49
062	1	0	02	60	21	8	2
070	1	0	23	49	21,12	2,0,8,1	49
070	1	0	33	16	12	2	15
071	1	0	23	49	02,12,13,21	9,8,2,1,0	179
071	1	0	23	60	21	8	15
072	1	0	23	49	02,12,13,20	2,3,8,0	107
073	1	0	23	42	02,21	0,2	35
073	2	0	32	42	19	0	15
073	1	0	23	49	21	0	10
074	2	0	33	16	19,21	0,2,3	25
075	2	0	33	16	19	2,3	10
075	4	0	33	16	21	0,2,3,4	18
076	2	0	33	42	12,13,19	0,2,3,4	29
076	2	0	34	42	21	0,2,3,4	12
077	2	0	33	16	21	0,2	15
077	2	0	33	42	13,19	0,2	20
077	2	0	34	42	21,12	0,1,2,4	35

TASK	AREA OF EMPHASIS	PROJECT CODE	PROGRAM COMPONENT	PRIMARY SUBJECT	PRIMARY AUDIENCE TYPE	PRIMARY DELIVERY PROCESS	DAYS PLANNED
080	1	0	26	28	19	0	20
081	1	0	26	28	19	2	20
082	1	0	26	28	19	2	50
083	1	0	26	48	19	2	50
084	1	0	26	48	19	0	50
090	4	0	31	09	15	4	5
091	4	0	31	48	15	4	25
092	4	0	31	09	15	4	20
100	1	0	23	49	12	0,1	60
101	1	0	23	49	12	8	100
102	1	0	23	49	12,13,02,21	8	410
103	1	0	23	49	02,12,13,21	7	200
104	1	0	23	49	12,21	0,1	60
110	1	0	23	71	12	1,0	30
111	1	0	23	71	12	1,0	25
112	1	0	23	71	12,02	0	25

AGRICULTURAL EXTENSION SERVICE

North Carolina State University
School of Agriculture and Life Sciences

Department of Biological and
Agricultural Engineering
Box 5906, Raleigh, N.C. 27650
Telephone (919) 737-2675

June 23, 1982

MEMORANDUM TO: Frank J. Humenik

FROM : James C. Barker James C. Barker

SUBJECT : ~~Plan of Work for FY 1983~~ - Livestock Waste Management
SITUATIONAL STATEMENT

In 1980 North Carolina farmers spent 225 million dollars to purchase 1.8 million tons of commercial fertilizer. Approximately 1.25 million dry tons of livestock manure and poultry litter were recoverable from confinement operations worth an estimated 55 million dollars in fertilizer nutrient value. After subtracting the storage, pretreatment, and field nutrient losses resulting from today's manure handling practices, ~~however~~, it is estimated that only 30 million dollars worth of nutrients actually became plant available from the land spreading of collected manure. This leaves 25 million dollars of lost manure nutrients that could be economically recovered through improved waste collection and handling, and land application practices which are agronomically sound. An in-service training session is planned to update agents on techniques whereby animal wastes can better be utilized as crop fertilizer supplements. A 5% improvement in manure land application practices could mean 1.25 million dollars in fertilizer savings to N.C. farmers.
EXTENSION OBJECTIVES, METHODS & EXPECTED RESULTS

One technique which seems to be gaining in popularity among N.C. producers consists of a liquid manure storage system for storing up to a six-month accumulation of wastes. These systems not only conserve more nitrogen during storage but allow the flexibility of manure application when the crop can best utilize its fertilizer value. Labor efficiency is also maximized. Earthen storage basins, where site and soil conditions permit, can save a 100-cow dairy farmer approximately $20,000 in construction costs when compared to alternative liquid manure systems. Emphasis will be placed on proper design, location and construction of these liquid manure storage systems in conjunction with the Soil Conservation Service. Meetings will be held with agents, and producers relative to the selection and use of manure storage and handling facilities.
AGRI-COOPERATIVE EXTENSION SERVICE
REQUIREMENTS AND COSTS

Dairymen in high-rainfall and sloping or mountainous regions often encounter severe difficulties regarding compliance with existing stream pollution regulations. An estimated 25-30% of the Grade-A dairies in N.C. are located in the mountain regions of the state. Many of these dairies are small farmers in the 50-75 cow range, having been in operation for a number of years, and may not feasibly be able to utilize the same waste handling and pollution abatement technology as their newer and larger counterparts. Conventional no-discharge wastewater collection and treatment systems fall heaviest on those small farms since a minimum baseline investment is required regardless of size. Pollution abatement systems may cost upwards of $200 per cow on those small farms where they can physically be located. Those farms where conventional systems are physically impossible may be eventually forced out of business. An innovative technique currently being evaluated for wastewater treatment from small
2ND FACT

to moderately sized dairy farms consists of a shallow manure solids settling basin coupled with a grassed waterway or overland flow vegetative filter. It is estimated that this system would cost only $50 per cow for the 50-cow dairy and would have a wider range of adaptations than conventional systems. A vegetative filter currently in place in Buncombe County will be monitored and evaluated with the hopes that 25-30 dairymen could utilize this system within the coming year to meet stream pollution regulations.

Technical assistance will continue to be provided for resolution of livestock or poultry odor-nuisance conflicts. Based on past years requests, approximately 40-50 producers will receive either by phone, correspondence, or one-on-one assistance regarding the preservation of environmental quality.

The 1.25 million dry tons of recoverable livestock manure and poultry litter produced in N.C. in 1980 represents roughly 2.85 trillion BTU's of energy in the form of methane gas or the equivalent of 170 million kilowatt-hours of electricity per year. This resource has not proven to be economically feasible yet as a profitable addition to a commercial farming enterprise, however, the on-farm technology has not yet been fully developed. It has been proposed that a commercial methane digestion-electrical cogeneration system will be installed within the year on a poultry farm in Wayne County. Specialists in energy and waste management will work conjunctively with researchers to monitor and evaluate the performance of this system in order to have first-hand information with which to advise other livestock and poultry producers in N.C.

The numerical values used in this plan of work are rough "guesstimates" which should only be used to emphasis major program objectives. They are not goals which can be reasonably predicted a year in advance.

J. C. Barker 1982-83 Plan of Work

Task	Area of Emphasis	Project Code	Program Component	Primary Subject	Primary Audience Type	Delivery Process	Days Planned		
042	1	0	33	48	02	1	5	5	Methane information
040	1	0	~~205~~	48	12	9	10	5	" research
060	1	0	01	42	01	0	~~2~~		Beef Bus.
060	1	0	02	42	02	0	40		Dairy Farm
060	1	0	02	42	01	0	3		Dairy Bus
060	1	0	04	42	01	0	2		Hog Bus
060	1	0	04	42	02	0	40	10	Hog Farm
060	1	0	05	42	01	0	3		Pond. Bus
060	1	0	05	42	02	0	10		Pond. Farm
061	1	0	02	42	01	3	5		Dairy Bus
061	1	0	04	42	01	3	5		Hog Bus
062	1	0	02	42	12	9	10	10	Dairy Veg. Filter
070	1	0	33	16	12	2	5	10	208
073	1	0	23	42	02	0	15		Reg. - Farmer
073	1	0	23	42	21	2	10	10	Reg. - ~~Ext.~~ Agency
073	2	0	32	42	19	0	15		Wdlfs. - Citizen
060	1	0	01	42	02	0	3		Beef - Farm

073	1	0	23	49	21	0	10	10
060	1	0	23	49	19	2	10	10
061	1	0	23	42	02	0	5	10
061	1	0	23	42	12	0	5	
062	1	0	23	49	12	0	10	20
062	1	0	23	42	02	0	10	

L. Bynum Driggers

STRUCTURES

~~PLAN OF WORK~~

SITUATIONAL STATEMENT

To maximize swine production output, proper housing facilities coupled with good management must be available. PRACTICED It has been demonstrated that 18 plus pigs per sow per year is reasonable, but North Carolina and the nation as a whole averages about 13 pigs per sow per year. With housing costs averaging $2000 per sow in a farrow-to-finish operation, it is evident that proper planning and management are keys to success. Coupled with the high capital costs are high interest rates, and many producers or potential producers do not possess the management skills to be successful resulting in failures other than those due to poor marketing conditions.

EXTENSION OBJECTIVES, METHODS AND EXPECTED RESULTS

Because of the supply and demand situation, it is not anticipated that a large number of new production systems will develop this year. However, with the improved marketing situation, a great amount of remodeling and renovation of existing facilities is anticipated. Direct consultation with producers and extension agents along with printed subject matter including recommended designs will be the primary teaching method.

Improving the environment in swine production facilities is a major emphasis area. Too much attention has been focused on electrical and gas costs without assessing the relationship of these energy costs to productivity. Studies show that feed constitutes about 85% of the variable costs of production with electricity at 1.8% and fuel at 2.4%. Other costs amount to 10.8% of the variable costs. With this data base, it is easier to advise producers of cost-effective changes if their records adequately partition their costs of production. Therefore, good records are essential if good management decisions are to be made. It is awfully difficult to recommend a change unless there is a good understanding of the existing situation.

Energy costs are real, absolutely essential and are rising. However, there are many ways to conserve and they will continue to be emphasized.

Driggers

EXHIBIT I

ANNUAL PLAN OF WORK SUMMARY FORMAT

(CODED DATA FOR MACHINE PROCESSING)

YEAR 1982-83

~~COUNTY~~ Dept CODE 905

TASK	AREA OF EMPHASIS	PROJECT CODE	PROGRAM COMPONENT	PRIMARY SUBJECT	PRIMARY AUDIENCE TYPE	PRIMARY DELIVERY PROCESS	DAYS PLANNED	
010	1	0	04	03	12	1	20	90
010	1	0	04	03	02	0	40	
010	1	0	05	03	12	1	12	
010	1	0	05	03	02	0	18	
011	1	0	04	48	02	0	20	40
011	1	0	05	48	02	0	20	
012	1	0	04	03	02	9	12	20
012	1	0	05	03	02	9	8	
060	1	0	04	42	02	1	12	20
060	1	0	05	42	02	1	8	

WATER QUALITY AND QUANTITY

PLAN OF WORK 1982-83

Buddy Atkins and Beverly Young

AGRICULTURAL NON POINT SOURCES CONTROL PROGRAM

SITUATIONAL STATEMENT

North Carolinians use an estimated 1.5 billion gallons of water each day for purposes ranging from municipal water supply to irrigation. A much larger quantity is also utilized for non-consumptive purposes such as recreation and fish and wildlife habitat. The quality of those water resources affects the daily lives of all North Carolinians and therefore is an important concern from both an economic and environmental view.

~~PROBLEM STATEMENT~~

Water quality can be degraded from a number of pollution sources including agricultural nonpoint source (NPS) pollution. On a national scale agricultural NPS pollutants are the largest type of NPS pollution, affecting 68% of all the watersheds within the U.S. With 42% of North Carolina's land area used for agricultural purposes and 6.2 million acres (19%) being cropland, the State has a high potential for NPS inputs from its extensive agricultural areas.

NPS pollutants of agricultural origin include sediment, nutrients, pesticides and animal wastes and enter receiving waters during intense rainfall events. This pollution can result in lowered water quality in surface and ground supplies and also represents a significant loss to a farm's resource base. Specific concerns associated with NPS losses include the following areas:

Sediment

Erosion of sediment from North Carolina's cropland totals 49 million tons annually accounting for 65% of the State's gross erosion. Sediment inputs to streams can result in increased flooding, higher dredging costs, increased water treatment costs, reduced recreation and destruction of aquatic habitat. Soil erosion also lowers in-field soil quality making production expenses higher and thereby reducing farm profits.

Nutrients

Based on research from across the nation, nutrient losses from cropland average 5 lb/ac/yr for nitrogen and 1 lb/ac/yr for phosphorus. However, losses can be much higher on soils with high fertility and without adequate conservation practices. Using these average values for North Carolina's cropland yields annual loadings of 31 million lbs/yr and 6.2 million lbs/yr of nitrogen and phosphorus, respectively, entering North Carolina's receiving waters. Excessive nutrient inputs can result in eutrophic conditions in lakes and estuaries resulting in fish kills, reduced recreation and taste and odor problems in drinking water supplies. Significant problems have been noted in the Chowan and Neuse Rivers and adjacent coastal nursery areas in the past few years. The loss of these nutrients also means a loss to a farm's soil fertility which can decrease yield potentials and increase fertilizer costs. At 1981 nitrogen and phosphorus prices, it would cost North Carolina producers approximately $9 million to replace all the nitrogen and phosphorus fertilizer lost as NPS pollution.

Pesticides

In 1976, 22 million pounds of pesticides were applied to North Carolina's cropland. An unknown percentage of these pesticides enter into our waters each year and can result in fish kills as well as toxic effects on aquatic ecosystems. The loss of pesticides through improper application or overuse can also be expensive to individual farms, especially given the present cost of these materials.

Animal Wastes

North Carolina's animals produce 18.4 million tons (wet basis) of manure annually (1980 estimate). There exists a high potential for a part of this manure to enter streams, especially from areas of dense animal confinement. Water quality problems associated with animal waste inputs include eutrophication, deoxygenation of waters resulting in fish kills and pathogenic bacterial

contamination. Improper manure management also results in reduced farm efficiency since plant available nutrients are lost and unavailable for crop uptake.

METHODS AND EXPECTED RESULTS
OBJECTIVES ~~AND EDUCATIONAL PROGRAM~~

The North Carolina Agricultural Extension Service will continue to provide educational leadership and coordination for the North Carolina Agricultural NPS Pollution Control Program. In conjunction with the North Carolina Agricultural Task Force agencies and other specialists at NCSU, major program objectives are to: (1) increase awareness and knowledge among county agricultural agency personnel, county leaders and producers about the costs of agricultural NPS pollution, (2) increase the voluntary implementation of best management practices (BMP's) in production agriculture to reduce NPS pollution, (3) provide quantitative data based on field and watershed studies on the losses of NPS pollutants from agricultural lands in the State's three geographic regions, and (4) assess the level of participation in the voluntary compliance program for NPS reduction. BMP's will be encouraged for the dual benefits of water quality protection and increased production efficiency. These BMP's include (1) soil and water conservation practices ranging from contour plowing to no-till; (2) fertilizer management techniques such as soil testing; (3) integrated pest management; and (4) animal waste management practices including proper storage, handling and utilization.

To meet these objectives, a number of methods will be utilized. First, a total educational package is planned and will be available to county agricultural agencies during 1983. Components of the package include (1) a logo and theme, (2) a number of water quality and BMP brochures, (3) slide/tape sets, (4) magazine article reprints and (5) mass-media commercial spots.

Second, this package will be presented at a number of meetings and training sessions. These will include the Annual Extension Conference, Soil and Water Conservation District fall area meetings and County Rural Development Panel meetings. Individual staff and county leader development will be incorporated into county programs as needed. Through this effort, it is projected that 20%

of the counties will adopt water quality concerns into their on-going annual and long-range programs during the coming year.

Third, a number of pilot demonstration farms will be established in critical water quality areas including the Chowan River area and mountain region. These farms will serve to enhance and tie together educational programs of the Extension Service, SCS, Soil and Water Conservation District and ASCS into an integrated farm management program. The establishment of seven demonstration farms with annual educational events is projected for 1983.

Fourth, data being collected on BMP effectiveness at the Wake County demonstration farms will continue during calendar year 1983. This data will be utilized as part of the total educational package and should demonstrate to producers the water quality and on-farm economic benefits of BMP's. Preliminary ~~data~~ results indicate BMP removal effectiveness of >90% for runoff water and pollutants including sediment, nutrients and organic matter as compared with the control site without BMP's. An economic evaluation is also planned to assess BMP cost effectiveness.

Fifth, ongoing research and demonstration projects in 11 agricultural watersheds across the state are providing detailed information on nutrient, sediment and organic loadings to surface waters from agricultural activity. ACTIVITIES. With field studies concluding in 10 of these areas in 1983, long-term project results and conclusions will assist efforts of county, regional and state planners in assessing agricultural NPS impacts and developing appropriate control programs. Also, the detailed yearly surveys of producer agronomic activity and use of conservation practices in two project areas will allow evaluation of how successful the volunary BMP implementation program has been. It is expected that data obtained during these projects will benefit North Carolina agricultural and environmental planners since it is specific to the State and REGIONS OF ~~regions~~ and reflects current agricultural production. PRACTICES.

Brenda- my task definitions are the same as last year

Beverly Young

5

EXHIBIT I

ANNUAL PLAN OF WORK SUMMARY FORMAT

(CODED DATA FOR MACHINE PROCESSING)

YEAR 1983 COUNTY CODE 905

TASK	AREA OF EMPHASIS	PROJECT CODE	PROGRAM COMPONENT	PRIMARY SUBJECT	PRIMARY AUDIENCE TYPE	PRIMARY DELIVERY PROCESS	DAYS PLANNED		
062	1	0	02	42	02,21,12	9,2,1,8,0,4	29		
062	1	0	02	42	02	9	15		
062	1	0	02	42	21	2	2	31	
062	1	0	02	42	21	1	2		
062	1	0	02	42	02	8	4		
062	1	0	02	60	21	8	2		
062	1	0	02	42	12	0	4		
062	1	0	02	42	21	4	2		
070	1	0	23	49	21	2	10		
070	1	0	23	49	12	0	2	10	29
070	1	0	23	49	21	8	5		
070	1	0	23	49	21	1	2		
071	1	0	23	49	21	8	45		
071	1	0	23	49	21	2	10		
071	1	0	23	49	21	1	2		
071	1	0	23	49	12	0	25	10	134
071	1	0	23	49	12	1	2		
071	1	0	23	60	21	8	15		
071	1	0	23	49	21	9	20		
071	1	0	23	49	02	9	5		

EXHIBIT I

ANNUAL PLAN OF WORK SUMMARY FORMAT
(CODED DATA FOR MACHINE PROCESSING)

YEAR 83 COUNTY CODE 905

TASK	AREA OF EMPHASIS	PROJECT CODE	PROGRAM COMPONENT	PRIMARY SUBJECT	PRIMARY AUDIENCE TYPE	PRIMARY DELIVERY PROCESS	DAYS PLANNED	
070	1	0	23	49	21	2	20	20
071	1	0	23	49	2	9	20	60
					12	9	20	
					13	9	20	
072	1	0	23	49	02	2	5	107
						3	7	
						8	15	
					12	0	2	
						2	5	
						3	7	
						8	15	
					13	0	2	
						2	5	
						3	7	
						8	15	
					20	3	7	
						8	15	

TASKS

Atkins

070

071

072

Same as last year

AGRICULTURAL
EXTENSION
SERVICE

North Carolina State University
School of Agriculture and Life Sciences

February 8, 1982

Department of Biological and
Agricultural Engineering
Box 5906 Zip 27650
Telephone 737-2675

MEMORANDUM TO: Chairman, SWCD Supervisors
District Conservationist, SCS
County Chairmen, AES
County Executive Director, ASCS

FROM: James Blake Atkins, Extension Specialist
Biological and Agricultural Engineering

SUBJECT: I. Background of the Agricultural NPS Pollution Control Program in North Carolina
II. Availability of Educational Program to Counties

I. As part of the Federal Water Pollution Control Act Amendments of 1972, Section 208 required states to develop a plan for the control of both point and non-point sources (NPS) of pollution in order to improve and protect our water quality. Resulting from the law, an Agricultural Task Force was established which developed a management plan to control NPS pollutants of agricultural origin including sediment, nutrients, pesticides and animal wastes. Members of this Task Force include North Carolina State University, North Carolina Department of Agriculture, North Carolina Farm Bureau Federation, North Carolina State Grange, USDA-Soil Conservation Service and USDA Agricultural Stabilization and Conservation Service, all under the guidance and coordination of the North Carolina Soil and Water Conservation Commission.

As an integral part of the plan, an educational effort by the Agricultural Task Force was begun with North Carolina State University (Agricultural Extension Service) serving as the lead agency. The purpose of the educational program is to increase awareness within the agricultural community of the costs, both to society and the producer, of NPS losses from North Carolina's cropland. The program also seeks and encourages the voluntary implementation of Best Management Practices (BMP's) by individual land owners and producers to reduce these losses.

The BMP's recommended consist of a number of proven agricultural conservation techniques including soil conservation, optimal fertilizer usage, proper pesticide application and improved animal waste management. All are an integral part of existing county agricultural programs which help to increase farm productivity and profits and are now also being utilized to help protect the quality of our waters.

II. As coordinator of the educational program, it is my responsibility to provide educational materials and assistance to each county concerning the NPS pollution control program. Educational materials which will be available through the Agricultural Task Force agencies include a slide program and two brochures on the Agricultural NPS Pollution Control Program in North Carolina and Agricultural Best Management Practices. A slide-tape set will also be developed if demand for the program exceeds my ability to be present for the slide program presentation.

PLAN OF WORK 1982-83

John W. Glover

Situational Statement

GRAIN DRYING

There has been a rapid increase in grain storage capacity in North Carolina in recent years. North Carolina has approximately 200 million bushels of grain storage capacity. Approximately 75 million bushels of this storage capacity is located on the farm. Much of the on-farm grain drying is done in the storage bin (in-storage or layer drying). Because of weather risk and the thrust of mold damage in the field, growers are attempting to harvest the grain earlier. This puts a strain on the capacity of the grain drier, especially the in-storage drying method. If the grain, especially corn, is not dried in a reasonable time, it may mold and develop aflatoxin in the bin. High aflatoxin levels are detrimental to livestock, especially swine and poultry.

EXTENSION OBJECTIVES, METHODS AND EXPECTED RESULTS

In 1981-82 an on-farm study was begun to determine if the Extension Service's drying and storage recommendations were adequate to prevent the development of aflatoxin under North Carolina conditions. This study was conducted in 16 grain bins on 11 farms in 6 counties. The preliminary results indicated that the recommendations are adequate; a continuation of this study is planned. The study includes taking a base sample of the corn at harvest, going into storage, during storage, and coming out of storage. These samples are analyzed for aflatoxin. Equipment and supplies for this project are being furnished by the North Carolina Corn Growers Association.

PEANUT CURING

Efficient Use of Fuels and Electricity

Fuel cost for crop drying and processing continues to increase. Methods of reducing fuel requirements are needed. The Extension Service must cooperate with the research worker to find methods for reducing fuel requirements and take them to adoption.

The extension agricultural engineer is cooperating and assisting in a research project on recirculation of the drying air to conserve energy in peanut curing. The results of this study will be incorporated in the Extension Service's educational program.

The harvest period for peanuts is very short. Because of this there is a tendency to dry the peanuts too fast which can reduce quality. Proper curing procedures to preserve quality will continue to be stressed.

COUNTY EXTENSION AGENT TRAINING IN CROP DRYING AND STORAGE

A one-day training workshop is planned for ~~the~~ county agricultural extension agents on crop drying and storage. The principles of ~~and~~ the latest information and recommendations will be stressed.

AUTOMATIC PROCESSING CONTROLS

As a way to reduce labor and conserve fuel, more automatic processing controls are appearing on the market, especially for tobacco curing. A bulletin is planned explaining the function, operation and use of these controls for tobacco curing.

ALTERNATE MOTOR FUELS

The high price of petroleum fuel has sparked an interest in alternate motor fuels. Because of the present high cost of alternate motor fuels, the extension agricultural engineer will furnish information on request to persons desiring information on alcohol and vegetable oils for motor fuels.

4-H

The engineering 4-H projects include the Automotive Project and the Electric Project. All ongoing work will continue including the 4-H Electric Congress which is conducted in cooperation with the electric power companies, district and state demonstration program in the Electric Project. North Carolina will also cooperate and assist in the Eastern Regional 4-H Engineering Contest (auto skill driving, tractor driving, and small engine demonstrations).

EXHIBIT I

ANNUAL PLAN OF WORK SUMMARY FORMAT

(CODED DATA FOR MACHINE PROCESSING)

YEAR 83 COUNTY CODE 905

TASK	AREA OF EMPHASIS	PROJECT CODE	PROGRAM COMPONENT	PRIMARY SUBJECT	PRIMARY AUDIENCE TYPE	PRIMARY DELIVERY PROCESS	DAYS PLANNED	
020	1	0	13	48	02	3	10	20
020	1	0	09	09	02	7	10	
021	1	0	10	09	02	3	40	
021	1	0	13	09	02	1	10	
021	1	0	14	09	02	1	15	75
021	1	0	15	09	02	1	10	
					02	2	10	10
030	1	0	23	09	02	3	5	50
031	1	0	14	09	02	1	5	5
033	1	0	33	09				
041	1	0	23	48	02	1	10	10
								5
090	4	0	31	09	15	4	5	
091	4	0	31	48	15	4	25	25
							155	

ELECTRONIC DATA PROCESSING

SITUATIONAL STATEMENT

Interest in the applications of microcomputer technology in agricultural production and family management is increasing rapidly as hardware costs decrease and/or capability expands and appropriate application of software becomes more readily available. The North Carolina Agricultural Extension Service has a responsibility to provide its clientele with educational programs that will make them aware of the potential benefits of utilizing microcomputer technology, that will help them in making decisions regarding the acquisition of microcomputer hardware and software, that will help them more effectively utilize computer hardware which they have purchased, and that will keep them abreast of the rapidly changing state of development of microcomputer hardware and software for agricultural production and family management. Also microcomputer technology has the potential to provide extension personnel with a tool that can help them to be more efficient in the delivery of educational programs in subject matter areas.

EXTENSION OBJECTIVES, METHODS AND EXPECTED RESULTS

Microcomputers in the hands of specialists and in county extension offices make it possible for extension to educate its clientele and to increase efficiency of its own educational delivery system. Microcomputer hardware is currently available in seventeen of the county extension offices in North Carolina and many specialists have access to microcomputers. Funds are expected to be available to purchase additional hardware for counties (5-8 counties) and specialists during the coming year. However, hardware is but one of two components of a microcomputer system which are necessary if it is to be effectively utilized by extension as described above. The other component is software. The Biological and Agricultural Engineering Department

will provide coordination and resources to develop software and assist in documentation preparation for software to be used on county computers. Distribution and maintenance of county software is also the responsibility of the Biological and Agricultural Engineering Department. Specialists in this department will provide direction for developing standards for software, and documentation, and policy for software distribution.

It will be necessary to continue to provide training for extension personnel who have access to the microcomputer systems. Training sessions have been provided for the counties which currently have computers. Similar training programs will be provided for counties (5-8) which get computers during the year and for other county staffs desiring microcomputer training. Training sessions will also be provided for specialists groups (2-3) who obtain computers during the year.

There is likely to be a continuing demand to present programs to clientele interested in microcomputers. It is anticipated that 8-12 such programs will be delivered contacting 200-300 persons.

By the end of FY 83 it is expected that 22-25 of the county extension offices will have a microcomputer with 20-30 software programs provided by specialists at N.C. State University and obtained from other Agricultural Extension Services. At least one and in some cases up to five agents will know how to use the computer and will use it routinely in working with their clientele. County personnel, in those counties with computers will be much better prepared to advise clientele on the purchase and utilization of microcomputers. The number of specialists utilizing microcomputer technology in delivering their programs to county personnel will probably double by the end of FY 83. The effectiveness of this project will indeed be measured

by the number of extension personnel utilizing microcomputers and the resulting improvement in their efficiency both in terms of numbers of persons contacted and impact they have on actions taken by clientele.

ELECTRONIC DATA PROCESSING

Task Definition	Estimated Man Days (Sowell)	(Chen)
(110) Develop technical applications software and documentation for software to be used on county computers.	30	180
(111) Develop procedures for software and documentation standardization and for distribution and maintenance of software and documentation.	25	20
(112) Advising and training specialist, county agents and clientele in the utilization of microcomputers in agriculture.	25	20

Mr. Sowell - I cannot locate this for your Plan of Work. Did you prepare one? I need ASAP.
Brenda

EXHIBIT I

ANNUAL PLAN OF WORK SUMMARY FORMAT
(CODED DATA FOR MACHINE PROCESSING)

YEAR______________ COUNTY CODE__________

TASK	AREA OF EMPHASIS	PROJECT CODE	PROGRAM COMPONENT	PRIMARY SUBJECT	PRIMARY AUDIENCE TYPE	PRIMARY DELIVERY PROCESS	DAYS PLANNED
110	1	0	23	71	12	1,0	~~15~~ 30
~~110~~	~~1~~	~~0~~	~~23~~	~~71~~	~~12~~	~~0~~	~~15~~
111	1	0	23	71	12	1,0	~~10~~ 25
~~111~~	~~1~~	~~0~~	~~23~~	~~71~~	~~12~~	~~0~~	~~15~~
112	1	0	23	71	12,02	0	~~20~~ 25
~~112~~	~~1~~	~~0~~	~~23~~	~~71~~	~~02~~	~~0~~	~~5~~

WATER QUALITY AND QUANTITY Kuchler

National Water Quality Evaluation Project
SITUATIONAL STATEMENT

Water pollution from agricultural lands is a major problem in the United States. There are large costs, both to society and farmers. It has been estimated that $250,000,000 per year is spent on removing sediment from streams, harbors and rivers. Loss of storage capacity in lakes and reservoirs is equally costly. Approximately fifty percent of this sediment comes from agricultural land. The costs to farmers is equally high. Almost one billion tons of soil in excess of tolerable limits are lost from cropland each year. Estimates of the value of this topsoil and associated nutrients range from thirty cents to two dollars per ton. Thus the cost to farmers of excessive erosion may range from 300 million to two billion dollars per year. Perhaps more importantly loss of topsoil can reduce yield potential. A recent USDA study indicates that at present erosion rates corn and soybean yields in the Cornbelt states may drop by thirty percent in the next fifty years.

These costs represent only a fraction of the total due to runoff from agricultural lands. Loss of recreational and aesthetic value because of entrophication, health hazards from pesticides and bacteria from animal wastes are some of the other costs society bears. From the farmers' viewpoint savings could be realized from reduced use of fertilizer and particles through better management. A 1977 estimate for North Carolina indicates that five million pounds of P_2O_5 in excess

of crop needs are applied yearly. This translates to a potential saving of over one million dollars yearly for one plant nutrient for one state. Obviously the potential savings nationwide for all fertilizers and pesticides would be manyfold greater.

EXTENSION OBJECTIVES, METHODS AND EXPECTED RESULTS

There are numberous agricultural nonpoint source control projects currently underway that address the problem of reducing loads from farming and livestock operations. A majority of these programs are funded under the Rural Clean Water Program, enacted by the Federal Congress to assist in this cleanup effort. As part of the enabling legislation, an evaluation of the water quality benefits of this program was mandated by Congress. Approximately fifty projects with total budgets in excess of 100 million dollars will be included in the evaluation.

The experimental Rural Clean Water Program, a joint USDA-EPA effort is the largest single program in agricultural nonpoint source control. Twenty-one projects are located nationwide and address a variety of water quality problems. The total acreage encompassed in these projects is 2,213,422 acres. Those farms designated as critical sources of pollutants number 4,827. Of these 4,126 are projected to employ Best Management Practices, applied to approximately one-half million acres.

The North Carolina Agricultural Extension Service was selected to conduct this evaluation under a joint USDA-EPA cooperative agreement, "Rural Nonpoint Source Control Water Quality Evaluation and Technical Assistance." The agreement calls for consultation with and training of personnel from many agencies connected with agricultural nonpoint

source control projects, an evaluation of the water quality benefits of these activities and preparation of associated educational materials.

A primary thrust of the project will be overall evaluation of recommended Best Management Practices (BMPs) to reduce the impact of agricultural runoff. Farmers are increasingly being asked to implement these practices without having sufficient information to formulate sound farm management strategies. Results from this project will provide the basis for technically sound recommendations for including water quality considerations into overall crop and livestock production guidelines.

To accomplish project objectives a tremendous volume of data must be collected, organized, analyzed and evaluated from the many projects across the country. ~~Project design, will involve collaboration of individual project personnel and~~ Extension specialists at North Carolina State University working on this special project will have responsibilities for coordinating ~~The analysis and evaluation of results will be the responsibility of the four extension specialists,~~ leading to the national evaluation of agricultural nonpoint source control projects. ~~involving substantial amounts of independent study. This will also include considerable consultation and cooperation with representatives of other USDA agencies~~. Results will be reported periodically to appropriate accountability groups, submitted for publication in technical publications and presented as educational materials for use by Extension personnel and other USDA agencies.

Three State-of-the-Art reviews of Best Management Practices were published late in Fiscal Year 1981. Two more will be published in Fiscal Year 1982. These are being distributed by USDA agencies at the national and state level. Additional distribution is to national, state, regional and local environmental agencies. Approximately

1,000 copies of each of the five publications will be distributed in Fiscal Year 1982. These publications will be updated and revised as research and demonstration results become available.

A collaborative study conducted in conjunction with the Economic Research Service will assess the socio-economic factors involved. Results from that study will be combined with results on water quality effects. The end products will be (1) water quality cost-effectiveness data for Best Management Practices, (2) on-farm cost-benefit calculations for using such practices, (3) social cost-benefit calculations for achieving measured water quality results, and (4) a methodology for determining the least-cost solution for a given water quality problem.

Rachel

EXHIBIT I

ANNUAL PLAN OF WORK SUMMARY FORMAT

(CODED DATA FOR MACHINE PROCESSING)

YEAR 1982 COUNTY CODE 905

TASK	AREA OF EMPHASIS	PROJECT CODE	PROGRAM COMPONENT	PRIMARY SUBJECT	PRIMARY AUDIENCE TYPE	PRIMARY DELIVERY PROCESS	DAYS PLANNED	
100	1	0	23	49	12	0	25	10
100	1	0	23	49	12	1	25	60
101	1	0	23	49	12	8	100	100
102	1	0	23	49	12	8	100	
102	1	0	23	49	13	8	100	410
102	1	0	23	49	02	8	100	
102	1	0	23	49	21	8	100	10
103	1	0	23	49	02	7	75	10
103	1	0	23	49	12	7	50	5
103	1	0	23	49	13	7	25	5
103	1	0	23	49	21	7	25	5
104	1	0	23	49	12	0	10	5
104	1	0	23	49	12	1	15	60
104	1	0	23	49	21	0	10	5
104	1	0	23	49	21	1	15	

PLAN OF WORK 1982-83

Ben N. Cox

RESIDENTIAL HOUSING SITUATIONAL STATEMENT

Presently there are over 2 million households in North Carolina. It has been estimated that the annual residential energy consumption in this state exceeds 190 trillion BTU's. This equates to $2,784,500,000 of electricity at 5¢ per kilowatt-hour. If only 10% of the residential energy could be saved, about 19 trillion BTU's of energy could be saved statewide.

Due to high interest rates, both mortgage and savings, care must be exercised not to invest more in energy saving techniques than can be justified. If the interest on the money invested is more than the energy savings, then people cannot and should not be encouraged to make the investment. However, there are a number of low-cost and no-cost energy saving measures residents can use. The investment recovery time will vary somewhat for each particular situation, but most are relatively short when compared with major investments for energy conservation or alternate energy sources.

The ~~same~~ high cost of money, ~~as mentioned before,~~ ALSO makes it difficult if not impossible for young families to consider first home ownership. It is necessary for the residential construction industry to make every effort to reduce construction costs while continuing or bettering the energy efficiency and quality of construction ~~levels~~.

OBJECTIVES, METHODS AND EXPECTED RESULTS

~~OBJECTIVE AND EDUCATIONAL EMPHASIS~~

Educational Programs

Education of agents with housing responsibilities in the area of residential energy analysis and construction cost-saving techniques will be carried out at Annual Extension Conferences and on an area basis when opportunities are available. Emphasis will be placed on low-cost, no-cost energy conservation techniques and construction cost saving ideas. These will include, but not limited to, residential energy consumption awareness, computer energy analysis of residences, infiltration reduction, and in conjunction with Home Economics the effect of human behavior and living habits on residential energy consumption.

Continued work with the North Carolina Home Builders Association,will be carried on to educate the home building industry to make builders aware of construction cost-saving techniques presently available to them. Also, they will be advised to the energy conservation aspects of various systems such as the underfloor plenum heat distribution system, whole house ventilation for cooling, and alternate insulation methods.

Publications

Complete an Extension publication on residential insulation, produce one on wholehouse ventilation and one on selecting a residential heating system.

Develop cooperatively with Home Economics a publication on factors affecting human comfort.

House Plan Service

Work will continue to upgrade the House Plan Service. Individual plans will be upgraded to an energy efficient standard at the rate of three per year, and low-use plans will be dropped from stock where appropriate. New plans will be added that display unusual cost-saving and energy-saving techniques.

Other Activities

Work will continue to include construction and energy cost-saving techniques

such as the wood foundation system and insulated headers in the North Carolina State Building Code.

A computer program for residential energy analysis will be developed to help agents make energy conservation recommendations based on user data inputs.

A realistic objective is to hold the increase in total residential energy consumption to zero which would be a net reduction of about 16 trillion BTU's based on the projected 8% increase over the next 5 years. This would equate to a savings of about $200,000,000 if all this energy was electricity at 5¢ per kilowatt-hour.

Task	Definition	Estimated Man Days
080	To provide engineering input into the overall cooperative residential housing program	20
081	To update the house plan service	20
082	To provide information and present educational programs on cost-saving residential construction techniques	50
083	To provide information and conduct educational programs on residential energy conservation measures for dwellings	50
084	To evaluate new energy and construction systems to determine their appropriateness for residential use	50

last years

Cof

EXHIBIT I

ANNUAL PLAN OF WORK SUMMARY FORMAT

(CODED DATA FOR MACHINE PROCESSING)

YEAR_____ COUNTY CODE 905

TASK	AREA OF EMPHASIS	PROJECT CODE	PROGRAM COMPONENT	PRIMARY SUBJECT	PRIMARY AUDIENCE TYPE	PRIMARY DELIVERY PROCESS	DAYS PLANNED
080	1	0	26	28	19	0	20 } 20
081	1	0	26	28	19	2	20 } 20
082	1	0	26	28	19	2	50 } 50
083	1	0	26	48	19	2	50 } 50
084	1	0	26	48	19	0	50 } 50

PLAN OF WORK FOR 1982-83

Rupert W. Watkins

SITUATIONAL STATEMENT

About half of North Carolina's crop production energy is used in curing tobacco. At current prices fuel for curing is a major crop expense. Extension's on-farm tests have demonstrated a potential savings of at least one-third of the estimated 126 million gallons of fuel used each year in curing tobacco. Educational efforts--including TV and radio programs, magazines and newspaper articles, and dozens of farmer meetings--are planned to encourage widespread implementation of the energy saving practices used in Extension's tests.

EXTENSION OBJECTIVES, METHODS AND EXPECTED RESULTS

Farm tests in 1980 and 1981 have demonstrated the practicality of curing tobacco with an alternate fuel--wood. In those tests the convenience of thermostatic temperature control in modern bulk barns was maintained. Tobacco quality was maintained and "firing" effort was monitored. While wood curing presently appears practical for many farms, many improvements in machinery and method would seem possible. Extension efforts in 1982 will include monitoring improvements and keeping tobacco agents apprised of developments. W/A

As a result of Extension's efforts in efficient curing, tobacco farmers in North Carolina are expected to save 30 million gallons of curing fuel in 1983, with about two dozen farmers using no fossil fuel at all for curing. These farmers who have installed "wood-curing" facilities will enjoy an approximate $200 per acre crop expense reduction.

Watkins

EXHIBIT I

ANNUAL PLAN OF WORK SUMMARY FORMAT

(CODED DATA FOR MACHINE PROCESSING)

YEAR_____ COUNTY CODE_____

TASK	AREA OF EMPHASIS	PROJECT CODE	PROGRAM COMPONENT	PRIMARY SUBJECT	PRIMARY AUDIENCE TYPE	PRIMARY DELIVERY PROCESS	DAYS PLANNED
020	1	0	09	48	02	3	120
021	1	0	09	13	02	3	24

PLAN OF WORK 1982-83

E. O. Beasley

SITUATIONAL STATEMENT

Escalating costs of production inputs including machinery, fuel and labor combined with static or declining commodity prices have pushed many farmers into a crisis situation. Tractor and equipment replacement have had to be postponed in many cases, necessitating increased emphasis on maintenance, repair, and operational management of existing machinery to extend its useful life and preserve its effectiveness. U.S. retail unit sales of farm tractors have declined from 138,990 in 1979 to 103,835 in 1981, with a further decrease to 102,800 forecast for 1982. Self-propelled combine sales have decreased from 32,246 in 1979 to 26,831 in 1981, and corn header sales have dropped 30 percent during the same period. Similar decreases have occurred in sales of disk harrows, field cultivators, chisel plows and other equipment items. The situation in North Carolina follows the national trend, with the net result that the average age of equipment in use has increased substantially in the past 3 years.

The cost-price squeeze has occurred at a time when there is an increasing awareness of the soil and water losses from agricultural lands due to intensive row-crop farming without adequate water control practices. Conservation practices have not been viewed by farmers as cost-effective in the short run, and thus have been implemented largely in response to government-provided cash incentives. These incentives have been drastically curtailed and this fact coupled with the increased utilization of marginal land for row-crop production and the trend toward larger machinery has resulted in soil losses which are estimated to average more than 9 tons per acre per year, many times the rate at which new soil is formed. Productivity decreases due to soil depletion,

particularly on more sloping fields, thus represent an additional loss of income which has been estimated at an average of $18 per acre per year in North Carolina. Farmers need to be made aware of these facts and shown better tillage and land management practices which would improve water availability for crop production and reduce erosion due to runoff. Applied research and on-farm demonstrations aimed at reducing soil erosion and compaction are already underway and need to be intensified.

Clean tillage and/or excessive tillage have been shown to be factors contributing to increased runoff, soil compaction, and erosion. Motor fuel requirements for producing corn and soybeans, which account for most row-crop acreage subject to severe erosion in North Carolina, are in the range of 5 to 6 gallons per acre for conventional tillage and can be reduced to 3 or 4 gallons per acre for minimum tillage and to 1 to 2 gallons per acre for no-tillage. In addition, the reduction in tillage results in less soil compaction and less wear and tear on equipment. The potential annual fuel savings of 8 to 10 million gallons on North Carolina's nearly 4 million acres of corn and soybeans, in addition to the reduced labor, improved timeliness of operations, and soil conservation aspects of optimal tillage practices make this a high priority area for 1983 and succeeding years.

North Carolina produces a variety of fruit and vegetable crops, many of which would have better market acceptability, less spoilage, longer shelf life and possibly higher cash value if pre-cooled prior to shipment and kept cool during shipment and handling through marketing channels. Increased market acceptability and more reliable quality will be important keys to expanding acreage and sales of fresh fruits and vegetables as an alternative to tobacco. Refrigeration techniques, facilities and equipment of a capacity and type suitable to these diverse crops are needed as an integral part of the production system.

Short seasonal use plus the need for high capacity make it difficult for most growers to justify the cost of pre-cooling and refrigerated storage, particularly when no direct compensation in the form of a price premium is assured. Reduced losses, fewer load rejects, increased market range and more consistent quality are benefits of pre-cooling which will have positive implications for higher prices and improved marketability of North Carolina fresh fruits and vegetables. It has been estimated, for instance, that the monetary loss from rejected loads of blueberries is about 20 percent of potential value, and recent tests have indicated that they can be pre-cooled for as little as 3 cents per pound, essentially eliminating losses from rejected loads. Thus for about 3 percent or less of the fruit value, 20 percent loss can be eliminated, resulting in a seven-fold return on investment. Similar situations exist for other perishable commodities although the higher-valued crops will yield greater returns on cooling investment. Broccoli and strawberries are two potentially profitable crops for western North Carolina and both require pre-cooling if they are to be marketed through other than local outlets. Tomatoes, apples, grapes, squash and peppers are other commodities which may show increased profitability from pre-cooling.

METHODS AND EXPECTED RESULTS

EXTENSION OBJECTIVES ~~AND EDUCATIONAL EMPHASIS~~

Informational programs will be developed and delivered to extension agents and farmers on maintenance and servicing to extend the life and increase the reliability of aging farm machinery. Fuel-saving operational techniques for tractors will be stressed, as well as the fuel-saving aspects of reduced tillage.

Equipment and methods for reduced-tillage and no-tillage production of grain crops, cotton and peanuts will be emphasized through news articles, publications, meetings and demonstrations. A reduced tillage and planting equipment field day will be held to acquaint farmers and extension agents with the tools available for conservation farming. On-farm tests involving water and erosion control, reduced soil compaction, and energy savings through crop residue management and conservation tillage methods will be continued. Assistance will be given to equipment manufacturers in developing more suitable equipment for optimum tillage of specific soil types.

Training will be provided to approximately 30 agents in the basics of fruit and vegetable cooling, equipment and methods available, selection and management of cooling systems, and economics of cooling. Assistance in selecting and sizing cooling equipment will be provided to individual growers on request. Meetings, workshops and training sessions will be held to assist new fruit and vegetable growers with equipment and methods for planting, cultural practices, pest control and harvesting.

Publications and computer programs on cost analysis and selection/matching procedures for farm machinery will be updated and revised. Continued emphasis will be given to cost containment through optimization of machine numbers, sizes and retention periods. Proper adjustment and operation of harvesting equipment to minimize losses will be stressed.

4-H

The 4-H Petroleum Power Program will be expanded with the addition of a compact tractor operator contest to the small engine demonstration, and a "Learn to Earn" component to the small engines project.

(Same task definitions as last year)

Beasley (?)

EXHIBIT I

ANNUAL PLAN OF WORK SUMMARY FORMAT

(CODED DATA FOR MACHINE PROCESSING)

YEAR 1983 COUNTY CODE 905

TASK	AREA OF EMPHASIS	PROJECT CODE	PROGRAM COMPONENT	PRIMARY SUBJECT	PRIMARY AUDIENCE TYPE	PRIMARY DELIVERY PROCESS	DAYS PLANNED
030	1	0	19	09	02,12	2,3,0,9	10+10+8+9=37
030	1	0	19	09	02	3	10
030	1	0	19	09	12	0	8
030	1	0	19	09	12	9	9
030	1	0	20	09	02,12	2,3,9	6+7+8+8=29
030	1	0	20	09	02	3	7
030	1	0	20	09	12	9	8
030	1	0	20	09	12	2	8
030	1	0	10	09	02,12	7,9	12+10=22
030	1	0	14	09	02,12	2,3	11+8=19
030	1	0	10	09	12	9	10
030	1	0	14	09	12	3	8
031	1	0	23	09	02	7,2	6+8=14
031	1	0	23	09	02	2	8
031	1	0	33	09	12	1,2	12+16=28
031	1	0	33	09	12	2	16
032	1	0	33	09	02	2	8
042	1	0	33	09	02	7	5
092	4	0	31	09	15	4	20

PLAN OF WORK 1982-83

Larry F. Graham

Energy

SITUATIONAL STATEMENT

Production agriculture uses about 3% of the nation's annual energy consumption. This amounts to over 2000 trillion BTU's each year and is equivalent to about 16 billion gallons of gasoline. North Carolina's production agriculture consumes around 56 trillion BTU's annually or 450 million equivalent gallons of gasoline. Thus North Carolina's agricultural energy consumption is about 2.8% of the nation's, or about .08 of 1% of the total. This is a fairly low percentage but amounts to over $450 million worth of energy. More important than cost, however, is its value in processing crops worth billions. Without adequate supplies of energy in practically any phase of production agriculture, the actual fuel costs are pale in comparison.

EXTENSION OBJECTIVES, METHODS AND EXPECTED RESULTS

Farmers in North Carolina face both economical and technological problems in their farming energy use. It is misleading to offer advice on the technical feasibility of alternative energy sources without adequately addressing economic implications. Thus any energy related recommendation must be accompanied by sound economic incentives. Under grants from the North Carolina Energy Extension Service and the North Carolina Alternative Energy Corporation work will be conducted to stress both the technological and economical aspects of energy use and alternative energies for agriculture in the State.

Energy Audits

Tobacco - On-farm energy audits will be conducted for tobacco farmers in North Carolina during the coming year. Past work in this area has generated considerable farmer and county agent enthusiasm. Results of these audits have shown hundreds of farmers low-cost or no-cost ways of cutting curing costs.

On the average, audits of bulk tobacco barns have shown ways of cutting curing costs by 15%. Predicted savings of up to 40% are not uncommon. For example, if a farmer has 10 bulk barns and can save 15% on his yearly curing fuel cost, this would amount to around $3500 per year. Savings due to replacing worn or missing door gaskets, using a wet bulb thermometer, and caulking hot air leaks are very low-cost ideas with very rapid pay backs. Even barn insulation, being a more expensive endeavor, usually shows pay back periods of less than 4 years. All of this audit information becomes an integral part of the farmer's decision making tools.

Swine and Poultry - Swine and poultry energy audits will also be conducted for North Carolina farmers. Emphasis will be placed on energy conservation through better management. Partial room brooding, replacing inefficient heaters, better record keeping, better scheduling, building insulation, and proper ventilation are a few of the areas that will be addressed. For example, ventilation fans with very dusty, wet or stuck louvers may have their ventilation efficiency reduced by 30%. This means the farmer must ventilate longer to maintain the desired environment, thus resulting in significantly higher electric bills. If a farmer has a $2000 per month electric bill in the summer, he may be able to reduce it by $300-500 per month by this very inexpensive cleaning chore. Electrical load management and time-of-day energy use may also provide the farmer a way of saving money. The energy audits will help farmers by making these and other simple improvement suggestions, as well as addressing the more complicated questions such as adding additional insulation. Efforts will be aimed at keeping all energy saving recommendations in agreement with sound and proven management schemes, with special emphasis on maximizing production.

County Agent Training - Emphasis will be placed on organizing audit data taking procedures, computing complicated routines and equations, and in training the county agent in performing audits in ~~his or her~~ their county. This will be accomplished through county meetings, state conferences, and in-the-field exercises. The goal is to afford any interested extension agent in North Carolina the opportunity to learn more about energy use and conservation in agriculture through the on-farm energy audits.

Alternative Energy Sources

North Carolina has 20 million acres of woodland, producing up to 75 million tons of biomass annually that is not currently being used. Wood can replace some fossil fuel requirements. For instance, 35 million gallons of fuel oil could be saved annually if only 30% of the State's tobacco crop was cured with wood. Wood currently offers the best technological and economical alternative fuel available to most North Carolina farmers. It can dry crops or heat greenhouses. Work will be ~~directed in this area of~~ conducted on wood utilization in agriculture with particular emphasis on utilizing and designing wood fueled hot water systems.

The methane potential from livestock in North Carolina is impressive if one looks at gas production only. Current livestock and poultry production practices would amount to approximately 2.85 trillion BTU's of energy or 170 million kwh of electricity per year. However, the cost of generating this gas or co-generating electricity is tremendous, a fact often overlooked by enthusiastic farmers. Work will be done to provide a focal point for information on methane production. Serious evaluation of state-of-the-art technical information will occur with particular emphasis on economics. Farmers will be advised of new developments by the utilities on rates paid for co-generated electricity and new technological advances in this area. Close cooperation will be maintained between NCSU and the State's electrical utilities.

Energy consumption and alternatives in many other phases of agriculture will be addressed. Tillage practices, most fuel efficient cultural practices, electrical load management, energy conserving automatic control devices, solar energy processes, vegetable oil, etc., will be monitored as to their potential on individual farms and ~~will be made to establish~~ a few demonstration farms across the State that incorporate one or more of these energy related practices WILL BE ESTABLISHED. These demonstration farms will offer many farmers a chance to observe these ideas in practice. The "energy integrated farmstead" is becoming a reality on many U.S. farms, thus making it important for North Carolina farmers to stay on the cutting edge of this emerging trend.

Work will be done to coordinate research and extension activities and help bridge the gap between the experimental and the readily applicable. TV, radio, and other mass media events will help publicize demonstrations and advances. Continued assistance with computer programs will be given to both county agents and farmers while continuing to develop new and useful energy related computer programs. Publications will be developed for farmers to study ~~and learn some~~ of these developments and procedures on their own.

ENERGY

Task Definition		Estimated Man Days
(040)	To investigate on-farm energy usage and needs for up-dating energy data base and programming direction.	20
(041)	To assemble and provide information on alternate motor fuels.	
(042)	To provide information and assistance on developing or integrating alternative on-farm energy resources while making technological and economical evaluations in these areas.	55
(043)	To provide information and assistance on energy conservation in agricultural production systems.	30
(044)	Electrical usage in agricultural production systems with emphasis on lowering peak demand.	20
(045)	On-farm energy audits for tobacco, swine, and poultry.	75
(046)	To serve on and provide technical assistance for local and governmental energy related committees.	2

GRAHAM

EXHIBIT I

ANNUAL PLAN OF WORK SUMMARY FORMAT

(CODED DATA FOR MACHINE PROCESSING)

YEAR 1982-83 COUNTY CODE 905

TASK	AREA OF EMPHASIS	PROJECT CODE	PROGRAM COMPONENT	PRIMARY SUBJECT	PRIMARY AUDIENCE TYPE	PRIMARY DELIVERY PROCESS	DAYS PLANNED	
040	1	0	04	48	02	8	3	20
			05	48	02	8	3	
			09	48	02	8	3	
			33	48	02	8	3	
			33	58	12	8	3	
			33	60	12	8	5	
042	1	0	04	48	02	0	18	55
			05	48	02	0	14	
			09	48	02	0	8	
			33	48	12	8	15	
			33	48	13	2	10	
043	1	0	04	48	02	2	8	30
			05	48	02	2	9	
			09	48	02	2	8	
			33	48	12	3	5	
044	1	0	04	48	13	2	5	20
			05	48	13	2	5	
			09	48	13	3	5	
			33	48	13	9	5	
045	1	0	04	48	02	0	10	75
			05	48	02	0	10	
			09	48	02	0	10	
			04	48	02	2	10	
			05	48	02	2	10	
			09	48	02	2	10	
			33	57	12	8	3	
			33	60	12	8	7	
			33	62	12	0	5	
046	1	0	33	48	13	2	2	2

WATER MANAGEMENT

SITUATIONAL STATEMENT

North Carolina has a water management problem. Yield reductions occur each year due to both excess soil moisture and deficit soil moisture conditions. The average annual rainfall in the state is 48 inches, but over a 25-year period variations of 25 to 30 percent have occurred. Rainfall is not equally distributed across the state with averages varying from approximately 35 inches to as much as 80 inches. Distribution is also not uniform throughout the year.

The state has about 6.2 million acres of cropland of which about 2.25 million acres or 36% requires artificial drainage. Only about 20% of these poorly drained soils have subsurface tile drainage systems. Most of the remaining acres have open ditch surface drainage systems that provide only marginal drainage during wet years. Of the 16.8 million acres of forest lands, more than 5 million acres are on wet soils that require some amount of artificial drainage.

Cropland erosion losses amount to 7.64 tons per acre per year. Conservationists consider anything above 3 tons/acre/year to be excessive.

Some 0.6 million acres of cropland is classified as droughty soil, which mean that short duration droughts can severely reduce yield. On many of the remaining 5.6 million acres of cropland, even to include some of the wet soils, extended droughts can reduce yields.

Farmers in North Carolina are installing water management practices, such as irrigation, drainage, and erosion control practices such as grassed waterways, terraces, strip-cropping, field borders, sediment basins and minimum tillage. However, the low grain prices and high cost of many have slowed the installation of some of these practices. Several years of below average rainfall spurred interest in irrigation development with a growth in irrigated acreage of more than 10% in 1981. Installation of subsurface tile drainage systems have greatly decreased.

Installation of water management practices will depend heavily on weather patterns, price of commodities and cost of money. Growers will continue to install irrigation systems, but a wet year like 1982 has significantly reduced purchases.

Growers are concerned about the profitability of their operation. To increase profitability they need either higher yields, higher commodity prices or reduced inputs. They need to know when to irrigate to obtain maximum returns with minimum water, they are interested in lower pressure irrigation systems and also systems that minimize runoff. From the standpoint of drainage, they need to know which soils will generate the greatest return from installing subsurface drainage systems. They are concerned about erosion control and will install systems that will conserve soil and water if they can also see some yield benefits.

Water management is an opportunity that concerns all North Carolina farmers. However, for some the opportunities are greater and it is to this group that much of the extension program will be directed.

METHODS AND EXPECTED RESULTS

EXTENSION OBJECTIVES ~~AND EDUCATIONAL EMPHASIS~~

Educational programs in water management will place major emphasis on installation and utilization of well designed, properly operated and energy efficient irrigation systems. An irrigation system is only one component of water management; however, water conservation, energy conservation, erosion control and drainage must be considered when installing these systems. This is a continuing objective but with some redirection.

To accomplish this objective, a combination of teaching methods will be used. A series of six, one-day in-service training sessions for agricultural extension agents are planned. A two-day irrigation conference is scheduled. This conference will be attended by irrigation dealers, distributors and installers, farmers, related agri-business representatives, extension agents, university personnel and Soil Conservation Service employees. Proceedings of this conference will be made available to attendees and to county extension staffs. Additions will be made to the Irrigation Handbook. Some time will be spent with individual growers. Presentations on irrigation will be made at commodity meetings and also at workshops sponsored by the several Extension Coordinating Committees on horticultural crops. Some time will be spent working with the North Carolina Irrigation Society, a group interested in the promotion of better irrigation practices. A computer program on irrigation design will be developed for a mini-computer. Emphasis will be placed on irrigation scheduling using soil moisture measuring devices and bookkeeping methods. Assistance will be provided to specialists and research personnel in other departments on irrigation equipment and designs for demonstrations and research projects.

Drip irrigation, which is a low-volume, low-pressure system, offers a method to significantly reduce water and energy consumption. While it is not

practical for many farming operations, it does have a place in some specialized operations and some time will be spent in developing materials on this system and working with growers to ensure that they install workable systems.

The results of these efforts should be an increase in net income (the amount dependent upon the crop being irrigated and the rainfall distribution), a savings in water consumption for irrigation of 10% or more, a reduction in fuel consumption per acre for irrigation of 15% or more and reduced erosion on irrigated fields.

It is difficult to measure the results of these programs. However, contacts with growers, irrigation dealers, SCS personnel and other extension specialists, and requests for information and meetings will indicate acceptance and installation of these practices. An irrigation survey will show the growth of irrigation, the crops being irrigated, the types of systems being used and the water sources. Changes from 1982 will indicate if some of the practices are being installed.

WATER MANAGEMENT

Task Definition		Estimated Man Days
(001)	To provide assistance to county extension agents in conducting an educational program on irrigation. This includes preparation of articles and update of articles for the Irrigation Handbook, in-service training on irrigation for agents, assistance with workshops conducted by extension coordinating committees, participating in meetings of extension coordinating committees, speaking at commodity meetings, making on-farm visits to discuss purchase and use of irrigation systems, assisting some growers with irrigation scheduling, planning a two-day irrigation conference, planning one or more irrigation tours and seminars, and preparation of a computer program for irrigation system design.	105
(002)	To provide technical assistance to professional staffs in other departments in design and selection of irrigation systems for projects and on-farm tests that include irrigation.	7
(003)	To provide leadership and technical assistance in an educational program for manufacturers, suppliers and installers of irrigation equipment and to serve as technical advisor of the North Carolina Irrigation Society. This includes serving as member of a Specifications and Standards Committee that reviews standards for irrigation equipment and also a Certification Committee that certifies irrigation designers.	15
(004)	To provide assistance to growers, other specialists, and state agencies in the design and selection of irrigation systems for land application of wastewater.	7
(005)	To provide assistance to state and federal agencies in the specifications and selection of irrigation equipment.	5
(006)	To provide technical assistance in the selection of water quality control equipment and water pumps and accessories for farm and home water systems.	5
(007)	To be a resource person on surface and subsurface drainage systems, erosion control and sediment control. This includes serving as technical advisor of the North Carolina Chapter of the Land Improvement Contractors of America and assisting the Soil Conservation Service with selected training for their personnel.	10

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EXHIBIT I

ANNUAL PLAN OF WORK SUMMARY FORMAT

(CODED DATA FOR MACHINE PROCESSING)

YEAR 1982-83 COUNTY CODE 905

TASK	AREA OF EMPHASIS	PROJECT CODE	PROGRAM COMPONENT	PRIMARY SUBJECT	PRIMARY AUDIENCE TYPE	PRIMARY DELIVERY PROCESS	DAYS PLANNED	
001	1	0	23	08	02	0,1,2	105	} 105
~~001~~	~~1~~	~~0~~	~~23~~	~~08~~	~~02~~	~~1~~	~~60~~	
~~001~~	~~1~~	~~0~~	~~23~~	~~08~~	~~02~~	~~2~~	~~20~~	
002	1	0	23	08	12, 13	0, 1	7	} 7
003	1	0	23	08	01,	0, 1	15	} 15
004	1	0	23	08	02, 12, 21	0, 1	7	} 7
005	1	0	23	08	21	0, 1	5	} 5
006	1	0	26	16	02	0, 1	5	} 5
007	1	0	23	08	01, 02	0, 1, 2	10	} 10

Situational Statement

WATER QUALITY AND QUANTITY Rubric

~~PLAN OF WORK~~

WATER SUPPLY AND WASTEWATER TREATMENT

Adequate water supply and safe environmentally sound wastewater and wastewater residuals management schemes continue to be problems throughout much of North Carolina. The development of agricultural, industrial, and municipal resources requires sound management policies with regard to water, wastewater and residuals management.

During 1981-82, North Carolina experienced below normal rainfall and several small communities faced serious water supply problems. The rainfall situation for 1982-83 appears to be significantly better than for the past several years, however, the rate at which water is being removed from underground storage sometimes exceeds the recharge. This may cause serious problems in the Coastal Plain of North Carolina. In areas of the Central Coastal Plain in particular water table levels are falling at a consistant rate of approximately 2-3 feet per year. As the water table falls, the quality of water pumped from underground storage deteriorates. The need for improved water management and conservation programs is clear.

Over one-half of North Carolina residents rely on septic tanks for treatment and disposal of domestic wastewater. The suitability of North Carolina soils for treating this wastewater varies markedly. In every area of the state, the soils will range from suitable to unsuitable for the operation of conventional septic tank/soil adsorption systems. In areas with unsuitable soils, alternative on-site wastewater treatment and disposal options are necessary. The need to develop these alternatives was clarified when a pilot county wide alternative on-site wastewater treatment and disposal plan was funded under the state's EPA Construction Grants Program. An entire mountain county has now been designated an on-site wastewater management district and alternative on-site wastewater treatment options developed by North Carolina State University and

other Universities will be the primary means of wastewater treatment and disposal in this county.

Discharge limitations on municipal wastewater treatment and disposal plants are becoming more and more stringent. Many wastewater treatment plants are now required to remove over 95% of the pollutant load for various constituents in the waste stream. Conventional wastewater treatment plants may have difficulty in achieving these limits consistently. Further, many of the constituents which must be removed are plant nutrients. These plant nutrients can be utilized very productively by the plant soil system. The major focus of the agricultural engineering waste management project has been and will continue to be utilization of waste rather than disposal of wastes.

As the wastewater treatment plants remove constituents from the waste stream, the concentration of these constituents in the wastewater residuals (sludges) increases. These sludges produced by operating wastewater treatment plants may create tremendous disposal problems. There is the potential for utilization of sludges for agricultural production. Again, utilization is the key to waste management schemes.

Operator training is a continuous problem. No certilifcation or training program exists for the operation of land treatment systems. Some of the problems encountered to date may have been averted if effective operator training and certification programs were in effect. An extensive operator training program will begin in August 1982. The operator training program will address disposal of wastewater and wastewater residuals on the land.

OBJECTIVES, METHODS AND EXPECTED RESULTS

Extension Objectives and Education Emphasis for 1982-83

Extension Objectives for 1982-83 will include water management training for municipal, county, and state level agency personnel. Water management will continue to be a major problem for these government agencies for many years to come. With the water table falling at a constant rate in many Coastal Plain areas, the need for precise water management strategies is clear. A series of workshops have been conducted for water supply personnel throughout the Coastal Plain and these workshops will continue in cooperation with the water supply branch of the North Carolina Department of Natural Resources and Community Development. Recent changes to the state ground adsorption laws and rules now puts the responsibility for septic tanks with the local Health Department. Until such time as all local Health Departments are "comfortable" and qualified to design large scale on-site wastewater treatment and disposal systems a series of workshops must be accomplished. Three workshops are planned for local Health Departments in the northeastern and central Piedmont region of the state. These workshops will address the siting criteria, sizing criteria, design criteria, and maintenance standards for large scale on-site wastewater treatment and disposal systems. These workshops are being conducted in cooperation with the North Carolina Department of Human Resources and the North Carolina Department of Public Instruction.

Proper management of wastewater and wastewater residuals will require an extensive operator training and certification program. At present the operator training and certification program adequately addresses conventional wastewater treatment processes. Unfortunately, there is no training or certification program for operators of land treatment systems. Many of the operational problems encountered with land treatment systems to date could have been eliminated through operator training. A series of operator training programs will be conducted by the training branch of the North Carolina Department of Natural

Resources and Community Development and the Agricultural Extension Service. These workshops are scheduled to start in August, 1982 and will continue throughout the entire year. At present there are sixteen land treatment systems in the later phases of design, the early phases of construction or actually in operation. The operators from these systems will be receiving the training.

To facilitate this training an operator certification/ training manual is being prepared. A major goal will be the final preparation of the operator training and certification manual and approval by the state's operator certification board.

Rubin

Change numbers

Josh Definitions

EXHIBIT I

ANNUAL PLAN OF WORK SUMMARY FORMAT

(CODED DATA FOR MACHINE PROCESSING)

YEAR_____ COUNTY CODE_____

TASK	AREA OF EMPHASIS	PROJECT CODE	PROGRAM COMPONENT	PRIMARY SUBJECT	PRIMARY AUDIENCE TYPE	PRIMARY DELIVERY PROCESS	DAYS PLANNED	
074 066	2	0	33	16	19	0,2,3	5,5,5	25
074 066	2	0	33	16	21	0,2	5,5	
075 067	2	0	33	16	19	2,3	5,5	~~30~~ 28
075 067	4	0	33	16	21	0,2,3,4	3,7.5	
076 068	2	0	33	42	12	0,2,3,4	3,3,3,2	41 ~~38~~
076 068	2	0	33	42	13	0	2.8	
076 068	2	0	33	42	19	2	10	
076 068	2	0	34	42	21	0,2,3,4	3,3,3,3	
077 069	2	0	33	16	21	0,2	10,5	70
077 069	2	0	33	42	13	0,2	5.5	
077 069	2	0	33	42	19	2	10	
077 069	2	0	34	42	21	0	15	
077 069	2	0	34	42	12	0,1,2,4	5,5,5,5	

Safety

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EXHIBIT I

ANNUAL PLAN OF WORK SUMMARY FORMAT

(CODED DATA FOR MACHINE PROCESSING)

YEAR_____ COUNTY CODE_____

TASK	AREA OF EMPHASIS	PROJECT CODE	PROGRAM COMPONENT	PRIMARY SUBJECT	PRIMARY AUDIENCE TYPE	PRIMARY DELIVERY PROCESS	DAYS PLANNED	
050	1	0	23	61	12	0	20	50
050	1	0	33	61	12	0	20	
050	1	0	33	57	12	1	10	
051	1	0	23	61	2,12	0	10 20	30
~~051~~	~~1~~	~~0~~	~~23~~	~~61~~	~~12~~	~~0~~	~~10~~	
051	1	0	33	57	12	1	10	
052	4	0	31	61	15,14	0	20 40	50
~~052~~	~~4~~	~~0~~	~~31~~	~~61~~	~~14~~	~~0~~	~~20~~	
052	4	0	31	57	14	1	10	
~~000~~								

PLAN OF WORK FOR FY 1982

EXTENSION DAIRY HUSBANDRY - 908

October 1, 1981 - September 30, 1982

SITUATIONAL STATEMENT

Grade A milk purchases from producers by North Carolina distributors during 1980 totaled 1,441,261,000 pounds, an increase of 3.9 percent over 1979. However, milk production in North Carolina during May 1981 was estimated at 145 million pounds unchanged from the same month a year earlier. The number of milk cows on Tarheel farms was estimated at 134,000 head, 3,000 more than a year ago. The average milk production per cow at 1,080 pounds was down 30 pounds from May 1980.

Sales of fluid milk and cream to consumers by North Carolina distributors total 1,097,363,000 pounds in 1980, a decrease of 1.5 percent from 1979.

The number of producers continued to decline throughout 1980. In December, 1981, there were 1280 grade A producers in the state. Fifty-five dairymen went out of business in 1980. However, we did have 43 new producers go into the dairy business during the year. During 1980 and the first half of 1981, there has been a huge increase in the number of people who are considering going into the dairy business. Most of these people lack dairying experience and have little, if any, money to invest. This interest is not warranted in many cases and is not based on sound information about probable returns from dairying.

Dairymen received an average price of $13.96 for their milk in 1980 and the gross income to North Carolina grade A farmers was $220,716,000.

Feed prices will continue to increase during 1981, interest rates will remain high, and other production costs will increase because of inflation. Thus, production costs will be considerably higher during the latter part of 1981 and early 1982, and will only partially be offset by increases in the farm price of milk. Unprofitable cows are likely to be culled but dairy replacements are plentiful. The long term trends of higher production per cow and more cows per farm will continue. A major adjustment in milk production must come from a decrease in the number of dairy farms.

North Carolina dairymen are likely to experience sharply lower net cash flows and lower farm incomes in 1981. Dairymen who are heavily in debt or who have not been following good management practices will be especially hard hit. Dairymen with business on a sound financial footing should be able to weather the cash flow problems.

EXTENSION OBJECTIVES AND EDUCATIONAL EMPHASIS FOR 1981-82

Educational programs in dairy production will put major emphasis on herd management practices that will eliminate losses for dairy farmers. Feed continues to be a major cost item for milk production. Feed costs (purchased feed and crop expense) average 42 percent of the total milk production cost or 50 percent of total operating expense for selected dairymen on the North Carolina State University Electronic Farm Business Records Program. These records indicate that feed cost per hundredweight of milk produced is directly related to profitability. Feed costs may be high due to: 1) low production unrelated to nutrition; 2) nutritional problems, such as underfeeding, overfeeding or feeding an unbalanced ration; 3) using unnecessarily expensive feed ingredients or feeding system; 4) feed wastage; 5) poor quality or an insufficient supply of forages or 6) other problems.

Underfeeding results in high feed costs since the value of unrealized milk production is greater than the savings from lower feed use. Overfeeding results

in high feed costs since the response in production is worth less than the cost of the additional feed. Extreme overfeeding can decrease production and result in health problems (i.e., fat cow syndrome or nutrient toxicity). Underfeeding or overfeeding may be considered unbalanced rations, however, this term usually refers to a ration containing the wrong proportion of nutrients. With an unbalanced ration, some nutrients may be overfed while others are underfed. A nutrient in lowest supply can limit production such that potential production is unrealized, nutrients in excess (out of balance) are wasted and feed costs are high. Improper feeding (underfeeding, overfeeding or unbalanced rations) may also result in health problems which raise the total cost of milk production. Use of unduly expensive feeds or feed wastage from improper storage, handling or feeding will also increase total feed costs.

Extension should work to improve feeding knowledge and practices. Educational programs, consultation and services will be provided. The major programs will concern: 1) feeding for high levels of production; 2) feeding for maximum profit; 3) feeding a balanced ration based on feed analysis; 4) feeding the lowest cost balanced ration which is of high quality, palatable and supports normal health and milk quality; 5) using proper methods of feed harvesting, storage and handling which makes maximum use of available resources; and 6) producing and utilizing high quality forages.

Emphasis will be placed on ration balancing based on forage testing. Extension will promote and work with the "North Carolina Farm Feed Testing Service" which is a cooperative program for feed testing involving North Carolina State University and the North Carolina Department of Agriculture. Information concerning the services of private laboratories will also be made available. Dairymen will be encouraged to analyze feedstuffs on a routine basis.

The Dairy Herd Improvement Association (DHIA) offers a computer service for balancing least-cost rations through a mail-in batch processing system. This "DHIA Dairy Cattle Feed Formulation System" will continue to be offered to dairymen on a request-by-pay basis through county agents and DHIA supervisors. Remote terminals will be placed in four to five counties to access the program directly. Ration balancing will be strongly encouraged on the basis of increased milk production and profits realized in controlled research results from other states. The value of ration balancing based on feed analysis will be evaluated in North Carolina from a field study now in progress.

Minicomputer software for ration balancing and feed inventory evaluation will be developed and offered to county agents and producers.

Producer meetings will be held individually and in conjunction with specialists in Crop Science and Economics. Topics will deal with our main objectives. Written materials will be made available.

Producers are expected to apply feeds and feeding information for more efficient milk production. Since feed is a major expense item and its improper use may be a primary factor limiting efficiency, information provided through Extension should serve as a basis for improved production and profit. The potential exists for an average of $50 or more increased profits per cow through ration balancing based on feed analysis.

The North Carolina Dairy Herd Improvement Association, Inc., (NCDHIA) offers a variety of herd management record plans, one or another of which will fit the circumstances of nearly any dairy farm. Adequate herd management records provide the information needed as a basis for making decisions to improve efficiency. Poor reproductive efficiency is a very costly management problem for many large herds. A new record system using on-the-farm terminals will become available through the DHI program during the coming year. One of the major advantages of this system will be the availability of more timely reproduction information and analyses. A new monthly report form will also become available this year which has been developed at the specific request of certain large herds. More than 40 percent of all grade A dairy herds do not have any organized system of herd management records and many dairymen who are on the DHI program do not fully understand how to use the information they receive. A one percent increase in production per cow through improved management practices would result in an estimated average increase of $1,000 net income per grade A dairy farm.

The objectives are: 1) implement the DART system (Direct Access to Records by Telephone) and teach dairymen, especially large herd owners, the advantages and the disadvantages of this system; 2) implement a new monthly report form for the DHI program and teach dairymen how to decide whether it will be more useful in their individual circumstances than the present form which will continue to be available; 3) increase participation in the DHI record plan; 4) prepare training guidelines for the state DHI fieldmen to use in training DHI supervisors; and 5) assist both the state DHI association and local DHI associations to improve their operating procedures.

Major emphasis of the Dairy Records Processing Center will be placed on expanding teleprocessing service. This will include increases in DHIA herds enrolled on DART (Direct Access to Records by Telephone) and the addition of new programs for these herds to include: 1) replacement animal programs; 2) feed formulation; 3) on-farm payroll; and 4) herd health management systems. Expanded teleprocessing service will also be provided for State Extension Dairymen educational needs and for State DHIA management needs.

Changes in DHIA records will be made to include: 1) somatic cell count profile report; 2) optional monthly DHI-210 report; and 3) development of a comprehensive replacement heifer management program.

The majority of dairymen are using artificial insemination (AI) to some extent. However, many of them do not adequately understand the interpretation of USDA Sire Summaries and fail to take full advantage of their opportunity to improve the inherited potential of their herds. Much additional genetic improvement could be realized through the proper selection of bulls used for natural service. A new natural service sire cross reference system is being added to the DHI program which will be helpful to dairymen with this problem.

The objectives for the Genetic Improvement of Dairy Cattle Project are: 1) teach dairymen how to interpret USDA Sire Summaries; and 2) improve the average genetic merit of bulls used for natural service.

Mastitis continues to be one of our dairymen's most expensive herd management problems. Although it will never be completely eliminated, proven management practices are available which, if adopted, would reduce the level of mastitis in the

average herd substantially. Thus, the primary problem is educational rather than a lack of knowledge on how to control mastitis.

A renewed effort will be made to provide agents with the information needed to "sell" mastitis control to producers.

Current changes in the processing and marketing of milk have resulted in the routine use of milk quality tests that have previously been used only sporadically (with little consequences). Since producers are not familiar with these tests, a continued educational effort will be necessary to assist producers in understanding and meeting these "new" standards.

During the past three years considerable emphasis has been placed on the proper use and selection of antibiotic preparations in dairy herds. Although we feel these efforts have been successful, the use of tests specified in the 1980 P.M.O. on individual producer milk samples will necessitate an enhanced educational effort. Particular emphasis will be placed on the correct use of antibiotic field test kits.

As dairy herds become larger, management considerations related to the milking operation must be re-evaluated. Some areas of particular concern include: 1) parlor size, type and investment; 2) degree of parlor automation; 3) labor efficiency; 4) cleaning and sanitizing larger milking systems; and 4) electrical energy usage and cost (most utility companies are developing or using load pricing systems and, unfortunately, most dairy farms have a very poor load factor). During the year, increased emphasis will be placed on developing educational material in these areas.

The field trial initiated in 1979-80 by I. D. Porterfield comparing cows treated with an Anthelmintic (Thiabendazole) at drying off and at calving was extended through 1980-81 in order to gain sufficient numbers. The data will be summarized and the results and recommendations will be made known to county agents and dairymen.

Plans are being made to conduct a field trial during the grazing season of 1982 with cooperating herds involving 200-300 herd replacements. This trial will compare the effect of treatment with an Anthelmintic versus no treatment at prescribed intervals on body weight gains.

Data will be obtained from one herd on the variation of the quality of colostrum produced by different cows and the blood level of immune proteins in calves ingesting the colostrum. This information will be used to emphasize the importance of proper care of the newborn calf.

Emphasis will continue to be given to the North Carolina Dairy Heifer Calf Program. The main objective will be to provide practical information to agents and dairymen through publications such as inserts for agents' handbook.

Average age at calving in DHI herds exceeds 28 months and could easily be reduced by one month through improved feeding and management. This reduction in age at calving will be an objective during the coming year and would result in cost saving to North Carolina dairymen of approximately $800,000 to $850,000.

With the trend to larger herd size, increased interest in dairy farming, approximately 175 dairymen will be making adjustments in existing facilities and constructing new facilities this coming year. Many meetings and farm visits will be made during the year relative to the drive-through free-stall milking parlor system of handling cows. In many cases, dairymen have reduced their labor by one man by using this type of free-stall housing system which means a saving of $12,000 to $18,000 per year.

Working with the Extension biological engineering specialists, new dairy layout plans will be developed and distributed for agents and dairymen use. Dairy handbook sheets will be developed on dairy housing. An Extension publication on dairy housing for herd replacements will be prepared and distributed for agricultural leaders and dairymen use.

With the increased interest in the dairy business and the fact that some of these proposed dairy operations have little chance of generating the cash flow needed to service borrowed capital and the fact that many dairymen are likely to experience sharp lower net cash flows and lower farm incomes in 1981-82, emphasis will be placed during the year on a series of debt management seminars for county agents, dairymen and lenders' organizations. Housing systems for dairy cattle relative to efficiency, cost and debt load for various size herds will be discussed. In addition, emphasis will be placed on financial records for effective financial management using financial measures to diagnose problems and general solutions to some common financial problems. The seminars will be organized and conducted with the Extension economists.

Confined handling of dairy cattle and more rigid waste control regulations have created problems with manure handling and disposal on dairy farms. This is especially true in the mountain area.

Planning for economical and suitable dairy waste disposal systems will be provided to producers as well as research data on waste management. Emphasis will be placed this year on workable waste handling and pollution abatement systems on producer farms in various areas of the state which can be demonstrated to surrounding producers. Many dairymen have voluntarily built or improved waste handling and storage facilities and have constructed retention ponds or lagoons for controling waste water and feedlot runoff rather than discharging to a stream. During the year approximately 200 additional dairymen will be improving or installing a suitable waste disposal system.

A project has been set up in Buncombe County on waste water control using grass terraces for filtering out waste material which could be a waste management alternative for many of the small dairymen in the mountain area. This system consist of a solids settling basin or holding tank which separates the manure solids from lot runoff, milk center washwater and other waste streams. The liquid drainage from these settling basins are routed through a vegetative filter such as a grassed waterway.

One of the new techniques which seems to be gaining in popularity among North Carolina producers consists of an earthen basin for storing up to a six-month accumulation of liquid manure. These earthen basins need about two cubic feet of capacity per cow per day of storage, and when soil and site conditions are suitable can be constructed at relatively low cost compared to alternative liquid manure

storage systems. An earthen storage pit saves a 100-cow dairy farmer approximately $20,000 in construction costs when compared to alternative liquid manure systems. Emphasis will be placed on this system of handling liquid manure during the year.

Due to rising costs of commercial fertilizers and an increasing competition for the energy required to produce inorganic nitrogen, renewed interest has been focused on maximizing the fertilizer returns of organic manures. Significant amounts of N, P, and K are present in manure. Meetings will be conducted during the year with agents and dairymen relative to the use of dairy manure as a crop fertilizer supplement.

Waste management has, in many cases, become the limiting factor regarding expansion of existing facilities or building new facilities and, therefore, should receive careful consideration in the planning process. Dairy specialist will work with agricultural engineering specialist on the waste management project.

Dairymen in eastern North Carolina, like dairymen in all of the states, are feeling the effect of inflation and decreasing margins of profit. Work with individual dairymen has proven effective in targeting areas of weakness in the dairy operation and creating interest in taking corrective action. During the coming year some time is planned to continue, in concert with local agents, analysis of a limited number of dairy farm operations and assisting those dairymen in initiating management adjustments which will improve efficiency. Despite the fact that dairy farms are widely scattered in eastern North Carolina, dairymen in general do observe what fellow dairymen are doing and often copy the practices they observe. A primary objective of individual farm consultation will be to establish certain practices which will hopefully spread to other dairy farms in the area.

During the coming year special emphasis will be placed on facilities for herd replacements and reproductive performance. Many herds currently exceed 140 days as average days open. Only modest improvements in record keeping, heat detection and insemination techniques could reduce this period by 10 days. Such an improvement in reproductive efficiency would result in a conservative estimated savings of $2,000 for the average size herd in the area or approximately $140,000 for the herds involved in these Extension efforts in eastern North Carolina.

The two area seminars conducted in 1981 were highly successful and well attended. Similar programs will be conducted early in 1982 with emphasis on reproduction.

There is considerable evidence that special interest 4-H clubs can generate interest and activity among youth in the 4-H Dairy Program. An essential ingredient in successful special interest clubs is relative program material for use by adult leaders. A continuing goal in the 4-H Dairy Program is to teach production principles to youth. The recently prepared 4-H Dairy Production Project Manuals and Exercises will provide youth with printed material not heretofore available. However, there is a need for additional audio-visual aids to assist 4-H agents and leaders in teaching the production principles involved.

A major effort will be made to develop video tapes to compliment the five segments of the new 4-H dairy production project. These tapes will be designed for use by 4-H dairy leaders working with special interest clubs and having access to video tape equipment in the county Extension office.

Subject matter agents in their respective counties will be encouraged to assist adult leaders in further interpretation and explanation of the material presented in the tapes.

Current programs will be maintained essentially as they are with the exception of the 4-H Dairy Conference. The possibility of expanding this activity into a 4-H Animal Science Conference including dairy, beef cattle and swine topics will be explored.

02 DAIRY

SUBJECT: 01 Animal and Plant Nutrition

Task 301: Prepare and provide information concerning feeding and nutrition of young stock or dairy beef.

302: Prepare and provide information and materials concerning feeds for and the feeding and nutrition of the dairy herd including feeding equipment and feeding methods.

303: Operate, refine and evaluate the "Dairy Cattle Feed Formulation Program" (a computerized least cost ration balancing program) including individual ration formulation.

304: Prepare and provide information concerning feed analysis including working with the "North Carolina Farm Feed Testing Service" and summarizing data.

305: Assist in nutrition and feeding problems.

306: Advise, assist or conduct applied research relevant to dairy cattle nutrition and feeding.

307: Work with development of computerized information system.

* 308: Prepare and provide information concerning dairy goats.

SUBJECT: 02 Animal and Plant Diseases

Task 501: Provide agents, veterinarians, sanitarians, fieldmen, milking machine dealers and dairymen with information on milking management and mastitis control.

502: Assist agents and dairymen with herd leucocyte and bacteria count problems.

503: Develop and maintain DHI screening test program.

504: Applied research related to the DHI screening test program and bulk milk somatic cell counts.

SUBJECT: 03 Building Structures and Facilities

09 or Machinery Equipment and Related Engineering

Task 507: Areas related to conservation of energy on the dairy farm (precooling, heat exchangers, etc.).

508: Assist agents with information on milking parlor design and equipment installation. Help dairymen with same also.

509: Provide information on milking parlor automation.

*Predominantly directed toward small farms.

Task 703: Provide agents and dairymen information on the design, construction and use of facilities for young dairy stock.

704: Prepare information and plans for county agents and others on efficient organizations and use of dairy facilities.

705: Counsel with and train agents and others in the efficient organization and use of dairy facilities.

* 706: Counsel with and train agents and others in the efficient organization and use of dairy facilities for manufacturing milk producers.

708: Prepare material and organize debt management seminar for county agents, dairymen, and lenders' organizations relative to housing systems for dairy cattle. These seminars will include subject matter relative to total cost, returns and debt load for various size herds.

SUBJECT: 04 Cultural Practices (All practice demonstrations)

Task 201: Provide 4-H adult leaders with video tapes to compliment teaching efforts in the 4-H Dairy Program.

203: Assist agents and leaders in planning and conducting activities and programs which compliment the 4-H Dairy Program.

204: Provide youth leaders and agents instruction in dairy production technology other than showing and selection.

205: Consult with agents and dairymen in eastern North Carolina on dairy production practices.

206: Organize and conduct seminars and workshops in eastern North Carolina.

801: Publish recommendations for the North Carolina Dairy Herd Replacement Program.

802: Collect and record information relative to the Anthelmintic in Dairy Cattle Project.

803: Publish results and recommendations from the Anthelmintic in Dairy Cattle Project for agents and dairymen.

804: Assist agents and dairymen with local programs and problems on dairy calf management.

805: Collect and publish data on variation in colostrum quality and its influence on blood antibody level in claves.

806: Off campus teaching of practicing professionals.

*Predominantly directed toward small farms.

SUBJECT: 07 Farm Management

Task 401: Sponsor a series of DHI seminars to demonstrate the DART system and to teach dairymen how to use the various DHI forms and report options to greater advantage.

402: Assist in developing a new DHI Supervisor's Handbook to help in training new DHI supervisors.

505: Areas of milk quality work other than mastitis control (bacterial counts, cooling flavors, etc.).

506: Provide information on proper selection and use of antibiotic preparations for mastitis therapy.

SUBJECT: 11 Marketing

Task 702: Keeping informed on dairy marketing changes and developments.

SUBJECT: 14 Selection and Breeding

Task 001: Judging dairy cattle and/or assisting with dairy cattle shows other than 4-H.

202: Provide youth, leaders and agents instructions in dairy cattle showing and selection.

406: Develop a SAS computer program to use to prepare reports for county agents and to help them teach their dairymen how to intrepret USDA Sire Summaries.

407: Teach DHI supervisors and dairymen how to use the new service sire cross reference system which is being added to the DHI program.

408: Provide leadership assistance to the purebred dairy cattle industry through the breed organizations and/or the Purebred Dairy Cattle Association.

409: Distribute USDA Sire Summaries and cow indices to dairy farmers.

410: Provide agents and dairymen information on dairy cattle breeding.

601: Supervising computer programming of DHI problems at DRPC.

602: Supervising computer programming of non-DHI problems at DRPC.

603: Studying system changes and equipment needs for DRPC.

604: Formulating or compiling summaries or publications on DHI records.

605: Conducting applied research using DHI records.

Task 606: Developing educational pamphlets on the DHI record forms.

607: Assisting cooperating states with DHI activities.

608: Developing modifications of forms and procedures for record systems.

SUBJECT: 42 Waste Disposal and Management

Task 710: Prepare information and plans for county agents and others on efficient alternative waste disposal systems.

711: Counsel with and train agents and others on alternative waste disposal systems.

712: District workshops conducted for dairymen, county agents, sanitarians and fieldmen on waste management technology.

713: Workable waste handling and pollution abatement systems will be developed on producer farms for demonstration purposes.

714: Advise and assist with the duties of SALS Animal Waste Management Committee.

SUBJECT: 53 Organization Development and Maintenance

Task 403: Assist with recruiting and training DHI supervisors.

404: Develop dairy leadership through DHI Program.

405: Assist with the operation of the DHI Program.

707: Working with organizations, agencies and other groups other than DHIA, in developing methods and procedures for initiating and implementing dairy programs.

SUBJECT: 54 Other Administrative Functions

Task 609: Management activities related to DRPC.

SUBJECT: 57 Program Planning, Implementation and Evaluation

Task 002: Review and evaluate county Extension dairy programs with county agents, district Extension agents and program leaders.

003: Administrative functions, staff conferences, supervision, reviewing, planning, coordinating and implementing operating procedures and other supporting functions related to Extension Dairy Husbandry.

309: Participating in staff conferences, committees, or other programs within the university.

SUBJECT: 58 Program Support and Development Public Relations Type Functions

Task 004: Attending activities of other agencies and organizations in a liaison interest for the advancement of dairying and the Extension Service.

010: Attend meetings and workshops and advise Integrated Pest Management Program.

011: Attend meetings relative to the North Carolina Dairy Foundation.

310: Organize and conduct area workshops.

510: Prepare materials and lecture to various classes in Animal Science.

610: Supervising a graduate student and working with the graduate student program in Animal Science.

709: Providing general information and statistics on the dairy industry in North Carolina to farmers who are interested in going into the dairy business as well as other organizations that request this information.

715: Advise and serve on Extension Dairy Coordinating Committee.

716: Advise and serve on committee for Annual Dairymen's Conference.

717: Advise and assist with the duties of the Southern Branch, American Dairy Science Association.

* 718: Advise and serve on committee for Dairy Goat Conference.

* 719: Provide agents and others information on dairy goat management.

720: Advise and serve on North Carolina Dairy Industry Promotion Committee.

721: Advise and serve on North Carolina Farm Business Records Program Advisory Committee.

SUBJECT: 60 Report Preparation

Task 005: Preparing Extension reports.

SUBJECT: 61 Safety

Task 006: Preparing and presenting information on safety in dairy herd operations.

*Predominantly directed toward small farms.

34 STAFF DEVELOPMENT

SUBJECT: 62 In-Service Training

Task 007: Improving professional competence by studying and reviewing literature.

008: Attending conferences, meetings and workshops, etc., to gain information on Extension methods.

SUBJECT: 65 Orientation Training

Task 009: Reviewing organization and subject matter responsibilities with new Extension workers.

316: Provide orientation training to new county agents.

ANNUAL PLAN OF WORK SUMMARY FORMAT

(CODED DATA FOR MACHINE PROCESSING)

YEAR 1981-82 COUNTY CODE 908

TASK	AREA OF EMPHASIS	PROJECT CODE	PROGRAM COMPONENT	PRIMARY SUBJECT	PRIMARY AUDIENCE TYPE	PRIMARY DELIVERY PROCESS	DAYS PLANNED
001	1	0	02	14	02	4	2
002	1	0	02	57	12	2	4
003	1	0	02	57	12	0,2	20
004	1	0	02	58	13	2	12
005	1	0	02	60	12	1	8
006	1	0	02	61	02	2	1
007	1	0	34	62	02,12	8	10
008	1	0	34	62	12	2	8
009	1	0	34	65	12	0	6
010	1	0	02	58	12	2	5
011	1	0	02	58	13	2	2
201	1	0	02	04	15	6	25
202	1	0	02	14	15	4	30
203	1	0	02	04	15	4	20
204	1	0	02	04	15	4	10
205	1	0	02	04	02	0	50
206	1	0	02	04	02	2	25
301	1	0	02	01	02	1	10
302	1	0	02	01	02	1	70
303	1	0	02	01	02	1	52
304	1	0	02	01	02	1	15
305	1	0	02	01	02	1	10
306	1	0	02	01	02	8	8
307	1	0	02	01	12	7	16
*308	1	0	02	01	02	1	4
309	1	0	02	57	20	2	11
401	1	0	02	07	02,12	2	80
402	1	0	02	53	14	7	10
403	1	0	02	53	20,13	0,7	75
404	1	0	02	52	02	2	60

*Predominantly directed toward small farms.

TASK	AREA OF EMPHASIS	PROJECT CODE	PROGRAM COMPONENT	PRIMARY SUBJECT	PRIMARY AUDIENCE TYPE	PRIMARY DELIVERY PROCESS	DAYS PLANNED
405	1	0	02	53	20	0	90
406	1	0	02	14	12	7	15
407	1	0	02	14	14,02	7	10
408	1	0	02	14	20	2	20
409	1	0	02	14	02	7	10
410	1	0	02	14	02	7	10
501	1	0	02	02	02	2	28
502	1	0	02	02	02	0	16
503	1	0	02	02	02	1	15
504	1	0	02	02	12	3	10
505	1	0	02	07	02	0	15
506	1	0	02	07	02	2	10
507	1	0	02	48	12	3	20
508	1	0	02	03	02	7	28
509	1	0	02	03	12	2	10
510	1	0	02	02	17	2	10
601	1	0	02	14	02	0	25
602	1	0	02	14	02	0	5
603	1	0	02	14	02	0	10
604	1	0	02	14	02	7	20
605	1	0	02	14	02	7	15
606	1	0	02	14	02	7	20
607	1	0	02	14	12	2	6
608	1	0	02	14	20	7	5
609	1	0	02	14	02	0	15
610	1	0	02	14	13	0	20
702	1	0	02	11	13	2	1
703	1	0	02	03	02	0	8
704	1	0	02	03	17	20	20
705	1	0	02	03	17	10	30
*706	1	0	02	03	02	0	5
707	1	0	02	53	13	0,2	10
708	1	0	02	03	17	4	15

*Predominantly directed toward small farms.

TASK	AREA OF EMPHASIS	PROJECT CODE	PROGRAM COMPONENT	PRIMARY SUBJECT	PRIMARY AUDIENCE TYPE	PRIMARY DELIVERY PROCESS	DAYS PLANNED
709	1	0	02	58	02	0,1	12
710	1	0	02	42	17	20	10
711	1	0	02	42	17	10	10
712	1	0	02	42	17	8	6
713	1	0	02	42	17	10	6
714	1	0	02	42	46	4	2
715	1	0	02	58	12	2	3
716	1	0	02	58	12	2	3
717	1	0	02	58	13	2	3
*718	1	0	02	58	02	2	8
*719	1	0	02	58	02	4	8
720	1	0	02	58	13	2	5
721	1	0	02	58	12	2	1
801	1	0	02	04	12	7	20
802	1	0	02	04	12,02	8	10
803	1	0	02	04	12	7	5
804	1	0	02	04	02,12	2	12
805	1	0	02	04	12,02	8	5
806	1	0	02	63	12	2	20

*Predominantly directed toward small farms.

MECHANIZATION

✓ EOB

CROP PROCESSING (7)

✓ WATKINS

✓ GLOVER

ENERGY

✓ GRAHAM

STRUCTURES

✓ TRIGGERS

LIVESTOCK WASTE MANAGEMENT (12)

✓ BARKER

WATER MANAGEMENT

✓ SNEED

WATER QUALITY / QUANTITY (11)

✓ RUBIN Sit. Statement, Exh. Obj.

✓ ATKINS & YOUNG "

✓ KOEHLER "

example

RESIDENTIAL HOUSING

✓ COX

ELECTRONIC DATA PROCESSING

✓ SOWELL

4-H

✓ COLLECT (Beasley, Glover