



United States Department of Agriculture  
National Institute of Food and Agriculture

**State Accomplishments  
For the  
Formula Grants  
2008 Annual Report**

**Bart Hewitt, Accountability and Reporting Leader  
Office of Planning and Accountability  
National Institute of Food and Agriculture  
United States Department of Agriculture**

01/25/2010

## **Overview and Background Information**

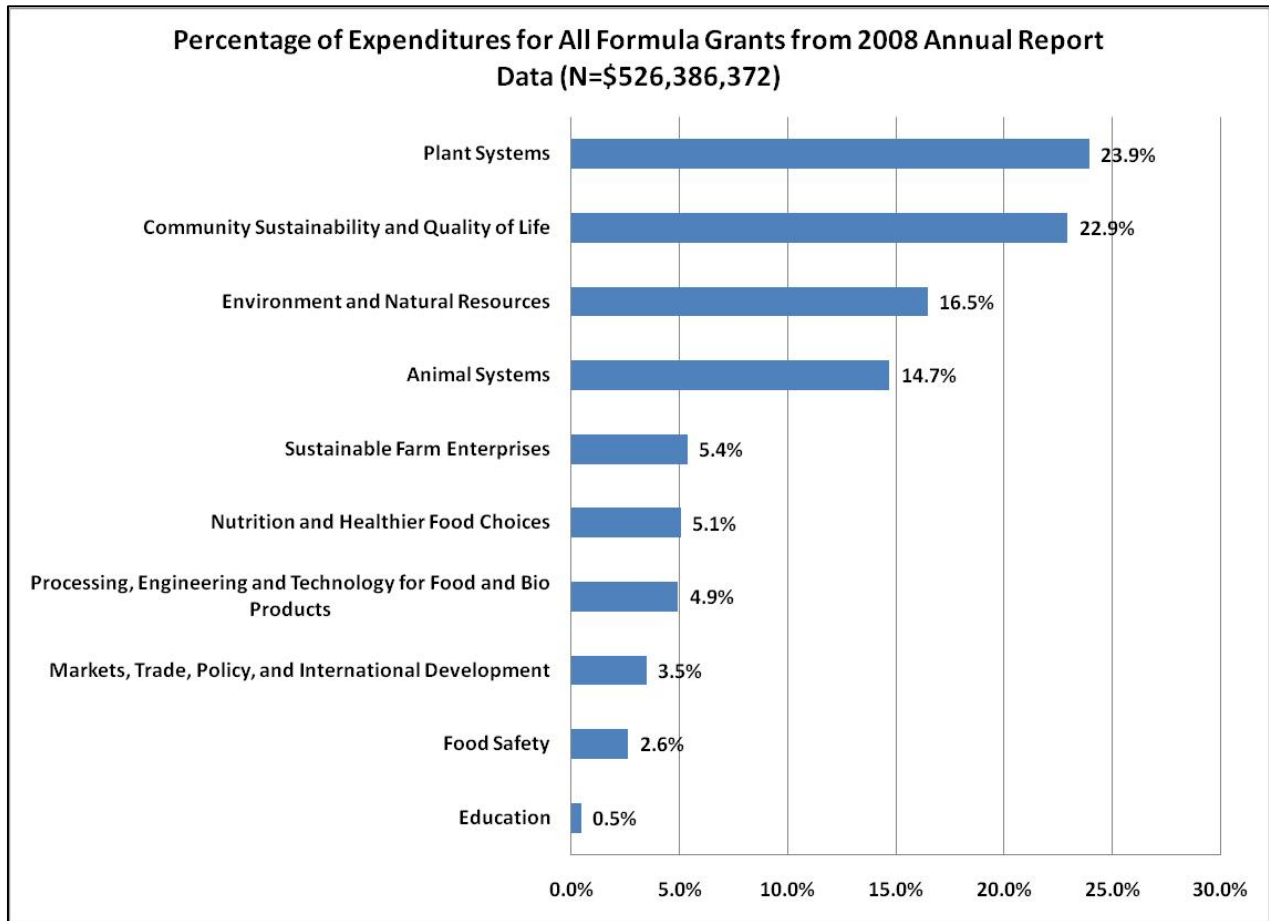
This summary report from The National Institute of Food and Agriculture (NIFA) shows some examples of the continued excellence being exhibited and received as outcomes from our land-grant university partners in the Fiscal year 2008 Annual Report of Accomplishments and Results. These accomplishments represent what the nation's land-grant universities accomplished with dollars from the four major research and extension formula grant funds; Hatch, Evans-Allen, Smith-Lever 3b&c, and 1890 Extension Programs.

The formula grant process works through the long-standing partnership that USDA has with the land-grant university system. NIFA identifies national priorities for these programs, but the allocation of funding to these priorities is decided by each individual university. These formula grants also work in concert with the competitively awarded grants in the Agriculture and Food Research Initiative (AFRI) to address important problems. The competitive process is specifically designed to work through attracting the best proposals to an agency-defined topic and funding those of highest relevance and quality. Whereas the formula grants allow the state land-grant universities to allocate funds quickly for a rapid response to emerging issues as well as for providing funding for activities not well supported by the competitive process – programs targeted to the regional or local level, very long-term research, seed money to initiate new lines of research, and supporting research and extension capacity.

The outcomes in this document include examples such as cost-benefit ratios, dollars saved, revenue generation, increases in yield, best management practices developed and used, new and value-added products developed and used, as well as a myriad of increases in knowledge and change in action and behavior outcomes. These outcomes show the continued importance of the four major formula grants to the NIFA portfolio, and also gives the NIFA – Land-Grant partnership information to examine the questions of balance and direction as a unified system.

## State Accomplishments by NIFA Portfolio

A total of \$547,373,000 was appropriated for the four formula grant funds subject to this Plan of Work and Annual Report in fiscal year 2008. A total of \$526,386,372 was reported expended from the formula grant funds in 2008 on the various planned programs in the 2008 Annual Report of Accomplishments and Results; \$232,129,135 from Smith-Lever, \$230,607,913 from Hatch, \$34,894,042 from Evans-Allen, and \$28,755,282 from 1890 Extension. The bar chart below shows the distribution of all four of these formula grant funds by NIFA portfolio.



### Plant Systems

#### *Increase in Yield and Revenue*

A research study found that during the 1983-2007 period, on average the rice producers in Arkansas experienced additional gains of \$61.4 million dollars per year through enhanced germplasm put forth by the **University of Arkansas** breeding program funded by NIFA. To put this in perspective, the University of Arkansas rice breeding budget for 2007 was \$1.47 million and the estimated benefits were \$93.1 million, resulting in a cost-benefit ratio of 81 to 1.

Formula Grant: Hatch and Smith-Lever

Successful NIFA funded genetic research is increasing the competitiveness of Montana wheat producers through improved winter wheat cultivars with enhanced yield potential, pest resistance, and desirable end-use qualities. **Montana State University (MSU)** is also participating in the wheat CAP program. Hockett, a high yielding 2-rowed dryland-adapted malting barley variety was released in 2007. As a result, Anheuser-Busch contracted 20,000 acres of Hockett in 2008. The replacement of older barley varieties with new ones (Haxby, Hays, Charles, Craft, and Eslick) should generate a yield improvement of about 15% with a net of about \$45 million per year in added revenue to dryland barley growers. Three malting barley varieties (Craft, Geraldine, and Hockett) should result in about \$80 million in added revenue. Formula Grant: Hatch

*Fusarium oxysporum* f.sp. *Vasinflectum* (FOV) is a widely spread soil-borne fungus that attacks cotton and other plants, causing general wilt. A collaboration of researchers featuring the NIFA funded **University of California** developed methods for early identification and best management practices. They evaluated hundreds of varieties and breeding lines for resistance to FOV Race 4. San Joaquin Valley growers have shifted to plant more high quality Pima cotton, which commands a premium price. The identification of resistant Pima varieties has enabled the continued success of the industry. Based upon the research findings, California cotton growers are able to continue growing resistant Pima cotton varieties in areas where FOV Race 4 is present. Planting resistant cotton varieties is one of the best management practices to reduce the spread of FOV. More than 95 percent of the 2007 Pima cotton crop - 832,000 bales - was purchased by overseas mills, contributing more than \$550 million to the state economy and improving the U.S. trade balance. Formula Grant: Hatch and Smith-Lever

With NIFA funding, **North Dakota State University** research has enabled release of Cavalier soybean, Avalanche navy bean, Northern Flare sugar maple, Sisseton sugar maple, Fireworks amur maple, Northland Boston ivy, and Northern Debut little leaf linden. The estimated dollar value of these new cultivars to North Dakota is \$35 Million. Formula Grant: Hatch

The results of the 2008 Ohio Soybean Performance Trials by NIFA funded **Ohio** scientists indicate the good and poor qualities of the 185 varieties evaluated. These data assisted producers in selecting more productive varieties for their fields resulting in an estimated yield increase of 15 kg/ha over 1.25 million hectares worth \$15,600,000. The data also allow a producer to select the most appropriate varieties to meet the quality requirements for specific Identity Preserved Markets. These data assisted producers in selecting more productive wheat varieties for their fields resulting in an estimated yield increase of 10 kg/ha over 0.4 million hectares worth \$2,500,000. Formula Grant: Hatch

Sweet cherry growers earn \$.08 to \$.81 per pound increases in fresh market prices by the introduction of improved varieties by NIFA funded **Oregon State University** scientists. Estimated total returns increased by over \$7.2 million annually. Improved sweet cherry rootstocks provide earlier fruiting and disease resistance and allow growers to respond more rapidly to market demand, doubling the harvest season over the past 15 years, providing greater employment stability to industry workers and contributing to the profitability of processing facilities. Formula Grant: Smith-Lever

NIFA funded **University of Tennessee** scientists released a new Roundup Ready 'USG Allen' soybean, which topped the yield tests last year, and was well received by farmers who planted an estimated 31,000 acres in 2008. An additional 9,000 acres was planted in two other Roundup Ready varieties (USG 56293 and USG 56379) and 4,300 acres were planted in conventional soybean varieties (USG 5601T and USG 5002T). In addition to this direct impact, Tennessee soybean genetics are utilized as crossing parents by breeders in USDA, other universities, and in industry to bolster seed yields and plant disease resistance. Tennessee soybean genetics provides an estimated \$1 million in additional revenue directly to soybean producers each and every year through production increases. Formula Grant: Hatch

Four new wheat cultivars were released by **Washington State University** (WSU) scientists in 2008. The new cultivars will give more options for farmers to plant in their rotations. They will also provide new export opportunities. In 2008, in Washington State, about 53% of the 2,420,000 acres sown to wheat were WSU cultivars, while about 15% of the 205,000 acres sown to barley were WSU cultivars. The proportional earnings from WSU wheat and barley cultivars harvested were estimated at \$530 and \$8 million, respectively. The WSU cereal variety testing program provided information to growers, which enabled them to select improved cultivars vs. average cultivars. It was estimated that this information has a value of \$25 million/yr to farmers in terms of increased yield and quality returns. Formula Grant: Hatch

#### *Best Management Practices*

Sugarbeet growers in Minnesota and North Dakota produce approximately 60% of the United States beet sugar. The total business activity of the sugarbeet industry in Minnesota and North Dakota is approximately \$3 billion. Cercospora leaf spot is the most serious leaf disease of sugarbeet. Because of NIFA funded research and extension programs at the **University of Minnesota and North Dakota State University**, the average number of fungicide application per acre on sugarbeet was reduced from 3.7 in 1998 to 2.4 in 2007. Growers saved over \$18 million per year in reduced fungicide applications. Last year, 94% of growers indicated excellent or good disease control and 6% reported fair disease control using fungicides as recommended. Formula Grant: Smith-Lever

Over the past 7 years, the fully implemented cotton IPM program by NIFA funded **University of Arizona** has resulted in a 69 percent reduction in pesticide sprays for all insects combined, including whiteflies, pink bollworm, Lygus bug and others. Insecticide usage decreased by more than 1.6 million pounds. In 1995, cotton growers sprayed on average 12.5 times with broadly toxic insecticides totaling nearly 1.71 million pounds. By 2008, cotton growers sprayed just 1.6 times with safer compounds totaling less than 80,000 pounds, a 20-fold reduction in insecticide use. Growers cumulatively have saved over \$201 million in pesticide costs and in reduced insect damage since 1996, which decreased by more than 37 percent. Almost half of the state's 150,000 acres of cotton was never sprayed for insect pests, and for the first time since the mid-1960s growers reported zero sprays for pink bollworm in 2008. The IPM plans have been exported for use in California, Texas, northern Mexico, Australia and Latin America. Formula Grant: Hatch and Smith-Lever

Adoption of best management practices would increase the nitrogen efficiency of applied nitrogen to fields and increase grower profitability. With NIFA funding, **North Dakota State University** estimates that a decrease in nitrogen rate of only 2 pounds per acre of nitrogen resulted in 2008 of an increase in grower profits on 20,000,000 acres of crop land of about \$15,000,000 in 2008. Formula Grant: Hatch and Smith-Lever

The soils of California's western Colusa County present major challenges to profitable tree crop production. A collaborative research program featuring the NIFA funded **University of California** developed management systems, based on drip irrigation/fertigation, high density spacing, and minimum pruning, with the goal of increasing the profitability of almond and walnut production on vast new areas in the west side of the Sacramento Valley and east side of the San Joaquin Valley. Soils previously unplanted to orchards are now increasingly developed for nut crops. Approximately 3000 new acres were added, which will produce 6,000,000 additional pounds of nuts, valued to contribute \$10,000,000 to the local economy. Formula Grant: Hatch and Smith-Lever

Best management practices developed by NIFA funded **Oklahoma State University** Agricultural Experiment Station and delivered to producers over the last ten years by NIFA funded Oklahoma Cooperative Extension Service personnel resulted in increased income from wheat grain in Oklahoma of between \$125,000,000 and \$230,000,000 for 2008. Formula Grant: Hatch and Smith-Lever

Golf courses in Tennessee, out of state and in other countries are implementing the alternating mowing and rolling practices for putting green management based on research conducted in my research program at the **University of Tennessee**. This research improves putting green quality and has an economic savings potential of as much as \$30,000 annually for participating golf courses. There are over 100 golf courses around the world participating which have an economic savings impact of more than \$3,000,000 annually, and can be translated to adding 60 new jobs. Countries where our research has had an impact include: the United States, Canada, Germany, and the Netherlands. Formula Grant: Hatch

Yuma County melon producers suffered crop losses of 60 percent or more to the whitefly-transmitted Cucurbit yellow stunting disorder virus (CYSDV) when it first appeared in 2006. Damages amounted to about \$14 million. Through a partnership including the NIFA funded **University of Arizona** Cooperative Extension and local growers, a wide-scale whitefly and virus monitoring program was implemented in Yuma County, along with a voluntary host-free period during the summer to reduce whitefly infestations, and other strategies. As a result, the growers disked their spring melon crop in July and any subsequent volunteer melons or other hosts and waited 30 days before planting the fall crop in August. As the virus cannot live without a host for more than 7-10 days, hungry whiteflies disperse to other fields. The 2008 summer host-free period helped growers achieve a 20 percent reduction in the severity of CYSDV in the fall 2008 melon crop. Formula Grant: Hatch and Smith-Lever

NIFA funded **University of Arkansas** formed a Soybean Rust Task Force to monitor the development and spread of soybean rust to train and educate county agents, producers, and consultants on how to identify and control soybean rust, and to provide timely and accurate

information to the state clientele regarding how best to manage soybean rust outbreaks in the state. In 2008, soybean rust was not confirmed in soybean sentinel plots and grower fields in southeast Arkansas until September. Fortunately, the monitoring program aided in providing the timely information needed for growers to make effective management decisions. It is estimated that Arkansas producers only applied fungicides to control soybean rust on 30,000 acres (<1% of total acres) as a result of the monitoring program eliminating unnecessary fungicide application. Formula Grant: Hatch and Smith-Lever

## **Community Sustainability and Quality of Life**

Through the Master Gardener Volunteer Program, NIFA funded **Virginia Cooperative Extension** agents recruit, train, and manage a volunteer staff that serves the general public and landscape professionals by educating them about the proper selection, planting, and maintenance of landscape and lawn materials. In 2008, Master Gardener volunteers statewide reported 269,080 contributed hours and contacted over 500,000 clients while serving the horticultural needs in their communities. The financial worth of these volunteers in Virginia is \$5.3 Million. Formula Grant: Hatch, Smith-Lever, Evans-Allen and 1890 Extension

As is typical across the United States, the 11,805 Arkansas 4-H direct volunteers contributed over 991,620 hours valued at \$18.77 (figure used by the Arkansas Department of Volunteerism) for an economic impact to the program of \$221,579.85. Using the Arkansas Department of Volunteerism figure of \$100.00 per hour for volunteer hours contributed by board members, volunteers to the **Arkansas 4-H** program would have contributed and estimated dollar value of an additional \$240,000 (480 volunteers donating five hours per volunteer) for a total of \$451,579.85. By incorporating volunteers, the delivery and quality of the NIFA funded 4-H program is maximized. Formula Grant: Smith-Lever

NIFA funded **Arkansas Cooperative Extension** offered a Strong Women program in 51 of the 75 counties. Of the women taking part in Strong women, 1,334 completed a fitness test. Of those women, 83% (1,107) increased their strength; therefore, our assumption is that they also reduced low bone mass, thus reducing osteoporosis. Based on the standard national statistics that 55% of women over the age of 50 will have a hip fracture, it is surmised that 609 women will not have a hip fracture due to participation in our program. Using the direct average cost of a hip fracture being \$13,470, it is projected that the Strong Women program participants have avoided \$8.2 million in direct medical expenditures. Formula Grant: Smith-Lever

A study on the leadership life skill of the NIFA funded 4-H program by **Colorado State University** shows that leadership is a higher level life skill which takes a longer span of time to master. Also, the positive leadership score increases dramatically as involvement in 4-H increases. The percent of positive leadership responses for those with 5 or more years of 4-H experiences was an average of 88.4% as opposed to those with 1 to 2 years of 4-H experience at 64.5%. Formula Grant: Smith-Lever

The NIFA funded **University of Idaho** Extension has started an after school program for this Hispanic Community. Hispanic youth in the after school program showed a 33% increase in life

skills related to communication and healthy life styles. They showed a 67% gain in life skills related to critical thinking and a 50% gain in positive identity skills. Youth that participated in the financial management classes showed an increase in their ability to use a check book and keep track of expenses. Formula Grant: Smith-Lever

NIFA funded **Purdue University** Extension, in cooperation with National City Bank and the IRS convened an 18 member coalition to organize Money Smart Week, a financial literacy event. Educational workshops and financial displays were used to increase the financial literacy of the participants. 94% of participants completing an evaluation said the Money Smart event was valuable or very valuable. 81% said they were likely or very likely to change the way they manage money because of what they learned. Formula Grant: Smith-Lever

NIFA funded **Purdue University** Extension has been involved in 325 communities helping them build their capacity to identify and address critical issues. Responding to the need for programming related to local government finance, three state-wide sessions were delivered on the topic. Over 700 local government officials attended these programs. In the local government finance program 100% of participants indicated that the information from the session helped them identify important community issues related to local government finance and 91% indicated that their new knowledge would have an impact on the fiscal well-being of their community. Formula Grant: Smith-Lever

NIFA funded **Iowa State University** Extension randomly selected 4-H Club members to complete the Iowa 4-H Youth Citizenship, Leadership, and Communication Self-Assessment Tool. The tool examined self-reported changes in 4-H Club members' citizenship behavior/practices after participating in 4-H as compared to before participating in 4-H. On average, 47.4% of 4-H Club members indicated a 1-point increase, 21.9% indicated a 2-point increase, 3.4% indicated a 3-point increase, and .8% indicated a 4-point increase in their citizenship behavior/practices after participating in a 4-H Club. 4-H Club members commonly indicated being involved in 4-H helped a young person demonstrate quality citizenship behavior/practices through... 1) working together as a team on service projects; 2) fundraising and writing grants for service projects; and 3) presenting to community groups. Formula Grant: Smith-Lever

Financial management workshops by the NIFA funded **Iowa State University** Extension have resulted in the following: 96% improved personal and family financial management skills; 31% took steps to reduce their debt; 33% increased contributions to an employer-based retirement plan; 17% increased their contributions to a personal retirement plan; 58% calculated their retirement financial projections; 87% gained greater control over their current spending, saving and financial security. 1,503 Iowans received a total of \$752,617 in Earned Income Credits by using Volunteer Income Tax Assistant programs, avoiding filing fees and potential costs associated with Refund Anticipation Loans. Formula Grant: Smith-Lever

The philosophy of community development that **Kansas PRIDE** encourages is based on the fundamental valuing of volunteer citizen participation. Kansas PRIDE communities invested approximately 75,676 hours of service to their communities in 2008. The total hours of citizen

involvement at \$19.51 per hour is valued at more than \$1,484,000 of volunteer investment in Kansas communities. Formula Grant: Smith-Lever

Because of NIFA funded activities by **Louisiana State University**, 89 percent of participants gained new knowledge in the family relationships, parenting and child care skills, family relationships, learning, and resource management; 100 percent of participants learned communication skills; 100 percent of participants developed an awareness of making a family budget; 92 percent used recommended practices to improve family relationships; 90 percent learned improved discipline and guidance techniques; and 200 pre-release male inmates gained knowledge about anger management, addictive behaviors, finding help, and resume' building, and job interview process. Formula Grant: Smith-Lever

Program participants taking part in the NIFA funded **University of Maryland** financial education program said that they plan to do the following: 68%-Pay more than minimum on credit cards; 59%-Review credit report annually; 50%-Establish Emergency Fund; 52%-Develop a spending plan; 65%-Track family income and spending. Following Dollars & Sense Classes taught to Workforce Opportunities Program Participants, 91% of participants intended to develop a spending plan; 88%, improve tracking spending; and 85%, set financial goals. A 2-4 month follow up evaluation revealed that 70% were actively using a spending plan, 75% could identify at least one positive financial behavior change they made since attending class. Formula Grant: Smith-Lever

NIFA funded **University of Minnesota** Cooperative Extension found that a higher percentage of 4-H youth volunteer in their communities than non-4-H youth. Data from "Exploring the Supply and Demand for Community Learning Opportunities in Minnesota" show that 70.9% of 4-H youth volunteer, compared to 57.6% of non 4-H participants. Compared to youth nationally in the All Work and No Play survey, 10.9% more Minnesota 4-H participants volunteer (70.9% vs. 60%). Longitudinal data from the 4-H Study of Positive Youth Development show that Minnesota 4-H youth sustain and may increase their volunteering over a three-year period. Formula Grant: Smith-Lever

NIFA funded **University of Minnesota** Cooperative Extension found that 4-H participants' involvement in positive developmental activities compared positively to percents for youth in the state as a whole. 4-H youth involvement in mentorship programs was 21.8% higher, 18.1% higher in academic or hobby clubs, 13.3% higher in science and technology programs/clubs, and 12.2% higher in fine arts programs. Formula Grant: Smith-Lever

Mississippi Homemaker Volunteer (MHV) Clubs sponsored by the NIFA funded **Mississippi State University** Cooperative Extension strives to strengthen and improve families, communities, state, and country through continuing education so they can serve all people. For example, each MHV club signed up to make or provide items to the Blair Children's Hospital (a total of 821 blankets, 1128 hats for cancer patients, 1,204 pairs of slippers, 505 teddy bears, 987 cough pillows, 793 therapy dolls, 721 gowns, 523 pairs of glasses, 172 silent layettes, 1321 tote bags, and many other items such as cleaning and office supplies, food, and activities for children). Overall, 2,582 MHV members contributed a total of 288,798 volunteer hours to local

organizations. This service was valued at almost \$5 million last year. Formula Grant: Smith-Lever

Mississippi has the highest teen pregnancy rate in the nation. The NIFA funded **Alcorn State University** Extension staff conducted six “Baby Think it Over” activities in various southwest and central Mississippi counties to address issues associated with demands of becoming a parent as a result of teen pregnancy as well its consequences. An evaluation of the program showed that nearly all youth students involved in the activity highly recommend that other students participate in the activity. These findings indicated that the program did have significant impact on the attitudes of teens participating in the activity; 66% reported that caring for a child was very difficult; 21% reported that they would expect to share responsibility of the baby care with their parents; and 90% indicated that it would be very expensive to care for a child. Formula Grant: 1890 Extension

A NIFA funded **University of Missouri** Extension study found that 4-H members in Missouri are twice more likely to have been on a college campus than their non-4-H peers. Also the University of Missouri is by far the campus most frequently visited and 4-H is the second most reported reason to be on the Campus. Being on a campus is a predictor of youth going on to higher education. Thus, 4-H members are more likely to go to college and enjoy increased financial success for themselves and their offspring, be better consumers, improve quality of life through more opportunities for leisure and hobbies, and improve health for themselves and their children. Moreover, if 10% earn bachelor's degrees, their increased annual earnings will total \$210 million (2.1 million per individual). Formula Grant: Smith-Lever

Businesses served by the NIFA funded **University of Missouri** Extension Business Development program were offered access to market research and demographics that would have been too costly for them to access in the private market. Communities were also offered market research and were assisted in using this research to create economic development plans, and make educated decisions on the future of their communities. Businesses were able to increase sales and government contracts by over 142 million dollars, which is a key indicator of marketing and market research. Formula Grant: Smith-Lever

NIFA funded **University of Maine** Extension offers estate planning workshops designed to increase people’s awareness of the complex elements of estate planning and transfer of farming operations and assets to a succeeding generation. In a post program study, approximately 64% of participants indicated that they have completed retirement planning; 47% have developed a rudimentary estate plan for review by professionals; 72% have implemented a retirement savings plan; 62% have discussed asset transfer with family; 72% have completed and filed a will; 56% have completed and filed a medical directive, and; 42% have completed a durable power of attorney. Formula Grant: Smith-Lever

The NIFA funded **University of California** Cooperative Extension contributed to the creation of new savings products for the low-to-moderate income market, with very low opening and minimum balance requirements and no fees for a year. For example, 782 people opened new savings certificates with a guaranteed 10% APY (interest rate). Account required minimum initial deposits of \$100, and commitment to add at least \$100 per month for the next 12 months

with no withdrawals during the 12 month period. Collectively the new account holders pledged additional savings of \$1.5 million over the next 12 months. A collaborator, Pacific Marine Credit Union, created the "Military Saver Certificate," a new savings product offered only to military personnel and dependents. By offering low-cost alternatives, these products removed institutional barriers to positive financial behaviors (saving) among first-time savers, low-to-moderate income households (with small amounts to save), and the unbanked. Formula Grant: Hatch and Smith-Lever

NIFA funded **Oklahoma State University** sponsors a Farm and Business Tax Institutes and the summer Tax Clinic for tax preparers. High quality, professional instruction is provided to make continuing education credit available for Certified Public Accountants, Enrolled Agents, and Tax Attorneys. Participants filed more than 51,000 Federal farm tax returns and 324,000 Federal non-farm tax returns as reported by the participants in the most recent program evaluations. Just two pieces of information supplied this year for farm returns and mineral owners is estimated to save at least \$10 per return on average - resulting in a likely taxpayer savings of over \$3,000,000. Formula Grant: Smith-Lever

The NIFA funded **Utah State University** Manufacturing Extension Program (MEP) is ranked as one of the top 5 MEP Centers nationally for Economic Impact on Manufacturers. Eighty seven percent of the companies MEP worked with reported impacts. Bottom-line impacts amounted to \$35,298,350. Total investment impacts were \$26,527,100. There were 817 jobs created or retained by companies utilizing MEP services. Formula Grant: Smith-Lever

100% of youth enrolled in Mini-Society, an experiential entrepreneurship program by NIFA funded University of the **Virgin Islands** Extension, created at least one product or service to be sold during program's Market Day. In addition, they experienced supply and demand, created their own community, flag and money, served in a variety of leadership positions in their community and developed other entrepreneurship skills, knowledge and attitudes. Formula Grant: Smith-Lever

In 2008 the incoming freshman GPA at **Washington State University** (WSU) was 3.46, the incoming freshman GPA of self identified 4-H members was 3.71 indicating a .27 GPA increase. This statistic would indicate that as a pool NIFA funded 4-H members are stronger students. Moreover, each year WSU recognizes high school students who have been nominated by their schools during their junior year in high school based on a grade point average of 3.80 or higher and at least 1200 on the SAT or 26 on the ACT or 180 on the PSAT. The youth are also judged on leadership, community and extracurricular involvement. 4-H youth continue to excel academically and are superior in their leadership and citizenship skills as documented through the Tufts Study of Positive Youth Development Washington State data. Formula Grant: Smith-Lever

NIFA funded **West Virginia University** Extension has been a leading member of the Earned Income Tax Credit (EITC) coalition and numerous county offices have assisted with literature distribution and education. Partially due to Extension's involvement in the EITC campaign, 145,000 West Virginians received the federal EITC (19.4 percent of all income tax filers in the state) bringing \$254 million back to the state. For many of these working families, the federal

EITC refund is the largest lump sum payment they receive all year, and helps with automobile repairs, child care, and to pay off debts. Some have applied their credit toward advancing their education, which may lead to a higher paying job. Formula Grant: Smith-Lever

Family Storyteller is a six-week series of workshops by NIFA funded **University of Nevada** Extension targeting families at risk for low literacy and related problems. Follow up evaluations of 1,219 participants in Las Vegas in 2008 found the following significant changes after six months: The number of children books at home went from 1 to average of 38 books per home. The days per week read to child went from 43% "none" to "everyone read to their child at least once a week or more (96% every day). The number of minutes per day read to child went from "10 minutes" to "40 minutes." And the percentage of participants taking child to library went from 2% to 63%. Formula Grant: Smith-Lever

Through a variety of local programming initiatives in nearly 40 counties by NIFA funded **Cornell University** Extension, more than 17,000 persons participated in programs directed at practical energy conservation measures. Many more were reached through media initiatives. A statewide survey of participants indicated that 6,207 (69 percent) of 8,991 respondents had implemented recommended practices. Recommended practices typically achieve 20 - 30 percent reduction in energy use per home; average electricity savings of 1,298 kWh (12%); average oil or gas savings of 270 therms (22%); and average cash savings of \$400 per year. Total estimated savings from the statewide effort total more than \$4,000,000. Formula Grant: Hatch and Smith-Lever

In West Virginia NIFA funded **West Virginia University** sponsored Community Education Outreach Service (CEOS) clubs train adult leaders go out and work in the community. Their service results in economic benefit to the state. CEOS members from 29 counties served as volunteers to 4-H camps, aids to the Dining with Diabetes program, volunteers at Missions, Hospitals, Nursing Homes, assisted Family Storytelling, Relatives as Parents, Character Education, Literacy, Energy Express, the International Student Program, and Breast and Cervical Cancer Awareness programs. The membership from 29 counties reported they volunteered 491,500 hours of service, at a value of \$9,215,625. Formula Grant: Smith-Lever

NIFA funded **Tennessee** Extension sponsored Tennessee Saves activities are conducted through bankruptcy education, homebuyer education, saving education for adults and youth, credit education, employee education and financial education simulations for youth. The annual economic impact through savings and debt reduction associated with the program was an increased savings or investment of \$14,246,016, debt reduction of \$7,651,680 for a total of \$21,897,696 saved. Formula Grant: Smith-Lever and 1890 Extension

## **Environment and Natural Resources**

Removing piggeries from riparian areas diminishes the chance that humans will contract leptospirosis and ailments associated with coliform bacteria. Because of NIFA funded **American Samoa** research, piggery owners have either moved their piggeries beyond 50 feet of a riparian area or, lacking space, closed their piggeries altogether. Initial research for counts of

coliform and E. coli in stream samples has decreased slightly from historic records. Formula Grant: Hatch

The NIFA funded **University of Arizona** researchers conducted a study from November 2007-November 2008 documenting the distribution, yearly costs and benefits of more than 2,000 individual trees flanking campus roads. According to the inventory, the 2,000 street trees in the study annually sequester 246,620 tons of carbon dioxide (CO<sub>2</sub>); reduce the energy costs for University facilities by \$18,230; reduce emission, pollutants and particulates by 9,994 pounds; and intercept more than a million gallons of rainfall or storm water (reducing flooding). If all 7,000 trees on campus were inventoried, the combined benefit of the University's urban forest could be three to four times higher. This study highlights the importance of trees in the urban landscape in reducing the carbon footprint. Formula Grant: Hatch and Smith-Lever

The NIFA funded **University of Arkansas** Cooperative Extension Service developed educational and promotional materials to be utilized in educating farmers about the dangers of old abandoned pesticides to the environment and how to participate in future pesticide collection events. Past history showed that farmers showed reluctance to participate in old pesticide collection events due to distrust and misinformation of the program. In counties in the targeted area, two collection events per county were offered over a two year period. In all but one case, participation and amounts collected increased after education was provided to the farmers. 164,856 pounds of chemicals were collected in Abandoned Pesticide Collection Events. Formula Grant: Hatch and Smith-Lever

One-hundred fifty-four loggers attended the NIFA funded **University of Idaho** Extension Logger Education to Advance Professionalism (LEAP) Updates in the Idaho Panhandle. This program features over 20 hours of training designed to increase loggers' understanding and skills related to forest ecology, silviculture, and water quality. As a result of 2008 LEAP Updates, Loggers increased their knowledge of: biomass fuels potential by 54%; pre-commercial thinning & pruning by 50%; white pine silviculture by 41%; FPA stream alterations by 34%; and fire safety precautions by 25%. Formula Grant: Smith-Lever

Because of NIFA funded **Kansas State University** Extension programs, a total of 14,991 acres of grain sorghum and corn had atrazine Best Management Practices (BMPs) implemented. This equated to 53% of the grain sorghum acres and 46% of the corn acres planted in the six targeted watersheds. Implementation of atrazine BMPs resulted in 20% less atrazine being applied in the targeted watersheds. Actual water quality monitoring of treated and untreated watershed found 65% lower atrazine concentrations in streams in targeted watersheds in which BMPs had been implemented. Formula Grant: Smith-Lever

The NIFA funded **University of Maryland** developed a new Bay Wise brochure and chapter for the Master Gardener training manual on water management and updated the Bay Wise curriculum to include information on rain gardens. 302 MD residents and Master Gardeners learned Bay-Wise Best Management Practices (BMPs) in 18 classes. Most of the class participants adopted at least one of the BMPs. Formula Grant: Smith-Lever and Evans-Allen

Research shows teaching youth about water conservation and use of water will lead to better environmental stewards in the future. NIFA funded **Michigan State University** Extension developed 4-H projects to address water use and conservation. It is estimated 85% of the over 2500 youth participants gained knowledge in these areas. Formula Grant: Smith-Lever

Emerald ash borer (EAB) is an exotic invasive insect known to kill ash trees of all species. In states surrounding Minnesota, the emerald ash borer has already killed millions of trees. To delay EAB introduction and spread to ash trees in Minnesota, a First Detector Program was created by NIFA funded **University of Minnesota** Extension. A public information campaign resulted in the collection of seeds from 254 ash trees; more than 30 ash seed samples submitted. These seeds were placed in a long-term storage facility, making it possible to preserve the ash gene pool for potential reintroduction of the species when more effective control mechanisms have been introduced to manage the EAB. This will save or regenerate a significant portion of Minnesota's forests. Formula Grant: Smith-Lever

NIFA funded **Mississippi State University** programs dealt with pine plantation thinning and the southern pine bark beetles. In addition, a pine thinning cost share program was initiated with the Mississippi Forestry Commission to encourage landowners to thin their pine trees, thereby increasing forest health. To date, nearly 1,000 acres have been thinned across N. Mississippi, with another 4,000 acres enrolled in the program. This practice has allowed for a decrease in pesticides used for controlling the Southern Pine Beetle. Formula Grant: Hatch and Smith-Lever

Since 2006, over 500 landowners and resource professionals have participated in the NIFA funded **University of Missouri** Extension sponsored Master Wildlifer Program, affecting approximately 60,000 acres. Participants learned land management techniques, including use of prescribed fire, disking, timber stand improvements, wetland management, techniques to prevent invasive species and techniques that can be used to promote native habitats. As a direct result of this educational program, participants applied practices to benefit wildlife on their property. Formula Grant: Smith-Lever

The NIFA funded **University of Illinois** Agricultural Experiment Station houses the National Atmospheric Deposition Program National Trends Network which provides the only long-term nationwide record of wet deposition in the United States. Their web site continues to be the primary data dissemination tool. This site received about 1.65 million web page hits, 90,000 unique visitors, and has about 37,900 registered users. Users retrieved 25,500 data files during 15,000 sessions, a continuing increase over FY07. Mercury data is approximately 15% of all downloads. About 33% of users are from federal and state agencies, 33% from universities, 20% from K to 12 schools, and the remainder from other organizations. These statistics demonstrate that NADP continues to be relevant to the scientific and educational communities. Formula Grant: Hatch

As a result of NIFA funded **University of Illinois** Extension educational resources and with the support of U.S. EPA funding, 25 take-back medicine events collected four million pills and 10 community electronic waste collection events recycled 10 million pounds of e-waste on Earth Day 2008. Over 11,000 pounds of garden plant trays and between three and four thousand

pounds of plastic garden plots have been recycled in one metropolitan county with an additional 5,500 pots and trays given to groups/individuals or returned to nurseries for reuse. This prevented contamination of waterways with these prescription drugs being flushed down drains and mercury and other contaminants from the disposal of electronic wastes. Formula Grant: Smith-Lever

Currently proven technologies and management practices have the potential to reduce statewide irrigation water pumped by 2 inches (or 460 billion gallons per year) or more and energy use by 42 million gallons of diesel fuel equivalent per year or more in Nebraska. In addition, for every acre-inch of water not pumped, we benefit from 55 pounds of reduced CO<sub>2</sub> emissions creating a current potential for a 490,000 tons of reduction in CO<sub>2</sub> emissions. Participants in a NIFA funded **University of Nebraska** program estimated that the skills gained during the educational experiences would allow them to reduce water use between 1.4 and 2.6 inches of water per acre. Formula Grant: Hatch and Smith-Lever

The removal of forest products, namely timber, can have an impact, positive or negative, on bird species. NIFA funded **Ohio State University** ornithologists are providing science-based management recommendations on the size, shape, and spatial distribution of timber harvests that will promote the continued viability of early-successional and mature-forest bird communities. In particular the scientists have shown that (1) successional bird communities may be sensitive to patch and landscape attributes related to the size and distribution of early-successional habitats and (2) mature-forest bird communities heavily use successional habitats during the post-breeding and post-fledging periods. This research shows that use of shrubby areas by juvenile mature-forest birds (e.g., ovenbird and worm-eating warbler) increases survival rates. Formula Grant: Hatch

The NIFA funded **Penn State University** Extension sponsored Master Well Owner Network (MWON), by design, increases the pool of knowledgeable individuals who can significantly extend extension's expertise. Through MWON, completion of voluntary testing of private wells statewide has resulted in the identification of private water systems not meeting drinking water standards. Owners of these systems were notified and provided guidance on action planning to reduce contaminants in their private drinking water system. Formula Grant: Hatch and Smith-Lever

Progress by NIFA funded **University of Puerto Rico** researchers is being made in the development of environmentally sound control methods for the *Harrisia Cactus Mealybug*, which is adversely affecting cacti in the dry forest reserve. Promising natural enemies are being identified locally and abroad for the implementation of a classical biological control program. Findings from dry forest research on species regeneration after hurricanes show that the multi-stemmed growth habit of dry forest trees can be generated naturally by hurricanes without breaking stems. This increases the value of forest stands in the perception of managers and the public because these lands are no longer assumed to be degraded. These findings are changing the understanding of scientists, forest managers, citizens, and government officials about the natural regeneration methods of the tropical dry forest. Formula Grant: Hatch

The RUSLE2 erosion prediction model was developed by NIFA funded researchers at The **University of Tennessee** in cooperation with scientists and field personnel from USDA-Agricultural Research Service and USDA-Natural Resource Conservation Service (NRCS). RUSLE2 is being used an estimated 5000 times a day to compare management alternatives for their ability to reduce erosion and to enhance soil quality. In addition, RUSLE2 is now being used for planning on construction sites, helping managers keep sediment from damaging streams and rivers by comparing best management practices using cost-benefit analyses. Formula Grant: Hatch

Invasive and noxious weeds have become an increasing menace to the productivity of rangeland and forest due to increased traffic and seed transfer over long distances. The **Utah State University** wildfire/weed management model remains a core element of national weed management plans of the Forest Service, Bureau of Land Management, Fish and Wildlife Service, and the National Park Service. The model also has been adopted by all National Park Service Exotic Plant Management Teams and all U. S. Fish and Wildlife Service Invasive Species Strike Teams. Special emphasis is being paid by these agencies on the model's elements of early detection and rapid response. Formula Grant: Smith-Lever

During informal meetings, NIFA funded **University of the Virgin Islands** Extension provided technical assistance re: erosion and sediment control BMPs to the VI Dept. of Public Works (DPW) maintenance crews and the Director of roadside maintenance. DPW employees followed Extension's recommendation to reduce clearing of vegetation and mulch from the edge of a watercourse. The DPW Director of Roads on St Thomas agreed to adopt BMPs to reduce erosion and sedimentation caused by roadside clearing. Formula Grant: Smith-Lever

NIFA funded **Washington State University** Extension professionals design and deliver programs that lead to specific and measurable changes in management practices on land and water resources of the state. This includes direct remediation of invasive plant species, training landowners how to improve management of forest resources and protect land and dwellings from catastrophic wildfires, and working with landowners and agency personnel directly to restore riparian zones and coastal regions. As a result of WSU Extension programs, management on over 153,000 acres of forest and rangeland was improved in 2008. Formula Grant: Smith-Lever

By 2010, Virginia is committed to making significant reductions of sediment, nitrogen, and phosphorus to the Chesapeake Bay waters. Agents and specialists throughout NIFA funded **Virginia Cooperative Extension** are advocating for use of no-till crop production where feasible. Studies have shown that compared to conventionally tilled fields, losses of sediment can be reduced by 99%, nitrogen by 94%, and phosphorus by 92%. In 2000, the Northeast Extension District had less than 10,000 acres in continuous no-till crops. By 2007, a survey showed the District had increased to over 280,000 acres (83%) of total grain cropland in continuous no-till. During the same time period the statewide continuous no-till crop acreage increased from 5% to 41% (440,000 acres).

For more than two decades the City of Norfolk Moores Bridges Water Treatment plant has produced sludge high in lime. Based on NIFA funded **Virginia Cooperative Extension** recommendations for using the material and Department of Environmental Quality approval, the

City of Norfolk is contracting to have up to 15,000 tons of the material recycled each year. The City of Norfolk will significantly reduce hauling and landfill disposal costs. Farmers will have a lower cost liming alternative. The value of the recycled lime in 15,000 tons of the material exceeds \$100,000. This is the first time in Virginia that water treatment plant sludge will be recycled for beneficial agriculture and horticulture purposes. Formula Grant: Smith-Lever, 1890 Extension and Hatch

## **Animal Systems**

Applied research and field evaluations by NIFA funded **University of Arkansas** of new genetic strains of broilers and turkeys, disinfectants and feed processing procedures were conducted to identify effective techniques. This information was supplied to poultry operations via trade publications, workshops, one-on-one consultations, newsletters and Cooperative Extension publications. Technology adoption rates were estimated at about 12%, with an estimated savings of \$7.1 million as a result of technology improvements. Formula Grant: Hatch and Smith-Lever

Pork producers were provided relevant information by the NIFA funded **University of Missouri** Cooperative Extension related to organic phosphorus, mineral, and grain prices to reduce total feed costs by more than \$20 per ton in some cases. The average savings per ration was \$9 per ton. This information was provided to more than 50 Missouri pork producers who raise more than 80 percent of the pork in Missouri. In 2008, these feed savings resulted in an economic benefit to Missouri pork producers of over \$1,620,000, or about \$3.50 per pig. Formula Grant: Smith-Lever

The NIFA funded **University of Missouri** Extension Show-Me-Select Replacement Heifer Program is based on a fundamental principle of extension and the land grant university system: the use and application of what we know to create knowledge. Heifers from the program have now sold to farms in 16 states: Arkansas, Arizona, Florida, Georgia, Iowa, Illinois, Indiana, Kentucky, Kansas, Missouri, Nebraska, Oklahoma, South Carolina, South Dakota, Tennessee and Texas. The Missouri Show-Me-Select Replacement Heifer Program is the first statewide on-farm development and marketing program of its kind in the United States. The economic impact of the Show-Me-Select Replacement Heifer Program on an annual basis is estimated at \$3.5 million. The impact on Missouri's economy from the first 12 years of the Show-Me-Select program exceeds \$40 million. Formula Grant: Smith-Lever

NIFA funded **New Jersey** scientists produced the fifth generation of tetraploid oysters and continued selection for disease resistance and fast growth. Tetraploid oysters have been used for commercial production of triploids. Triploid oysters produced from tetraploids are 100% pure and grow significantly faster under normal diploids. Triploid oysters have become an important product of the oyster culture industry. The genetic markers and maps have provided useful tools to the research community and are being used to identify and manage oyster resources. Oyster survival rates in the Delaware Bay have increased more than twofold, preserving a regional fishery and thousands of jobs. The restored harvest has had a direct impact on the economy of the region with a return of \$40 for each \$1 spent. Formula Grant: Hatch and Smith-Lever

The NIFA funded **Virginia Cooperative Extension** partnered with the Virginia beef industry to develop the Virginia Quality Assured (VQA) program which encourages the use of scientifically-based cattle health and management procedures for feeder cattle. In 2008, a total of 10,301 calves were marketed through the VQA program. Producers received a premium of \$49.01 per calf resulting in \$504,802 of additional income for Virginia beef producers. Over twelve years of the VQA program, producers have marketed over 88,000 head of feeder cattle resulting in \$2.85 million in value-added income. Formula Grant: Smith-Lever

Farmers adopting improved animal management programs developed by NIFA funded **North Carolina State University** research and extension have experienced improvement in animal growth and performance resulting in increased farm income of over \$8.4 million. Formula Grant: Hatch, Smith-Lever, and 1890 Extension

NIFA funded **Fort Valley State University** scientists have found that *Sericea lespedeza* can control internal parasite in small ruminants including goats. Thus, *Sericea lespedeza* can now replace alfalfa in lactating goat diet with same milk yield, protein, lactose and total solids and lower fat and saturated fatty acid content. Formula Grant: Evans-Allen

Very Virulent IBDV is a disease that has significant negative economic impact for the global poultry industry. NIFA funded **Ohio Agricultural Research and Development Center** (OARDC) has developed, through its Center for Diagnostic Assays, the only validated tool for detection of vvIBDV. The development of the vvIBDV real-time assay is providing a front-line tool for monitoring and controlling the spread of this highly destructive immunosuppressive poultry disease. The development of a first of its kind validated Real-Time PCR Assay for Rapid Detection of Very Virulent Infectious Bursal Disease Virus (vvIBDV) is most important because IBDV is able to rapidly produce mutated viruses that are resistant to vaccines. The vvIBDV strain causes unusually high morbidity and mortality. Early diagnosis is central to protecting this industry from one of its most economically damaging diseases. Formula Grant: Hatch

### **Sustainable Farm Enterprises**

The long-term future of Michigan farms and agribusinesses is dependent upon successful business transitions to the next generations. The goal is to keep the assets and resources of the business in agricultural on a sustainable basis that looks at having good industry information, good farm information, and plans that help the transition of farms from one generation to the next. NIFA **University of Michigan** staff worked with 253 family members who manage 67 farm businesses during 2008. Those businesses controlled 84,170 acres of land, and by implementing the suggestions team members offered, they will save more than \$25,683,000 or \$383,000 per farm in future estate taxes. Formula Grant: Smith-Lever

More than 3,800 producers attended educational programming on "Winter Feeding Systems for Beef Cattle" given by the NIFA funded **University of Missouri** Cooperative Extension. This effort has brought about real-change in producer practices. For instance, based on farmer surveys taken in 1998 and again in 2006, number of producers using stockpiled tall fescue has increased by 28 percentage units. Economic analyses conducted by Driskill et al. show that producers save approximately \$62 per cow annually if they efficiently use stockpiled tall fescue. At the adoption

rate of 54 percent statewide, the increased use of stockpiled tall fescue saves the state's beef producers \$38 million annually. Formula Grant: Smith-Lever

Clientele attending NIFA funded **University of Nebraska** sponsored events or accessing generated web-based materials self-assessed the value of the information in potential increased profits or loss mitigation at an average value of over \$150 million. For example, Crop Management and Diagnostic Clinics impacted 57% of Nebraska's row crop acres through 13 workshops in 2008; the over 800 participants influence or manage over 7.1 million acres; participants estimated that the estimated value of changes they planned on their acres was \$8.67/acre, or a total of over \$65 million. Formula Grant: Hatch and Smith-Lever

NIFA funded **Ohio State University** scientists found that using more accurate forage phosphorus concentrations, and reducing the phosphorus concentration in mineral mixes from 6 - 8% to 2 - 4%, based on the time of year and forage being fed, cattle producers can save approximately 100 dollars per ton of mineral, or five cents per pound of mineral. With 292,000 beef cows in Ohio, the annual savings exceeds \$1.3 million. Equally as important, phosphorus supplementation in excess of an animal's requirement leads to phosphorus being excreted into the environment. Reducing the phosphorus content in mixes to the levels previously mentioned saves 80 pounds of phosphorus per ton of mineral. With 292,000 beef cows consuming 91.25 pounds of mineral per year, or 13,322.5 tons of mineral mix, this has the potential to save 1,065,800 pounds of phosphorus supplementation per year, reducing both the economic and environmental costs. Formula Grant: Hatch

### **Nutrition and Healthier Food Choices**

NIFA funded **American Samoa** Extension staff conducted 356 Nutrition educational workshops. Program participants acquired knowledge and developed skills in purchasing and preparing safe, economical, and nutritious meals. Further, participants were able to better manage their food resources especially food stamps, WIC vouchers, and others. With fresh vegetables available from their own gardens in the back yard, the consumption of vegetables increased. With a better diet, diet related diseases are reduced. Participants have shown improvements in diet, knowledge and food related behavior. Moreover, participants learned how to use local fruits and vegetables in preparing economical and nutritious recipes. Participants attended 34 vegetable gardens workshops and established 141 vegetable gardens as a result of the program. 3601 continued to consume more vegetables as result of the vegetable gardening project. 244 participants continued to grow vegetables. In total, 3040 participants prepared and consumed more economical and nutritious meals. Formula Grant: Smith-Lever

Bone Builders is a community education partnership between the NIFA funded **Arizona Cooperative Extension** and Arizona Prevention Center, and various public and private partners. All seniors completing the physical activity class improved in at least 1 out of 6 fitness assessments. In a sample of community class participants taken 6 months later, 39 percent said they had actually increased their calcium consumption as a result of the classes, and 36 percent had increased their weight-bearing exercise. If one hip fracture can be prevented from early screening/education it would save \$81,000 in health care costs. Formula Grant: Smith-Lever

The NIFA funded **University of Arkansas** Cooperative Extension provided nutrition education programs to 35,815 Food Stamp Nutrition Education eligible participants and 3,940 other Arkansans in a variety of community settings using multi-session programs in group settings; learn-while-you-wait demonstrations; one-on-one lessons; and other strategies. 61% of adult and 55% of youth participants reported increased fruit consumption and 57% of adult and 46% of youth participants reported increased vegetable consumption; 69% of adult and 66% of youth participants reported increased low fat or fat free dairy consumption; 79% of adult and 69% of youth participants reported they now use food/nutrition labels to make food choices; 33% of adult participants reported decreasing weight; and 53% of adults and 90% of youth participants reported increased physical activity. Formula Grant: Smith-Lever

Multiple StrongWomen workshops were taught by NIFA funded **Idaho** Extension. Participants showed an 85% to 207% increase in arm and leg strength from the first class to class 12. Participants increased their intake of fruits, vegetables, whole grains, and milk. Although there was a minimal increase of 8% in whole grain intake, there was a greater (24-26%) increase in fruit, vegetable, and milk consumption. Formula Grant: Smith-Lever

130 sessions of "Weight: the Reality Series" were offered by NIFA funded **University of Kentucky** Extension in 60 counties with over one third of participants succeeding in losing 5% or more of their initial weight during the program. Program participants averaged 6.5 pounds of lost weight and a waist reduction of nearly 2 inches. Over 105,512 individuals reported an increase in knowledge or skills related to diet and exercise and 50,626 actually made lifestyle changes as a result of involvement in Extension programs related to improving personal health. Formula Grant: Smith-Lever and Hatch

The NIFA funded **Louisiana State University** Extension Service delivered Smart Portions and Smart Choices nutrition education program to low-income families and youth. These programs increased consumption of fruits, vegetables, and whole grains, decreased consumption of foods high in saturated fats, and increased physical activity (PA). Eighty percent of adults became more PA; 80% made changes in food choices; 60% doubled daily vegetable and 40% increased whole grain and fruit consumption; and 40% reduced foods high in saturated fat. Recipients demonstrated improved food safety skills, resource management, and food-related practices. Formula Grant: Smith-Lever

In 2008, 1,261 members of the Latino community participated in a variety of events offered to increase knowledge of healthy nutrition through NIFA funded **University of Minnesota** Extension programs. Examples of events developed include "Fiestas de Salud" and fruit and vegetable tastings with and within local grocery stores. The community-based events had a significant effect on participants' knowledge and increased intake of fruits and vegetables. Results from pre-post surveys indicated that approximately 70% increased knowledge regarding healthy benefits of fruits and vegetables, and 71% intend to eat more fruits and vegetables. Formula Grant: Smith-Lever

NIFA funded **University of Missouri** Extension provides nutrition, health, and physical activity education for adults and youth. Expanded Food and Nutrition Education Program participants

made significant improvements in dietary behaviors--87% improved one or more behaviors; 69% improved two or more behaviors; 42% improved three or more behaviors; 21% improved four or more behaviors; and 7% improved all five nutrition behaviors evaluated. Formula Grant: Smith-Lever

During FY 2008 NIFA funded **Colorado State University** Extension-based nutrition education reached 2,919 adults and 118 youth with direct education. An additional 3,612 low-income persons were reached through the Healthy Habits Network Farmer's Market project. "Brigid on the Bus" was a 6-week program targeting seniors with nutrition education surrounding their regular grocery shopping trips. This innovative program reached participants who otherwise would not have attended a traditional class. As a result, 83% use a grocery list more often; 50% reported eating more fruits and vegetables each day. Formula Grant: Smith-Lever

The MyPyramid was adapted by the NIFA funded **University of Maine** Extension for use as "Steps to a Healthier ME", which uses variety of innovative ways to convey concepts to diverse audiences. Within eight weeks of participating in the program, a survey showed; 90 percent reported that they were still using MyPyramid guidelines and 66 percent reported they were meeting the recommended levels of physical activity. Based on a Blue Cross, Blue Shield, MaineCare report, improvement in individual risk factors for the group will result in nearly \$3 million per year saved in combined direct and indirect costs. Similarly, quantifying the value for participants reached indirectly through our trainees this year adds an additional \$3 million, for a total of \$6 million saved in combined direct and indirect costs. Formula Grant: Smith-Lever

NIFA funded **Ohio State University** scientists have found that lycopene molecules in tomatoes that are combined with fat and subjected to intense heat during processing are restructured in a way that appears to ease their transport into the bloodstream and tissue, thus increasing the availability of this most important carotenoid. Prior research has shown that lycopene plays a protective role against multiple disease processes, and in particular, are linked to the prevention of cancer and other chronic diseases. Improving the human body utilization of lycopene has major health benefits. Formula Grant: Hatch

NIFA funded **Ohio State University** scientists have been advancing the knowledge of the role of black raspberries in cancer management. Findings from these studies suggest that a mixture of preventative agents, which berries provide, may more effectively prevent cancer than a single agent that targets only one or a few genes. Black raspberries have vitamins, minerals, phenols and phytosterols, many of which individually are known to prevent cancer in animals. Freeze drying the berries concentrates these elements about ten times, giving a power pack of chemoprevention agents that can influence the different signaling pathways that are deregulated in cancer. Formula Grant: Hatch

The goal of the NIFA funded **Oregon State University** Extension nutrition education program is to increase the likelihood that food stamp recipients and those eligible make healthy and safe food choices within a limited budget and choose physically active lifestyles. Adults participating in a series of nutrition education classes report practicing the following more often: 61% follow My Pyramid advice to plan and prepare family meals; 55% use "nutrition facts" on food labels to make food choices; and 78% of adult participants showed improvement in one or more nutrition

practices (plans meals, makes healthy food choices, reads nutrition labels, prepares foods without adding salt). Formula Grant: Smith-Lever

The SNAP-Ed program in NIFA funded **Washington State University** (Food \$ense) reaches large numbers of youth in partnership with public schools. Curriculum content and outcome measures include both nutritional quality and physical activity. Youth reported behavior changes in the following areas of dietary quality: eating fruits and vegetables daily (68 percent); increased willingness to taste new foods (93 percent); and using labels to compare nutritional content of foods (64 percent). Sixty-nine percent of youth also reported increased levels of physical activity after participating in Food \$ense. Based on the parent survey, 72 percent of families reported buying healthier snacks and reading nutrition labels. Eighty one percent reported higher levels of physical activity and 75 percent increased consumption of fruits and vegetables. Formula Grant: Smith-Lever

The NIFA funded **University of Wyoming** Cooperative Extension Service's Cent\$ible Nutrition Program resulted in 53 percent reported thinking about healthy food choices more often when deciding what to feed their families; 65 percent reported using the "Nutrition Facts" labels more often to make food choices; 40 percent reported they or their children more often eat something in the morning within two hours of waking; 53 percent reported serving more than one kind of fruit to their families each day more often; 50 percent reported serving more than one kind of vegetable to their families each day more often; and 46 percent reported when eating bread, they eat whole-grain bread more often. Formula Grant: Smith-Lever

### **Processing, Engineering and Technology for Food and Bio Products**

Canola is one of the world's most oil-dense crops. NIFA funded scientists believe canola has the potential to play a dominant role in unclenching the grip that imported petroleum fuels have, as well as offering growers new markets for a high-value crop. In 2008, 200 acres of canola were planted by farmers and crushing and biodiesel processing facilities were established at the **Michigan State University** Biorefinery Training Facility. The crusher can smash 1 ton of seeds per day, enough for about 100 gallons of biodiesel. The first year of research demonstrated that canola could be grown, processed and made into biodiesel with a profit return for farmers. For 2009, researchers will increase to 600 acres the amount of canola planted for research purposes. Formula Grant: Hatch

As a result of research at the **University of Arkansas** best management practices were developed for bins, grain bags, and other alternative storage options for corn. Extension conducted several producers meetings and on-farm visits to familiarize producers with findings and recommendations. 1717 persons gained knowledge that bags have shown that they can provide a short term storage option if managed properly. The key is to place grain into the bags at market moisture or below to maintain storage quality. This work has verified that on farm storage helps producers better manage harvest and capitalize on potentially higher profit margins. Formula Grant: Hatch and Smith-Lever

A multidisciplinary team of engineers and poultry scientists at the **University of Delaware** have developed a novel foam depopulation method as a tool for fighting avian influenza. Research showed that water-based foam caused cessation of movement as fast as other currently accepted procedures and showed similar stress levels in the birds. The foam procedure, however, can be implemented on a large scale far faster and with fewer people. With fewer technicians needed for decontamination, fewer people are at risk for contracting avian influenza and therefore the human risks associated with the depopulation of diseased poultry are minimized. Water-based foam was used to depopulate adult turkeys in two separate incidents in West Virginia and Virginia. In 2008, water-based foam was used to depopulate game birds in Idaho. In October 2008, a University owned patent for the foam depopulation procedure was issued. The University is actively licensing the technology. Formula Grant: Hatch and Smith-Lever

Studies by **University of Maine** scientists indicate that crab mince obtained through mechanical separation techniques retains sufficient gelation properties for further utilization as a primary ingredient in a value-added food product. The researchers showed that minced meat by-products from Jonah crab can be used to create a crab appetizer product acceptable to consumers as well as an extruded snack food product. The main impact of this project will be the increased use of crustacean processing resources and a decrease in the generation of seafood processing "waste". Formula Grant: Hatch

### **Markets, Trade, Policy, and International Development**

As a result of the educational training workshops by **Alcorn State University** Extension, eight (8) producers planted a new variety of sugarcane developed by the South Mississippi Branch Experiment Station. The new variety increased the producers yield per acre and the number of gallons of extracted juice. By increasing their yield per acre, the producers increased their profitability from marketing high quality syrup. The producers also used their root stock as seed stock to increase production acreage. Formula Grant: Evans-Allen and 1890 Extension

This study by **Colorado State University** scientists demonstrated that carcass LMA (a commonly accepted evaluation of beef carcass ribeye area at the 12th and 13th rib interface in the beef industry for determining quality and pricing) is not an accurate determinant of the size, and subsequent acceptability, of other muscles in the carcasses and may not be a good determinant of the remaining value of the beef carcass; it will be used by industry to modify current beef pricing practices. Formula Grant: Hatch

**Iowa State University** Extension developed and delivered an educational program based on applied research of how to improve efficiency and/or reduce input costs for beef cowherds. Computer models were developed to evaluate alternative production systems under different input and output prices, and factsheets were developed and meetings were held to explain the results. Pasture walks, ration development workshops, educational meetings and one-on-one consultations were held for producers. As a result, beef cowherds quickly adopted the use of ethanol co-products to reduce winter feed costs and extend summer grazing. Herds also weaned earlier to reduce winter feed needs of the cow and culled non-productive cows. Formula Grant: Smith-Lever

The growing season is too short to profitably produce certain high-value berry crops in New York. Meanwhile, consumer demand is very high for these high-value specialty crops. Several cultivars of berry crops, particularly blackberries and fall raspberries, were identified by **Cornell University** scientists and Extension that perform particularly well in a tunnel environment. New recommendations for treating fall raspberries enable the crop to continue to fruit into mid-November rather than ending at the end of September or early October. The response of blackberries was also remarkable. Plants were able to overwinter and produce a full crop within tunnels. Growers are now implementing recommendations. Demand for information is very high, and Cornell staff have been invited to give many presentations to grower audiences and also to a venture capitalist group. Formula Grant: Hatch

### **Food Safety**

NIFA funded **American Samoa** Extension staff conducted 356 food safety workshops and demonstrations about safe food handling, storage and preparation to youth, childcare providers, WIC participants, Food Stamp clients, homemakers, and other clients. Demonstrations on the correct way to wash hands to prevent food borne illness were also conducted to school age children and adults. 4030 program participants adopted safer food handling, storage, and preparation practices. Teachers reported that more students are washing their hands before preparing family meals and consumption of food. Formula Grant: Smith-Lever

The NIFA funded **Kansas State University** Extension ServSafe Food Safety program in cooperation with the Kansas Restaurant and Hospitality Association (KRHA) coordinated and conducted more than 20 ServSafe Manager Certification classes reaching more than 450 students statewide. In 2008, more than 71 foodservice operations were involved in ServSafe classes taught by extension professionals. Two of the 20 classes were provided in Spanish in an effort to reach out to the Spanish speaking employees who continue to increase in the foodservice industry. They had an 86% passing rate, providing approximately 387 ServSafe certified foodservice managers/supervisors in the state. The estimated economic value of the foodservice educational programs is \$5,325,000. Formula Grant: Smith-Lever

A NIFA funded **University of Maine** food scientist is one of only a handful of scientists worldwide studying cranberries from a food-safety standpoint. Research has shown that cranberries have the power to fight food poisoning, eliminating or inhibiting several important food-borne pathogens. In ground beef and in the petri dish, the compound slowed the growth of -- and in some cases, reduced to untraceable levels -- listeria, salmonella, staph infection and E. coli 0157:H7, the form of the microorganism responsible for the 2006 spinach contamination. In a sensory study at the University of Maine, researchers found that consumers would accept a burger that included up to 5 percent cranberry or blueberry extract by weight; a mixture of the two berry extracts scored highest. It looks and tastes like a regular hamburger, but it fights pathogenic E. coli like a superburger. Formula Grant: Hatch

Ensuring the safety of aquaculture and seafood products from *Listeria monocytogenes* is a continuing challenge. Listex P100 (phage P100) is a bacteriophage preparation approved by

FDA and USDA for raw and ready-to-eat foods. NIFA funded research findings by **Mississippi State University** demonstrated that phage P100 was effective in reducing *Listeria monocytogenes* counts on catfish fillet tissue. Such overall reductions in *Listeria monocytogenes* counts were still maintained at the end of the 10-day shelf-life of fresh catfish fillet after phage P100 treatment. This is a promising new technology that can selectively kill target *Listeria monocytogenes* on fresh catfish fillets. Formula Grant: Hatch and Smith-Lever

A NIFA funded **University of Maine** food scientist, in collaboration with a researcher at the National Chiao Tung University in Taiwan, has found a way to detect pathogenic *E. coli* in food with the naked eye, using nanotechnology. The quick, easy and affordable method developed by this team of researchers could allow consumers and producers to know immediately whether their food is safe to eat, because the presence of pathogenic *E. coli* causes the nanoparticles to change color. The implications for the industry are revolutionary. Formula Grant: Hatch

NIFA funded **University of Maine** researchers, collaborating with Beacon Analytical Systems, a Maine biotechnology company, have developed a commercial kit (EIA) for the rapid quantification of melamine residues in food. Beacon is currently the only manufacturer of melamine EIA kits in the world. The University of Maine collaboration with Beacon was instrumental in helping this small Maine company grow substantially. In addition to their work on melamine contamination, University of Maine scientists are working with Beacon on new ways to detect paralytic shellfish poison (PSP) in seafood. Formula Grant: Hatch

NIFA funded faculty and graduate students in the Department of Veterinary Science and Microbiology at the **University of Arizona** developed a new poultry vaccine using *Salmonella* to induce chicks to make antibodies to *Campylobacter* proteins in their intestines—where the infection begins. The vaccination process is simple, easy to produce and protective to the chick. The *Salmonella* lives four to five days, enough time to stimulate antibody production, and dies. Chickens need to be vaccinated early because they become infected at just two to three weeks of age. The goal is to halt the contamination before it spreads and survives on raw chicken sold in stores. The vaccine may be available in 3 to 5 years. The vaccine's effect could be significant: about 8.9 billion broilers go to market annually in the U.S., with a value of \$21.5 billion. The vaccine could serve as an intervention method for *Campylobacter* when the USDA and FDA mandate reduced numbers of food-borne pathogens in chicken, most likely in the next few years. Formula Grant: Hatch and Smith-Lever

NIFA funded **University of Puerto Rico** Extension home economists offered “Fight BAC” courses with a minimum of four lessons. All participants adopted at least one safe food handling practice. The most adopted practice was hand washing with an 88% of the participants and the least adopted was the use of a food thermometer to measure food temperature, where 53% of the consumers said that they used a food thermometer. Other adopted practices were: avoiding cross contamination (73%), cleaning and sanitizing food contact surfaces (70%), and reducing to two hours the maximum time exposure to dangerous temperatures. Formula Grant: Smith-Lever

As a part of a statewide monitoring program, state officials in the Departments of Agriculture and Consumer Protection submitted samples of pomegranate juice to the NIFA funded **Connecticut Agricultural Experiment Station** for chemical analyses. Pomegranate juice was

found to contain 0.011 ppm - 0.052 ppm of Carbendazim (Benomyl). Since there is no tolerance for this pesticide in pomegranate juice, the product had to be recalled. There were 6,746 cases of products in commerce nationwide. The producer voluntarily recalled all of the pomegranate juice. These results had impact because stakeholders learned that a food security monitoring system was detecting contaminated products. The prompt recall of contaminated products prevented human illnesses. Formula Grant: Hatch

As a part of a statewide monitoring program, state officials in the Departments of Agriculture and Consumer Protection submitted candy and cookie samples to the NIFA funded **Connecticut Agricultural Experiment Station** for chemical analyses. Melamine was detected in candy and cookies, and products were removed from commerce. These results had impact and resulted in action because (1) the US Food and Drug Administration activated state and federal laboratories in the Food Emergency Response Network nationally to increase monitoring of melamine in foods and animal feeds and (2) the prompt recall of contaminated products prevented illness in humans and domestic animals. Formula Grant: Hatch

## **Summary**

NIFA believes that this new Plan of Work and Annual Report of Accomplishments is not only reducing burden on the States from the old Plan of Work and Annual Report requirements, it is also providing much needed supporting documentation for NIFA Portfolio reviews, the PART process for OMB, the budget submission, and other external requirements. As part of this documentation, we have been able to more efficiently and accurately link the outcomes from the Annual Report of Accomplishments via the Knowledge Areas to the NIFA and USDA strategic plans, and thus, to our goals and objectives, and to our portfolios. Many of the outcomes from this summary document have already been used in the NIFA Portfolio reviews, the budget process, and in a request for evidence of performance from Congress.

A separate, more detailed 2008 Annual Report Summary document focusing on a statistical summary has also been prepared and is available on the NIFA Plan of Work website.

## **Definitions**

*State Planning Unit* – One or more institutional entities that make up a single State Plan of Work. This could be any combination of 1862 and 1890 State Land Grant University Research and/or Extension entity in a single State.

*Portfolio* – A portfolio is a set of continuing, NIFA-funded activities broadly focused on a current and/or emerging issue of societal importance and serves as the foundation for agency planning and evaluation. A portfolio is operationally defined by a unique set of primary knowledge areas (KAs) supplemented by secondary KAs that may be shared with other portfolios.

*Knowledge Areas (KAs)* – A subject content classification scheme for use in characterizing federally-funded, NIFA-administered research, education, and extension activities for the purpose of enabling budget and accountability reporting and integration.