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1680 Madison Avenue
Wooster, OH 44691-4096

February 28, 2003

Mr. Barton Hewitt
CSREES/Partnerships
US Department of Agriculture
Stop 2214
Washington, DC 20250

Dear Mr. Hewitt:

We are enclosing the FY 2002 AREERA Report of Accomplishments and Results for the College of Food, Agricultural, and Environmental Sciences, including the Ohio Agricultural Research and Development Center and Ohio State University Extension.

If you have any questions, please contact for research: Steve Slack (330-263-3987), John Allred (614-292-3897) or for extension: Keith Smith (614-292-4880), Deborah Lewis (614-292-5089).

Sincerely,

Steven A. Slack
Director, OARDC

Keith L. Smith
Director, OSU Extension

Attached: FY 2002 AREERA Report of Accomplishments and Results

hard copies: Bob Moser
John Allred
Deborah Lewis
Tom Archer

Federal Report of Accomplishments and Results (FY 2002)

The Ohio State University
College of Food, Agricultural, and Environmental Sciences
including
The Ohio Agricultural Research and Development Center
and
Ohio State University Extension

Goal 1. An Agricultural System that is Highly Competitive in the Global Economy

Executive Summary

Ohio farmers, like other American producers, have the land, resources and, thanks to decades of agricultural research, the knowledge to compete in the global market place. Because of investments in research over the past century, American farmers lead the world in productivity and efficiency. Food costs for the American public as a percentage of disposable income have never been lower. But to stay ahead of competition from abroad as well as new and re-emerging animal and plant diseases, the commitment to research must continue. Advances in plant breeding and biotechnology have continued to give American producers a competitive edge and American agriculture has continued to become both more efficient as well as more protective of the environment. Plant breeding has resulted in the development of new varieties with greater yield of both of Ohio's two most important agronomic crops, soybeans and corn,. Conventional breeding techniques have produced varieties of soybeans with higher monounsaturated fatty acids and protein, providing inroads into new niche markets. And conventional breeding combined with biotechnology methods have minimized economic losses to two of the most recent threats to soybean production - soybean root rot and soybean cyst nematodes.

While research to improve productivity and profitability of animals is continuing, examples of research on combating animal diseases are highlighted here. Ohio has long been and remains a national leader in the control of mastitis which underscores the economic importance of the dairy and accompanying cheese industry to the state's economy. And Ohio researchers have developed an international reputation for the study of control of gastrointestinal viruses which cause major heath problems for young food animals as well as human infants.

Ohio's Commercial agriculture and horticulture industries depend upon Ohio State University Extension to provide timely and innovative, science-based, objective information that can be implemented within their management systems to remain competitive in our global economy. An innovative approach to problem solving, research and extension outreach is the use of empowered teams. A high priority for The Ohio State University Extension is the development and coordination of commodity/issue focused teams consisting of State/District Extension specialists, County Agriculture and Natural Resource agents and research faculty from multiple disciplines to deliver high impact, science-based information and educational programming that is timely and easily accessed by Ohio's diverse commercial agriculture and horticulture industries.

Ohio State University Extension and the Ohio Agricultural Research and Development Center have currently engaged 21 interdisciplinary self-directed teams ranging from our Swine Educators' Team to our Watershed Management Network. These faculty-led teams interact closely with respective state/national commodity organizations, state/federal agencies and environmental organizations to assist in developing our Extension led statewide programming and current communications structure.

Team electronic communications are the keys to access strategic information for global competitiveness. Many of our teams continue to develop weekly/monthly electronic newsletters and research updates that will be evaluated for their economic impact. Our team members develop newsletters following weekly tele-conferences such as: *Amazin' Graze, Buckeye Yard and Garden Line (BYGL), Crop Observation and Recommendation Network (CORN), Grain Marketing Research and Innovative Strategies (GRAINS), Pesticide Update (Pep-Talk), Pork Pointers, Veg-Net and Vineyard Vantage*, etc. Many newsletters are listed on our OSU Extension *Ohioline* web site, as well as many of our team's individual web sites for easier access by our stakeholders.

Smith-Lever Fund expenditure for Goal 1: $3,030,543 EXTENSION FTE's: 63
Hatch expenditures for Goal 1: $4,106,735 OARDC FTE: 52

Goal 1 Key Themes

1. Key Theme: Agricultural Communications/Information Technologies

(Reference OSU Plan of Work Extension Program 1A: Summary of Extension Programs)

a. **Description of Activity** - Team electronic newsletters and fact sheets/bulletins through appropriate e-mail list serves and Web sites have been identified by Ohio clientele as preferred option to more traditional extension educational meetings. Many of OSU Extension's commodity-focused teams provided weekly/monthly electronic newsletters and research updates which have been evaluated for their economic impact. OSU Extension team members developed educational newsletter summaries following weekly tele-conferences titled: *Amazin' Graze, Buckeye Yard and Garden Line (BYGL), Crop Observation and Recommendation Network (CORN), Grain Marketing Research and Innovative Strategies (GRAINS), Pesticide Update (PEP TALK), Pork Pointers, Vet-Net, Vineyard Vantage* and the Watershed Network's *Buckeye Basins*. We have listed all newsletters on our OSU Extension *Ohioline* Web site, as well as many of our team's individual Web sites for easier access by our stakeholders/producer clientele.

b. **Impact** - Newsletter surveys have indicated that agronomic crop producers saved over $11.3 million dollars in chemicals used from implementing management practices presented in the *CORN* newsletter and over $3.8 million from utilizing marketing tips found in our *GRAINS* newsletter. The OSU Extension beef team Web site, released in May 1997, had more than 10,500 hits during June, 2002. The *Buckeye Yard and Garden Line (BYGL)*, started in 1990, continues to be a key electronic educational tool developed by the OSU Extension Nursery Landscape and Turf Team for county Extension offices, the commercial green industry, and the gardening public. In the 2002 *BYGL* Evaluation Survey, over 2,000 respondents indicated that *BYGL* saved their businesses over $3.4 million.

Over 55% of the respondents indicated that the *BYGL* changed their pest management practices. Through newsletters, media and other sources, respondents indicated that *BYGL* reached over 1.1 million people in 2002. This version of *BYGL* web site is linked to thousands of plant and plant pest images and over 23,000 fact sheets from throughout the U.S. via links to the OSU Horticulture and Crop Science in *Virtual Perspective* Web site. In addition, *BYGL* is used throughout Ohio at universities as part of the curriculum for undergraduate horticultural courses.

c. **Source of Federal Funds** - Smith-Lever 3b&c

d. **Scope of Impact** - State Specific

2. Key Theme: Adding Value to New and Old Agricultural Products

(Reference OSU Plan of Work Research Program 1B: Value Added Products)

a. **Description of Activity** - Soybeans have long been one of the two most important agronomic crops in Ohio so soybean research is certainly not new. However, it is this long term, dedicated commitment to basic research that has yielded dividends. OARDC soybean breeders have been using a variety of germ plasm stock to develop plants producing soybeans with different properties. Some of these are high in the fatty acid oleic acid which is one of the monounsaturated fatty acids that provides the dietary benefits of olive oil. While development, testing and marketing of these high oleic acid varieties is continuing, the development of high-protein varieties which have other attributes making them desirable in human foods began much earlier. The first of these high protein food grade varieties suitable for the growing conditions of Ohio were released about ten years ago and have now become an important niche market for Ohio soybeans marketed in Japan for the production of tofu.

b. **Impact** - When varieties featuring high-protein, food-grade soybeans developed at OARDC were publicly released in 1994, substantial acreage was devoted to their production almost immediately. These soybeans had a ready market in Japan for the production of tofu and drew a premium of about $1 per bushel. This niche foreign market has generated conservatively $80 to $120 million for Ohio farmers over the last 8 years.

c. **Source of Federal Funds** - Hatch

d. **Scope of Impact** - State Specific

3. Key Theme: Plant Production Efficiency

(Reference OSU Plan of Work Research Program 1E: Increased Plan Production Efficiency)

a. **Description of Activity** - Soybeans are one of Ohio's main field crops, accounting for about a billion dollars in 2001 for Ohio farmers. Ohio is ranked

sixth nationally in soybean production. In spite of the economic importance and high national ranking, OARDC has a very active soybean breeding program backed by a strong molecular biology initiative because it is clear that competition from others, especially South American countries, will continue to expand so American producers must become increasingly efficient.

The soybean breeding and testing program is designed to research and release varieties that are best suited to Ohio conditions and keep Ohio's soybean industry thriving. To this end, varieties from around the world are tested for field performance for a variety of genetically-based characteristics including maturity date, disease resistance, yield potential and protein and oil content. When a plant with a genetic characteristic of interest is found, tools of molecular biology are used to identify the location of the gene and related markers for use in future genetic crossing. It may take years of plant breeding and field testing to produce commercial soybean varieties that can give soybean producers an edge in a competitive market.

An example of this type of research was the variety testing program conducted in 2002 in which 202 varieties were tested at six locations around the state for yield, relative maturity, disease resistance, plant height and lodging, seed size and oil and protein content. Results of the performance testing were distributed to growers. Another example, based on a longer time frame, was the development of varieties of food grade soybeans with higher protein content. This variety yielded soybeans suitable for tofu and were marketed in Japan.

Corn also accounted for about a billion dollars for Ohio farmers in 2001. And there are similar corn breeding and testing, along with companion molecular biology programs that are being conducted by OARDC in cooperation with other scientists in the region. For example, a new experimental breeding line has been developed as a part of the Germplasm Enhancement of Maize (GEM) project and evaluated through a cooperative private - public sector breeding effort. The new line, after evaluation through tests in Ohio, Indiana, Illinois and Iowa, has been approved for release as GEMS - 0002 to serve as a breeding resource. To this purpose, it is unique in that it has a high proportion of tropical germplasm yet is able to impart earliness to hybrids.

The above descriptions illustrate the practical culmination of years of basic research that is the underpinnings of modern agricultural research. Use of the tools of biotechnology promises much greater practical effects in the future. For example, OARDC scientists have used a combination of molecular genetic, genomic, bioinfomatic and biotechnology techniques to understand cold tolerance in some plants and to transfer this desirable trait to economically important crops. It has long been known that plants can be acclimated to withstand freezing temperatures by slowly reducing ambient temperature. Molecular biology has now established that this acclimatization is actually due to regulator genes responsible for the production of a series of proteins which protects the plant cells from frost damage. Progress is being made on transferring these regulator genes from cold-tolerant wild plants into their cultivated counterparts.

b. **Impact** - In some cases, the specific impact of research can be assessed. For

example, the soybean variety testing program conducted in 2002 identified varieties which provided an average increase in yield of 15 kilograms per hectare over several locations around the state. Such an increase in yield due to the adoption of these varieties over 1.8 million hectares would increase soybean farmer income by $6.25 million per year. This yield advantage represents a small portion of the slow but steady progress in production efficiency over the years.

The impact of the current basic research in biotechnology is difficult to assess but it is not difficult to imagine that soybean, corn or tomato varieties which had the gene for cold tolerance would do better than their conventional counterparts in the face of a sudden frost occurring in the middle of May as happened in 2002. The impact would be easily measured as a dramatic difference in yield.

c. **Source of Federal Funds** - Hatch

d. **Scope of Impact** – Multi-state

4. Key Theme: Animal Health

(Reference OSU Plan of Work Research Program 1F: Enhancement of Animal Health)

a. **Description of Activity** - Mastitis in dairy cows is the most costly of animal agricultural diseases. Mastitis is the result of a bacterial infection of the udder by any of a number of organisms but the coliform bacteria, Escherichia coli and Klebsielia pneumoniae and the most common cause of the disease in well managed herds. These pathogens have high resistance to antibiotic treatment and chemical disinfectants. OARDC scientists have taken advantage of the fact that these infectious organisms have developed an interesting mechanism to meet their iron requirement in the face of very low iron content of milk. Specifically, these bacteria can express an iron absorbing protein, called iron-regulated outer-membrane proteins (IROMP), which it was reasoned could be used to produce a vaccine for mastitis. Antibodies were produced in response to IROMP when it was injected into laboratory animals and into cows which was then shown to reduce the microbial uptake of iron and bacterial growth.

Two viruses, calicivirus and rotavirus, are the leading cause of diarrheal diseases in young animals as well as human infants. OARDC scientists have taken a novel approach to the development of vaccines for the control of these viruses. Tools of molecular biology were used to construct a virus-like particle which, when injected into cattle, elicits antibodies against the rotavirus. This use of biotechnology to prepare a rotavirus like particle which can elicit antibodies but cannot infect appears to be a major breakthrough for the prevention of a major cause of diarrhea in animals as well as humans Feeding colostrum from injected cows to calves was shown to provide passive immunity. The virus-like particles were also administered to gnotobiotic pigs to study their immune responses to challenges against human rotavirus. Finally, since human strains of calicivirus do not grow in cell culture, methods to grow comparable animal viruses have been

developed as a model to culture human strains.

b. **Impact** - Ohio produces 4.3 billion pounds of milk annually, worth about $660 million dollars. Mastitis costs Ohio dairy farmers an estimated $21 million each year in lost milk production, veterinary expenses, discarded milk and drug costs. A vaccine against mastitis would not only save these costs within the state but would decrease losses estimated to be about $97 million to coliform mastitis in the many other dairy states within the region. But the importance of the dairy industry to the State of Ohio goes far beyond the quantity of milk produced - it forms the basis of the cheese industry which produces about 140 million pounds of cheese per year, adding substantially to the state's economy. For example, the Ohio cheese industry produced 81 million pounds of Swiss cheese in 2000, worth about $130 million. Ohio ranked number one in the production of Swiss cheese.

Diarrhea caused by calicivirus or rotavirus is a serious problem in calves and pigs under three weeks of age and at weaning. Mortality is 10 to 20 percent and morbidity approaches 100 percent since infected animals are much more prone to other diseases. If vaccination saved 10 to 20 percent of the calves born in Ohio annually, this would amount to 50,000 to 100,000 head. But more importantly, this research, generously supported by the USDA and the NIH, forms the basis for development of vaccines for children, over a million of whom die annually world wide from rotavirus infection.

c. **Source of Federal Funds** - Hatch

d. **Scope of Impact** – Multi-state

5. Key Theme: Plant Health

(Reference OSU Plan of Work Research Program 1G: Enhancement of Plant Health)

a **Description of Activity** - Phytophthora, also known as root rot, is the single biggest threat to Ohio's soybean production, infecting over a million acres each year. It is particularly a problem during climatic years like 2002, characterized by an unusually wet spring followed by an extended dry period. The plants look healthy until the soil becomes dry and then they wilt and die. OARDC plant pathologists and soybean breeders, using a combination of conventional plant breeding and molecular biology, have identified a novel resistance gene to Phytophthora which can now be introduced into elite soybean germplasm to develop cultivars resistant to this disease. This represents the first time that such a gene has been discovered in nearly 20 years. Work is continuing to incorporate this gene into high-yielding varieties which also contain the Round Up Ready gene since about 80% of the soybeans grown in Ohio are Round Up Ready.

Another major problem for Ohio soybean producers is soybean cyst nematodes, first identified in Ohio in 1987 and in the US in 1974. These nematodes are microscopic round worms which feed on the roots of soybeans, robbing the plant of nutrients as well as creating wound sites for root rot fungi to enter. The severity of symptoms and losses depend upon several factors including the number of nematodes present in the field at planting, soil (texture, fertility and moisture) and, importantly, variety. OARDC scientists have been working for the past 15 years on controlling this pest, using both management and plant breeding techniques. Since the soybean cyst nematode can travel no more than a few inches per year, spreading requires "hitching a ride." Thus, one of the management recommendations is careful cleaning of planting, cultivation and harvesting equipment between fields. Rotating crops is also an inexpensive method to control nematodes since OARDC research has shown that the population declines about 50% per year under non-host crops in Ohio. Since the soybean cyst nematode is most active in warm soil, planting early will allow the establishment of roots before they are damaged. [Note that early planting increases the possibility of frost damage so the work described in a previous section on the development of cold tolerant varieties becomes even more important.] Weed control is also very important since not only most legumes are hosts to soybean cyst nematodes, so are a large variety of weeds. Finally, one of the most effective means of control is the development of resistant varieties of soybeans with the caveat that use of these varieties is most effective with low to moderate (2000 to 5000 eggs per 200 cc of soil) infestation. At higher population levels of nematodes, there can still be significant root damage even in resistant varieties and, more importantly. Further, use of these resistant soybean varieties could lead to development of nematode races which can attack and reproduce in roots of even resistant varieties.

b. **Impact** - Phytophthora root rot costs Ohio soybean producers as much as $120 to $150 million annually, depending upon climatic conditions. If adoption of the Phytophthora resistant varieties prevented even 10% to 20% of this loss, it would mean an increase of $12 to $30 million dollars per year to Ohio soybean producers.

Soybean cyst nematodes can lead to even greater losses for Ohio soybean growers and therefore OARDC research has had an even greater economic impact. This roundworm, first detected in Ohio in 1987 had spread to 53 of Ohio's 88 counties by 1999. Over 90% of Ohio soybeans are produced in those 53 counties. Studies in 1999 and 2000 have shown that in moderately infested fields in Woods County, soybean cyst nematode resistant varieties out yielded non-resistant soybeans by 10 to 15 bushels per acre and in Clermont County with higher infestations and heavier soils, resistant varieties showed a 20 bushel per acre advantage over susceptible soybeans. Assuming an average production rate of 40 bushels per acre in non-infested soils and a price of 6$ per bushel, use of soybean cyst nematode resistant varieties would have saved losses to the pest in these counties of $60 to $120 per acre. Ohio had 4.6 million acres planted to soybeans in 2001. Prevention of losses from nematodes damage of even $10 per

acre average statewide using the management techniques and resistant varieties developed at OARDC would have saved Ohio farmers $46 million. Savings from use of varieties which are both soybean cyst nematode and Phytophthora resistant are additive and give Ohio soybean farmers a decided advantage over the past.

c. **Source of Federal Funds** - Hatch

d. **Scope of Impact** - State Specific

Goal 2. A Safe and Secure Food and Fiber System

Executive Summary

Food safety and security have taken on a new meaning and greater urgency since the terrorists attacks in September, 2001. While food safety with respect to chemical and biological contamination has always been of concern, the possibility for the deliberate introduction of harmful agents has heightened the need for research on the detection, removal of contaminants and disposal of contaminated food. Further, the development of new strains of organisms as well as the potential spread of old ones requires the utmost care and vigilance because of world-wide food and animal feed distribution. Fortunately, along with the increased threat of food borne pathogens, there have been improved methods of detection, based upon biotechnology. Further, newer methods of food preservation are being developed.

Safe food handling is a targeted issue and includes: Promote food safety across the food chain; consumer education for safe food handling; certificate training for food handlers; and food safety education for growers, producers, distributors, retailers, and food service workers. At the same time that food safety is an issue, consumers demand and will pay for greater convenience. The challenge is to produce food which is nutritious and tasty but which can be processed and distributed without contamination, either accidentally or deliberately, and is handled safely as it is prepared by and for consumers.

At the same time that food safety is an issue, consumers demand and will pay for greater convenience. The challenge is to produce food which is nutritious and tasty but which can be processed and distributed without contamination, either accidentally or deliberately. Consumers' lifestyles, hence their eating habits, are constantly changing. These changes bring about increased demand for high quality, value added, and convenient foods. This requires that production of food ingredients, which are as nutritious as non-processed counterparts and are not subject to contamination with harmful microorganisms during production and shipment.

Although research that leads to a safer food supply is actively in place, scientists acknowledge that the safest foods are still a hazard if mishandled during food preparation just before consumption either in a food establishment or at home. Consumer and food worker behavior is an important issue to address to complete the assurance of the safe food cycle. Education efforts, either in higher education or through outreach, have focused on this critical need so that the

"human factor" can be reduced or eliminated as a cause of food-borne illness.

Surveys of Ohioans indicate that a majority think that the American food supply is not as safe as it was ten years ago. Perhaps this public perception is based more on national publicity about outbreaks and food recalls than reality. Still, few observers believe that our food supply is as safe as it should be. It remains subject to natural contamination and quite possibly vulnerable to deliberate contamination. Food safety begins at the production site, continues during processing and is ultimately in the hands of the consumer. Research on management procedures and other methods designed to control one of these microbial contaminants, Campylobacter, commonly found on retail chicken, is highlighted here. As an integral part of this research, the problem of antibiotic resistance of this organism is also investigated.

More basic research, using the newest methods of molecular biology, is also described. This research uses DNA fingerprints to detect the presence of dangerous bacteria before they have reproduced in large enough numbers to cause food spoilage and illness whether the contamination is accidental or deliberate.

Smith-Lever Fund expenditures for Goal 2: $699,356 EXTENSION FTE's: 15
Hatch expenditures for Goal 2: $107,692 OARDC FTE: 1

Goal 2 Key Themes

1. Key Theme: Food Safety

(Reference OSU Plan of Work Extension Program 2Ae: Pre-Harvest Food Safety)

a. **Description of Activity** - Spurred by recent incidences of drug residues in junior fair animal carcasses and at the urging of meat processors in the state, the Ohio Department of Agriculture now mandates all junior fair exhibitors must attend a quality assurance training session before they sell certain species of livestock through a junior fair sale. To answer this mandate county Extension agents, with the cooperation of state Extension specialists and vocational agricultural teachers work together to provide educational quality assurance programs which meet the mandate and the needs of the consumer, and youth exhibitor.

b. **Impact** - More than 30,000 youth and adult junior fair food animal producers received quality assurance training to assist them in meeting compliance standards being implemented by respective processing industries. Several counties reported having no livestock quality assurance issues associated with their junior fair livestock sales in 2002. . Franklin County Evaluations (n=150) indicated: 95% of participants could explain the differences between ethical and unethical livestock management practices, 96% of participants had an increased understanding of calculating withdrawal times and 98% of participants could explain why quality assurance is important to the food and animal industry. A pre-post test was used to determine changes in the level of awareness of sound

quality assurance practices by Highland County junior fair exhibitors (n=575). Youth demonstrated a 15.2 % (75% to 90.2%) increase in test scores after participating in the quality assurance programs. In Monroe County 186 youth completed a questionnaire to assess their knowledge after the training. 98.9% were able to identify at least two possible causes of stress for their animals, and 97.8% were able to identify at least two ways to prevent animal stress.

c. **Source of Federal Funds** – Smith-Lever 3b&c

d. **Scope of Impact** – State Specific

2. Key Theme: Food Safety

(Reference OSU Plan of Work Research Program 2Ar: Pre-Harvest Food Safety)

a. **Description of Activity** - Food safety starts on the farm with the raw products for human consumption. A number of microbial infectious agents, present in our food supply, can cause major human health problems. Often, these organisms are transmitted to humans directly from animals or animal products or indirectly in the form of food or water contaminated with animal waste. One such organism which has received special attention from OARDC scientists is Campylobacter jejuni.

Campylobacter jejuni causes a disease called either campylobacteriosis, Campylobacter enteritis or gastroenteritis and is the leading cause of bacterial diarrhea in the United States. It is estimated that there are more than 2 to 4 million human cases per year although many, if not most cases, are never reported to the medical community. It is also thought that over 90% of the cases are food borne, predominantly from improperly cooked chicken. Estimates from surveys report that 20 to 100% of retail chicken is contaminated and it only takes a relatively few bacteria (400 - 500) to cause illness.

Spread of Campylobacter j. has probably increased over the past several years because of antibiotic resistance. Studies at OARDC indicated that about 46% of Campylobacter j. contaminating commercial broilers showed antibiotic resistance. Treatment of chickens with enrofloxacin has been found to rapidly select quinolone resistant organisms. This has led to management techniques designed to control the organism with minimal use of antibiotics. For example, multiple sources of infection exist on poultry farms and contaminated water supplies and re-used litter are common vehicles for transmission. On the positive side, partial protection is conferred to newly hatched chicks by maternal antibodies which suggests that immunology based approaches are promising for the control of Campylobacter colonization in chickens.

Of the food borne diseases, campylobacteriosis and salmonellosis are perhaps the most common while Escherichia coli 0157:H7 is perceived as the most dangerous since the deaths attributed to under cooked hamburgers at the "Jack-in-the-Box" restaurant. That story gave the public the impression that hamburger is the major if not the only source of E. coli 0157:H7 when in fact animal waste coming into contact with fruits and vegetables have probably been

responsible for a greater number of cases. While the effects of food and water borne organisms are most often associated with gastrointestinal distress and diarrhea, this particular strain of E. coli can shut down the kidneys, leading to uremic poisoning and death.

Control of food borne diseases begins at the production stage and continues through the use of HACCP (Hazard Analysis Critical Control Points), both of which have been the subject of investigations of OARDC scientists. At the same time, research has continued on reducing microbial contamination of the retail product through the use of thermal and alternative non-thermal processing. In addition, research on newer, more rapid methods of detection of microbial contamination has taken on a greater sense of urgency, not only because of natural contamination that we have long been concerned but now from threat of deliberate contamination of our food and water supplies.

Traditionally, detection and identification of contaminating microorganisms took days because it relied upon culturing methods. Now, one of the most promising practical methods of rapid detection relies upon biotechnology in a process called "real time PCR." PCR is an acronym for "polymerase chain reaction," a process by which a very small amount of DNA can be amplified. This would then allow detection of "signature" DNA sequences in food of contaminating microorganisms of interest. PCR is not new - it has been around for decades. What is new is technological advances to speed up the process so that small amounts of DNA from contaminating microorganisms can be detected in minutes. It should be noted that OARDC scientists represent only a portion of those nationwide working on "real time PCR." But sufficient unique progress has been made here to form the basis of patent applications.

b. **Impact** - It is estimated that there are 6 to 33 million cases of food borne illnesses in the U.S. annually, prevention of which would result in an estimated $3 to $6.5 billion in lost wages and health care costs. Losses to the food industry from spoilage cost at least another $5 to $6 billion each year. This is particularly important to Ohio where the food and food processing industries represent an annual income of about $50 billion. Obviously, it will take substantial, continuous effort in both research and education to reduce losses.

The research to control Campylobacter and other food borne diseases with minimal use of antibiotics will not only have some economic losses but will likely provide other benefits which are more difficult to measure. That is, decreased use of antibiotics would save the money used to buy these medicines but this will, in part, be offset by additional managerial costs, e.g. new litter for each change of broilers. More importantly, there is a public perception that the use of antibiotics in animal feeds has led to antibiotic resistance in organisms responsible for some human diseases. While there may be some truth to this, most biomedical scientists are convinced that the great majority of antibiotic resistance of pathogens attacking humans is due to over-prescription of antibiotics and/or patient non-compliance in which medication is stopped too soon. Nevertheless, elimination or even significant reduction of routine antibiotic use for food animals could substantially reduce public concern that modern agricultural practices are harmful

to the environment and human health.

Similarly, the development of reliable and rapid detection of microbial contamination of our food and water supply will undoubtedly save money. And it hopefully will also decrease the public's sense of vulnerability of our food and water supply from terrorists' activities.

c. **Source of Federal Funds** - Hatch

d. **Scope of Impact** - State Specific

3. Key Theme: Food Safety

(Reference OSU Plan of Work Extension Program 2Be: Post-Harvest Food Safety)

a. **Description of Activity** - Lydia Medeiros, State Extension Specialist, has provided leadership to a multi-state project, "DEVELOPMENT AND VALIDATION OF INSTRUMENTS TO EVALUATE FOOD SAFETY EDUCATION," in collaboration with Virginia Hillers (Washington State University), Patricia Kendall (Colorado State University). The goal of this project was to develop and validate an instrument that is suitable for evaluation of food safety educational programs for low-income, low-literacy audiences. This is a population cohort believed to be vulnerable to food safety illnesses because of the high proportion of children and elderly living in poverty. The project had five objectives:

1. Develop consensus among experts concerning the most important behaviors that will reduce risks of foodborne illnesses during home food preparation.
2. Determine the relationship of intermediate variables (stage of change variables, knowledge, attitudes, awareness, self-efficacy, and intention to change) to the behavioral outcomes related to food safety.
3. Evaluate whether self-reported behavior changes are a valid way to assess the behavioral outcomes of food safety education.
4. Design, validate and test an instrument that will assess food safety behavior and intermediate variables.
5. Pilot the instrument; Revise as needed and retest.

b. **Impact** – All the objectives have been accomplished successfully. For Objective 1, the Delphi technique was used to survey a group of food microbiologists, foodborne illness epidemiologists, food safety educators and food safety policy makers, so as to develop consensus on food handling behaviors of importance in preventing foodborne illnesses. All together, four rounds of Delphi were conducted. The process yielded a list of 29 behaviors that were rank-ordered for importance within five pathogen control factors and 13 pathogens and classified for their special importance to four high-risk groups.

For Objective 2, twenty subjects were recruited by the Colorado research team to participate in a post education follow-up study designed to assess the

applicability of the Transtheoretical Model of Behavioral Change in assessing readiness to change specific food handling behaviors. Six behaviors that appeared likely targets for behavioral change were studied (checking if refrigerated juice you buy is pasteurized, not thawing meat on the counter, and using a thermometer to evaluate doneness of four different products). Participants were asked a series of questions to determine the individual's stage of change for each behavior, decisional balance and self-efficacy related to the behavior.

- Among the 6 behaviors studied, participants reported being in the action stage both post education and at the 3-month follow-up for 2 behaviors: using a thermometer to determine doneness of roast turkey and not thawing frozen meat, poultry or fish on the counter all day.
- For 3 behaviors, there was progression in the mean stage of change from post education to the 3-month follow-up. Participants moved from the pre-contemplation to contemplation stage for the behaviors of using a thermometer to measure the doneness of hamburger and chicken breasts and moved from the contemplation to preparation stage for the behavior of checking to make sure refrigerated juice was pasteurized.
- The most difficult behavior for participants to adopt was using a thermometer with leftovers, which remained in the pre-contemplative stage at both post and follow-up.
- Overall, a highly significant positive correlation was found between participant stage of change and perceived self efficacy to perform the specific food safety-related behavior within the next six months.

For Objective 3, the researchers first developed a protocol to evaluate whether self-reported behaviors are a valid way to assess the behavioral outcomes of food safety education. It was designed so that data from homemakers taking the Food Safety Behavior Questionnaire (self reported behavior) would be compared with data collected through observation of homemakers preparing a meal and an in-depth interview with homemakers on their food handling behaviors. The observation checklist and interview questions were developed after two practice-audits by the researchers in the three universities.

- The research team at The Ohio State University conducted 21 observations and interviews. The research team at Washington State University completed 20 observations and interviews. The research team at Colorado State University conducted 52 observations and interviews.
- All the observations were videotaped and all the interviews were audio-taped upon the approval of the participants to ensure accuracy of the data. All the participants took the food safety behavior questionnaire before being observed and interviewed.
- Questionnaire responses and observed behavior and interview responses were compared. 54.5% (6 of 11) observable questions were in agreement

with observable behaviors and 66% (27 of 41) non-observable questions were in agreement with non-observable behaviors obtained from interviews.

For Objective 4, knowledge, attitude and behavior questions designed to address the 29 food safety behaviors identified by the expert panel were written by panelists at the Spokane Food Safety Evaluation Summit (May 23-25, 2000). Development and evaluation of parallel questionnaires designed to assess attitudes, knowledge and behavior were assigned respectively to the three research groups at The Ohio State University, Washington State University, and Colorado State University. The developed questionnaires were mailed to those experts who attended the Spokane Conference for their comments. Each research group then reviewed the questionnaires with EFNEP/FNP participants for format, readability, and usability of the questionnaires as related to use with limited resource audiences. In each state, reliability of the questionnaire type assigned to that state was determined using the test-retest method. Using this method, the questionnaire was given to a group of clients on one week, then one-two weeks later with no intervention in-between. The knowledge and attitude questionnaires were also evaluated for discriminatory power by comparing responses from audiences considered highly knowledgeable about food safety (nutrition major students) and audiences considered less knowledgeable (EFNEP clients or non-nutrition major students).

For Objective 5**,** the final draft instrument that can be used to evaluate food safety education has been completed. The instrument is composed of Food Safety Attitude, Behavior and Knowledge Questionnaires. The three questionnaires have been sent to EFNEP and FNP program assistants in Ohio, Colorado and Washington for use in evaluation of food safety education with food stamp eligible recipients from each state. The three questionnaires were combined into one survey and given to 170 students in an undergraduate class at The Ohio State University prior to food safety education. The data were analyzed by using SPSS statistics software. Strong correlations were found among knowledge, attitudes and behavior questions.

This project has resulted in the publication of three papers in major journals, two thesis manuscripts for the MS degree, and numerous presentations at local, national and internal conferences and seminars. Other manuscripts are in preparation and review.

c. **Source of Federal Funds** - Smith-Lever 3b&c

d. **Scope of Impact** – Multi-state

Goal 3. A Healthy, Well-nourished Population

Executive Summary

Dietary Guidance can be defined as the use of principles found in the Dietary Guidelines for Americans to develop non-formal nutrition education series for youth and adults. Additionally, there are programs targeted to the elderly, focusing on their nutritional needs. These community-based nutrition education programs are offered at the local level by CES. The Dietary Guidelines for Americans provide a basis for healthy lifestyle choices. The Food Guide Pyramid is a pictorial and practical guide for educating consumers to use the Dietary Guidelines. OSU Extension professionals inform consumers of health risk factors (e.g., obesity, hypertension, etc.) and nutrition practices and encourage appropriate nutrition and lifestyle changes and promote reading labels on processed foods.

U.S. citizens, like other highly developed countries in the world, have an abundant, inexpensive food supply available to them. Food provides both pleasure and the nutrients necessary for health and survival. The goal is for all to be food secure, that is, access by all people at all times to enough food for an active, healthy life and at a minimum, includes: (1) the ready availability of nutritionally adequate and safe foods, and (2) the assured ability to acquire personally acceptable foods in a socially acceptable way. It is important to recognize that nutrient needs vary over the life cycle and research must be conducted to determine how age and gender influence nutrient needs. It is also important to recognize that the human body uses nutrients in chemical reactions within the body. Nutrition science plays an important role in reducing obesity, diabetes, cancer and heart diseases. The Ohio State University is one of a few institutions with a college of agriculture, a department of human nutrition science, and a medical college. Scientists from the many disciplines are researching together agricultural products as tomatoes, soybeans, and raspberries to discover the chemical content and chemical reactions in hope of discovering chemicals that are effective as antioxidants and as anti-carcinogens. They are also researching behaviors that lead to healthy food choices.

A healthy, well-nourished population is dependent on the ability of people to obtain foods that will improve the over-all quality of their diets, and the quality of the food they eat. A healthy population also engages in other positive health practices, including physical activity, individual health monitoring, and safety practices that will reduce the risk of accidents and disease. OSU Extension professionals have been actively educating the people of Ohio regarding the importance of good health and nutrition practices. The professionals met with individuals and groups, in formal and non-formal teaching sessions, in workshops, committee meetings, health fairs, and walk-by exhibits. The result has been a change in 1) the way some individuals purchase, prepare and store food; 2) the level of interest in monitoring and improving health through screenings and exams; and 3) the ability of individuals to improve their personal practices to decrease health risk.

Stakeholder input through the Food and Nutrition Extension Advisory Committee indicates a desire of specific population groups to acquire the information and knowledge necessary to improve nutritional health. Teens active in sports want to understand how food can provide an "edge" in sports competitions. Teachers want resources for teaching the in-school pregnant teen best nutrition choices for herself and for her baby. FCS professionals have worked with school food service personnel in fifty Ohio schools to incorporate fresh fruits and vegetables into the food stream of students while they are at school. Students are consuming the foods, not wasting

them. Older adults want to manage their blood pressure and their blood cholesterol levels. Older adults often express needs in one of two ways: those who are so busy that they want to prepare quick, nutritious meals or want to select healthy food choices at a restaurant and those who have no desire to prepare food because of declining health.

The two major nutrition-related health issues faced by Ohioans as well as other Americans are excess body weight and chronic diseases. Biomedical authorities generally recognize that the two issues are at least partially connected in that being overweight contributes to heart disease, diabetes and high blood pressure. At the same time, nutritionists generally agree that more exercise, decreased caloric intake and greater consumption of fruits and vegetables would help with weight control as well as decrease the risk of chronic diseases. While the message to eat more fruits and vegetables has been consistent over the past two decades, Americans have not embraced the idea. A number of projects supported by OARDC, some of which are highlighted here, have attempted to relate the consumption of components of fruit and vegetables to the prevention of diseases and disorders, with the expectation that if components of these foods can be shown to be more beneficial, perhaps the advice to increase their consumption will be more effective.

Smith-Lever fund expenditures for Goal 3: $1,398,712 EXTENSION FTE's: 29
Hatch expenditures for Goal 3: $32,537 OARDC FTE: 1

Goal 3 Key Themes

1. Key Theme: Human Nutrition

(Reference OSU Plan of Work Extension Program 3Ae: Human Nutrition/Health)

a. **Description of Activity** - Extension Specialists provided leadership to curricula selection and development for programming targeting special audiences including low-income parents of young children and Food Stamp Program participants. Specialists provided nutrition and food safety in-service training for the Program Assistants in the Food Stamp Nutrition Education Program (we call it Ohio Family Nutrition Program) in 74 Ohio counties and for 55 Nutrition Educators in the Expanded Food and Nutrition Education Program in 11 Ohio counties. Collaborating agencies and organizations included: WIC, Departments of Health, faith-based organizations, United Way, Salvation Army, food pantries, senior meal site programs, community centers, local school districts, health clinics, Metropolitan Housing, and local and state Departments of Job and Family Services.

b. **Impact** - The Expanded Food and Nutrition Education Program reached 7,019 parents of young children between October 1, 2001 and September 30, 2002. As a result, 89.7% of the individuals taught made positive changes in their food intake, as measured with a pre/post instrument for recalling food eaten in the previous 24 hours. Homemakers who graduated from the series of classes taught

by the Expanded Food and Nutrition Education Program's Nutrition Educators showed marked change in the ability to manage food resources and practice food safety recommendations and improved their nutrition knowledge and practices. Seventy one percent (71%) of graduated homemakers improved one or more food resource management practices taught (meal planning, price comparisons, strategies for extending the food supply, or use of a grocery list to be a wise shopper). Forty three percent (43%) improved in two areas. Seventy seven percent of the graduates improved their nutrition practices in at least one area (meal planning, healthy food choices, food preparation without salt, nutrition label reading, eating breakfast) and 56% improved in at least 2 categories. At graduation 54% of homemakers showed improvement in their food safety practices.

Nine Nutrition Educators taught 21,212 young people nutrition information. Over half (57%) report that as a result of the information learned in the program, they eat a greater variety of foods, and 84% reported an increased knowledge of nutrition.

Program results and accomplishments of the Food Stamp Nutrition Education Program between October 1, 2001 and September 30, 2002 include:

- Ohio FNP included 76,092 direct contacts attending educational presentations and/or demonstrations. Those direct contacts reported 151,610 individuals in their households. A direct contact is an individual attending an educational program or demonstration taught by the FNP Program Assistant and/or the Family and Consumer Sciences Agent.
- Direct contacts reported their ethnicity as 85% white, 9% black, 3% Hispanic, 1% American Indian, 1% Other, and 1% Asian. This ratio is similar to Ohio's ethnic composition as reported in the 2000 Census.
- Twenty four percent of the direct contacts were male and 76% were female, of which 5% reported being pregnant.
- Thirty eight percent of direct contacts identified themselves as 65 years of age or older.
- Thirty six thousand eight hundred seventy eight (36,878) direct contacts responded to the question, "Which of the following statements best describes the food eaten in your household in the last 30 days?" as follows:
    - 47% reported "enough of the kinds of food we want to eat."
    - 35% reported "enough, but not always the kinds of food we want to eat."
    - 9% reported "sometimes not enough to eat."
    - 9% reported "often not enough to eat."
- Direct contacts in Ohio FNP represent a greater percentage of households with food insecurity (53%) than that reported for Ohio (8.5%) by Nord, Jemison, and Bickel in "Prevalence of Food Insecurity and Hunger, by State, 1996-1998" (Food and Rural Economics Division, Economic Research Service, U.S. Department of Agriculture, Food Assistance and Nutrition Research Report No. 2).

According to this self-report, the participants in the second six-month period reported more food insecurity (3% increase) than in the previous six months.

- Sixty percent of the 13,456 direct contacts participating in a food safety program or demonstration reported learning new information about food safety, 40% reported planning to use the information, and 24% reported using one or more recommended practices after having attended a program.
- Sixty eight percent of the 14,882 direct contacts attending a thrifty shopping program reported learning new information about thrifty food shopping, 48% are planning to make recommended changes, and 25% reported using one or more recommended practices after having attended a program.
- Fifty four percent of the 40,398 direct contacts attending a Dietary Quality program reported learning new information about nutrition, 37% plan to make recommended changes, and 19% are using the recommended changes as a result of having attended a program.

b. **Source of Federal Funds** - Smith-Lever 3b&c

c. **Scope of Impact** - State Specific

2. Key Theme: Human Health

(Reference OSU Plan of Work Extension Program 3Ae: Human Nutrition/Health)

a. **Description of Activity** - More than one million people will be diagnosed with skin cancer each year and 8,500 people will die each year from skin cancer. Most of these skin cancers are treatable if diagnosed early. Developing safe sun practices early in life and, especially among high-risk populations, can reduce the incidence of skin cancer. Adhering to better dietary practices, following risk reduction guidelines for other cancers, osteoporosis, heart disease, etc also can reduce other diseases. State Specialists developed lessons and handouts for positive health promotion programs, or helped the local extension agent plan and implement these programs and activities.

b. **Impact** – In the Sun Safety program, over 50 counties have offered sun safety and skin cancer programming in Ohio. In addition, at least 4 counties have purchased their own Dermascan equipment (an instrument that helps an individual assess the amount of skin damage) to extend programming potential. Most counties have offered educational events that have reached across program area lines and have also involved collaboration with other health related or work related entities, i.e. health departments, hospitals, farm groups, public schools.

c. **Source of Federal Funds** - Smith-Lever 3b&c

d. **Scope of impact** - State Specific

3. Key Theme: Human Health

(Reference OSU Plan of Work Research Program 3Ar: Human Nutrition/Health)

a. **Description of Activity** - It has been two decades since the initial introduction of the Food Guide Pyramid which recommends 2 to 4 servings of fruits per day and 3 to 5 servings of vegetables. In spite of repeated attempts at education, no more than about 10% of Americans follow the advice, perhaps because in the past public perception is that the advice has often based on no more than the materialistic admonition that "they are good for you." Yet, in addition to adding to our quality of life by giving pleasure from consumption, foods contain chemicals besides nutrients which can have physiological effects upon the consumer. These non-nutritive, physiologically significant chemicals have been called "nutraceuticals." One of the areas of focus of OARDC research, in cooperation with the Ohio State University College of Medicine and Public Health, is on the role of specific chemicals present in fruits and vegetables which can prevent chronic diseases. These include ellagic acid from raspberries for the prevention of esophageal cancer, the red carotenoid lycopene from tomatoes for the prevention of prostate cancer and two other carotenoids, lutein from dark leafy vegetables such as spinach and kale and zeaxanthin from yellow corn to act as antioxidants for the prevention of macular degeneration and age-related cataracts, both of which appear to be related to photo oxidation. In each case, studies have used the pure compound as a model for other physiologically active substances in food. For example, while ellagic acid is a component of raspberries, studies of animal models using freeze dried berries indicate that other components may be as effective as ellagic acid and perhaps more effective. The issues being addressed by the lycopene research involve absorption since the epidemiological evidence indicates that processed tomatoes are more effective against prostate cancer than raw tomatoes. Processing has been shown to improve absorption of lycopene as well as other carotenoids. The issue with lutein and zeaxanthin is the mechanism by these lipid soluble antioxidants can be concentrated in an aqueous environment of the lens of the eye.

b. **Impact** - While relatively pure components from fruits and vegetables form the basis of these studies of prevention of chronic diseases, the aim in each case is to use them as model compounds to determine the efficacy of fruit and vegetable consumption for such prevention. That is, based upon years of observation it is much more likely that it is consumption of the mixture of compounds found in fruits and vegetables rather than any one chemical that is preventive of chronic diseases. Too much emphasis on individual components may entice supplement manufacturers to produce and the public to consume them in a purified, capsule form. Yet, data on individual components can be used to persuade the public that consumption of fruits and vegetables are a good idea.

It is difficult to show a direct impact of this research in terms of dollars or even prevention of morbidity or mortality. Even so, it is being supported by OARDC in partnership with funding from the National Institutes of Health because it offers hope of more clearly establishing the relationships between diet

and health. Besides, this type of research fosters a closer relationship between fields that have traditionally been the purview of agriculture and the USDA with fields that have been associated with medicine and the NIH.

c. **Source of Federal Funds** - Hatch

d. **Scope of Impact** - State Specific

Goal 4. Greater Harmony between Agriculture and the Environment

Executive Summary

Ohio is different than most sister states in that it has a relatively high population density and yet agriculture [defined broadly to include plant and animal production, food and food processing and landscape / turf] leads all other industries in dollar value, amounting to about $75 billion annually. This commingling of agriculture and food processing with large urban and suburban population centers provides opportunities but also challenges. Most often the challenges are the disposal of wastes and by-products without offending the aesthetic sensibilities and quality of life of neighbors. Efforts to solve these problems have long occupied the time of OARDC scientists and continue to do so with the development of new methods and technologies.

Another area which causes some friction between urban populations and agriculture are the perceived dangers of chemicals used for pest control. Ironically, much of the use of pesticides is by home owners and companies treating lawns and golf courses within urban - suburban centers. One method to reduce pesticide use is called integrated pest management (IPM) in which management and natural enemies of pests are used to decrease the need for insecticides. The use of a species of round worms (nematodes) to control white grubs in turf grass is highlighted here as one example of IPM.

In addition to the usual methodology to minimize environmental damage, scientists at The Ohio State University have created a team, called ecosystems management, which seeks to use ecologically sound principles to not only increase profitability but also be environmental friendly. This systems management approach has been extended to the classroom in the education of undergraduate as well as graduate students.

As livestock production continues to expand in Ohio and with the odors, dust, insect pests, and water pollution associated with the increased numbers, there is a need to provide educational programs to producers on composting livestock mortality and composting animal waste. Due to the diverse distribution of the state's population, livestock producers, commodity groups and OSU Extension are taking a pro-active approach to improve neighbor relations by providing programs that ameliorate issues associated with agricultural waste.

Ohio contains nearly 7.9 million acres of forests and woodlands. OSU Extension district specialists, county agents and Soil and Water Conservation District personnel provide

newsletters and best management practice workshops across the State, addressing a wide variety of topics, including but not limited to House Bill 88 - Agriculture Pollution Abatement Law and issues related to silvicultural non-point source pollution.

OSU Extension, working in partnership with the Ohio Livestock Coalition and key state and federal agencies, has developed and implemented the Ohio Livestock Environmental Assurance Program (LEAP). LEAP helps livestock producers to profitably manage environmental challenges that are critically important to the success of their business.

Smith-Lever Fund expenditures for Goal 4: $466,237 EXTENSION FTE's: 10
Hatch expenditures for Goal 4: $1,053,913 OARDC FTE: 11

Goal 4 Key Themes

1. Key Theme: Agricultural Waste Management

(Reference OSU Plan of Work Extension Program 4Ae: Agricultural Wastes And By-Products)

a. **Description of Activity** - The Manure Science Review program is a statewide manure management education program targeting animal operations. This multi-agency and organizational program focuses on environmental, economic and production issues critical to animal operations in this state with an emphasis on Best Available Technology for manure handling, treatment and storage.

b. **Impact** - The Second Annual Manure Science Review program reached 665 individuals dealing directly with animal manure over four days. 216 of these individuals received continuing education credits toward maintaining their CCA accreditation. This program specifically targets animal producers with important information about animal manure management. Key topics in 2001 focused on detection, prevention, and safety of animal manure entering subsurface drains during manure handling and application. Additional topics highlight community and neighbor relations and the development of plans to address site-specific issues associated with animal operations. Biogas generation systems were highlighted as a part of a systems approach to dealing with animal manure. Producer awareness of manure handling options is a critical component stimulating innovative approaches to challenges facing the individual operation.

Ohio Compost Operator Education Course This program combines research and engineering knowledge to deliver a certification course on the science and art of composting, including composting principles, site design, facility operation, feedstock selection, equipment, operational management, as well as health, nuisance and environmental issues related to large-scale composting. Forty-eight individuals were certified through this program in 2002. Participants receive continuing education credit for wastewater certification and registered sanitarians.

c. **Source of Federal Funds** - Smith-Lever 3b&c
d. **Scope of Impact** - State Specific

2. Key Theme: Agricultural Waste Management

(Reference OSU Plan of Work Research Program 4Ar: Agricultural Wastes and By-Products)

a. **Description of Activity** - The strategic location of Ohio agriculture to a large segment of the population of the U.S. has provided an advantage but the juxtaposition of production agriculture and large population centers produce challenges. Animal production facilities, including those for dairy cattle, swine and poultry, have often created acceptability problems for neighbors, including fly infestations and odors. While Ohio has every reason to support economic growth in the agricultural sector, the citizenry must be assured that the quality of life is maintained or improved and that there is no long-term degradation of the environment. The age-old solution to animal waste disposal is to scatter it on farm land but this approach caries negative effects, including dust, odors and run-off which contaminates nearby streams. The nutrient overloading concern carries well beyond the production facilities and land application sights to water supplies, streams, and lakes. The OARDC food animal production research facilities are equally vulnerable to creating environmental problems while potentially being exemplary models of appropriate technology and environmental stewardship. An OSU team of faculty and staff have since organized the Ohio Composting and Manure Management (OCAMM) Program with approximately 30 Ohio livestock producers, livestock facility designers and consultants, compost manufacturers, manure and compost users, equipment manufacturers and public agency technologists. The overall goal of OCAMM to identify issues and technologies leading to safe, economic utilization of livestock manure with minimum odors and nutrient losses to water supplies. Work of OCAMM is establishing the OARDC facilities as exemplary environmental stewards with respect to composting and manure management. Through seminars, tours, field days and support of research, it has disseminated information to stakeholders to help them solve composting and manure management problems. Research has led to the development of methods of composting to reduce odors and in the process produce a value added product which can be safely used as fertilizer. Additional studies have investigated the biology of composting organisms to more effectively eliminate odors and hazardous chemicals.

Research currently in the early developmental stage has the objective of using animal and other agricultural wastes as a source of material to ferment for the production of methane and other useful products. The fermentation facilities, produced in cooperation with Ohio industry, are patterned after similar facilities in Europe. The second phase will be to find best management practices and perhaps produce more efficient fermentation organisms using genetic engineering.

b. **Impact** - Development of better methods of waste management are absolutely

essential to the economic future of not only animal agriculture in Ohio but to other industries such as food processors as well. For example in the animal production area, the trend in dairy production has been to larger herds to obtain the economy of scale but this puts pressure on the industry to handle waste. If the industry finds that large scale dairy operations are not compatible with the population density of Ohio and many of these operations move elsewhere, the cheese industry which produces 140 million pounds of cheese annually worth millions of dollar to Ohio's economy will also be lost. Ohio is number one in Swiss cheese production worth about $130 million per year to the state's economy. Perhaps more important in the long term is that loss of this industry will eliminate thousands of jobs associated with milk processing and cheese and yogurt manufacturing.

At the same time, wastes from processing plants are a problem. Yet fermentation technology promises to convert this problem to an asset. Currently, fermentation facilities using wastes from cheese production and from soybean oil and protein production are being planned.

c. **Source of Federal Funds** - Hatch

d. **Scope of Impact** - State Specific

3. Key Theme: Integrated Pest Management

(Reference OSU Plan of Work Research Program 4B: Integrated Pest Management)

a. **Description of Activity** - Integrated pest management (IPM) is the process whereby management practices and the use of pest's natural enemies are combined to reduce reliance on chemical means of plant protection. One area in Ohio where this system has shown significant promise is with the turf grass industry, worth well over a billion dollars per year to Ohio's economy. The problem is infestation of white grubs - the root feeding larvae of beetles. The usual control is with chemical insecticides applied during the summer. In this research, nematodes, also known as microscopic round worms, have been found to infect and kill these grubs. While some species of nematodes are the nemesis of soybean growers, other species have been used for pest control in citrus, berries and mushroom crops as well as in nurseries and greenhouses. Nematodes are a safe alternative to insecticides and recent trials indicate the method is up to 90% effective in controlling white grubs.

b. **Impact** - IPM generally results in the use of fewer pesticides and provides a safer and more economical means of protecting plants from pests. In the case of white grub control, one of the insecticides of choice for mature grubs is diazinon. According to the EPA, over 13 million pounds of this highly toxic insecticide is applied annually, 80% of which is for turf and residential use for the control of various insects. Again according to the EPA, Diazinon is highly toxic to birds, mammals, honey bees and other beneficial insects as well as to freshwater fish and invertebrates following acute exposure. Unfortunately, Diazinon is one of the leading causes of acute insecticide poisoning for humans and is one of the top

causes of bird kill incidents. The product will not be available for use after December 31, 2004. While there are other insecticides available, the use of an environmental friendly alternative such as nematode control is obviously highly desirable.

c. **Source of Federal Funds** - Hatch

d. **Scope of Impact** - State Specific

4. Key Theme: Amish Water Quality Education

(Reference OSU Plan of Work Extension Program 4De: Water Quality)

a. **Description of Activity** - As part of a USDA-CSREES water quality grant, under-served audiences like the Amish are being educated on water quality issues.

b. **Impact** - Accomplishments include:

- Over 1200 soil samples tested and analyzed resulting in 120 nutrient management plans and recommendations to manage manure and commercial fertilizer on Amish farms.
- Amish farmers are being taught about Management Intensive Grazing (MIG) to decrease pasture erosion, streambank erosion, and increase productivity. Ninety percent of Amish farmers adopted MIG in one community, saving on average $7500 in feed cost per farm. These farmers voluntarily installed 10,000 feet of fencing to exclude livestock from streams.
- The drinking water from 202 Amish wells have been tested (283 total tests) for bacteria with 76 wells (37.6%) testing positive for total coliform bacteria (TCB) and 19 (9.4%) testing positive for E.Coli. (EC). Approximately 50% of the TCB wells and 65% of the EC wells have been improved upon retesting. About eighty percent of the Amish have participated and eighty-five percent have followed OSU Extension recommendations on shock chlorination and well improvements.
- Extensive Amish soil testing revealed that forty percent of Amish fields were low in phosphorous (about 7,200 acres). OSU Extension worked with local egg laying companies to promote poultry manure (high in phosphorous) to the Amish. In 2002, eight demonstration plots using poultry manure as the main fertilizer for corn were conducted. Over 1,000 tons of poultry manure was brokered in 2002 and utilized on Amish farms. Yield increases aver the last several years have averaged 25-30 bushels of corn per acre.

b. **Source of Federal Funds** - Smith-Lever 3b&c

c. **Scope of Impact** - State Specific

5. Key Theme: Forest Resource Management

(Reference OSU Plan of Work Extension Program 4G: Forest Resource Management)

a. **Description of Activity** - Building on last year's success, Extension associates, district specialists and county agents across the state offered 13 classes within the Ohio Woodland Stewards Program. The program also published 3 editions of the program's newsletter, 'Ohio Woodlands, Watersheds and Wildlife'. The web page for the program is up and running allowing interested landowners the opportunity to register for classes online and to read an electronic copy of the newsletter. Under this umbrella is also the forest wildlife course COVERTS – a one time, multi-day class that instructs interested woodland owners on managing their forests for wildlife.

b. **Impact** - There were more than 300 participants in 13 classes conducted by the Ohio Woodland Stewards program in 2002. These participants, 89% of whom were first time attendees, represent nearly 12,000 acres of privately owned forestland across the state.

- While long-term impacts of this program have not been directly measured, participants were asked about the extent to which they anticipated using course information. Sixty-six percent of them indicated that they would definitely use information from the present course in the management of their property (another 26% said they would "probably" put course information to use).
- Participants in OWS classes were also asked how they intended to use the information from their experience. The overwhelming majority planned to apply their new knowledge and skills in the management of their property, improving their forestland for personal enjoyment or in harvesting and selling timber. Several mentioned sharing woodland management ideas with their family as well – uncles, grandparents, parents and grandchildren.
- Other participants indicated that the information would be put to use and shared with others in their professional lives as consulting foresters, OSU Extension staff, property managers for parks and arboreta, wildlife rehabilitation people, and schoolteachers.
- Within the COVERTS program a survey was done of the 2001 participants to see what activities they had participated in as part of their volunteer component to the class. A total of 73 surveys were mailed and 55 responded as follows:
    - They shared information about stewardship with over 1,000 landowners who control over 20,000 acres of land.
    - They spoke to 23 different audiences totaling over 800 people about wildlife management and the benefits of management.
    - They planted over 58,000 trees, and improved over 800 acres of forestland.
    - They wrote 35 newspaper articles, taped 3 radio spots and appeared on television 10 times.

c. **Source of Federal Funds** - Smith-Lever 3b&c

d. **Scope of Impact** - State Specific

6. Key Theme: Forest Crops

(Reference OSU Plan of Work Extension Program 4H: Forest Specialty Crops)

a. Description of Activity - Forest specialty crops, including maple products, Christmas trees, herbs, and tree fruits and nuts offer income opportunities that often exceed typical commercial timber production. In Ohio both the Christmas tree and maple syrup industries are well organized and progressive. Both have commodity organizations, the Ohio Christmas Tree Association and the Ohio Maple Producers Association. A recent study indicates that there are over 600 commercial Christmas tree growers in Ohio. The size of the commercial maple industry in Ohio is less well documented, but is probably somewhat larger. In both of these industries most of the entrepreneurs are part time, and their earnings represent an important component of their annual income. Both industries represent several million dollars in annual sales – around five million dollars for the maple industry and approaching thirty million for the Christmas tree industry. Both the Christmas tree and maple industries are interested in the application of new production technologies and marketing strategies to the industry as a whole and to their individual operations. Less well-organized are the tree fruit and nut and the forest herb producers. Nonetheless, they are a clientele who are growing in numbers and their desire to receive information and participate in OSU Extension programs.

b. Impact - Fifteen hundred and ninety eight participants were involved or in some way received training in forest alternative crop programs.

- 198 commercial maple producers in Ohio 210 commercial maple producers in two other states received in-depth training on various aspects of maple production.
- 249 potential maple producers in Ohio and 28 potential maple producers in Iowa received training on the fundamentals of maple product production and marketing.
- 258 commercial Christmas tree growers in Ohio, 230 commercial Christmas tree growers in Michigan and Pennsylvania, and 325 commercial Christmas tree growers at the National Christmas Tree Growers Annual Meeting received training on various aspects of Christmas tree production.
- 85 potential Christmas tree growers received training on the fundamentals of growing and marketing Christmas trees.
- OSU Extension personnel continued to strengthen participation in programs that address needs of other forest specialty crops by participating in programming of other organizations including the Ohio Walnut Council and Rural Action, an entity focused on providing education and services to individuals in southeastern Ohio interested in forest specialty crops.

c. Source of Federal Funds - Smith-Lever 3b&c

d. **Scope of Impact** - State Specific

7. Key Theme: Nutrient Management

a. **Description of Activity** - OSU Extension, working in partnership with the Ohio Livestock Coalition and key state/federal agencies, have developed and implemented the Ohio Livestock Environmental Assurance Program (LEAP). LEAP is helping livestock/poultry producers to profitably manage environmental challenges that are critically important to the success of their business, and effectively assess how their farmstead practices affect water quality. By OSU Extension providing LEAP certification programs, we will accomplish our primary objective - to promote sustainability by seeking profitable environmental solutions. The Livestock Environmental Assurance Program (LEAP) continues to advance environmental stewardship educational programming in Ohio in 2002. Since 1997, more than 4,300 individuals have participated in this environmental awareness program.

This same program targets certified LEAP participants with an advance environmental stewardship program, LEAP, Level 2. This program addresses the issues related to manure and wastewater handling and storage, feed management, land application practices, nutrient management, record keeping and other utilization options, while the plan's BMPs address and minimize the impact and effect of dust, noise, odors and pests on the respective farm's neighbors and community. LEAP, Level 2 is designed to help producers obtain and organize data and information, as well as identify appropriate best management practices (BMPs), necessary to develop, adopt and implement a Comprehensive Nutrient Management Plan (CNMP) for their operation.

b. **Impact** – CNMP developed through private consultants is costing Ohio producers in excess of $4,000 per plan. LEAP, Level 2 save producers money by helping them compile and organize the necessary data to complete a CNMP. It is expected that organized data will reduce the time required to develop and certify a completed plan. Train-the-trainer programs for LEAP, Level 2 had 160 individuals participate from across the state, and include Ohio State University Extension, Natural Resources Conservation Service, and Ohio Department of Natural Resources. Producer training will begin in early 2003.

Row crop producers in Ohio are generally not familiar with the benefits of utilizing animal manure nutrients within their operation. The Manure Science Review hosted an educational program to provide critical environmental, economic and agronomic information to 43 row crop producers at the Ohio Farm Science Review. This program focused on the use of animal manure by row crop producers. These operations tend to have land which can utilize animal manure more efficiently than land owned and operated by animal operations. Row crop producers in close proximity to animal operations with excess nutrients can benefit from this source of low cost nutrients. Row crop producers attending this program reported nutrient savings of nearly $100 per acre through the utilization

of neighboring animal manure resources. Over 14,000 acres of row crops where represented by producers responding to an evaluation of this meeting.

c. **Source of Federal Funds** – Smith-Lever 3b&c

d. **Scope of Impact** – State Specific

Goal 5. Enhanced Economic Opportunity and Quality of Life

Executive Summary

During the decade of the 90's, most Ohioans prospered but many others were left behind. As economic difficulties continue, lack of economic opportunities worsens, particularly in Southeastern Ohio which has been in decline since the coal industry moved out. Agriculture, mostly in the form of beef cow and calf operations and forage crops provide some opportunity but others are needed. One of the possibilities that have been explored is aquaculture, represented here by the newest entry in the field, fresh water shrimp. Production of these crustaceans for a niche market can provide some income to residents of this economically depressed area.

The Land Use Team has recently been active with workshops on the new state purchase of the development rights program that was funded by a $25 million state bonding initiative with a local match. In addition, the Ohio Department of Development had provided grants to nearly 60 Ohio counties to develop a farm preservation plan. Extension personnel were actively involved in recruiting and training members and assisting in the development of these plans. Additional assistance was given to the development and training of various planning commissions and in assisting in the comprehensive community planning process.

Community Economic Development: Extension personnel provide the lead in about a nine counties for their economic development program. Extension works on a total community development paradigm. In the economic development strategies, the Business Retention and Expansion Program continues to be enhanced by the Department of Agricultural, Environmental and Development Economics. This flexible consulting program assists the local community in selecting their own survey tool and reporting mechanism. The community is provided the items and assistance they request. Retention and Expansion Programs are conducted for nearly all sectors of the economy including industrial, agricultural, retail and service. Additional assistance is provided in educational programs on enterprise zones, joint economic development districts, and tax abatement. Assistance is also provided in attraction and community capture of local discretionary income.

Programs are also available for local leaders and government officials on wastewater treatment alternatives and water supply systems. Extension educators in several counties work closely with local groups in the creation and operation of revolving loan funds and the establishment of industrial parks. Some of the Community Development Agents conduct downtown revitalization programs and state route corridor development projects.

Community Leadership Development is a wide-ranging area that includes operation or assistance of year-long leadership training programs. More ad hoc programs include training for members of non-profit boards of directors. Leaders are instructed in such programs as: appreciative inquiry, finding and mobilizing community assets, and Vision to Action. The Public Issues Team provides instruction on Framing of Issues, National Issues Forum (as per Kettering Foundation), and dispute resolution.

Local Government Leadership Academy: In 2002 The Local Government Leadership Academy concept began. This is the first local / regional Academy organized outside the major Academy for local officials who cannot find time to attend the programs and conferences of state local government associations. The focus of the academy is more efficient and better government operations.

Tourism Development Programs are focused in the rural areas on heritage tourism. The Ohio Chautauqua Program has brought a renewed sense of pride in several counties as they participate in enrichment activities and rekindle an interest in historical events.

The Ohio 4-H Youth Development program provides positive environments for culturally diverse youth and adults to reach their fullest potential as capable, competent, caring and contributing citizens thus enhancing their quality of life. As a result of the Ohio 4-H positive youth development experience: youth develop marketable skills for lifelong success; youth participate in and learn through citizenship opportunities to transform local communities; youth appreciate and build upon diversity to foster a harmonious global society; youth have a sustained relationship with a caring adult to enable them to be productive citizens; and volunteers build their skills and abilities in working with youth.

Smith-Lever Fund expenditures for Goal 5: $3,496,781 FTE's: 73
Hatch expenditures for Goal 5: $328,620 OARDC FTE: 3

Goal 5 Key Themes

1. Key Theme: Enhanced Economic Opportunity

(Reference OSU Plan of Work Research Program 5A: Economic Development)

a. Description of Activities - Ohio is a very diverse state which features three large urban centers, productive farm land flattened by glacier activity during the last ice age in the North and West, and the rolling hills of Appalachia in the East and South. This diversity gives the State its strength and beauty but the decline of the coal and steel industries has left the Southeast portion of the State relatively depressed. Agricultural production is represented primarily by beef cow and calf operations and forage crops. Much effort has gone into the development of alternative sources of agricultural revenue, one of which is aquaculture. The latest

entry is the production of Malaysian prawns, other wise known as fresh water shrimp. These crustaceans seem to be a good fit to Southern Ohio because of favorable regional temperatures, small production space requirements, a short growing season and promising profits. Shrimp are grown in ponds ranging from 1/4 to one acre. The Ohio Department of Natural Resources approved the production of fresh water shrimp in January, 2001 and some Ohio farmers have already entered the business even though research is continuing to find optimum management and growing conditions.

b. **Impact** - The production of fresh water shrimp in Southeastern Ohio is just beginning but holds great promise for supplemental income as a niche market for this depressed region. It has been estimated that profits of $2,000 to $5,000 per acre, depending on pond size, stock density and marketing plans.

c. **Source of Federal Funds** - Hatch

d. **Scope of Impact** - State Specific

2. Key Theme: Community Development

(Reference OSU Plan of Work Extension Program 5E: Community Economic Well-Being)

a. **Description of Activities** - Community Economic Development rural and agriculture value-added projects are important to the economic health of many small towns and farm producers. Contributions to value-added projects include assistance in creation of roadside markets, roadside marketing conferences and other research and education projects.

b. **Impact** - County agents, District Specialists and State Leaders provided assistance with feasibility studies, tours, planning, and promotional materials. A feasibility study on the potential of an Ethanol Plant was accomplished. In 2002 legislation was enacted to provide tax incentives for a plant but unfortunately additional funding was not secured. Tours of value added facilities were conducted for interested producers and steering committees established from these tours. Farmers markets were created in various communities. Business plans were developed and promotional materials such as ones for the woodcraft industry. A woodcraft-training manual was created and distributed to help interested producers understand customer standards. This booklet has led to businesses focusing their product development and marketing together. Finally, Extension Professionals performed market research on customer demands for agricultural and wood products.

c. **Source of Federal Funds** - Smith-Lever 3b&c

d. **Scope of Impact** - State Specific

4. Key Theme - Jobs/Employment

(Reference OSU Plan of Work Extension Program 5E: Community Economic Well-

Being)

a. **Description of Activities** - Community Development Program Areas work in economic development issues is centered on working in partnerships to create and enhance economic opportunities. Sixteen full-time Community Development Agents and many dual-program Extension Professionals contribute to this effort. Work reported includes tourism development activities, retention & expansion programs, attraction of businesses, development of public infrastructure, small business planning and training, job preparation skills and assistance to local economic development boards.

b. **Impacts** - Agents reported assisting the community in the creation of 90 jobs. They provide business-training workshops to entrepreneurs and business planning assistance for 104 entrepreneurs. They help manage and direct the use of small business revolving loan programs. One R&E Program resulted in the creation of a Port Authority. In addition they assisted community and public leaders in obtaining grants to fund public infrastructure programs such as a $20,000 R&E Training Grant. Programs in job readiness skills reached 240 persons with 85% saying they plan to use at least one of the items learned.

c. **Source of Federal Funds** - Smith-Lever 3b&c

d. **Scope of Impact** - State Specific

5. Key Theme - Community Development (Leadership)

(Reference OSU Plan of Work Extension Program 5F: Community Development)

a. **Description of Activities** - A Community Planning or Community Visioning process to develop widely held goals for the community has been outlined as a priority program for Ohio communities. In these programs an effort is made for every community member who wishes to be involved in creating the Community Vision in Action plan. The concepts of assets and capacities of the community are utilized as well as concepts of sustainable development. This includes not only considering the economic impact of development but also the social and environmental impacts to the community.

b. **Impact** - In Highland County public officials accepted the planning materials development through the Extension Comprehensive Planning Process. Public officials then employed a technical consultant to complete the counties comp plan using the community materials as guidelines. In the pilot Kent Sustainable Comprehensive Planning Process in nearly 300 residents shared their vision of a sustainable future for their community by developing lists of items that they currently valued about their community and items they hoped would be different for future generations. In the second round this list will be linked across economic, social and environmental sectors to serve as a guide for the Community Design Committee as they develop the technical aspects of the comp plan.

c. **Source of Federal Funds** - Smith-Lever 3b&c
d. **Scope of Impact** - State Specific

6. Key Theme: Community Development

(Reference OSU Plan of Work Extension Program 5F: Community Development)

a. **Description of Activities** - Community Leadership: Elected local government officials often take office without any formal training for the leadership responsibilities they assume once in office. Most elected officials have received on the job training as they have worked their way through community civic and political processes. However, once in office they are faced with a number of challenges relating to the way they conduct themselves in office. In a series of dialogue sessions between Ohio State University Extension Community Development representatives and directors from the County Commissioners' Association of Ohio, the Ohio Municipal League, and the Ohio Township Association, representing a combined total of more than 7,000 local elected officials, an Ohio Local Government Leadership Academy was created to provide a structured learning experience for local elected leaders. The curriculum was negotiated among the participating parties and concluded with the development of ten courses for elected officials. The Toledo Area Local Government Leadership Academy was organized beginning in January 2002 with thirty-five participants. This is the first local / regional Academy organized outside the major Academy for local officials who cannot find time to attend the programs and conferences of state local government associations. The focus of the Academy is better government and more efficient operations.

b. **Impact** - The Toledo Program was very successful. From the feed back from participants, elected officials indicated they had developed many new ideas for implementation in their local communities. The evaluations from the program showed high levels of satisfaction with the training. This has led to programs development for Greene County and Ashtabula County. The Toledo Program will have it's second year in 2003. Also the Ohio Township Association will begin a township series in 2003.

c. **Source of Federal Funds** - Smith-Lever 3b&c
d. **Scope of Impact** - State Specific

7. Key Theme - Community Development

(Reference OSU Plan of Work Extension Programs 5F: Community Development and 5H: Land Use Issues)

a. **Description of Activities** - Land Use Issues: During the calendar year 2002, Extension agents and specialists assisted public officials, community leaders and the general public dealing with land use issues. Educational workshops were held regarding zoning and planning tools. Information was provided on land use

planning and farmland preservation tools such as conservation easements.

b. **Impact** - Attendance at the various meetings held on land use issues was over 900 people. Specific outcomes of Extension land-use programs include comprehensive planning programs in Van Wert, Columbiana, Defiance, Morrow, Adams, and Coshocton Counties. A distance learning course was development in cooperation with the School of City & Regional Planning. A Citizen's Comp Planning resource guide was drafted and a statewide township planning and annexation survey was begun.

c. **Source of Federal Funds** - Smith-Lever 3b&c

d. **Scope of Impact** - State Specific

8. Key Theme - Community Development

(Reference OSU Plan of Work Extension Program 5F: Community Development)

a. **Description of Activities** - Public Issues Education: A state specialist working with the Columbus Health Department and the Mid-Ohio Regional Planning Commission facilitated a multi-year effort to develop ozone reduction strategies for central Ohio. Project CLEAR was led by a Steering Committee comprised of representatives from over 20 stakeholder groups representing health, industry, commerce and the environment.

b. **Impacts** - Following a participatory process used to gather citizen opinion the Steering Committee was able to reach consensus on a list of 52 suggested strategies to reduce ozone in central Ohio. With scientific documentation, these became the basis for a 110-page Final Report that was sent on to Ohio EPA and numerous other agencies with an interest in air quality. These strategies are now being considered as the basis for new public policy.

c. **Source of Federal Funds** - Smith-Lever 3b&c

d. **Scope of Impact** - State Specific

9. Key Theme - Leadership Training and Development

(Reference OSU Plan of Work Extension Program 5F: Community Development)

a. **Description of Activities** - Community Economic Development Programs, Planning activities and Workshops are conducted for public officials and community leaders to better prepare them to meet their responsibilities. Yearly leadership classes are held to help existing and aspiring leaders enhance their skills in providing leadership in the public arena. Training is provided to help individuals gain basic skills necessary for their participation in community activities and decision making. Countless hours are spent by Extension Professionals in developing communication channels that enhance collaboration between public agencies and the public-private sector. Management of a statewide training workshop for Economic Development Professionals is coordinated and taught by Extension Professionals.

b. **Impact** - It is estimated that more than 280 public officials, in excess of 395 community leaders and 475 citizens took advantage of Extension Leadership Programs for Community and Economic Development. The outcome was the development of community priorities. The Extension Tools Team worked with Morrow County officials and residents to complete a Community Economic Development Strategy Plan which will be used to apply for funding through the Federal Economic Development Administration. A similar process has begun in Preble County.

c. **Source of Funds** - Smith-Lever 3b&c

d. **Scope of Impact** - State Specific

10. Key Theme: Family Resource Management

(Reference OSU Plan of Work Extension Program 5G: Management of Economic Resources)

a. **Description of Activities** - Ohio families cope with daily stresses of managing resources and planning for financial security in later life. OSU Extension provides family financial resource management programs and resources including MONEY 2000+, Pathways to MONEY 2000+ (targeted to low income), Investing For Your Future, Master Money Manager Program, Family Nutrition Program, and Master Clothing Educator Program as a means to empower families to reduce debt, increase savings, prepare tax reports, manage housing and clothing resources, and plan for financial security in later life, including retirement and dispersal of wealth.

b. **Impact** - OSU Extension partnered with the State Treasurer's Women and Money Program to provide educational programs and money management resources to 1800 Ohio women. Over 5000 MONEY 2000+ newsletters were distributed by county FCS professionals to program participants. Educational sessions on Financial Security in Later Life, an Extension national initiative, were presented throughout the state. Of 11 Tuscarawas county participants in a 6-hour Mutual Fund workshop, 100% increased knowledge and confidence and 91% identified at least one strategy they planned to adopt. Erie county participants in the Pathways to MONEY 2000+ program reported improvements on setting aside money for future 2000+ needs and wants (70%) and 75% reported paying bills on time.

c. **Source of Federal Funds** - Smith-Lever 3b&c

d. **Scope of Impact** - State Specific

11. Key Theme: Financial Security in Later Life

(Reference OSU Plan of Work Extension Program 5G: Management of Economic Resources)

a. **Description of Activities** - A team of 5 Ohioans attended the March 2002 roll out conference for Financial Security in Later Life (FSLL), a new national

Cooperative Extension initiative. The goal of the conference was to share research and programs that respective states could use to develop and deliver the programming in that state. The Ohio Task force members used the conference research, curriculums, presentations, and resources as a basis for an Ohio initiative. Nineteen Ohio OSU Extension professionals from FCS and from Ag program areas committed to the FSLL Team and prioritized FSLL objectives, identified potential audiences, and developed appropriate in-service training. Eighty eight percent of the Ohio FSLL Team members reported increased knowledge of the Initiative components and 93% committed to conducting an FSLL program within a year. In addition the Team developed a listserv to share information.

Unveiling the New National Initiative - A 3-hour workshop provided an overview of Financial Security in Later Life research, goals, programs, and web-based resources to conduct local programs. It featured a full-length presentation of Take the Road to Financial Security, the cornerstone curriculum. Online browsing web resources were also featured as well as ideas to apply the information personally, share it with friends, aging parents, and clientele.

Financial Security in Later Life for Farm Families - An interdisciplinary 2-day in-service featured Financial Security in Later Life concepts and resources as well as the newly revised "Estate Planning for Ohio Families," an Ohio Extension publication. Presenters included Extension personnel, financial planners, government agency staff from Social Security and U.S. Department of Labor, and a counselor. An optional evening session focused on personal planning for later life.

b. **Impact** - Ninety percent of the 61 FSLL workshop participants reported increasing knowledge; 70% feel confident about offering programs; 74% plan to offer face-to-face programming within a year; and 79.5% plan to reach clientele with non face-to-face methods. End of workshop comments from the 45 FSLL for Farm Family participants were very favorable. Agents from 2 counties have developed programs for early 2003. More than 100 educational sessions were held in this program area. Financial information displays were developed and used at work site fairs and at other educational activities. Ten issues of a newsletter, “LifeTime” were written and distributed to county FCS professionals for distribution to appropriate residents.

c. **Source of Federal Funds** - Smith-Lever 3b&c

d. **Scope of Impact** - State Specific

12. Key Theme - Tourism

(Reference OSU Plan of Work Extension Program 5I: Business Efficiency)

a. **Description of Activities** - Tourism development is one major focus of the Ohio community economic development program. Tourism is important in Ohio with over ten billion dollars in primary economic activity. Many of our programs reported in other places such as small business development and management

assist tourism. Extension tourism programs are often focused on the 29 Appalachian counties of Ohio based upon the natural resources of the area. It is also the area of the state where unemployment is highest and income levels are below the state average.

b. **Impact** - The Tourism Team introduced a newsletter that is providing information to the tourism industry. Community Festivals such as Honda Homecoming and Heritage Days were implemented.

c. **Source of Funds** - Smith-Lever 3b&c

d. **Scope of Impact** - State Specific

13. Key Theme - Farm Safety

(Reference OSU Plan of Work Extension Program 5J: Work/Life/Health Issues)

a. **Description of Activities** - Community and Farm Safety. Safety is a priority program for Amish families due to the relative high incidence of buggy accidents and serious farm accidents. A program was developed to target Amish buggy drivers and their families. This program was conducted in community events and through the Amish schools. Special Amish safety programs including marketing of buggies with reflective materials were also developed. Meetings were conducted with Amish Bishops to determine what would be acceptable or unacceptable due to religious convictions with various markings and use of lights on Amish buggies.

b. **Impacts** - More than 4,000 Amish participated in programming. Since October 2000, more than 1,000 buggies in Ohio have been outfitted with the recommended reflective materials. Over 1,500 LED lights and 2,000 SMV emblems have also been sold in this area in the same time period. From 1999 to 2001, the number of injury crashes involving horse-drawn vehicles dropped from 91 to 54. There has not been a fatality involving a horse-drawn vehicle in the state of Ohio since 1999.

c. **Source of Federal Funds** - Smith-Lever 3b&c

d. **Scope of Impact** - State Specific

14. Key Theme: Leadership Training and Development

(Reference OSU Plan of Work Extension Program 5K: Positive Youth Development)

a. **Description of Activities** - The purpose of State 4-H Leadership Camp is to help meet that challenge by enabling teen participants to become better leaders and to achieve the following objectives: develop collegial leadership knowledge, skills, and attitudes; contribute leadership in groups to identify & achieve goals and earn support; develop leadership skills such as envisioning, consensus-building, group building & recognition; realize the degree of control they have over their lives; are encouraged to take the initiative to try new things and not be afraid of failure or success; gain in physical, intellectual, emotional and social development; gain

ideas & methods to improve their clubs, communities, country & world; develop new friendships; provide real leadership in committees, leadership groups, & cabin groups, and have fun.

State 4-H Leadership Camp is built on 10 research-based principles for effective youth leadership development. It: a) is built around specific leadership development purposes and goals, b) encourages high expectations and confidence in teens and demonstrates respect for teens, c) emphasizes experiential learning and involves teens in exercising genuine leadership, d) teaches teens history, values, and beliefs of U.S. society, e) promotes awareness, understanding, and tolerance of other people, cultures, and societies, f) involves teens in collaborative experiences, teamwork, and networking with peers, g) helps teens develop specific skills related to leadership, h) involves teens in significant relationships with mentors and positive role models, i) facilitates the development of individual strengths and personal characteristics, and j) involves teens in service to others, to their community, to their country, and to the world.

b. **Impact** - Camper ratings of how well the State 4-H Leadership Camp objectives were achieved ranged from 6.3 to 6.9 (Agree to Strongly Agree), as outlined on the table below (scale: 7=strongly agree/excellent to 1=strongly disagree/very poor) (n=95):

As a result of the 2002 State 4-H Leadership Camp, participants…

- Developed collegial leadership abilities – **6.5**
- Contributed leadership in helping groups shape & achieve goals and gain support – **6.3**
- Developed leadership skills such as envisioning, consensus-building, negotiation, perspective-taking, p.r., group building and recognition – **6.3**
- Realized the degree of control they have over their lives – **6.3**
- Were encouraged to take initiative to try new things and not be afraid of failure or success – **6.6**
- Gained in physical, intellectual, emotional and social development & became more competent, caring and contributing individuals – **6.5**
- Gained ideas to improve their clubs, communities, country & world – **6.5**
- Developed new friendships – **6.9**
- Provided real leadership in committees, leadership groups & cabins – **6.7**
- Had fun – **6.8**

c. **Source of Federal Funding** - Smith-Lever 3b&c

d. **Scope of Impact** - State Specific

15. Key Theme: Youth Development/4-H

(Reference OSU Plan of Work Extension Program 5K: Positive Youth Development)

a. **Description of Activities -** In Ohio, 76,339 youth participated in organized community clubs, 94,719 youth participated in special interest and day camp programs, 28,767 youth participated in resident camps, and 109,958 youth participated in school enrichment opportunities.

b. **Impact -** 4-H youth participants enrolled in over 358,097 individual projects as a result of their involvement. Youth participated in a variety of educational clinics

and in-services to increase their subject matter and life skill development. Ohio was also a part of the national 4- H Impact Assessment project. In general, youth are very positive about 4-H and specific aspects of the program. The vast majority (90 percent or more) agree or strongly agree with the statements such as the following: "4-H teaches me to be responsible for my actions" and 4-H teaches me to help other people. Other program impact highlights include youth reporting: "All kinds of kids are welcome in 4-H," 97 percent; "I feel like I belong in 4-H," 89 percent; "4-H helps me accept differences in others," 90 percent; "I feel safe when I do 4-H activities," 93 percent; "In 4-H I feel that it is safe to try new things," 94 percent; "Boys and girls have equal chances to do everything in 4-H," 94 percent and "Both boys and girls can be leaders in 4-H" 94 percent.

c. **Source of Federal Funding** - Smith-Lever 3b&c

d. **Scope of Impact** - State Specific

16. Key Theme: Parenting and Child Care

(Reference OSU Plan of Work Extension Program 5L: Parenting and Family Life)

a. **Description of Activities** - Today's families face many challenges such as divorce, family violence, teen pregnancies, and general parenting issues. Parents need to learn skills to help them nurture and guide youth from infancy through adolescence and beyond as well as nurturing themselves. Child care providers are also in need of training.

b. **Impact** - Extension county faculty provided training for child care providers across the state, much of which satisfied requirements for child care program licensing through the Ohio Department of Job and Family Services. Over 800 providers attended training programs that included the following content areas: health and safety, nutrition, working with parents, and guidance and discipline. Thirty-one providers in two counties completed a comprehensive training program that will assist them in earning the Child Development Associate credential. In addition to training, county faculty collaborated with other community-based organizations to create awareness of issues related to child care. For example, community events celebrating the annual Week of the Young Child in Wayne County attracted over 600 community members, creating awareness of the importance of high quality care for young children.

A Positive Parenting Newsletter is distributed statewide 6 times per year to approximately 150,000 parents. The newsletter Child Care Connection had 43,950 copies distributed. A Family Life Month Packet and an Older Americans Month Packet are developed as resources for those doing programming targeting parents and families. A significant number of the participants were from court mandated programs and from programs developed in collaboration with other agencies and organizations and that targeted families at risk.

c. **Source of Federal Funds** - Smith-Lever 3b&c

d. Scope of Impact - State Specific

Stakeholder Input Process

The College of Food, Agricultural, and Environmental Sciences of The Ohio State University was awarded a grant from the W. K. Kellogg Foundation to conduct a process that would create: 1) a new vision for food systems education, with implications for changes in land-grant universities and higher education across the country; 2) new structures for engaging citizens in vision building, decision making, and agenda setting; and 3) new models for educational responsiveness to constituent needs. The process entitled "Project Reinvent" brought together, through 18 focus group sessions, more than 230 individuals from the College, the University, and citizens of the State of Ohio to gather their views on what the College of Food, Agricultural, and Environmental Sciences must become to most effectively serve the needs of the people of Ohio and meet the challenge of the 21st century. External stakeholder groups participating in the focus sessions included farmers and producers, consumer and food advocacy/health care, food processors and retailers, agribusiness suppliers, commodity groups, environmental and natural resources groups, sustainable agriculture groups, legislators, primary and secondary educators, entrepreneurs/new technology, rural economic development groups, and media.

Some key highlights resulting from the focus groups input includes:

- The College adopted a new vision statement that would drive future decisions and an implementation grant was secured. Four teams were formed to address system change issues in:
  - Organizational structure
  - Reward system
  - Programmatic focus
  - Communication and marketing
- A team was formed to create a strategic plan for the Ohio Agricultural Research and Development Center, encompassing the Columbus and Wooster campuses and the 10 branch stations. In May 1998 the team presented the first phase of a strategic planning process, which identified a number of strategic issues and a series of experimental efforts to address those issues.
- Integrated systems approach identified and adopted as the foundation of the efforts within the College. The College recognizes that to sustain agricultural practices in the future the efforts must address issues of 1) production efficiency, 2) economic viability, 3) environmental compatibility, and 4) social acceptability in an integrated manner.
- A group of college and community leaders were brought together to serve as an ongoing advisory council to the Vice President and Dean of the College on issues that have widespread impact and implications for the College, its many units, and the full spectrum of audiences.
- An OARDC Internal Competitive Grants Program that matches funds from industry and other stakeholders with OARDC funds.

And the stakeholder input process continues. The Ohio Agricultural Research and Development

Center and most academic departments have external advisory boards that meet at least quarterly to discuss current programs and provide input for future direction. Within the past 2 years in excess of 100 meetings have been held throughout Ohio with state legislators, community lay leaders, and representatives of Ohio State University Extension and OARDC to dialog on current educational and research programs and converse on future programs.

The Extension Community Development Program utilized a variety of methods to obtain stakeholder input. Many of these processes are intricate to the Community Development process itself. For example, appreciative inquiry, community asset assessment, and traditional needs assessments were used in twenty counties where full-time Community Development Agents are employed. Other community input programs were conducted in the Price Hill project in Hamilton County, the Comprehensive Community Planning Project in Highland County and Community Economic Development. Each of these boards conducts a year round program for community funds for the Community Economic Development Program Agents in other counties utilize Community Development Program Sub-committees that interact with the county Extension Advisory Committee.

The Ohio 4-H Youth Development program seeks stakeholder input in a variety of ways. Fundamental to the input are the local county 4-H advisory and subject matter committees located throughout the state. Furthermore, the many committees include the direct input from both adult and youth membership. Stakeholders are also involved on statewide committees to further ensure important input to the development and implementation of positive youth development programming in Ohio.

Program Review Process

Merit Review
(Note: The merit review process has not changed in FY 2002.)

OSU Extension develops long range program plans through a process involving Extension personnel from throughout the system, input of lay leaders in communities, incorporating data about Ohio's population, and through collaboration with other agencies, institutions and organizations.

Each of the four program areas conducts long range strategic planning to prioritize programming. Specialists from academic disciplines provide insight from research trends while county Extension personnel provide insight from local communities. Systematic prioritization processes, such as Delphi, are used. Program area personnel work together to identify key issues that cut across disciplines. Special task forces or teams then collaborate to identify priority program efforts to address these issues. Funding is then allocated to support program priorities. Programmatic resources such as personnel or materials reflect the program priorities. In addition, these priorities direct from what sources grant funds are sought.

Once strategic plans are in place, there is continual review of plans to include the ability to be responsive to unanticipated issues. The system provides flexibility for agents to address these

issues. In situations where grant monies are obtained, staff with specific, short-term employment contracts are hired to assist in meeting priority needs.

Agent specialization is a way for the system to provide subject matter expertise close to local communities. Agents determine a subject matter specialization that relates to needs in their geographical area of the state. They receive additional training to remain on the cutting edge of their field. They are encouraged to work with other agents in their district to address local needs in a timely manner. In addition, agents are linked to state specialists in the same discipline to enable the rapid dissemination of new information or the development of appropriate programming to address critical needs.

Scientific Peer Review
(Note: The scientific peer review process has not changed in FY 2002.)

Base funds (Hatch, McIntire Stennis, Animal Health) allocated to OARDC undergo an extensive review process within the OARDC system. The following describes the review process:

- Project proposals are initiated by research faculty and research scientists in consultation with colleagues and Department or Program chair.
- Chairs review all proposals. Chairs are responsible for selecting at least two peer reviewers for each proposal. The reviewers are expected to have expertise in the subject matter area and can be from on campus or off-campus. The reviewers evaluate, recommend, and comment on each proposal.
- Reviews are returned to the proposing scientist who them responds to suggestions, makes changes, and resubmits the proposal to the Chair.
- Chairs indicate departmental approval by signing the AD-416.
- Following review and approval by Chairs, proposals are forwarded to the Experiment Station Director's Office where they are reviewed for accuracy in coding and format and concurrence with State Experiment Station and CSREES program directions. Revisions are requested if proposals are incomplete, are not sufficiently justified, or documented.
- Upon approval by the Director or his/her designee, projects are assigned a number and are electronically forwarded to CSREES for approval and inclusion into the Current Research Information System (CRIS). The Experiment Station Fiscal Office is notified of all approved projects wherein the Fiscal Office maintains records of expenditures to be used in the AD-419 and the Annual Report which are submitted to CSREES. The Experiment Station publishes the Annual Report to document and distribute scientific accomplishments and impacts.

Evaluation of the Success of Multi and Joint Activities

Agriculture and Natural Resource Extension Programs

Over the past three years, Ohio State Extension's Agriculture and Natural Resources (Ag/NR) program area has provided strong leadership to engage our 21 Commodity and Issue Teams to network with neighboring land grant universities. Within our annual report, we have profiled

just a few of the very successful high profile programs, products and activities that are better leveraging our Federal, State, and County dollars to serve our very diverse industries and clientele.

Evaluations conducted by our multi-state committees and Teams have indicated that they feel that Multi-state conferences create improved learning opportunities and also better complement the discipline strengths of each institution. Many of our conferences and educational products have developed a strong tradition of support from clientele throughout the entire region. It is our vision to continue to provide a supportive environment to our Extension Field and State Faculties that will build upon these successful multi-state ventures.

Research Activities from a Research Perspective

Multi-disciplinary research teams have been formed to address critical issues. The Agroecosystems Management Team brings together stakeholders and those involved in research, teaching and outreach from different disciplines and institutions to discuss and develop whole systems approaches to the challenges affecting agriculture and rural communities. Its activities include public seminars on system research, sustainable agriculture and agroecosystems, sponsorship of stakeholder initiated workshops on sustainable management practices, and support of local learning communities. A practical management guide that relates basic principles of ecosystems based management to specifics of crop and livestock production has been produced. Educational materials have been developed for grade K-12.

The Ohio Compost and Manure Management Team was formed to build focus on issues and system technologies leading to safe, economic utilization of livestock manure with minimum odors and nutrient losses to water supplies. A video linked seminar series addressing manure management issues followed by discussion increased communication among stakeholders and provided an opportunity for networking with researchers and policy-makers. Organized tours of livestock and composting facilities that demonstrated effective waste management were conducted. A field day highlighting construction of a composting pad and treatment wetlands was attended by approximately 100 individuals. A website that highlights OCAMM goals, activities, seminar summaries, and link to sites with relevant information was developed.

Multi-state Extension Activities

1. Key Theme: Agricultural Communication

a. Description of Activity - The *Agricultural Outlook* is a multi-state effort (Purdue-Illinois-Ohio) to provide a comprehensive and timely hard copy commodity outlook guide for the Eastern Corn Belt farmers and Agri-business professionals. Lead editors from each state choose the various commodity experts in each participating state to provide both a short and long term outlook for commodities of major economic importance to this region. Each year, as many as twelve authors from the three participating states will produce this very timely

and high demand publication.

b. **Impact** - Agriculture Economists in Indiana, Illinois and Ohio prepared a 16-page annual Outlook publication which was inserted in the issue of the Prairie Farmer which is published/circulated in each state. The potential readership of farmer and allied industry personnel is over 200,000 subscribers.

c. **Source of Federal Funds** - Smith-Lever 3b&c

2. Key Theme: Human Health

a. **Description of Activity** - The mission of the Healthy People/Healthy Communities national health initiative is to promote the capacity of individuals, families, and communities to increase healthy behaviors and lifestyle choices and make informed consumer decisions. The initiative strengthens community leadership, and promotes the formation and enhancement of quality partnerships and infrastructures to meet local health and health care needs. OSU Extension and the College of Pharmacy at The Ohio State University have such a partnership.

b. **Impact** - Projects completed in 2002 include: Brown Bag Medicine Review sessions in two counties were incorporated into dental health/nutrition programs and geriatric health fairs. In addition, a Doctorate of Pharmacy student interned in Ross County with OSU Extension and provided an Acetaminophen education program for parents of young children in Ross County. Herbal fact sheets were written by OSU Extension professionals and reviewed by College of Pharmacy faculty for use with consumers. Continuing Education Credits were offered to pharmacists attending an in-service about herbal supplements.

c. **Source of Federal Funds** - Smith-Lever 3b&c

3. Key Theme: Agricultural Communications

a. **Description of Activity** - Purdue/DTN Agreement (Electronic News Service) - This partnership is a joint effort to disseminate timely management/marketing information aimed at larger scale commercial farmers across the Eastern Corn Belt through the most widely subscribed farmer information network. Both Purdue and Ohio State University specialists and research faculty on a daily rotation provide articles on contemporary crop and livestock production.

b. **Impact** - Both Indiana and Ohio cooperated in disseminating production oriented ag news, research results, contemporary advice from production extension specialists and AG/NR agents, and updated calendar event information to producers via electronic news systems.

c. **Source of Federal Funds** - Smith-Lever 3b&c

4. Key Theme: Agricultural Profitability

a. **Description of Activities** - The Tri-State Dairy Nutrition and Management program effort provides an annual educational forum aimed at larger scale professional dairy producers and many professional industry consultants across the Eastern Corn Belt dairy region. Educational agendas range from the latest diet formulation software programs to recruiting and retaining new dairy farm employees and neighbor relations

b. **Impact - Dairy and Veterinary Extension Specialists from Indiana, Michigan** and Ohio developed and conducted two educational dairy conferences focusing on contemporary nutrition and efficient management systems. Conferences focused educational agendas toward highly competitive dairy managers and professional allied industry (veterinarians, nutrition and reproductive specialists and herd consultants).

c. Source of Federal Funds - Smith-Lever 3b&c

5. Key Theme: Water Quality

a. Description of Activity - Wastewater Treatment Alternatives for Small Communities - Small communities are facing the prospect of complying with the federal Clean Water Act to eliminate the discharge of pollutants to navigable waters of the US. Cost to build sewer systems and treatment plants to serve small communities exceed $2,000,000 per every 100 houses. Fortunately, small communities have other alternatives to eliminate the discharge of pollutants while still reducing costs. This program teaches local officials, professionals, regulators, property owners what they need to know to make these expensive and sometimes confusing decisions. Current collaborations include Michigan, Iowa, Illinois, and Massachusetts.

b. Impact - In 2002, OSU Extension worked with onsite wastewater treatment associations and regulatory agencies in Michigan, Iowa, Illinois, and Massachusetts. In addition, soil suitability for onsite wastewater treatment was presented in a new extension bulletin 896. As a result of the presentation in Utah in 2000, OSU Extension was invited back to present additional information on onsite wastewater management in 2003.

c. Source of Federal Funds - Smith-Lever 3b&c

6. Key Theme: Water Quality

a. Description of Activity - New Partnerships for Regional Water Quality Coordination in the Great Lakes Region. OSU Extension is one of six partners (with University of Illinois Extension, Purdue Extension, University of Minnesota Extension Service, University of Wisconsin Extension, and Michigan State University Extension) on a USDA-CSREES Regional Water Quality Coordination Grant. The grant is spearheaded by the Great Lakes Regional Water Quality Leadership Team (WQLT). The WQLT seeks to ensure the integration of water quality efforts in the Great Lakes Region, specifically in the areas of Animal Waste Management, Nutrient and Pesticide Management, Watershed Management, and Drinking Water and Human Health. The goals of the regional project are:

- Increase coordination and collaboration across states in the region;
- Leverage University Extension and research resources across the region to address high priority water quality issues;
- Strengthen regional relationships with federal and state partners and offer an entry point to Extension and the Land Grant University resources.

As part of the regional grant agreement, Ohio State University Extension receives an annual allocation to support efforts to coordinate Extension and research activities and foster the professional development of faculty, Extension Agents, Specialists, and Associates working in the area of water quality. In FY2002, OSU Extension utilized these funds to cover travel expenses of 8

Extension Agents, Specialists and Associates to attend a two-day regional strategic planning session held at the University in Wisconsin. OSU Extension personnel met with their peers from the other five Great Lakes Region states to discuss opportunities for multi-state water quality education and research projects. Several working groups were formed out of the strategic planning session that are conducting ongoing discussions, including the Fish Contamination Advisory, Public Participation, Urban Stormwater, and Animal Waste Management groups. In June of 2003, OSU Extension will host a Watershed Conference involving representatives from all six Great Lakes Region Extension Departments.

Funds were used to cover travel and registration costs for four Extension Agents, Watershed Management and the State Water Quality Coordinator to attend the 2002 NREM Conference in Naples, Florida. OSU Extension was well represented at the conference with two posters and one presentation.

In addition to the Strategic Planning efforts, funding from the Great Lakes Regional Water Quality Coordination Grant were used to supplement professional development for water quality Agents and Associates. For example, Three Watershed Agents and the Water Quality Coordinator attended the National Water Quality Coordinator's Conference in Tucson AZ. OSU Extension was represented at the conference with three posters and one presentation.

b. **Impact –** Activities are currently at the output stage: Extension Agents, Watershed Management have conducted a number of educational programs for youth and adults using water quality testing and fish electroshocking equipment purchased with regional grant funds in year one. For example, over 500 individuals attended electrofishing demonstrations in 2002, where they learned about the connection between land use practices and local fish populations. Regional grant funds also supported the Ohio Watershed Leaders (OWLs) workshop. Fifty eight agency professionals and watershed coordinators participated in this two-day workshop, which gave participants hands-on experience in stream habitat evaluation, team building, fish identification, and a variety of other water quality related topics. A survey of participants indicated that the workshop allowed them to build relationships, develop new knowledge on stream protection, and gave them a renewed sense of purpose in their work.

c. **Source of Federal Funds** - Smith-Lever 3b&c

7. Key Theme: Positive Youth Development in Out-of-School Time

a. **Description of Activities -** A variety of efforts are directed toward improving the quantity and quality of after-school programs. Methods used include electronic and print resources and conferences. (1) Multi-state team of Extension professionals from three states (Michigan, Ohio, and Pennsylvania): A website was developed and team members meet bimonthly by phone conference to add resources, review the site, and make sure that it is up to date. The conference planning committee meets regularly; the next conference is scheduled for March 25-26, 2003 at Michigan State. (2) 4-H Afterschool national leadership team: Created in 2002. Team comprised of Extension professionals (Massachusetts, Ohio, Michigan, Missouri, North Carolina, Oklahoma, Nevada, California, USDA, & National 4-H Council) provides program direction through three-day

quarterly meetings and regular phone conferences. A logo and marketing materials were created. Three resources guides for 4-H Afterschool were developed and pilot tested and will be used in training in 2003. (3) Serving as the co-chair of the School-Age Committee for the national Children, Youth, and Families at Risk (CYFAR) Conference. (4) Serving on the North Central region team for states implementing 4-H Afterschool as part of the Rural Youth Development grant (Engaging Youth, Serving Communities).

b. **Impact** - Activities are currently at the output stage: materials developed and participants reached. The website that was developed (http://outofschool.osu.edu) receives an average of 400 hits per month (during the past six months). Seventy-five people attended the conference in Cleveland in February 2002. Short-term outcomes include knowledge gained. Two states that sent teams (Illinois and Wisconsin) returned home and used the information to further their own planning efforts. Registration has reached capacity (150) for the 2003 conference, attracting participants from several additional states. Three resource guides, a website, logo, and marketing materials were developed.

c. **Source of Federal Funds** - Smith-Lever 3b&c

8. Key Theme: Aging

a. **Description of Activities -** Extension Agent from Montgomery County Served as Ohio Chairman for four-state Extension Conference on "Celebrating Mid-life: The best is yet to be!" Coordinated Ohio proposals for presentation, served as Housing Tract Chairperson selecting with committee comprised of person from each state presentations for that area, prepared press release packet as Marketing Chairman for the Conference, pulled together program material and printed program and post cards for the Conference, sharing material for web site and also with person designated to print final conference program.

b. **Impact** - No impact data available at this time.

c. **Source of Federal Funds** - Smith-Lever 3b&c

9. Key Theme: Family Life

a. **Description of Activities -** Extension agents' effectiveness in the field is enhanced by the desire and practice of keeping current in the research related to their work. With this in mind, Ohio State University Extension, in partnership with Alabama Cooperative Extension at Auburn University, conducted a five-day electronic conference (e-conference) in May 2002 in an effort to connect educators in the field with top researchers in a selected area of study in direct dialogue to promote up-to-date knowledge, dialogue about issues, and agreement on practical application. The 2002 Family Life E-Conference, "Couple Relationships: Research and Extension Programming," included multi-state participants, (Ohio, Alabama, New York, Oklahoma, Kansas, and Indiana). During the e-conference participants read papers, written by a panel of experts in couple relationships, on the latest research and programming available in this field and then used a bulletin board to "converse" via computer with them (see

http://hec.osu.edu/couples).

b. **Impact** - 49 extension professionals from Ohio, Alabama, New York, Oklahoma, Indiana, and Kansas participated in an electronic conference (e-conference) on couple relationships. On average, participants spent about 15.8 hours involved in this five-day e-conference. Nearly all of the participants reported that the e-conference was useful, that they better understood couple relations, and that they had new ideas for working with couples. Most (90.0%) participants indicated that they would like more e-conferences offered in this format and that they would participate in this type of e-conference again.

c. **Source of Federal Funds** - Smith-Lever 3b&c

Integrated Research and Extension Activities

1. Key Theme: Workforce Preparation - Youth and Adult

a. **Description of Activity -** Workforce Preparation Across the Life Span program incorporates the multi-state project, "Rural Low-Income Families: Tracking their Well-Being and Functioning in the Context of Welfare Reform." The principal investigator in Ohio is Sharon Seiling. The other states involved are California, Colorado, Indiana, Kentucky, Louisiana, Maryland, Massachusetts, Michigan, Minnesota, Missouri, Nebraska, New Hampshire, New York, Ohio, Oregon, Utah, Wyoming.

This is a research study of rural low-income mothers with at least one child age 12 or under. The study will assess the impact of welfare reform on their lives and on the community. Each state is interviewing 20-40 mothers in one or two counties. In Ohio, the investigators are interviewing participants in Hardin County. From the qualitative and quantitative data collected on these families, the research will provide insights to agencies and policy makers in Hardin County, the state of Ohio and the other states regarding family well-being and functioning within their rural communities.

As part of the study in Ohio, government officials and agency representatives, employers, and non-profit agency representatives will be interviewed about the implementation of welfare reform in the community. The data will be analyzed to compare the responses from the families to those of the community leaders, to more fully understand the issues and to assist in better meeting the needs of low-income families in rural counties in Ohio.

b. **Impact** - Most families in the Ohio study had at least one adult working. Two-thirds of the mothers (20 of 30) and 15 of the 18 partners were working. The mothers averaged 30 hours per week, whereas the partners had an average work week of 48 hours. The mean hourly wage for mothers was $7.12, and for partners it was $9.05. Mothers were employed in five types of jobs: laborers/helpers, production, service, administrative support and sales. The partners were employed in jobs classified as laborers/helpers, production, service, transportation and mechanics. On average, they had no work benefits: one-third of mothers had private health insurance, as did 45% of partners. Their children were typically covered my Medicaid. Most adults had no health insurance coverage.

The typical family in the study involved a working mother with two children who was married or was living with a partner. The mother had completed high school or had a GED and her partner had the same level of education. Their household income was $16,272, which put them below the poverty level. They received benefits from WIC and Medicaid and had gotten the Earned Income Tax Credit in the previous year. They relied on their extended family for childcare and other types of support. The mothers were more likely to be clinically depressed and food insecure than the population as a whole. Although not significant in the OH sample, in the larger study families' food security was significantly related to depression and money management practices, but not to amount of income.

c. Source of Federal Funds - Smith-Lever 3b&c

2. Key Theme: Human Nutrition

a. Description of Activity - The Nutrition Education for Limited Resource Audiences: Food Safety Education Validation Study. Educators in the area of food safety have identified a need for developing valid and reliable evaluation instruments for determining the effectiveness of their education efforts, particularly with limited resource audiences. This tri-state USDA funded grant project involves Cooperative Extension researchers in food safety education from Ohio State, Washington State and Colorado State Universities. The primary objectives of this study are three-fold:

1. Identify key behaviors needed to prevent food borne illness arising from home food preparation techniques, and use these behaviors to develop effective food safety education programs within Cooperative Extension.
2. To design and test an evaluation questionnaire, that will accurately assess food safety behaviors among low-literacy and/or low-income audiences.
3. Evaluate whether self-reported behavior changes are a valid way to assess the behavioral outcomes of food safety education.

b. Impact - Impact information not available at this time.

c. Source of Federal Funds - Smith-Lever 3b&c

3. Key Theme: Parenting and Family Life

a. Description of Activity - The Study About Young Fathers and Mothers (SAYFAM) project was funded by the University Seed Grant Program and involves investing the factors that influence the parenting behaviors of young fathers with children born to adolescent mothers. Given the paucity of empirical research on young fathers, this project draws on recent research on fathers, in general, to examine the role of adolescent and young adult fathers in their children's lives and how context may affect father involvement. Specific empirical questions that were investigated include: What is the nature and quality of the coparental relationship that adolescent mothers and their child's father share? How supportive are adolescent mother's of the father's involvement in their child's

life? What is the nature and quality of familial, extrafamilial, and nonfamilial support young fathers receive? How do adolescent mothers and their child's father identify with the paternal role? What is the nature and level of parenting behavior that young fathers exhibit, and how do these contextual and individual factors additively and/or interactively influence the degree of responsible fathering these young men assume for their child.

b. **Impact** - During Fall 2001 and Spring 2002, surveys were mailed to 168 teen mothers whose child was two years old or younger and the child's fathers was 24 years old or younger. Surveys were also mailed to the fathers of these children for whom we had permission to survey (n=106). Completed surveys were returned by 125 mothers (74%) and 40 fathers (38%). Data are currently being analyzed. Findings from this study will help inform programmatic efforts that attempt to improve the lives of these at-risk parents/families.

c. **Source of Federal Funds** - Smith-Lever 3b&c

U.S. Department of Agriculture
Cooperative State Research, Education, and Extension Service
Supplement to the Annual Report of Accomplishments and Results
Multistate Extension Activities and Integrated Activities

Institution The Ohio State University
State Ohio

Check one: X Multistate Extension Activities
____ Integrated Activities (Hatch Act Funds)
____ Integrated Activities (Smith-Lever Act Funds)

	Actual Expenditures				
Title of Planned Program/Activity	**FY 2000**	**FY 2001**	**FY 2002**	**FY 2003**	**FY 2004**
Goal 1			**$171,964**		
Goal 2			**$ 41,796**		
Goal 3			**$ 19,492**		
Goal 4			**$114,230**		
Goal 5			**$128,595**		
Total			**$476,077**		

Director

February 28, 2003
Date

Form CSREES-REPT (2/00)

U.S. Department of Agriculture
Cooperative State Research, Education, and Extension Service
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Multistate Extension Activities and Integrated Activities

Institution The Ohio State University
State Ohio

Check one: ___ **Multistate Extension Activities**
X **Integrated Activities (Hatch Act Funds)**
____ **Integrated Activities (Smith-Lever Act Funds)**

Title of Planned Program/Activity	Actual Expenditures FY 2000	FY 2001	FY 2002	FY 2003	FY 2004
Goal 1			$432,880		
Goal 2			$ 39,798		
Goal 3			$ 12,138		
Goal 4			$234,099		
Total			$718,915		

Director

Febrary 28, 2003
Date

Form CSREES-REPT (2/00)

U.S. Department of Agriculture
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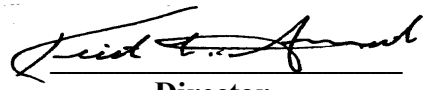
Multistate Extension Activities and Integrated Activities

Institution The Ohio State University
State Ohio

Check one: ____ **Multistate Extension Activities**
____ **Integrated Activities (Hatch Act Funds)**
__X__ **Integrated Activities (Smith-Lever Act Funds)**

	Actual Expenditures				
Title of Planned Program/Activity	**FY 2000**	**FY 2001**	**FY 2002**	**FY 2003**	**FY 2004**
Goal 1			$381,872		
Goal 2			$ 63,926		
Goal 3			$ 2,066		
Goal 4			$135,602		
Goal 5			$ 78,157		
Total			$661,623		



Director

February 28, 2003
Date

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