

2015 Iowa State University Combined Research and Extension Annual Report of Accomplishments and Results

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I. Report Overview

1. Executive Summary

Agriculture in the state of Iowa has grown beyond traditional production of crops and livestock to encompass the revolution in the bioeconomy, life sciences, food sciences, value-added products, environmental sciences, and social sciences. Iowa's world-class endowment of natural resources, its highly skilled and educated people, and its well-developed infrastructure supports a diverse and dynamic set of food, feed, fiber, biofuels and bioproducts, environmental and community endeavors.

Iowa's abundance is astonishing, ranking second nationally (behind California) with cash farm receipts (2014) of over \$30 billion. This position is the result of Iowa's strong ranking in the production of several commodities. The state consistently is the nation's first- or second-largest producer of corn, soybeans, pork, eggs and ethanol, the fourth largest producer of cattle, and in the top dozen for dairy and turkey production. Iowa had 88,637 farms operating on 30,622,731 acres in 2012. Cropland accounts for 91 percent of Iowa's total farm acres (2012). The average-sized farm in Iowa has 345 acres, while the median farm size is 136 acres (2012).

Of Iowa's 99 counties, 21 are located within metropolitan statistical areas (MSAs). Iowa's nine MSAs, which include both rural and urban space, contain 59 percent of its total population (2014). Iowa had 3,123,899 residents in 2015, ranking 30th among states in total population size. Slightly more than one third of Iowa's population lives in rural areas. This 36 percent rural share ranks 12th among states in rural population percentage (2010). Urban areas contain 64 percent of Iowa's residents and about two percent of the state's total land area (2010).

The Hispanic/Latino population, which includes people of any race, is the largest minority group in Iowa, accounting for 5.6 percent of the population in 2014. The Black or African American population, both Latino and non-Latino, is the second-largest minority group with 3.4 percent of residents. The Asian race group is third with 2.2 percent (2014). Iowa's non-Latino white alone population accounts for 87 percent of the total population (2014). The poverty rate for individuals in Iowa was 12.3 percent (+/- 0.3%) in 2014, compared to a rate of 15.5 percent (+/- 0.1%) for the United States. The growth rate of youth of color in Iowa (with public school student enrollment of 9.7% in 2000-01 versus 21.8% in 2014-15) is much faster than that of adults. Continuing demographic change and globalization create ongoing opportunities and challenges toward achieving socially beneficial, economically successful, and environmentally sound systems for food, feed, fiber, fuel, and other value-added products.

The Iowa State University (ISU) Combined Extension and Research Plan of Work for FY 2015 incorporates the five USDA priority areas; however, they are not reported on as separate and distinct programs. Climate change is included in Food Security; childhood obesity has been incorporated into Health and Well-being; food safety is split, with consumer education falling under Health and Well-being, while production related programming has been folded into Food Security. Therefore, we are reporting on seven broad, interdisciplinary programs:

- Community and Economic Development
- Expanding Human Potential
- Food Security
- Health and Well-being
- Natural Resources and Environmental Stewardship
- Sustainable and Renewable Energy
- Youth Development

Research is conducted across most disciplines in agriculture, defined in its broadest sense, from basic to applied, to make advances in feed, food, fiber, and fuel production to help increase capacity and provide an adequate and nutritious food supply. The research expressed in the program areas is the result of cooperation among researchers within and between departments and colleges at all levels of activity.

In the Community and Economic Development program, participatory action research and engagement focus on increasing economic activity in rural communities through entrepreneurship and small business planning, helping communities adjust to changing demographics, confronting the challenges of disinvestment in public infrastructure and the built environment, and increasing local leadership capacity.

In response to both the population changes and geography of the state, a population-based programming model was developed and initiated in 2014, with 2015 providing the first full year of implementation. In concert with this change, a Human Sciences Extension and Outreach (HSEO) management team was developed and implemented, with an emphasis on field operations, evaluation and reporting, and college projects. The intent of these changes was to better support faculty, staff and partners in their programming efforts, to be positioned for an anticipated increase in demand for HSEO educational programming, and to think differently and strategically in delivering relevant and high quality HSEO educational opportunities.

For the estimated number of professional FTEs/SYs total in the state, we have again readjusted and refined the method of calculating research SYs. USDA guidance indicates inclusion of professional FTEs applies only to extension, while research FTEs should include only scientist years. All program FTEs, regardless of funding source, are included per USDA guidance and clarification. We classify the administrative portion of research faculty salaries (i.e., deans, department chairs, center directors, etc.) as "Professional", thus are now excluded. This more closely parallels how personnel are categorized for the project Financial Reports submitted in REEport. To emphasize, this applies only to the calculation of research SYs.

Hatch and Smith-Lever formula grants provide critical funding for staffing that ultimately allows us to leverage and match other external funding sources. The formula grants also provide flexibility in programming to better meet current and emerging needs not being addressed by other sources of funding. Without these funds, there would be less applied research, less real world application of research, and less integration of extension and research work.

Total Actual Amount of professional FTEs/SYs for this State

Year: 2015	Extension		Research	
	1862	1890	1862	1890
Plan	384.0	0.0	307.5	0.0
Actual	371.0	0.0	186.8	0.0

II. Merit Review Process

1. The Merit Review Process that was Employed for this year

- Internal University Panel
- External Non-University Panel
- Expert Peer Review

2. Brief Explanation

Merit review: ISU Extension and Outreach continued to monitor and adjust the plan of work through use of self-directed work teams, continuous needs assessment, and ongoing work with public and private partnerships. At the state level, state staff worked closely with key statewide constituencies. Surveys of needs assessment were done at both the local and state level to inform selected plans. Iowa County Extension Councils and local stakeholder groups annually review, and prioritize needs, feeding the information back to the statewide plan of work teams. Program leaders monitor feedback from stakeholders in the above reporting mechanisms as well as through departmental reviews, program evaluation by Plan of Work teams and program evaluation as part of externally funded projects, and work with team leaders to make necessary course corrections. North Central Regional Program Directors provide periodic oversight, guidance, and course corrections on logic models and joint program implementation and evaluation.

Scientific Peer Review: Project Proposals: Each project proposal is endorsed by the department chair and Associate Director of the Experiment Station. Each proposal is sent to peers internal to ISU (typically 2 to 4 faculty) for a thorough review of the scientific merit. Depending upon the reviews, the project is either approved, revised based on reviewer comments, or rejected.

III. Stakeholder Input

1. Actions taken to seek stakeholder input that encouraged their participation

- Use of media to announce public meetings and listening sessions
- Targeted invitation to traditional stakeholder groups
- Targeted invitation to non-traditional stakeholder groups
- Targeted invitation to traditional stakeholder individuals
- Targeted invitation to non-traditional stakeholder individuals
- Survey of traditional stakeholder individuals

Brief explanation.

The majority of programs use media and the internet to announce public meetings and listening sessions, and use targeted invitations to traditional stakeholder groups and individuals. In addition, the various programs have employed the following:

- Ad hoc surveys of residents in specific communities to obtain feedback.
- Team members are in regular contact with primary stakeholders at meetings, electronically, and on an individual basis.
 - Producers, suppliers, policy makers, and other interested parties are invited to state-wide webcasts.
 - End-of-meeting and post-program surveys consistently seek input for future research and

programming needs.

- Responding to stakeholder input to encourage additional input.
- Identify existing stakeholder meetings, ask to be placed on the agenda, and ask stakeholders to answer questions or provide input.
- Faculty and staff have developed relationships, one key to quality interaction with stakeholder groups, and actively participate in a variety of events where stakeholders are present for interaction.
- Surveys, focus groups and on-going informal assessments match program delivery methods with preferences of stakeholder groups. Decisions regarding content, delivery, and mechanisms to reduce barriers to participation are made with a goal of increasing participation.
- Blogs and other online venues gather comments on programming.
- Post-program site visits and one-on-one interviews with clients to measure impacts and to obtain client feedback.

2(A). A brief statement of the process that was used by the recipient institution to identify individuals and groups stakeholders and to collect input from them

1. Method to identify individuals and groups

- Use Advisory Committees
- Use Internal Focus Groups
- Needs Assessments
- Use Surveys
- Other (Media -- press releases, websites, social media; CED program's quarterly newsletter, "Community Matters")

Brief explanation.

ISU Extension and Outreach conducted a formal needs assessment in 2013, which was reported in the 2014 Annual Report of Accomplishments and Results. Such extensive efforts are undertaken on a periodic basis, and are supplemental to ongoing efforts such as these listed below for 2015.

- Formal advisory boards, by far the most common method employed, specifically invite representation from the organizations and agencies that work in a given area, and may also include producers nominated by extension program specialists, and representatives of the program specialists, campus specialists and campus researchers.
- Web-based needs assessment and listening sessions are open to the public. Targeted groups are identified and contacted. Steering committees identify key individuals to ensure that the invitation list represents the broad spectrum of stakeholders.
- Use of developed mailing list or a random survey of current and potential clientele.
- External Focus groups include information from peer groups. Conduct needs assessments informally via routine contacts with target audience or formally via surveys.
- Extension state and field specialists serve on multiple county and state advisory committees where needs are identified and used to shape program efforts.
- Extension specialists acquired a very good knowledge, increased through hundreds of personal contacts, telephone calls, e-mail messages and blog comments received each year from potential clientele, of the individuals and groups that will have interest in their programs. Recommendations are also received from county-based Extension staff, campus faculty and staff, and commodity/producer organizations.
- Participants provide personal contacts for our planning process; much attention is paid to major client groups and their boards of directors and other key influences. Suggestions from university administration are an excellent source of contributors.
- Faculty and staff are members of coalitions and taskforces at the state and local level that continually review and check changing needs against operational plans.

- Meeting with representatives from state agencies regularly allows for input from consultants to districts throughout the state. Attendance at state and national meetings allow input from individuals, as do email contacts from the web site.
- Media and surveys are used to identify interested stakeholders. State staff hold conversations with individuals in more than 30 key state agencies and state organizations to share information and seek input.
- Post-program site visits and one-on-one interviews with clients to measure impacts and to obtain client feedback.

2(B). A brief statement of the process that was used by the recipient institution to identify individuals and groups who are stakeholders and to collect input from them

1. Methods for collecting Stakeholder Input

- Meeting with traditional Stakeholder groups
- Meeting with traditional Stakeholder individuals
- Survey of traditional Stakeholder individuals
- Meeting specifically with non-traditional groups
- Meeting specifically with non-traditional individuals

Brief explanation.

In Fall 2013, Iowa State University Extension and Outreach conducted a periodic state-wide needs assessment utilizing a Pre-Meeting Survey and Needs Assessment Planning Session, Focus Groups, and an Existing Data Approach.

In addition and on an ongoing basis:

- Meetings with traditional stakeholder groups and individuals are the most common method used.
- Listening sessions with current and potential clients were held.
- Conducted targeted and random surveys to current and potential clients.
- Contacts are ongoing by field staff, county extension staff, and state specialists who work with individual private sector partners.
- Meetings are held with professional associations and advisory boards, and other groups across the state, providing information and asking for input both on existing and emerging issues, and to assist in better understanding local needs.
- Select stakeholders are asked to serve on advisory boards, leadership councils and work teams to help set program direction, develop innovative programs to reach new audiences, and implement strategies to reach desired outcomes.
- Webinars share information and new program direction and receive input from stakeholders.
- Participants are often surveyed about needs and interests.
- Participants are often asked to complete a survey at the beginning and end of training to assess their needs and how the training series can be improved, as well as a self-assessment to identify specific knowledge and skills participants gain from the training. These data are continuously reviewed to modify the training as appropriate. Follow-up surveys sometimes occur, and website contacts for information are provided.
- ISU Extension and Outreach state and field specialists serve on multiple county and state advisory committees where needs are identified. ISU Extension and Outreach staff use this information to shape program efforts.
- Personal contacts initiated by the stakeholders with research and extension/outreach faculty and staff.
- One-on-one interaction, surveys from clients at public meetings, discussions with advisory

board members, e-mail communication including responses to Web and other media.

- Surveys allow those unable to attend meetings to voice opinions about needs and program planning processes. Follow-up meetings with select individuals providing 'missing voices' are conducted to gather broad-based input.
- Each community determines how they collect input, utilizing a variety of methods, including personal conversations, web surveys, speaking to individuals and groups, and work with the media.

3. A statement of how the input will be considered

- In the Budget Process
- To Identify Emerging Issues
- Redirect Extension Programs
- Redirect Research Programs
- In the Staff Hiring Process
- To Set Priorities

Brief explanation.

Below are examples of how stakeholder identified priorities from the ISU Extension and Outreach 2013 statewide needs assessment are being addressed.

Extension to Agriculture and Natural Resources:

- Hired a Water Quality Program Manager, organized a water team, prioritized Iowa Nutrient Reduction Strategy programming implementation.
- Received a Beginning Farmers and Rancher Development Program grant to facilitate successful farm succession.
- Established Farm Financial Task Force, increased number of associates to provide objective analysis of farmers' options and programming on cost control and financial management.
- Increased programming on employer best practices, human resource management.
- Increased support for local foods programming, established state-wide local food system working group, re-established small farms coordinator, developing educational programming for small farm/acreage dwellers.
- Developing modules for non-ag audiences about modern agriculture, food and water issues.
- Initiating Digital Agriculture program to help farmers understand and evaluate use of such technologies to make informed decisions.

Human Sciences Extension and Outreach:

- Stakeholder input considered in development of strategic/operational plan through 2020
- An expansion and enhancement of educational opportunities and programming through reorganization of duties/hires/appointment increases:
 - Scientist I, Strengthening Families 10-14, 50%
 - Faculty members:
 - Family/Early Literacy, 50%
 - Multicultural Education, full-time
 - Food Safety and Consumer Food Production, full-time
 - Specialist:
 - Family Life, increase from 75% to full-time
 - Family Life-Strategic Initiative, increase from 50% to 75%
 - Communications Specialist, increase from 50% to full-time

- Program Coordinator--Hotlines, increase from 50% to full-time
- Development/adaptation of new programmatic offerings, including:
 - Wellness and wellbeing
 - Healthy relationship education
 - Finances of caregiving

Community and Economic Development:

- Created shared position with Univ. Nebr. to provide community and economic development support to Latino populations in Sioux City area and NW Iowa.
 - Part of Iowa Retail Initiative, providing targeted assistance in diverse (incl. Latino and other minorities) retail areas and businesses.
 - Teach Retail-Scapes studio class, engages minority businesses to provide design support to improve retail spaces, introduce new marketing strategies.
 - Part of OpportUNITY Leadership, working to understand poverty in central Iowa, create a plan to decrease poverty among 3 counties, engage diverse community members to help shape the future of central Iowa.
 - Indicators Portal launched as one-stop information site for local and regional level decision makers regarding planning and zoning, economic development initiatives, other community development issues.
 - Specialists fluent in Spanish:
 - support Latino business owners/entrepreneurs in business planning.
 - facilitate "Juntos for a Better Education" programs to help Latino parents and their children make education a family goal.
 - Community Design Lab, through "Agricultural Urbanism Toolkit," works with communities to promote local food systems.

Brief Explanation of what you learned from your Stakeholders

Programs continue to shift to address many of the needs expressed by stakeholders.

Through the needs assessment, ANR stakeholders identified common themes of:

- Water quality / nutrient reduction strategy
- Farm transition: retirement and beginning farmers
- Farm financial health and risk management
- Human resource management.

Other often mentioned topics include:

- Local foods and small farm and acreage living
- Ag literacy for non-farming public and youth
- Technology use and analysis "Big Data".

HSEO learned from stakeholders that our focus on health and wellbeing and expanding human potential are aligned with the needs and desires they expressed. In particular, these specific areas were mentioned (examples provided):

- Family life (examples: relationships, communication, parenting, time and stress management, mental health/disability, pregnancy prevention, bullying, youth development)
- Financial stability (examples: money management, cost of living, estate planning, investments, internet scams)
- Child Care (examples: cost, quality, access)
- Health and Health Care Coverage (examples: environmental issues, nutrition, obesity, physical

- exercise, outdoor education and recreation, healthy children, food safety, insecurity, and systems)
- Growing older (examples: intergenerational issues, health, retirement, caregiving, death)
 - Community capacity (examples: leadership development, visioning, collaboration, knowledgeable local government, and access to education (literacy), housing, jobs, social networks, and resources)

Top issues related to the CED program include:

- Job creation and retention
- Individual and family sustainability
- Capacity building in communities
- Community development support to underserved populations
- Economic development support to underserved populations

IV. Expenditure Summary

1. Total Actual Formula dollars Allocated (prepopulated from C-REEMS)			
Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
9603568	0	7716113	0

2. Totalled Actual dollars from Planned Programs Inputs				
	Extension		Research	
	Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
Actual Formula	8121310	0	7200290	0
Actual Matching	8121310	0	7200290	0
Actual All Other	20506764	0	65668849	0
Total Actual Expended	36749384	0	80069429	0

3. Amount of Above Actual Formula Dollars Expended which comes from Carryover funds from previous				
Carryover	7869268	0	7008578	0

V. Planned Program Table of Content

S. No.	PROGRAM NAME
1	Community and Economic Development
2	Expanding Human Potential
3	Food Security
4	Health and Well-being
5	Natural Resources and Environmental Stewardship
6	Sustainable and Renewable Energy
7	Youth Development

V(A). Planned Program (Summary)

Program # 1

1. Name of the Planned Program

Community and Economic Development

Reporting on this Program

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
608	Community Resource Planning and Development	100%		100%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2015	Extension		Research	
	1862	1890	1862	1890
Plan	9.3	0.0	1.8	0.0
Actual Paid	8.9	0.0	1.8	0.0
Actual Volunteer	4.0	0.0	0.0	0.0

2. Actual dollars expended in this Program (includes Carryover Funds from previous years)

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
912708	0	307194	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
912708	0	307194	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
1453617	0	1003026	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

- Conducted workshops and educational efforts with community organizations, individuals and leaders

to assist developing and implementing plans for physical and social community improvements.

- Conducted research and outreach to communities on planning, zoning, resource management, and community and economic development activities using a variety of information dissemination methods.
- Held training sessions to improve skills of local government officials, community leaders and individuals.
- Provided long-term, disaster-recovery planning assistance to aid Iowa communities that suffered from flooding or other disasters.
- Conducted participatory research, outreach and training with leaders, workers and individuals to improve the effectiveness and skills of leaders and volunteers in community organizations.
- Launched the ISU Extension and Outreach Indicators data portal created in 2014 through which city and county governments are able to access a wide range of products using local finance, economic, and demographic data, all available from one website.
- Faculty participated in relevant multistate research committees NC1030 and NC1034.

2. Brief description of the target audience

Individuals, businesses, organizations, public officials, community leaders, and public and nonprofit organizations in Iowa.

3. How was eXtension used?

eXtension was not used in this program

V(E). Planned Program (Outputs)

1. Standard output measures

2015	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	52817	162831	0	0

2. Number of Patent Applications Submitted (Standard Research Output)

Patent Applications Submitted

Year: 2015
 Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2015	Extension	Research	Total
Actual	0	0	23

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Number of articles, publications, reports, plans.

Year	Actual
2015	1341

Output #2

Output Measure

- Businesses started or improved.

Year	Actual
2015	169

Output #3

Output Measure

- Community leaders and government officials trained.

Year	Actual
2015	3508

Output #4

Output Measure

- Jobs created/retained.

Year	Actual
2015	552

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Community visioning and design: Communities completing quality of life projects.
2	Community planning: Community plans/projects initiated.
3	Community planning: Communities with improved civic functioning.
4	Community economic development: Communities participating in economic development events.
5	Community economic development: Number of jobs created or retained.
6	Community planning: Communities participating in training sessions.
7	Community visioning and design: Number of communities receiving planning and design assistance.
8	Minority community and economic development: Number of people in underserved populations receiving assistance.

Outcome #1

1. Outcome Measures

Community visioning and design: Communities completing quality of life projects.

Not Reporting on this Outcome Measure

Outcome #2

1. Outcome Measures

Community planning: Community plans/projects initiated.

Not Reporting on this Outcome Measure

Outcome #3

1. Outcome Measures

Community planning: Communities with improved civic functioning.

Not Reporting on this Outcome Measure

Outcome #4

1. Outcome Measures

Community economic development: Communities participating in economic development events.

Not Reporting on this Outcome Measure

Outcome #5

1. Outcome Measures

Community economic development: Number of jobs created or retained.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	552

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Due to the housing crisis, financial crisis, and recessionary layoffs, a growing number of people are facing financial stress, credit issues, and loss of income. Small business and jobs creation is particularly important for sustaining family income for many people during economic recovery. Many communities in Iowa lack the resources necessary to develop innovative projects and initiatives designed to improve their economic growth. The recent recession and the property tax cut have further affected economic growth in these communities and they are looking for innovative ways to attract new residents, visitors, and businesses.

What has been done

CED specialists worked with small business owners and entrepreneurs to start or strengthen their businesses, to assist them with writing business plans and navigating the business permit process. Extension CED is part of the Iowa Retail Initiative (IRI), a collaboration to create thriving rural communities that involves College of Design studios in community economic development projects. Extension CED shares joint positions with the Keokuk Area Chamber of Commerce, Des Moines County Extension, the University of Nebraska, West Liberty (WE-LEAD), and Cedar County (CCEDCO), and the regional development organization of southwest Iowa (SWICO). Extension CED continued to conduct tours through its Road Scholar Program.

Results

In 2015, 552 jobs were created or retained. 169 businesses were started or assisted with help from Extension CED. Of those, 57 were minority entrepreneurs. One hundred businesses were expanded or improved, and CED specialists trained 989 business leaders/entrepreneurs. PLACE and IRI assisted more than 30 business owners with on branding/community identity.

4. Associated Knowledge Areas

KA Code	Knowledge Area
608	Community Resource Planning and Development

Outcome #6

1. Outcome Measures

Community planning: Communities participating in training sessions.

Not Reporting on this Outcome Measure

Outcome #7

1. Outcome Measures

Community visioning and design: Number of communities receiving planning and design assistance.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	669

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

A gap exists between demand for planning and design services to rural Iowa communities and the availability of those services. Many smaller communities in Iowa face issues that they are unable to address due to lack of planning personnel and/or resources. Issues facing communities include Iowa's changing demographics, and wellness issues such as adult and childhood obesity. A combination of factors such as aging infrastructure, resistance to additional taxation, depopulation, and lower population density are pushing small local governments' budgets to their limits. Legislative and economic issues also impact nonprofit organizations.

What has been done

The ILR Community Visioning Program assists small Iowa towns in developing design plans that reflect the values and identity of the community. I-WALK evaluates walkability for school children and older adults. The PLACE program partners design classes/individual students with towns and organizations needing design and planning assistance. The Community Design Lab assists towns with design challenges at multiple scales and sees projects through to implementation. CD-DIAL conducts surveys for communities as part of their long-term planning activities. Extension CED trains local governments, COGS, and nonprofits. Extension CED developed the ISU Extension and Outreach Indicators Portal to provide one-stop information for decision makers at both the local and regional levels, as well as to the public.

Results

Ten visioning communities received conceptual design plans, feasibility studies, and implementation planning assistance. ISU Extension CED completed I-WALK (Iowans Walking Assessment Logistics Kit) projects in 3 towns to help create safe routes to school and conducted I-WALK for older adults in 1 town. CDL conducted the Agricultural Urbanism Toolkit project with 3 towns. CED Representatives from 21 communities attended GIS workshops conducted by CED's

Geospatial Technology Program. CED Extension trained nonprofit employees in 6 communities. 279 local government officials, city and county employees, and planners from 80 communities attended CED Extension's Introduction to Planning and Zoning workshop, held at 8 locations throughout the state. The Office of State and Local Government Programs provided training to representatives from 525 communities through 2015 Municipal Professionals Institute/Academy, budget workshops, the Municipal Leadership Academy, On The Road workshops, and annual fiscal report workshops. Training on the Iowa Government Finance initiative was held in 6 towns. Through the PLACE program, College of Design studios conducted design projects in 14 communities.

4. Associated Knowledge Areas

KA Code	Knowledge Area
608	Community Resource Planning and Development

Outcome #8

1. Outcome Measures

Minority community and economic development: Number of people in underserved populations receiving assistance.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	644

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

According to the 2010 US Census, 5% of Iowa's population is Latino, almost double that of the 2000 Census, in which Latinos made up 2.8% of the state's population. The influx of immigrants to the state, particularly to Iowa's rural communities, creates the need for support to New Iowans who do not understand the US tax system, health-care system, and other aspects of US residency, as well as the need for long-time residents to adapt to their communities' changing demographics. All other minority groups, including people who identify two or more races, have grown significantly as well. As Iowa becomes more diverse, the need for business and community development assistance to underserved populations grows.

What has been done

ISU Extension CED continues to aggressively employ outreach strategies for this growing demographic. One-third of CED Extension field staff is fluent in Spanish. CED Extension added a Latino community development specialist in West Liberty, and is working to fill Latino community development specialists in Sioux City and Des Moines County. Alliant Energy awarded CED Extension a \$75,046 grant to conduct a Latino energy-efficiency pilot project. Through programs such as JUNTOS, CED Extension educates youth on career options as well as strategies for pursuing higher education. CED is building relationships with minority populations in the urban areas in Iowa broadly, and Des Moines and Cedar Rapids specifically, in partnership with the Black Business Coalition, Black Business Consortium, NAACP, OpportUNITY and others.

Results

CED specialists provided JUNTOS training for 96 Latinos, and provided citizenship training for 56 minorities, leadership training to 131 minorities, and education, outreach and/or facilitation to 188 people in minority populations. CED specialists assisted 95 entrepreneurs from underserved populations in starting or expanding their businesses. During the past year, CED specialists assisted with starting or improving 57 minority businesses and with creating 81 jobs and retaining 248 jobs for minority employees. PLACE and IRI assisted 21 Latino business owners with branding/community identity. CED specialists conducted an energy-efficiency pilot project in Storm Lake, resulting energy-efficiency education of 57 Latino residents, 25 energy audits and 18 rebates, saving participants at total of nearly \$17,000.

4. Associated Knowledge Areas

KA Code	Knowledge Area
608	Community Resource Planning and Development

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Natural Disasters (drought, weather extremes, etc.)
- Economy
- Appropriations changes
- Populations changes (immigration, new cultural groupings, etc.)

Brief Explanation

The economy is a major external factor affecting ISU Extension CED outcomes because not only has it led to a shrinking state budget, but because more communities need assistance with budgeting and financial management, and some local businesses are struggling. That said, the economic climate is good for entrepreneurship. Natural disasters that occurred as far back as 2008 continue to affect Extension CED outcomes. Communities such as Cedar Rapids are still recovering from the 2008 flood, east central Iowa is still rebuilding after flat-line winds, and more than half of the trees in Mapleton were destroyed by a tornado in 2011. CED specialists have been working with these communities on issues such as affordable housing, land use practices, population shifts, and other disaster-related issues. The immigrant population of Iowa continues to grow and CED has responded with diversity training, assistance for immigrant entrepreneurs, and training on parenting skills, budgeting, and language.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

These community projects involve random sample surveys in such topic areas as health care, health systems, economic development, land use, transportation, and environment and conservation. For the Community Visioning Program, focus groups were conducted in 10 communities to obtain feedback from specific demographics for the development of transportation enhancement concepts. Extension sociology will continue the annual Iowa Farm and Rural Life Poll. The I-WALK project surveyed teachers and conducted mapping workshops with parents and children in communities that needed to assess their routes to school.

Key Items of Evaluation

Need for better community programming. Community programming is often not intuitively related to what is seen as Agricultural Extension. CED continued to publish its quarterly newsletter and improve the CED and the Program Builder websites, and continues to develop ongoing programming into products. The College of Design's Community Design Lab helps communities think through design challenges at multiple scales, many of which are part of disaster recovery (e.g., Cedar Rapids). Providing support in disaster recovery is crucial with the increasing number of severe weather events in Iowa. Several CED initiatives addressed healthy communities (I-WALK, Community Visioning, CDL). CED continues to develop programming for the growing Latino population in Iowa, including the creation of a second Latino business and community development specialist.

V(A). Planned Program (Summary)

Program # 2

1. Name of the Planned Program

Expanding Human Potential

Reporting on this Program

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
607	Consumer Economics	0%		28%	
801	Individual and Family Resource Management	30%		28%	
802	Human Development and Family Well-Being	50%		20%	
803	Sociological and Technological Change Affecting Individuals, Families, and Communities	0%		21%	
805	Community Institutions, Health, and Social Services	20%		3%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2015	Extension		Research	
	1862	1890	1862	1890
Plan	16.6	0.0	2.8	0.0
Actual Paid	12.1	0.0	3.6	0.0
Actual Volunteer	0.0	0.0	0.0	0.0

2. Actual dollars expended in this Program (includes Carryover Funds from previous years)

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
1032104	0	428260	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
1032104	0	428260	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
2526377	0	591336	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

Short term and in-depth sequential educational programs targeted individuals, families, professionals, and community leaders through one-on-one education, workshops, meetings, conferences, online learning, and social and mass media to strengthen the impact of increased knowledge, improved skills and positive behavior changes. The changes contributed to greater financial security and family well-being. Curricula, on-line tools, and other educational resources were developed for use in training, technical assistance, and facilitation of community-based processes. Selected programs were evaluated to assess program impacts and ways to make continuous improvements.

Faculty participated in relevant multistate research committees NC1030, NC1198, and NC2172.

2. Brief description of the target audience

Parents of children, teens, and young adults, families with lower incomes, child and family caregivers, family serving professionals, health professionals, worksite employees, policy makers, businesses, community members and leaders, adults, older adults, education professionals, and employers.

3. How was eXtension used?

ISU Extension resources were promoted and linked to eXtension (e.g., Science of Parenting blogs, podcasts, specific publications), and specially promoted eXtension's US Trustee-approved financial education course for bankruptcy and resource to parents/primary caregivers. Additionally, eXtension resources were actively promoted to Iowa early care and education and family support professionals through conference displays, health fairs, and social media. The eXtension-Family Caregiving resource is linked on the Powerful Tools for Caregivers web page. This resource is also shared with newly trained class leaders.

V(E). Planned Program (Outputs)

1. Standard output measures

2015	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	55802	79997	22497	7485

2. Number of Patent Applications Submitted (Standard Research Output)

Patent Applications Submitted

Year: 2015
 Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2015	Extension	Research	Total
Actual	0	0	19

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Number of parents and family members in educational programs related to child care, parenting, couple relationships, and aging.

Year	Actual
2015	41942

Output #2

Output Measure

- Number of professionals involved in programs related to child care, aging, couple relationships, and parenting.

Year	Actual
2015	8037

Output #3

Output Measure

- Number of individuals participating in family finance educational programs.

Year	Actual
2015	4931

Output #4

Output Measure

- Number of professionals or community volunteers trained to work with families on financial management.

Year	Actual
2015	136

Output #5

Output Measure

- Number of adults participating in educational programs that increase awareness of public issues.

Year	Actual
2015	756

Output #6

Output Measure

- Number of community groups formed to address a public issue.

Year	Actual
2015	13

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Number of parents improving parenting skills.
2	Percent of professionals trained to provide education and/or support to families.
3	Percent of early child care programs improving learning environments and teaching strategies.
4	Percent of caregivers better able to manage later life issues.
5	Number of communities who report taking action to address public issues related to improving circumstances for children, youth and families at risk.
6	Percent of individuals improving personal and family financial management skills.
7	Percent of individuals making progress toward financial goals.
8	Percent of professionals or volunteers who are better prepared to apply or teach financial management skills.
9	Number of communities reporting taking actions to improve circumstances for older Iowans.
10	Percent of parents who improved parenting.
11	Number of professionals trained to provide education and/or support to families.

Outcome #1

1. Outcome Measures

Number of parents improving parenting skills.

Not Reporting on this Outcome Measure

Outcome #2

1. Outcome Measures

Percent of professionals trained to provide education and/or support to families.

Not Reporting on this Outcome Measure

Outcome #3

1. Outcome Measures

Percent of early child care programs improving learning environments and teaching strategies.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	89

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Iowa currently ranks second in the nation for the percentage of young children with employed parents. More than 70% of Iowa children from birth through age 6 are in child care. Demand is high for quality early childhood programs. By 2020, the number of child care professionals is expected to increase nationally by 20%. Research has shown that the early years in a child's life represent a critically important window of opportunity to develop a child's full potential and shape key academic, social, and cognitive skills that determine a child's success in school and in life.

What has been done

The Better Kid Care New Staff Orientation program provided 16 hours of instruction for preschool and child care center staff and 6 hours of online instruction for child care center directors. The Early Childhood Environment Rating Scale (ERS) program provided child care professionals with a self-assessment, sequentially based instruction and guidance in developing a program improvement plan to strengthen the quality of early childhood education. Formal, independent Environment Rating Scale Assessments were provided for 125 child care classrooms. Early Childhood Consultants working for Child Care Resource and Referral and Department of Public Health participated in a 15-hour skill-based introductory program and/or a four-day consultant credential and mentor credential program. Over 50 single topic child care provider workshops on health and safety and early learning were conducted across the state. Website resources and the Let's Talk Child Care Blog were developed to support training efforts.

Results

787 child care or preschool teachers and 117 directors participated in the NSO program, completing 14,800 training hours. Preschool teachers completed workbook portfolios and showed statistically significant ($p < .001$) gains in each of the 11 NSO outcomes leading to improved child care quality and practice. Environment Rating Scale training participants completed self-assessments and began program improvement plans. A retrospective survey of child care professionals ($n=437$) participating in the Early Childhood Environment Rating Scale training indicated that 89% of participants could better identify strengths and limitations, prioritize changes and initiated a workable plan for program improvement. Early Childhood Education consultants received coaching and consultation training. In the I-Consult program, 39 early childhood education consultants learned and demonstrated skills in coaching and consultation, 9 consultants earned an I-Consult credential, 3 consultants earned an I-Consult Mentor Credential. Across all early childhood training programs 4922 participants demonstrated documented changes in learning environments and teaching strategies.

4. Associated Knowledge Areas

KA Code	Knowledge Area
802	Human Development and Family Well-Being

Outcome #4

1. Outcome Measures

Percent of caregivers better able to manage later life issues.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
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2015

100

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Based on a 2015 study by the National Alliance for Caregiving and AARP, 18.2% (43.3 million) of the U.S. population provided unpaid care to an adult or a child in the prior 12 months. The impact on caregivers is threefold: physical, emotional, and financial. One in 5 caregivers indicate their health is fair or poor and 1 in 4 say their health has declined from caregiving. One in 5 report a high level of physical strain. Two in 5 consider their caregiving situation emotionally stressful. Improved self-care practices by family caregivers leads to reduced reliance by caregivers on health care and public services.

What has been done

21 Class leaders trained by ISUEO master trainers co-led Powerful Tools for Caregivers programs in their communities. This program is a series of six classes designed to empower family caregivers to take better care of themselves so they can thrive, not just survive.

Results

183 family caregivers participated in Powerful Tools for Caregivers series and 100% of the caregivers who completed the evaluation survey reported increased self-care practices (increased exercise, use of relaxation techniques, health self-care) after participation. They also increased self-confidence in their caregiver roles and improved management of emotions. The participants indicated an increased knowledge of resources and how to access them.

4. Associated Knowledge Areas

KA Code	Knowledge Area
802	Human Development and Family Well-Being

Outcome #5

1. Outcome Measures

Number of communities who report taking action to address public issues related to improving circumstances for children, youth and families at risk.

Not Reporting on this Outcome Measure

Outcome #6

1. Outcome Measures

Percent of individuals improving personal and family financial management skills.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	71

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Iowa lags the nation in median household income and has experienced a decline in real median income in recent years (American Community Survey, 2012). The poverty rate has trended upward in Iowa over the last decade. Empirical research documents consumers' limited knowledge and skills to manage finances effectively. Financial management skills help families set priorities, develop plans for use of limited resources, reduce stress, and maximize satisfaction. Skills in accessing, evaluating and using reliable, unbiased and noncommercial information facilitate making informed decisions in an increasingly complex marketplace. Consumers who are knowledgeable and skilled decision-makers are more likely to make wise financial decisions, use appropriate financial products and services, and build long-term financial security.

What has been done

Financial management skill-building programs were attended by 4,847 adults. Research-based programs targeted low- and moderate-income families to improve basic budgeting, credit management and banking skills. Money Talk workshops addressed challenges unique to women. Smart investing@your library, a program focused on strengthening saving and investing skills, was a partnership with rural public libraries. Smart Choice sessions promoted health insurance literacy. Online courses targeted young families learning to take control of finances and first-time home buyers. Publications, news releases, a blog and webinars reached consumers with timely, research-based information.

Results

At the conclusion of at least two financial management workshops, 71% (223 of 312) of participants surveyed reported improved money management skills; this average includes 75% of participants in Your Money, Your Future basic budgeting classes who completed surveys reported improved skills in record-keeping, planning, evaluation and assessment or access to reliable sources of information; 100% of Money Talk participants reported improved management skills; and, using a pre- and post-tests, 87% of Smart Investing participants scored higher on a knowledge test while 71% reported improved ability to discuss financial topics with other family members.

4. Associated Knowledge Areas

KA Code Knowledge Area

801 Individual and Family Resource Management

Outcome #7

1. Outcome Measures

Percent of individuals making progress toward financial goals.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	70

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

With stagnant wages and an increasingly complex marketplace, consumers face growing challenges in using financial resources in ways that are consistent with their goals. Research shows that those who set specific goals are more likely to achieve them. Those who close the gap between current and desired conditions are more likely to report satisfaction or higher levels of economic well-being. Failure to set goals often leads to mismanagement of scarce resources and significant social and economic cost to families and society.

What has been done

Financial management workshops were attended by 4,847. Workshops focused on the goal-setting process and addressed specific financial goals (e.g., basic planning skills to achieve a balanced budget, credit management, saving and investing, retirement planning, and estate planning). Basic money management workshops emphasized setting realistic, achievable goals. Over a series of 5 weeks, Money Talk participants addressed financial planning, credit, insurance and investment goals. Smart Investing participants took hybrid courses, meeting face-to-face at the beginning and following a four-part online course.

Results

On average, 70% (218 of 312) of participants in sequenced, in-depth workshops exhibited behavior change-making progress toward specific financial goals. 74% of participants in basic money management workshops reported making progress in achieving budgeting goals, credit management or using banking services. Among participants in Money Talk workshops, 88% reported progress on savings goals, reduction of consumer debt, improved retirement preparedness, and adequacy of legal preparedness for future life events. Using pre- and post-tests, 53% of the participants in the 6-week Smart Investing course reported an increased number

of specific financial actions, including assessing their risk tolerance, estimating retirement saving needs, and using financial resources at the public library.

4. Associated Knowledge Areas

KA Code	Knowledge Area
801	Individual and Family Resource Management

Outcome #8

1. Outcome Measures

Percent of professionals or volunteers who are better prepared to apply or teach financial management skills.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	83

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

A growing body of research evidence supports integration of financial education into existing, on-going programs and venues that consumers frequent are often more effective than stand-alone, one-time offerings. Training professionals and volunteers to teach financial skills in non-formal settings can be very effective in extending outreach and changing behaviors. Iowa schools now require financial literacy education. Iowa has a shortage of Volunteer Income Tax Assistance sites--particularly in rural areas. Social service and other family-serving agencies see the financial challenges facing their clients, but are ill-prepared to help.

What has been done

Professional developments workshops, conference displays and media have been used to make Iowa teachers aware of the High School Financial Planning curricula. Hundreds receive introductory packets at teacher conferences; 73 teachers ordered HSFPP materials to teach 2,485 students. Extension trained 34 VITA volunteers who completed 1,352 returns at no cost to the filers. Working with the Consumer Financial Protection Bureau, 89 family-serving agency staff participated in all-day training sessions on the use of the new Your Money, Your Goals toolkit.

Results

On average, 83% (57 of 69) professionals and volunteers who completed evaluations reported being better prepared to apply or teach financial management skills. Using pre- and post-tests, 90% of the professionals attending the Your Money, Your Goals financial coaching training reported increased understanding of how to access and use tool and materials from the CFPB website. Five of the 11 teachers who completed a survey at the conclusion of a HSFPP curriculum training reported being better prepared to teach financial literacy. All VITA volunteers successfully completed IRS examinations and prepared 1,352 tax returns, returning \$745,942 in EITC refunds. VITA helps many low- and moderate-income lowans avoid tax preparation fees and secure EITC refunds that circulate in the local economy and bolster family financial security.

4. Associated Knowledge Areas

KA Code	Knowledge Area
801	Individual and Family Resource Management

Outcome #9

1. Outcome Measures

Number of communities reporting taking actions to improve circumstances for older lowans.

Not Reporting on this Outcome Measure

Outcome #10

1. Outcome Measures

Percent of parents who improved parenting.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	92

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Parenting education reduces tax dollar expenditures by helping to create stable families, reduce reliance on public assistance, and reduce risky behaviors. The adjusted 2013-14 four year high

school graduation rate in Iowa was 90.5% overall, but was lower for Blacks (78.6%), Latinos (81.7%), youth with limited English proficiency (83.1%) and youth who were economically disadvantaged (84.1%). Youth who fail to complete high school are more likely to use governmental resources, and are at high risk of being unemployed or incarcerated, and having poorer physical and mental health. Increasing parental involvement in school and parental academic motivation promotes academic success among youth.

What has been done

15,657 parents/caregivers participated in parenting education workshops and wrap-around components. Thousands more were reached (newsletters, podcasts, blogs, and websites). Research- and evidence-based curricula implemented include: SFP 10-14/Familias Fuertes to prevent youth substance abuse; Family Story Teller, family literacy program; Together We Can: Creating a Healthy Future for Our Children, a program focused on strengthening alliance between parents who have young children; Growing Strong Families, a home visitation program on parenting, nutrition, health and family finance skills for parents of children 0-5 years; and Juntos Para Una Mejor Educación, a program that increases knowledge/skills of Latino youth and their parents/caregivers to help youth complete high school and pursue higher education.

Results

100% of parents who participated in Juntos Para Una Mejor Educación (n=63) reported increased confidence in working with their child's school, monitoring their child's homework, and increased knowledge about courses their child needs to take to be prepared for college, and about college admission and application procedures. Two parents completed their GEDs and applied to community colleges. 92% (n=730) of parents who participated in extension parenting programs improved their parenting skills. ISUEO trained professionals to deliver SFP 10-14 (Strengthening Families Program: For Parents and Youth 10-14). For every dollar spent on the program, \$9.60 is saved by reducing substance abuse and other youth risky behavior. 84% (n=158) of parents who participated in retrospective pre-posttest surveys after participating in SFP 10-14 improved their communication skills with their family members. In Iowa, 320 parents and youth participated in the program.

4. Associated Knowledge Areas

KA Code	Knowledge Area
802	Human Development and Family Well-Being

Outcome #11

1. Outcome Measures

Number of professionals trained to provide education and/or support to families.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	1136

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Effective family life education relies heavily on quality implementation, specifically how individuals are trained, supervised, and supported in their work with families. Professionals must learn to work across cultures, disciplines, and systems, master a growing and diverse body of knowledge, be adept at processes and methods that truly strengthen families, and produce dramatic results in short periods of time with decreasing funding.

What has been done

115 professionals were trained by ISUEO staff in evidence-based (SFP 10-14) and research-based (Juntos Para Una Mejor Educación) curricula to deliver parenting education directly to families. Additionally, 21 individuals were trained in an evidence-based curriculum (Powerful Tools for Caregivers) to deliver caregiver education to families.

Results

71 professionals and extension staff implemented the Juntos program in 7 Iowa communities. Youth were connected to 4-H youth development for additional life skills education, and visited institutes of higher education. Two parents completed their GEDs and applied to community colleges. 48 professionals implemented SFP 10-14 in 13 Iowa communities.

4. Associated Knowledge Areas

KA Code	Knowledge Area
802	Human Development and Family Well-Being

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Natural Disasters (drought, weather extremes, etc.)
- Economy
- Appropriations changes
- Public Policy changes
- Government Regulations
- Competing Public priorities
- Competing Programmatic Challenges
- Populations changes (immigration, new cultural groupings, etc.)
- Other (staff changes)

Brief Explanation

A continued period of slow economic growth constrains lowans' incomes and their abilities to achieve financial goals. Two long-time field staff and a faculty member with family finance expertise retired or resigned during this program year. A process of hiring new staff was implemented, but in the short term these staff changes reduced our abilities to maintain the same level of family finance program outputs. Specifically, these changes, limited staffing in the state IRS SPEC office, and the increasing difficulty in recruiting and retaining volunteers reduced our ability to support rural VITA sites. An increasingly diverse population challenges our ability to meet the learning needs of varied audiences across the state. Staff and trained volunteers, as well as local Extension councils, are not as prepared as needed to engage and implement educational programming with increasingly diverse (e.g., race, socioeconomic status, gender, age) audiences. Professional development opportunities and trainings related to diversity and inclusion have been initiated this year. Also, to address changing demographics and population areas within the state, a new programming model was implemented approximately 18 months ago, which created changes in staff assignments and re-established partnerships in some geographic areas. The faculty and staff operating within this plan of work remain committed to educational programming that aids learning and changes behavior to enhance the health and well-being of consumers and families.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

Pre and post surveys from parents reveal that 92% (n=730) of parents who participated in extension parenting programs improved their parenting skills. Follow up surveys with parents who participated in Juntos Para Una Mejor Educación program reveal that 100% of the parents increased one or more of the following: confidence in working with their child's school, monitoring their child's homework, increased knowledge about courses their child needs to take to be prepared for college, college admission and application procedures, and increased communication with their youth about their future goals.

Evaluation of in-depth, sequential family finance programs yielded the following results:

- 71% of participants surveyed during the last session of sequential financial

management workshops reported improved financial skills;

- 70% of participants surveyed during the last session of sequential financial management workshops reported making progress toward financial goals; and
- 83% of professionals or volunteers are better prepared to apply or teach financial management skills

Extension-sponsored rural VITA sites helped eligible Iowans access \$745,942 in refundable Earned Income Tax Credits.

Key Items of Evaluation

92% of parents who participated in extension parenting programs improved their parenting skills. Parents who participated in the Juntos Para Una Mejor Educación program have increased their confidence in working with their child's school, monitoring their child's homework, and increased communication with their youth about their child's future goals. 71% of participants surveyed during the last session of sequential financial management workshops reported improved financial skills.

V(A). Planned Program (Summary)

Program # 3

1. Name of the Planned Program

Food Security

Reporting on this Program

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
102	Soil, Plant, Water, Nutrient Relationships	20%		1%	
131	Alternative Uses of Land	4%		0%	
132	Weather and Climate	4%		1%	
201	Plant Genome, Genetics, and Genetic Mechanisms	0%		4%	
202	Plant Genetic Resources	0%		4%	
205	Plant Management Systems	11%		16%	
212	Pathogens and Nematodes Affecting Plants	2%		14%	
216	Integrated Pest Management Systems	9%		2%	
301	Reproductive Performance of Animals	4%		1%	
302	Nutrient Utilization in Animals	4%		14%	
303	Genetic Improvement of Animals	4%		23%	
305	Animal Physiological Processes	0%		3%	
311	Animal Diseases	0%		5%	
401	Structures, Facilities, and General Purpose Farm Supplies	7%		0%	
405	Drainage and Irrigation Systems and Facilities	4%		1%	
503	Quality Maintenance in Storing and Marketing Food Products	0%		4%	
601	Economics of Agricultural Production and Farm Management	8%		1%	
602	Business Management, Finance, and Taxation	7%		1%	
603	Market Economics	8%		1%	
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins	4%		4%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2015	Extension		Research	
	1862	1890	1862	1890
Plan	27.1	0.0	47.2	0.0
Actual Paid	21.3	0.0	30.8	0.0
Actual Volunteer	29.0	0.0	0.0	0.0

2. Actual dollars expended in this Program (includes Carryover Funds from previous years)

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
2570197	0	4736543	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
2570197	0	4736543	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
9399438	0	49811289	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

- Continue to be a leading research institution on basic and applied questions impacting Iowa's ability to increase agricultural production capacity.
- Maintain and strengthen extension education programs targeting Iowa farmers that develop their skills to evaluate and adopt emerging technologies, including regional food production & distribution, and best management practices.
 - Hire and retain faculty and staff that are committed to the success of Iowa agriculture.
 - Foster integrated research/extension teams to address priorities facing Iowa farmers and assist with risk management when making decisions for their operations.
 - Support professional development of faculty and staff to ensure that they are competitive in external funding, respected by peers and producers and proud and productive colleagues.
 - Educate both producers and consumers regarding local food production and marketing.
 - Assist farmers adapting to the impacts of extreme weather fluctuations (flooding, drought and high temperatures) on crop and livestock production.
 - Faculty participated in relevant multistate research committees NC7, NC140, NC205, NC213, NC1023, NC1029, NC1030, NC1034, NC1170, NC1173, NC1177, NC1182, NC1183, NC1184, NC1190, NC1194, NC1195, NC1197, NC1198, NC1200, NC2040, NE1020, NE1227, NE1334, NE1442, NRSP7, NRSP8, S294, S1032, S1055, S1062, W2006, W2010, W3168, and W3171.

2. Brief description of the target audience

Agricultural producers and landowners in Iowa and the agribusinesses and agencies that interact with them. Policy makers that impact agriculture. Existing and beginning farmers are increasingly interested in producing value crops and livestock and market them in such a way as to retain a larger

share of consumer expenditures on food. Processors, distributors, retailers and institutions interested in buying more locally produced food products. Agricultural professionals who serve farmers and influence their decisions regarding production and marketing options.

As programming is developed, audiences will be targeted. Targeted audiences must be those with whom research and education can make a difference, and who can benefit from and apply research-based information, such as those whose production systems are affected by extreme weather, as well as those who consult or influence the decision-makers of these growers and producers. Audiences include farmers and landowners who are returning flooded soils to production through adaptation of science-based reclamation strategies, and crop and livestock farmers impacted by low farm income.

3. How was eXtension used?

eXtension was not used in this program

V(E). Planned Program (Outputs)

1. Standard output measures

2015	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	156718	13246	0	0

2. Number of Patent Applications Submitted (Standard Research Output)

Patent Applications Submitted

Year: 2015
 Actual: 3

Patents listed

Genetic Test and Genetic Basis for SCID in pigs. Dekkers et al. Filed 1/8/2015.

Yield Measurement and Base Cutter Height Control Systems for a Harvester. Darr. Filed 10/29/2014.

Materials and Methods for Using an Acyl-Acyl Carrier Protein Thioesterase and Mutants and Chimeras Thereof in Fatty Acid Synthesis. Nikolau et al. Patent # 8,951,762 issued 2/10/2015. Also applies to the Sustainable and Renewable Energy program.

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2015	Extension	Research	Total
Actual	0	0	243

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Number of producers and agribusiness professionals who attended face-to-face educational activities, including individual consultations.

Year	Actual
2015	118324

Output #2

Output Measure

- Number of producers and agribusiness professionals who subscribed to newsletters and access web-based resources.

Year	Actual
2015	1127695

Output #3

Output Measure

- Number of producers or agribusiness professionals who gained knowledge in safe pesticide application through attending pesticide applicator Continuing Instructional courses or pesticide safety education programs.

Year	Actual
2015	11710

Output #4

Output Measure

- Number of local food producers attending extension programs.

Year	Actual
2015	51

Output #5

Output Measure

- Number of popular press articles and publications authored by Extension specialists.

Year	Actual
2015	358

Output #6

Output Measure

- Number of lowans receiving food safety certification.

Not reporting on this Output for this Annual Report

Output #7

Output Measure

- Number of adult participants in Extension programs on food safety.

Not reporting on this Output for this Annual Report

Output #8

Output Measure

- Number of visits on Iowa State University Extension food safety project websites.

Not reporting on this Output for this Annual Report

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Number of increased efficiencies _____ (i.e. % pregnant; increases in yield/unit, such as bushels/acre; lbs product (meat, protein, milk) per animal; lbs feed per gain).
2	Number of producers indicating adoption of recommended practices.
3	Number of producers reporting increased dollar returns per unit of production.
4	Number of producers and landowners who adopt BMPs after extreme weather events.
5	Number of crop and livestock producers who increase their knowledge on marketing, insurance or USDA program alternatives that are consistent with the risk bearing ability of their businesses and their personal preferences for managing risk.
6	Number of intergenerational transfers or new farm businesses who learn strategies on how to successfully transition farming operations within their family, or understand the risks and opportunities connected to starting a farming enterprise.
7	Number of producers indicating their ability to identify crop diseases and implement recommended management strategies.
8	Number of people interested in local food production and marketing who received MarketReady Training
9	Number of start-up businesses that show economic benefits from Extension recommendations.
10	Dairy producers and dairy consultants who enhanced their knowledge of dairy nutrient best management practices and adopted practices to maximize nutrient economics and environmental stewardship

Outcome #1

1. Outcome Measures

Number of increased efficiencies _____ (i.e. % pregnant; increases in yield/unit, such as bushels/acre; lbs product (meat, protein, milk) per animal; lbs feed per gain).

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	7

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

The national beef cow herd has been at record low numbers resulting in all-time high beef prices. Growth of the national beef herd will require improved management of the replacement and first-calf heifer to improve both conception and retention. As it takes as many as 5 calves before a replacement female recoups her development costs, implementation of best management practices are critical to ensure profitable herd expansion. Expansion of the cowherd not only helps support a strong cow-calf industry, but also adds value to Iowa's economy and ensures a consistent supply of high quality, affordable beef for the consumer.

What has been done

In 2012, the Iowa Beef Center and allied industry partners conducted a state-wide meeting series focused on best management practices for developing the yearling female with over 600 producers attending. Because of the success of the first series, a second state-wide series was conducted focusing on best management practices of first-calf females to promote longevity. "Heifer development: Retaining Your Investment" was conducted at twelve locations in January and February 2014, with 308 people attending. A flash drive containing the presentations as well as fact sheets, newly developed decision tools, and information pertaining management of first-calf heifers were distributed. Video recordings of multiple best management practices have been made available through the Iowa Beef Center channel on YouTube.

Results

[6.5% increased efficiency] A follow-up survey showed that attendees manage in excess of 30,000 cows, and planned to develop almost 8200 heifers in 2014. On average, respondents improved pregnancy rates of their 1st-calf heifers by 3% and the program reduced culling rates of 1st and 2nd calf heifers by 3.5%. The 2014 program resulted in retention of an additional 223 first- and second-calf females per year. Based on the current Net Present Value decision tool

developed for this program, this program helped producers realize an economic benefit of \$303,726 from reductions in cull females. Respondents reported \$1640 increased profitability per year, resulting in a total economic impact of \$475,600 per year for the 2014 program. When combined, the 2012 and 2014 programs have had an economic impact of \$1 million per year for the 900 attendees of the live series. An additional 4,400 people have been educated through YouTube virtual classroom, and an additional 3,450 producers have downloaded the decision aides and accompanying fact sheets on the Ag Decision Maker web site.

4. Associated Knowledge Areas

KA Code	Knowledge Area
301	Reproductive Performance of Animals
302	Nutrient Utilization in Animals
303	Genetic Improvement of Animals
305	Animal Physiological Processes
601	Economics of Agricultural Production and Farm Management

Outcome #2

1. Outcome Measures

Number of producers indicating adoption of recommended practices.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	15906

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

A. The national beef cow herd has been at record low numbers resulting in all-time high beef prices. Growth of the national beef herd will require improved management of the replacement and first-calf heifer to improve both conception and retention. As it takes as many as 5 calves before a replacement female recoups her development costs, implementation of best management practices are critical to ensure profitable herd expansion. Expansion of the cowherd not only helps support a strong cow-calf industry, but also adds value to Iowa's economy and ensures a consistent supply of high quality, affordable beef for the consumer.

B. The most recent "Survey of Land Ownership and Tenure" found that 55 percent of farmland in Iowa is under a lease; this includes 42 percent under a cash lease, 12 percent crop-shared and 1 percent other. This same survey also found that 60 percent of leased farmland is owned by people who do not live on a farm. Thus, providing lease meetings to producers and their landowners gives both parties research based information for negotiating rental contracts and creating a shared knowledge base among participants.

C. The Agricultural Act of 2014 (2014 Farm Bill) was signed into law February 2014. This new Farm Bill established a set of new government programs to support agricultural producers during periods of low prices and/or revenues for agricultural products. University Extension agents from across the nation were tasked with educating farmland owners and farmer-operators about the new programs. There were several steps to enrollment in the new programs. Thus, educational efforts needed to explain the programs and instruct on the process by which producers would sign up and receive potential payments.

What has been done

A. In 2012, the Iowa Beef Center and allied industry partners conducted a state-wide series of meetings that focused on best management practices for developing the yearling female with more than 600 producers attendees. Because of the success of the first series, a second state-wide series was conducted focusing on best management practices of first-calf females to promote longevity. "Heifer development: Retaining Your Investment" was conducted at 12 locations in January and February 2014, with 308 people attending. A flash drive containing the presentations, as well as fact sheets, newly developed decision tools, and information on management of first-calf heifers were distributed. Video recordings of best management practices have been made available through the Iowa Beef Center channel on YouTube.

B. The ISU Farm Management field specialist team hosts a large set of meetings for landowners and farmer-tenants on farmland leasing across Iowa. The team also provides leasing discussions at other ISU Extension and Outreach meetings, such as Annie's Project and Crop Advantage meetings. At the stand-alone leasing meetings, participants receive an extensive leasing publication detailing information about land values, laws related to farmland leasing, various approaches to determining rental rates, and other factors that influence farmland rental rates.

C. The ISU Farm Management field specialist team hosted over 230 meetings for landowners and farmer-tenants on the 2014 Farm Bill across Iowa. The team provided Farm Bill discussions at other ISU Extension and Outreach meetings, such as Annie's Project and Crop Advantage meetings. The team partnered with state and local USDA-Farm Service Agency staff to provide content and present. The team, along with campus staff, created a resource library on the new Farm Bill, including 10 newsletter articles, 8 extension publications, 6 online decision tools, and 15 webinars.

Results

A. (n=277) A follow-up survey showed that attendees manage in excess of 30,000 cows and plan to develop close to 8,200 heifers in 2014. 90% of survey respondents implemented or plan to implement a new best management practice as a result of the 2014 program. On average, respondents improved pregnancy rates of their 1st-calf heifers by 3% and the program reduced culling rates of 1st and 2nd calf heifers by 3.5%. The 2014 program resulted in retention of an additional 223 first- and second-calf females per year. Based on the current Net Present Value decision tool developed for this program, this program helped producers realize an economic benefit of \$303,726 from reductions in cull females. Respondents reported \$1640 increased profitability per year, resulting in a total economic impact of \$475,600 per year for the 2014

program. When combined, the 2012 and 2014 programs have had an economic impact of \$1 million per year for the 900 attendees of the live series. An additional 4,400 people have been educated through YouTube virtual classroom, and an additional 3,450 producers have downloaded the decision aides and accompanying fact sheets on the Ag Decision Maker web site.

B. (n=629) Eighty-one stand-alone leasing meetings were held in 2015, with 1,850 attendees. As mentioned earlier, 24% of participants in leasing meetings indicated that their rental rates would decline in the following year. 10% of participants are moving from an oral lease agreement to a written one. Prior to the stand-alone leasing meetings, 18% of participants considered their farmland leasing knowledge level as good to excellent. Post-meeting, 73% of participants rated their knowledge as good to excellent. The subject matter where participants noted the largest knowledge gain was in "Methods to determine a 'fair' cash rent", increasing from 25% good to excellent pre-meeting to 90% good to excellent post-meeting. The meetings provide education and research to a large audience of off-farm landowners that are often not addressed through popular farm publications. At the stand-alone leasing meetings, 49% of participants were non-farming landowners. The leasing meetings provided a needed component as these landowners work with their tenant-farmers to establish farmland rental rates.

C. (n=15000) More than 15,000 individuals participated in the Farm Bill meetings. The information provided during the meeting helped guide participants' decision in choosing among the programs offered. Based on the 150,000 farms signed up in Iowa, the ISU Farm Management Farm Bill educational effort may have reached 10% of the total potential clientele, all within a limited six-month window. As the Farm Bill process involved landowners, tenant operators, and owner-operators, the educational effort targeted all 3 groups. More than 150,000 farms in Iowa are now enrolled in one of the 2014 Farm Bill programs (Ag Risk Coverage [ARC] or Price Loss Coverage [PLC]). The owners/operators of these farms control over 22.5 million acres in Iowa (roughly 2/3rds of the state's land area). And as of December 6, 2015, those owners/operators had received \$908 million in assistance from the 2014 Farm Bill programs. The economic impact of Farm Bill programs in Iowa is substantial. As indicated earlier, over \$900 million has already been released to Iowa agricultural producers. And that economic stimulus will ripple through Iowa's rural communities.

4. Associated Knowledge Areas

KA Code	Knowledge Area
301	Reproductive Performance of Animals
302	Nutrient Utilization in Animals
303	Genetic Improvement of Animals
305	Animal Physiological Processes
601	Economics of Agricultural Production and Farm Management
603	Market Economics

Outcome #3

1. Outcome Measures

Number of producers reporting increased dollar returns per unit of production.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	160

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Proper ventilation of swine buildings is important for various reasons. Animal well-being is important, keeping them comfortable in the thermo-neutral temperature zone as less temperature stress has been shown to reduce the risk of disease. Energy use is important to producers and consumers--producers to reduce cost of production and increase competitive position, while the public benefits from lower energy use reducing carbon emission. Additionally, proper ventilation increases the health of the animals, reducing the need for treatment medication. Learning how to properly operate swine building ventilation systems is important, not only for producer profit, but also carbon footprint reduction through lower energy use.

What has been done

Workshop curriculum has been refined, potential audience identified, publicity materials written, invitations to the workshops delivered and workshop location/organization completed. Across the State of Iowa in 2015, ten workshops were held. The workshops were attended by 182 operations and system flows owner/managers. The number of pigs influenced by those attending the workshop was over 13.9 million pigs and more than 72,000 sows in Iowa alone. A survey was developed to determine what changes were made and returned by 91 participants in the workshops.

Results

Ninety-five important ideas were provided by respondents on the survey indicating substantial learning from the workshop. Learning was transformed into changes. Ninety-one survey participants listed 80 changes implemented in their operations, such as improving animal health while using less energy and decrease production cost. One-hundred-seven of the operations estimated an average value of \$2595 for their operations as a result of attending the program. For those 91 operations, more than \$236,000 was estimated as the value from changes made

because of the ventilation workshops presented by Extension. If similar value was common to all 182 participants, the total value of the workshops would be close to \$472,000. Documented change examples: run heaters half BTUs; implement maintenance schedule; getting fans and inlets coordinated; adjusting cfms needed for inlets, attic, static pressure, cleaning mud and junk on a pit fan cover; adjusting inlets for healthy air mixing; turn off fans in curtain mode saving energy; clearing attic opening; adjusting curtains to improve pig health and save energy; improve seal on curtains; change motor curves in the controller when replacing fan motors (critical for operational efficiency of variable speed fans).

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
131	Alternative Uses of Land
205	Plant Management Systems
301	Reproductive Performance of Animals
302	Nutrient Utilization in Animals
401	Structures, Facilities, and General Purpose Farm Supplies
601	Economics of Agricultural Production and Farm Management
602	Business Management, Finance, and Taxation
603	Market Economics

Outcome #4

1. Outcome Measures

Number of producers and landowners who adopt BMPs after extreme weather events.

Not Reporting on this Outcome Measure

Outcome #5

1. Outcome Measures

Number of crop and livestock producers who increase their knowledge on marketing, insurance or USDA program alternatives that are consistent with the risk bearing ability of their businesses and their personal preferences for managing risk.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	260

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Women have significant ownership, management, and employment on Iowa farms. There is a critical need for education directed specifically to farm women to help them manage risks. Farm women of all ages and experience levels can learn to manage risks through analytical thinking and long range planning. Women are willing to take on influential roles in managing the farm business with training and support.

What has been done

Working with USDA E-RME and RMA to enhance curricula and deliver programs, the Extension team offered Annie's Project courses on a variety of agricultural business and risk management topics. The goal of the educational program is to empower farm and ranch women who want to be even more knowledgeable about their agricultural enterprises. Annie's Project creates a comfortable and supportive learning environment focused on the best farm business management practices. Building on these best practices, the team also offered other courses for women that focused on more specific risk management topics.

Results

All respondents to an evaluation indicated Annie's Project and other courses were successful in improving the knowledge of farm women in the five areas of agricultural risk management: financial, human resources, legal, marketing, and production. Analysis shows statistically significant increases in the mean scores of knowledge in each construct between the pre and post surveys. More than 90% of participants agreed the courses provided a safe learning environment and local professionals provided valuable information. Surveys showed course participants took important actions towards managing agricultural risks during the timeframe of the courses.

4. Associated Knowledge Areas

KA Code	Knowledge Area
601	Economics of Agricultural Production and Farm Management
602	Business Management, Finance, and Taxation
603	Market Economics

Outcome #6

1. Outcome Measures

Number of intergenerational transfers or new farm businesses who learn strategies on how to successfully transition farming operations within their family, or understand the risks and opportunities connected to starting a farming enterprise.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	16

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Established farm/ranch generations own, control, and manage the majority of assets while beginning farm/ranch generations seek to work with them to transition into managerial and/or ownership roles. Such successful transitions are beneficial not only for those directly involved in the farm/ranch enterprise, but also for maintaining rural business continuity and enhancing national food security. As influential partners and/or owners in many family farms and ranches, women have a potential role to play in understanding and addressing the need for transition planning.

What has been done

"Managing for Today and Tomorrow" is the farm/ranch transition curriculum that was developed through a multi-state BFRDP grant to provide in-depth training in four topic areas: business planning, estate planning, retirement planning and succession planning. The curriculum is designed to be offered as a 15-hour, multi-session local extension course that follows the best education practices established by Annie's Project. The purpose of the course is to prepare women to take a leadership role in the transition planning process for their farm and ranch operations.

Results

Evaluation results show "Managing for Today and Tomorrow" helped women gain knowledge across all topics related to transition planning, indicating participants are prepared to initiate and manage transitions. This adds to the likelihood of successful transition outcomes for themselves and their partners/families. Whether they belong to the currently owning/managing group or the beginning/successor group, knowledge gained through this course empowered participants to begin or improve transition planning. And what's more, within the time-frame of the multi-session courses, farm/ranch women took important actions towards their transition planning goals. During the five weeks of the course, many had already begun to take actions related to initiating business, estate, retirement, and succession planning.

4. Associated Knowledge Areas

KA Code	Knowledge Area
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601	Economics of Agricultural Production and Farm Management
602	Business Management, Finance, and Taxation
603	Market Economics

Outcome #7

1. Outcome Measures

Number of producers indicating their ability to identify crop diseases and implement recommended management strategies.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	1186

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Having a profitable farm industry and reducing risks to the environment are important to all Iowans. Farmers who attended a 2015 ISU Extension and Outreach Crop Advantage Series (CAS) conference are now prepared to make better management decisions for their operations regarding plant diseases and nitrogen, and have significantly increased their profit per acre.

What has been done

Thirteen Crop Advantage conferences were held across Iowa during January 2015. Attendance totaled 1,946. Topics varied by the needs of the region where each conference was held; a wide range of issues was covered. However, almost all sites included nitrogen management, sudden death syndrome, and northern corn leaf blight management because these issues were widespread concerns as we approached the 2015 growing season. Additionally, program content, including summaries of almost all the presentations from across the state, was printed and shared so attendees at sites where a topic was not presented would still receive the research results and recommendations.

Results

Fifty percent of respondents who attended CAS conferences (n=585) indicated they had attended a soybean diseases and management session. 74% noted that they now can effectively identify Sudden Death Syndrome (SDS) if it appeared in their soybean field. 99% positively identified the new soybean seed treatment that can effectively manage SDS, and now 97% feel comfortable discussing how to appropriately select SDS tolerant varieties with their seed supplier.

A survey of participants who attended a corn disease session at Crop Advantage resulted in 258 responses: 79% can now identify conditions that lead to Northern Corn Leaf Blight (NCLB) occurrence; 86% identified the proper application timing of fungicides to protect the crop when the environment is right for NCLB development; and 97% are at least somewhat comfortable discussing selection of corn hybrids with NCLB tolerance.

4. Associated Knowledge Areas

KA Code	Knowledge Area
205	Plant Management Systems
212	Pathogens and Nematodes Affecting Plants

Outcome #8

1. Outcome Measures

Number of people interested in local food production and marketing who received MarketReady Training

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	51

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Demand for locally grown fruits and vegetables by consumers and intermediate markets, such as grocery stores, restaurants, food hubs and institutions has dramatically increased in the past few years. The demand exceeds the local production of agricultural food products so there is potential increased profitability for small scale producers to sell to intermediate markets, yet there are risks and challenges to meet their buyer's needs. Growers looking to expand their market from retail to wholesale not only need information on scaling up their production but also their marketing skills to be successful to sustain their business.

What has been done

A team from the ISU Extension and Outreach Value Added Agriculture program has developed a 1-day training, called MarketReady, modeled after the University of Kentucky's MarketReady program. The training includes three online modules that participants view prior to attending the

face-to-face workshop. The workshop addresses communication, marketing, pricing, labels, packaging, insurance, rules and regulations, and wholesale food safety. The workshop is offered to producers as one in a series of three, partnering with the Food Safety team's GAPs level 1 and level 2 trainings.

Results

MarketReady instruction was held at four locations throughout Iowa with a total of 51 participants. Upon completion of the training, all farmers participating in the program said they intend to sell a portion of their production to intermediate markets as a result of what they learned. An average of 21% of respondents said they would try and sell between 50 and 75%, 19% will work toward selling 25-50%, and 35% said they would try to sell up to 25% of their production to intermediate markets.

4. Associated Knowledge Areas

KA Code	Knowledge Area
601	Economics of Agricultural Production and Farm Management
602	Business Management, Finance, and Taxation

Outcome #9

1. Outcome Measures

Number of start-up businesses that show economic benefits from Extension recommendations.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	7

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

USDA Rural Development in Iowa has a mission to improve, develop and finance business, industry and employment in rural communities. By bolstering rural businesses, the goal is to improve rural communities. Existing and startup businesses need help investigating and evaluating the feasibility of their business or business ideas. Iowa Economic Development as well as regional and local Economic Development also look for means to grow the economy in rural and urban areas.

What has been done

A team was assembled to provide a comprehensive look at all major operating elements of the potential startup businesses. General business consulting took place along with feasibility studies and/or market analyses of the businesses in the areas of economic impact, technical feasibility, market potential, management strengths and weaknesses, and financial viability of the venture. Technical assistance was provided to seven businesses for rural economic development.

Results

ISU Extension and Outreach Value Added specialists provided technical assistance for rural economic development in feasibility and/or Market Analysis Studies for 7 startup businesses that represented:

- Investment of \$20.5 million dollars
- Financing of \$13.5 million dollars from local banks
- Potential for 68 new jobs created with total payroll of \$2.26 million dollars injected into local economies
- Projected gross sales of \$32.82 million dollars

4. Associated Knowledge Areas

KA Code	Knowledge Area
601	Economics of Agricultural Production and Farm Management
602	Business Management, Finance, and Taxation

Outcome #10

1. Outcome Measures

Dairy producers and dairy consultants who enhanced their knowledge of dairy nutrient best management practices and adopted practices to maximize nutrient economics and environmental stewardship

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	1106

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Nutrients present in manure are increasingly receiving attention for environmental, production, and financial reasons. Nutrients in manure are being scrutinized more for fertilizer purposes and value. Conversations with livestock producers have shown that many do not understand how to maintain and efficiently manage and utilize manure nutrients. Understanding how to control risks associated with manure nutrients during handling, storage, and application is imperative from an environmental liability aspect. After recent DNR-EPA inspection announcements, many producers are seeking proactive on-farm assessment tools and strategies. Knowledge of nutrient sources entering a manure system is important to properly design and manage systems to handle current and future requirements.

What has been done

The ISU Extension Dairy team developed a dairy nutrient management spreadsheet that quantifies costs of manure handling, storage, and application, and calculates fertilizer value of manure nutrients. Fourteen on-farm workshops were conducted showcasing different nutrient handling systems and provided dairy nutrient management economics. Dairy nutrient management and economics was the focus of 8 Dairy Days. The team also developed an on-farm training and educational video that discussed optimizing nutrient value of dairy manure while minimizing risk. An On-Farm Environmental Assessment tool & scoring system was developed for small groups' and individuals' on-farm environmental assessment & analysis; 5 on-farm workshops evaluated, validated, and modified the Assessment tool; 9 workshops covered soil & manure testing, fertilizer requirements & application, and proper nutrient management practices; > 100 consultations on nutrient management were conducted.

Results

34 dairy nutrient management economic spreadsheet surveys validated the tool; 14 on-farm workshops with 312 participants showed 98% improved understanding of dairy nutrient management opportunities, risks, and financial costs and values. Dairy Days pre & post surveys of nutrient management and economics showed 42% increased knowledge; 5 on-farm environmental assessment workshops with 62 participants showed 100% increased understanding of nutrient management systems; all intent to make changes. A dairy nutrient management video was disseminated to Iowa DNR, ISU Extension, and NRCS; 9 workshops addressing soil & manure testing, fertilizer requirements/application of BMPs for nutrient management. Participants averaged 1,028 acres/operation and stated intentions to change fertility practices on 60% of acres (560 acres), with \$10-20 reduction/acre in purchased fertilizer. Twenty NRCS Project Coordinators adopted the spreadsheet and economic calculator.

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
205	Plant Management Systems
302	Nutrient Utilization in Animals
601	Economics of Agricultural Production and Farm Management

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Natural Disasters (drought, weather extremes, etc.)
- Economy
- Appropriations changes
- Public Policy changes
- Government Regulations
- Competing Public priorities
- Competing Programmatic Challenges
- Populations changes (immigration, new cultural groupings, etc.)
- Other (Consumer trends and preferences)

Brief Explanation

The national beef cow herd has the fewest numbers since 1962, due to high feed costs, droughts and reduced profitability, but is primed for expansion. Reproductive failures of yearling and first-calf heifers represent significant economic losses for cow-calf producers. The 2007-08 National Animal Health Monitoring System (NAHMS) reported that 33% of all culled cows left the herd because they did not conceive during breeding season; 15.6% of all culled cows left the herd before 5 years of age. To grow, beef herds require improved management of the replacement heifer and first-calf heifer to improve conception and retention. Because the first-calf heifer has substantially increased energy demands compared to other females in the herd, this group of females is often the most fragile, and many times the hardest to get safe in calf. As it takes as many as 5 calves before that replacement female recoups her development costs, implementation of BMPs are critical to ensure profitable herd expansion for cattlemen.

New pork industry common swine industry audit was a game changer, educational programming adjusted to provide improve food safety and animal welfare documentation and procedures. Availability of on-line certification for food safety and animal welfare reduced the time required to host workshops to educate producers for these certification programs.

The significant decline in crop prices over the past 2 years has reduced farm incomes and highlighted the support agricultural producers get from the Farm Bill. The two main types of support programs are triggered by either low crop prices or low crop revenues. Thus, the drop in crop prices activated payments in the new programs. With lower farm incomes from crops, producers were searching for additional sources of revenue. The choice of a program under the new Farm Bill was unique, in that under previous programs, there was only one option to choose. The 2014 Farm Bill had 3 programs for Iowa producers. Also, the choice of the program was a multi-year decision. Thus, the decision was more complex as the choice made in 2015 would impact potential support for the next few years.

All Value-added Food Security programming is centered around economic development and business planning for farmers and producers. The outcomes are directly impacted and reflective of local and personal economic realities. Business expansions, consolidations, mergers and transitions are often triggered by changes in local, state, national and world economic indicators. Producers and business owners desire to position themselves in a

more secure financial position and adjust their plans based on ever changing economic realities.

The dairy industry views manure management as a regulatory issue that sometimes either limits or enhances participation in programs. The dairy workshops developed by the ISU Extension Dairy team were designed to be a proactive industry-driven educational nutrient management program to optimize nutrient value while also minimizing risks to the animals, farm, and environment.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

Follow-up surveys were conducted at all Farm Bill programs, with 822 participants responding. 96% indicated that they would share Farm Bill information with 1 or more people who did not attend. Prior to the meeting, 14% indicated their knowledge was good-to-excellent; after, 78% rated knowledge at good-to-excellent. Evaluation covered the standard end-of-meeting survey (to capture learning), with pre- and post-test questions; incorporating Turning Point audience-response technology to capture information regarding true learning real-time during the workshops; audience response technology was used to capture impact from previously held workshops, and follow-up online surveys using email addresses of the participant and Qualtrics survey platform.

Value Added evaluations for economic development activities directly related to Food Security issues are best measured by 'deal flow'. That deal flow may manifest itself in many ways including, access to capital, business transfers, or business expansions, or in thoughtful planning and preparation for business changes. VAA and affiliates have seen continued growth in farmers and business owners utilizing resources to make sound business decisions. USDA agencies and/or the Iowa Bankers Association members now refer nearly 80% of contacts to business consultant services and feasibility study work.

For Food Safety & Antibiotic Resistance programming, a 6-month survey results show that 39% of producers are still working on these 25 written documents and the rest have completed most of the work. 89% of participants are now confident or very confident regarding medical record compliance and daily observation records, compared to less than 21% in compliance pre-workshop. Pre-workshops, 35% cannot confirm insensibility, 55% don't know more than one out of six signs of insensibility. Post-workshops (note: not all 46 but most have data) 90% have at least some confidence in confirming insensibility. Before the workshops only 10% knew 5 or more signs of death; 2/3s report they can now confirm death to the standard required to pass the audit.

At Crop Advantage programs, 88% of nitrogen management attendees (n = 380) found the relationship between economic diminishing returns and nitrogen application rate as important or very important; 94% can identify relationships between nitrogen application rates and nitrate in water systems; 79% are likely going to adjust nitrogen rates based on the ISU Corn Nitrogen Rate Calculator. When asked to estimate the value of the increased profits per acre as a result of the knowledge gained at a Crop Advantage program, 354 responded: 73 indicated the value at less than \$5/acre, 184 thought the value was between \$5 and \$10 per acre, 51 valued their increased profit between \$10 and \$20 per acre, and sixteen thought the value increase was worth more than \$20/acre.

Dairy nutrient management workshops resulted in 54%, 73%, 47%, and 55% increase in

knowledge in interpreting soil and manure tests, determining crop fertility requirements & rates, and utilizing manure nutrients to meet these needs, respectively.

Key Items of Evaluation

A follow-up survey by the Beef Center was conducted to monitor medium- and long-term impacts of enlarging herds. Attendees manage more than 30,000 cows annually, and planned to develop ~ 8200 heifers in 2014. Approximately 6,400 of those replacement females are calved out on these operations. 90% of respondents implemented or plan to implement a new BMP as a result of the 2014 program. On average, respondents improved pregnancy rates of their 1st-calf heifers by 3% and reduced culling rates of 1st and 2nd calf heifers by 3.5%. These figures indicate that the 2014 program resulted in retention of an additional 223 first- and second-calf females per year. Based on the current Net Present Value decision tool developed for this program, it helped producers realize an economic benefit of \$303,726 from reductions in cull females. On average, respondents reported increased profitability by \$1,640 per year, resulting in a total economic impact of \$475,600 per year for the 2014 heifer development program. The 2012 & 2014 Heifer Development programs have had an economic impact of \$1.04M per year for the 900 attendees; has educated an additional 4,400 people through YouTube; has helped drive economically sound decisions for an additional 3,450 producers through Ag Decision Maker downloads of heifer development decision aides and fact sheets.

The Farm Bill evaluation showed strong growth in knowledge about federal programs. Many producers were initially confused by the number of choices in the new Farm Bill. The ISU Extension Farm Management team walked participants through options, explaining potential impacts of each one. Evaluations indicate this educational effort gave producers greater confidence in selecting the best program for their operation.

The Value Added Extension team assisted 7 start-up businesses in obtaining > \$20M of investment capital with loan guarantees to start or expand rural/agricultural businesses. Additionally more than 260 women agriculturalists participated in business management training to improve their farm management skills; 90% indicated the training directly impacted the success of their farming operations.

182 owners/managers influencing the production for over 13 million pigs attended one of 10 ventilation workshops. The workshops help producers improve animal health while using less energy, and decrease production costs. 91 of those operations reported >\$236,000 value from changes made because of the ventilation workshops. 46 workshops were held to help producers improve and document food safety and animal welfare procedures in their operations; 747 operations and system flow managers participated. 89% are now confident or very confident regarding med record compliance and daily observation records, compared to less than 21% in compliance pre-workshop. For each of the five pass/fail audit questions, 29% to 55% of participants did not have enough pre-knowledge to pass the audit, post-workshop 85% had at least some confidence they would pass the audit.

V(A). Planned Program (Summary)

Program # 4

1. Name of the Planned Program

Health and Well-being

Reporting on this Program

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
501	New and Improved Food Processing Technologies	0%		27%	
503	Quality Maintenance in Storing and Marketing Food Products	10%		0%	
703	Nutrition Education and Behavior	40%		22%	
704	Nutrition and Hunger in the Population	15%		0%	
711	Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources	5%		2%	
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins	20%		48%	
723	Hazards to Human Health and Safety	10%		1%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2015	Extension		Research	
	1862	1890	1862	1890
Plan	4.8	0.0	1.0	0.0
Actual Paid	4.9	0.0	1.4	0.0
Actual Volunteer	0.0	0.0	0.0	0.0

2. Actual dollars expended in this Program (includes Carryover Funds from previous years)

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
421267	0	291901	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
421267	0	291901	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
1725933	0	1527603	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

- Conduct workshops and meetings. Workshops include ServSafe® Certification food safety, food preservation, HACCP implementation, GAPS preparation, childcare provider training, food assistance outreach, etc.
- Develop and deliver educational materials and resources and curriculum (i.e., EFNEP, SNAP-Ed, web-based tools and Extension nutrition and health publications).
- Provide training and technical assistance such as fundamental food safety training for volunteer staffed events, line level employees, and general nutrition and health training for childcare providers; respond to specific questions related to application of food safety principles.
- Facilitate community advocacy.
- Faculty participated in relevant multistate research committees NC170, NC1023, NC1171, NC1194, NC2172, NE1048, NE1439, S294, S1056, W2192, W3002, W3003, and W3045.

2. Brief description of the target audience

School aged youth, child care providers, school staff and other adult mentors of youth. Adult lowans in the workforce, participating in food assistance and community health outreach programs. Food growers, foodservice management and staff in commercial and noncommercial operations, consumers, and food stand volunteers will be served.

3. How was eXtension used?

eXtension was not used in this program

V(E). Planned Program (Outputs)

1. Standard output measures

2015	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	26785	1115681	1009	9058

2. Number of Patent Applications Submitted (Standard Research Output)

Patent Applications Submitted

Year: 2015
 Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2015	Extension	Research	Total
Actual	0	0	31

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Number of youth receiving educational programming related to nutrition, physical activity, and health promotion.

Year	Actual
2015	10067

Output #2

Output Measure

- Number of adults who impact youth receiving educational programming related to nutrition, physical activity and health promotion.

Year	Actual
2015	3674

Output #3

Output Measure

- Number of adults receiving educational programming related to nutrition, physical activity, and health promotion.

Year	Actual
2015	375386

Output #4

Output Measure

- Number of professionals working with youth and/or adults receiving training related to nutrition,

physical activity, and health promotion.

Year	Actual
2015	155

Output #5

Output Measure

- Number of hits on Iowa State University Extension nutrition/health pages and publication downloads.
Not reporting on this Output for this Annual Report

Output #6

Output Measure

- Number of lowans receiving education related to home food preservation.

Year	Actual
2015	4004

Output #7

Output Measure

- Number of lowans receiving food safety certification.

Year	Actual
2015	2089

Output #8

Output Measure

- Number of adult participants in Extension and Outreach programs on food safety.

Year	Actual
2015	17378

Output #9

Output Measure

- Number of hits on Iowa State University Extension and Outreach food safety project websites.
Not reporting on this Output for this Annual Report

Output #10

Output Measure

- Number of unique visitors on Iowa State University Extension and Outreach nutrition/health websites and publication downloads.

Year	Actual
------	--------

2015 470886

Output #11

Output Measure

- Number of unique visitors on Iowa State University Extension and Outreach food safety project websites.

Year	Actual
2015	215832

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Percent of youth participants reporting increased intake of milk.
2	Percent of youth participants reporting increased intake of fruit.
3	Percent of youth participants reporting increased intake of vegetables.
4	Percent of youth participants reporting increased physical activity.
5	Percent of childcare training participants reporting preparedness to apply or teach health promoting dietary behaviors.
6	Percent of adults reporting increased fruit and vegetable intakes.
7	Percent of adults reporting increasing minutes of physical activity.
8	Percent of adult EFNEP/FNP graduates who made a positive change in food resource management skills such as not running out of food.
9	Number of people receiving food safety certification.
10	Percent of adults reporting increased knowledge of safe home food preservation techniques.
11	Percent of adult EFNEP/FNP graduates with a positive change in food safety practices.
12	Number of food handlers receiving food safety training and education in safe food practices.
13	Number of dietary professionals and consumers that understand modern dairy practices as they pertain to animal health, comfort, and sustainability, as well as milk and dairy product quality and safety.

Outcome #1

1. Outcome Measures

Percent of youth participants reporting increased intake of milk.

Not Reporting on this Outcome Measure

Outcome #2

1. Outcome Measures

Percent of youth participants reporting increased intake of fruit.

Not Reporting on this Outcome Measure

Outcome #3

1. Outcome Measures

Percent of youth participants reporting increased intake of vegetables.

Not Reporting on this Outcome Measure

Outcome #4

1. Outcome Measures

Percent of youth participants reporting increased physical activity.

Not Reporting on this Outcome Measure

Outcome #5

1. Outcome Measures

Percent of childcare training participants reporting preparedness to apply or teach health promoting dietary behaviors.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	79

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Dietary and physical activity behaviors can be established as early as 2-4 years of age. Informing child care providers of appropriate food and physical activity behaviors is essential to early childhood development.

What has been done

Childcare training has been provided to 1685 childcare providers in Iowa.

Results

79% of participants reported preparedness to make changes in their own childcare settings.

4. Associated Knowledge Areas

KA Code	Knowledge Area
703	Nutrition Education and Behavior

Outcome #6

1. Outcome Measures

Percent of adults reporting increased fruit and vegetable intakes.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
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3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Current program data show that at entry EFNEP and SNAP-Ed clients consumed 1 cup of fruits per day and 1.6 cups of vegetables -- well below the DGA recommendation. Additionally, 25% of program participants ate no fruit at program entry.

What has been done

EFNEP and SNAP-Ed direct education in Iowa is a series of eight to ten nutrition lessons taught by paraprofessional nutrition educators to families with low income and children age ten and under as well as pregnant or parenting teens. These lessons show participants how to choose nutritious foods, stretch their food dollars, handle food safely, be physically active, and prepare nutritious recipes. Lessons three through seven all focus on practicing healthy nutrition behaviors--Fruits and Veggies: Half Your Plate, Make Half Your Grains Whole, Build Strong Bones, Go Lean with Protein, and Make a Change (addresses sodium, fats, and added sugars).

Results

Following participation in at least eight lessons, 51% of participants increased their consumption of fruits and 56% vegetables. On average, fruit and vegetable consumption among EFNEP and SNAP-Ed graduates each increased by 0.4 cups.

4. Associated Knowledge Areas

KA Code	Knowledge Area
703	Nutrition Education and Behavior
704	Nutrition and Hunger in the Population

Outcome #7

1. Outcome Measures

Percent of adults reporting increasing minutes of physical activity.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	49

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

The 2010 Dietary Guidelines for Americans recommend that adults participate in moderate physical activity for 30 minutes per day, five days per week. The 2013 Behavioral Risk Factor Surveillance System data show that less than half of adult Iowans meet these physical activity recommendations. Furthermore, these data show that 82% of Iowans do not meet aerobic and muscle strengthening guidelines. For those with an income below \$15,000, not meeting guidelines increases to 88%.

What has been done

EFNEP and SNAP-Ed direct education in Iowa is a series of eight to ten nutrition lessons taught by paraprofessional nutrition educators to families with low income and children age ten and under as well as pregnant or parenting teens. These lessons show participants how to choose nutritious foods, stretch their food dollars, handle food safely, be physically active, and prepare nutritious recipes. Each lesson has a physical activity component. In particular, lesson 1, Get Moving, focuses on physical activity.

Results

Following participation in at least eight lessons, 49% of participants increased the amount of physical activity in which they regularly participate. In addition, by the completion of the program, 78% of participants reported meeting the physical activity recommendations set by the 2010 Dietary Guidelines for Americans.

4. Associated Knowledge Areas

KA Code	Knowledge Area
703	Nutrition Education and Behavior
704	Nutrition and Hunger in the Population

Outcome #8

1. Outcome Measures

Percent of adult EFNEP/FNP graduates who made a positive change in food resource management skills such as not running out of food.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
------	--------

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Effective food resource management is critical to healthy eating behaviors among families with low-incomes. Families need to build skills to maximize available resources to gain the most nutrition for their dollar. Nearly 13% of lowans are food insecure.

What has been done

EFNEP and SNAP-Ed direct education in Iowa is a series of eight to ten nutrition lessons taught by paraprofessional nutrition educators to families with low income and children age ten and under as well as pregnant or parenting teens. These lessons show participants how to choose nutritious foods, stretch their food dollars, handle food safely, be physically active, and prepare nutritious recipes. Participating families learn shopping and meal planning strategies that minimize waste and stretch expensive ingredients.

Results

Among families graduating from the EFNEP and SNAP-Ed lesson series, 88% improved their food resource management. This data point is measured through questions related to frequency of planning meals, comparing prices, using a grocery list and running out of food at the end of the month.

4. Associated Knowledge Areas

KA Code	Knowledge Area
703	Nutrition Education and Behavior
704	Nutrition and Hunger in the Population

Outcome #9

1. Outcome Measures

Number of people receiving food safety certification.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	2069

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

It is estimated 48 million people experience a foodborne illness each year with 3,000 deaths resulting from these illnesses. Providing food handlers and decision makers involved in food preparation and service with knowledge about risks can help in reducing incidents of foodborne illness by leading to better practices.

What has been done

Over 2,500 Iowans (n = 2,652) participated in an 8-hour workshop about safe food handling practices.

Results

Of the 2,652 who participated in the 8-hour certification course workshop, 80% (n = 2,069) were successful in earning certification as Certified Food Protection Managers.

4. Associated Knowledge Areas

KA Code	Knowledge Area
711	Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins
723	Hazards to Human Health and Safety

Outcome #10

1. Outcome Measures

Percent of adults reporting increased knowledge of safe home food preservation techniques.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	100

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Interest in home food preservation has increased due to the local food movement and economy. According to the National Center on Home Food Preservation 1 in 5 U.S. households can their own food; however, many are unaware of the food safety issues that home food preservation encompasses.

What has been done

Of the 4,004 people who received food preservation assistance, 526 adults participated in food preservation education programming. Of these 526 adults, 52 completed the statewide comprehensive food preservation program, 9 had their pressure canner tested and 474 attended a general food preservation class. Additionally, 3,469 individuals called with food preservation questions.

Results

Of those who took part in the online food preservation lessons, there was an increase in those reporting "high to very high" post knowledge about canning processing times (64.4% increase), foodborne illness (e.g. causes, high risk foods; 51.6% increase), safe food handling practices (43.0% increase), recommended canning practices (36.1% increase).

4. Associated Knowledge Areas

KA Code	Knowledge Area
711	Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins
723	Hazards to Human Health and Safety

Outcome #11

1. Outcome Measures

Percent of adult EFNEP/FNP graduates with a positive change in food safety practices.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	70

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Previous EFNEP and SNAP-Ed data show that families with low income do not, seldom, or sometimes (as opposed to most of the time or almost always) practice food safety management skills such as thawing and storing food properly. These are skills that can prevent or alleviate illness.

What has been done

EFNEP and SNAP-Ed direct education in Iowa is a series of eight to ten nutrition lessons taught by paraprofessional nutrition educators to families with low income and children age ten and under as well as pregnant or parenting teens. These lessons show participants how to choose nutritious foods, stretch their food dollars, handle food safely, be physically active, and prepare nutritious recipes. Each lesson includes a component related to food safety with particular focus on minimizing food waste without compromising food safety.

Results

At entry to the program 17.5% of program participants demonstrated acceptable food safety practices (i.e. thawing and storing foods properly). Following participation in at least eight lessons 61% of participants demonstrated acceptable food safety practices (i.e. thawing and storing foods properly) at exit.

4. Associated Knowledge Areas

KA Code	Knowledge Area
703	Nutrition Education and Behavior

Outcome #12

1. Outcome Measures

Number of food handlers receiving food safety training and education in safe food practices.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	5680

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

It is estimated 48 million people experience a foodborne illness each year with 3,000 deaths resulting from these illnesses. Providing food handlers and decision makers involved in food

production and service with knowledge about risks can help in reducing incidents of foodborne illness by leading to better practices.

What has been done

Over 5,000 (n= 5,680) participated in food safety sessions related to produce safety, general food safety, and safe handling of food when working in retail outlets and food stands.

Results

Participants indicate food safety training prepares them to minimize risks of food borne illness in their work settings.

4. Associated Knowledge Areas

KA Code	Knowledge Area
703	Nutrition Education and Behavior
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins
723	Hazards to Human Health and Safety

Outcome #13

1. Outcome Measures

Number of dietary professionals and consumers that understand modern dairy practices as they pertain to animal health, comfort, and sustainability, as well as milk and dairy product quality and safety.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	2444

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

A. There are a wide variety of highly nutritious, safe and affordable dairy products that meet and exceed all milk quality standards and tests. Differential labeling is sometimes confusing to consumers, and they also have many interests and questions regarding how their food is produced, and the quality, safety, and assurance of animal well-being, farm sustainability, and dairy product quality and safety. Dietary and health professionals, dairy grocer case managers,

and in store dietary professionals are often the front line and only source of credible information and recommendations for consumers and the public. Many of these professionals have never been exposed to agriculture, farms, and different dairy production systems and practices which form the basis for the great variety of dairy products as well as consumers' attitudes, understandings, and choices.

B. A large percentage of the U.S. population lives in an urban or suburban environment, and are slightly disconnected from agriculture and food production. At the same time, there is increasing interest and concern in the general population about food safety, quality, and sustainability. While many have trust in the dairy and other food systems, a segment of anxious but uninformed consumers appear to readily accept viewpoints of anti-livestock/anti-agriculture that are negative about animal care, environmental stewardship, and safety/quality of dairy products.

What has been done

A. Three all-day dairy retail academies (which included on-farm and milk processing plant tours and education modules, as well as other presentations on dairy practices, dairy sustainability, and animal health and well-being) were conducted for dairy grocer case managers and in-store dietitians and health professionals by ISU Extension and Midwest Dairy Association. Pre and post tests on participants' understanding of dairy facts and knowledge were conducted as well as a personal satisfaction survey. Also, 2 national webinars for dietitians were conducted addressing similar topics, with 600 attendees and 1100 dietitians who viewed the archived materials.

B. The ISU Extension and Outreach Dairy Team developed and/or partnered and conducted a variety of educational programs and venues transparently addressing on-farm practices and sustainability of dairy and agriculture. 19 joint meetings or interactions were conducted. Examples of these included the National EPA/DNR training (n = 100), Gilbert 1st grade students/teachers (145), Agricultural Insurance agents (68), Northcrest Community Retirement Community (35), Iowa Food Technology Student Affiliate annual workshop(85) and the first College Dairy Day sponsored by MDA (240 which included on-farm dairy modules and tours taught by extension faculty and ISU Dairy Science undergraduates. Three 'June Dairy Month' events and programs similar to above were conducted in northeast, northwest and central Iowa.

Results

A. 100% ranked the academies as highly effective educational events. 100% ranked them as a highly credible, understandable source of dairy practices and information. 94% increased post workshop test scores compared to pre workshops scores (78% knowledge increase). Dairy grocer case managers (DGCM) rated this as most highly effective educational training of their careers and had greater understanding of dairy practices and sustainability. 100% DGCM and dietitians stated they had greater understanding of dairy practices and dairy sustainability. 100% DGCM and dietitians stated they would use this information with their peers and clients. DGCM estimated individual interactions with > 500 customers/year and felt they were the sole person at the store to respond to dairy issues and questions. In-store dietitians estimated 400+ individual clients and contacts/year.

B. A total of 7700 participants were involved in all events, with 5400 participants involved in the 3 'June Dairy Month' programs; many included families with young children; most participants were from non-agricultural backgrounds. A total of 594 post 'June Dairy Month' surveys were completed. 99% rated events as very educational (88% as excellent). Post workshop surveys showed 99% believe dairies provided the best care and handling of animals; 98% believe dairies are protective of the environment and excel at environmental stewardship; 99% stated dairies provided extremely safe and wholesome milk and dairy products; 99+% stated modern dairies and dairy practices were impressive and had extreme confidence and trust in dairy farms and the

dairy industry.

4. Associated Knowledge Areas

KA Code	Knowledge Area
503	Quality Maintenance in Storing and Marketing Food Products
703	Nutrition Education and Behavior
711	Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Natural Disasters (drought, weather extremes, etc.)
- Economy
- Appropriations changes
- Public Policy changes
- Government Regulations
- Competing Public priorities
- Competing Programmatic Challenges
- Populations changes (immigration, new cultural groupings, etc.)

Brief Explanation

Federal and state legislation continues to impact appropriations and policy for nutrition and health programming initiatives. Healthcare reform will also modify the landscape for programming, and additional opportunities in preventive health care may be available in the future and is being monitored. The Food Safety Modernization Act has raised awareness about risks from improper handling of food along the food chain and proposed standards related to fresh produce. Economic constraints continue to influence program planning and participation rates. Citizens and organizations may wish to participate in programs but lack the resources of time and transportation.

Within the state, a grocery store chain employs Registered Dietitians in stores throughout the state (currently 100). This trend has created competition for programming in rural communities that had been traditionally served by ISU Extension and Outreach faculty and staff. An increasingly diverse population challenges our ability to meet the learning needs of varied audiences across the state. Staff and trained volunteers, as well as local Extension councils, are not as prepared as needed to engage and implement educational programming with increasingly diverse (e.g., race, socioeconomic status, gender, age) audiences. As one example, increasing numbers of new lowans--as well as general economic challenges--have resulted in food entrepreneurs investigating of ways to grow food-based businesses and have led to our efforts to offer limited text and Spanish language educational materials. In response to changing demographics, we are also exploring ways to reach non-traditional audiences including programming via technology. We now have several of the educational materials available on the Spend Smart. Eat Smart., Food Safety, and Nutrition and Health websites. Professional development opportunities

and trainings for faculty and staff related to diversity and inclusion have been initiated this year. Also, to address changing demographics and population areas within the state, a new programming model was implemented approximately 18 months ago, which created changes in staff assignments and re-establishment of partnerships in some geographic areas.

Specifically within this Health and Well-being program, priority programming based upon timeliness, relevance, uniqueness (services not offered by other organizations) and impact have been identified and implemented. Iowa's recent adoption of Food Code 2011 Supplement requires one employee at each foodservice establishment to have certification in food safety through an approved program (i.e., ServSafe). In addition, sequential programming was prioritized based on the ability to demonstrate impact. Other factors related to reporting include that indirect contacts made through the EFNEP program have been reported elsewhere and are no longer included in this report. A redesign of several websites and social media pages occurred and are evaluated through "unique visitors" rather than page "hits." Other reasons for changes in reporting include a decrease in enrollment in Live Healthy Iowa Kids due to programming changes.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

Through high pass rates (80%) on the national ServSafe certification exam and food preservation knowledge surveys we know our food safety programs have led to increases in knowledge, with an ultimate goal of changes in behavior. Increases in numbers of Iowans participating in food safety programming, beyond our targets, indicates there is considerable interest in improving safe food handling practices at all links of the food chain. Adult EFNEP and SNAP-Ed participants showed high rates of behavior change this year with the majority of participants increasing consumption of fruits, vegetables and dairy. Participants also demonstrated strong improvements on critical health and nutrition measures including physical activity, food resource management and food safety practices. Childcare training results suggest more than 70% of participants felt prepared to teach health promoting dietary behaviors.

Key Items of Evaluation

High pass rates (80%) on the national ServSafe certification exam; adult EFNEP and SNAP-Ed participants demonstrating high rates of behavior change with the majority increasing consumption of fruits, vegetables and dairy and showing improvements in physical activity, food resource management and food safety practices; and childcare training participant survey data with a finding of more than 70% of participants feeling prepared to teach health promoting dietary behaviors.

V(A). Planned Program (Summary)

Program # 5

1. Name of the Planned Program

Natural Resources and Environmental Stewardship

Reporting on this Program

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
101	Appraisal of Soil Resources	6%		7%	
102	Soil, Plant, Water, Nutrient Relationships	11%		25%	
111	Conservation and Efficient Use of Water	5%		0%	
112	Watershed Protection and Management	6%		2%	
121	Management of Range Resources	0%		5%	
123	Management and Sustainability of Forest Resources	5%		0%	
125	Agroforestry	5%		0%	
131	Alternative Uses of Land	6%		3%	
132	Weather and Climate	5%		6%	
133	Pollution Prevention and Mitigation	6%		2%	
135	Aquatic and Terrestrial Wildlife	5%		25%	
136	Conservation of Biological Diversity	5%		5%	
141	Air Resource Protection and Management	5%		6%	
403	Waste Disposal, Recycling, and Reuse	5%		3%	
405	Drainage and Irrigation Systems and Facilities	10%		0%	
605	Natural Resource and Environmental Economics	10%		11%	
608	Community Resource Planning and Development	5%		0%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2015	Extension		Research	
	1862	1890	1862	1890
Plan	18.8	0.0	6.0	0.0
Actual Paid	15.6	0.0	7.0	0.0

Actual Volunteer	29.0	0.0	0.0	0.0
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2. Actual dollars expended in this Program (includes Carryover Funds from previous years)

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
1876056	0	800041	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
1876056	0	800041	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
2819945	0	5347424	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

The following basic to applied research activities will allow for attainment of the program goals.

- Address air and water quality along with other environmental issues of Iowa through research, education, and extension programs targeted at solving environmental problems of producers, citizens, public health officials, and regulators.
 - Increase the research and adoption of best management conservation practices, crops, and cropping systems that control soil erosion, minimize sediment transport, and reduce nutrient export. Increase the research and adoption of practices, crops, and cropping systems that reduce nitrate export.
 - Approach water quality and quantity issues from a watershed perspective using adaptive management principles the link the private and public sectors.
 - Develop better models and tools to be used to evaluate the effects of changes in the mix and location of crop and livestock systems due to climate change and the impacts of those changes on native plants and animals (wildlands and wildlife).
 - Identify site specific strategies and facilitate the implementation of these strategies to improve air quality and address related concerns such as risks of domestic-wildlife disease transmission, particularly with respect to siting and operations of confined-animal feeding operations and neighbor-to-neighbor relationships.
 - Understand and evaluate the economic impact of management of natural resources including the economic viability of alternative crops, cropping practices, and cropping systems, and the economic and environmental benefits of such alternatives.
 - Quantify the non-market and market values associated with our Iowa natural resources including forests, natural areas/abandoned pasture, CRP, wildlife, energy, and community resources.
 - Research ways to conserve the use of energy inputs used in the production of food, feed, fiber and biofuels with a particular view towards carbon reduction.

The following extension/outreach activities will allow for attainment of the program goals.

- Appropriate curriculum for targeted groups, fact sheets, and web access tools for decision making.
- Targeted programming to address policy issues as they arise including response to public comment documents, development of hard copy materials and resources for regulators and policymakers.

- Produce, update or revise handbooks, newsletters, and bulletins as appropriate.
- Present workshops, field days, farm/field visits, and satellite and web based sessions as appropriate.
- Develop strategies and programs to increase community (citizen) involvement, especially related to private and public natural resources.
 - Develop and execute educational programs about indices and diagnostic tools (e.g. P Index) that can be used to improve nutrient management.
 - Develop and execute educational programs on methods to conserve and produce biorenewable energy.

Faculty participated in relevant multistate research committees NC213, NC507, NC1034, NC1173, NC1178, NC1181, NC1182, NC1190, NC1195, NC1198, NE1438, NE1442, S1032, S1053, S1055, S1063, S1065, W2006, W3004, W3045, W3128, and W3188.

2. Brief description of the target audience

This program focuses on the private and public sectors. Stakeholders to be engaged with research and extension activities associated with this program include: crop and livestock producers, private citizens, public health officials, state and federal agricultural and natural resource agencies, environmental groups, landowners, homeowners, agricultural and natural resource scientists and engineers, agribusinesses, and policy makers.

3. How was eXtension used?

eXtension was not used in this program

V(E). Planned Program (Outputs)

1. Standard output measures

2015	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	84823	9034	0	0

2. Number of Patent Applications Submitted (Standard Research Output)

Patent Applications Submitted

Year: 2015
 Actual: 1

Patents listed

Depolymerization of Polylactic Acid. Srinivasan & Grewell. Patent # 8,895,778. Issued 11/25/2014.

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2015	Extension	Research	Total
Actual	0	0	66

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Number of producers, agribusiness professionals, and land-owners who attend face-to-face educational activities, including individual consultations.

Year	Actual
2015	65408

Output #2

Output Measure

- Number of producers, agribusiness professionals and land-owners who subscribe to newsletters and access web-based resources.

Year	Actual
2015	476300

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Number of acres where the adoption of BMPs and conservation practices was implemented.
2	Number of producers increasing the efficiency of manure and crop nutrient utilization while minimizing surface run-off and preserving ground water quality.
3	Number of acres impacted by improving crop performance through proper drainage.
4	Number of swine operations that intend to increase size using environmental and economic techniques.

Outcome #1

1. Outcome Measures

Number of acres where the adoption of BMPs and conservation practices was implemented.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	174800

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Soil erosion and nutrient loss are major problems facing Iowa farmers as higher land prices and rents increase the pressure to maximize production. Eroded sediment along with nutrients is a source of pollution in Iowa streams and rivers. Reducing soil erosion and nutrient loss will maintain the long term production of Iowa farmland, improve water quality for Iowans, and improve water quality in the Mississippi and Missouri rivers leaving Iowa.

What has been done

Iowa State University Extension and Outreach with the Iowa Learning Farms program provided farmers with needed information on cover crops, conservation tillage, and conservation drainage through partnerships with NRCS, Agribusiness and Extension and Outreach programming. Topics included water quality benefits of cover crops, improving soil with cover crops, managing cover crops, using no-till and strip-till, the Iowa Nutrient Reduction Strategy, controlled and shallow drainage, and use of wetlands and bio-reactors for nitrate reduction.

Results

Since 2010, 88% of farmers attending Iowa Learning Farm field days have made a change in their behavior:

- * 38% of farmers increased surface residue management on 97,331 new acres of strip-till or no-till
- * 47% of farmers increased surface residue management on 77,492 new acres of cover crops since 2010
- * 73% of Field Day participants reported discussing the use of no-till/strip-till or use of cover crops with their landowner/tenant.

These farmers represent 174,000 acres that have benefited from practices that reduce nutrient runoff.

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
112	Watershed Protection and Management
132	Weather and Climate
133	Pollution Prevention and Mitigation
605	Natural Resource and Environmental Economics

Outcome #2

1. Outcome Measures

Number of producers increasing the efficiency of manure and crop nutrient utilization while minimizing surface run-off and preserving ground water quality.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	1300

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Manure from livestock farms can be an economic and environmental asset if properly applied to crop fields. When manure is mishandled or over applied, it becomes a liability contaminating the environment. Proper application of manure provides a win-win opportunity to minimize crop input cost while optimizing crop production and protecting the environment.

What has been done

Iowa State University Extension helps farmers manage their manure through news articles, assisting with manure management plans, and providing education in the manure certification program. Research results presented demonstrate how careful application of the manure provides the optimal crop nutrients and protects the soil, water and air. The program also reviews past environmental spills from other livestock farmers so that steps can be taken to prevent repeating the same mistakes. This program is presented to over 1300 farmers in Iowa through 64 face to face meetings and additional DVD viewings.

Results

In follow up surveys of the participants, farmers reported on current practices and plans to reduce negative environmental impacts on over 160,000 acres. The results were:

* 67% of farmers reported having an emergency action plan, and an additional 32% reported they will be preparing an emergency action plan.

* 82% of the farmers reported they are testing manure for nutrient content on an annual or more frequent basis.

* Of the 18% who tested manure less than annually, 53% reported they planned to test manure more frequently.

Iowa farmers are using the knowledge gained from manure applicator training along with available technology and equipment to optimize manure applications in protecting the water, soil, and air.

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
112	Watershed Protection and Management
133	Pollution Prevention and Mitigation
403	Waste Disposal, Recycling, and Reuse
605	Natural Resource and Environmental Economics

Outcome #3

1. Outcome Measures

Number of acres impacted by improving crop performance through proper drainage.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	80000

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Agricultural farm drainage is becoming increasingly important due to the critical role it plays for Iowa's bio-economy. Drainage systems that are optimally designed and operating are essential to achieving excellent agricultural production capability while addressing potential water quality

concerns. Stakeholders looking to install a new drainage system or retrofit an existing system need to be trained on drainage design concepts, economics of drainage, water quality and quantity management, and legal issues related to drainage.

What has been done

Iowa State University Extension and Outreach, in collaboration with University of Missouri Extension, and Iowa USDA-NRCS delivered a three-day Iowa Drainage School. The school trained participants on sub-surface drainage concepts, the design and layout of drainage systems, calculating line sizes and spacing using actual field data, making connections and setting up drainage control structures, and review of NRCS regulatory considerations for sub-surface drainage. In addition, one-day workshops were held throughout the year for contractors and landowners.

Results

Participants completing the evaluations ranked the programs. 96% rated them as good and useful in making drainage decisions on over 80,000 acres annually. All participants, when asked what they learned from the school and how they will use it, indicated that the school helped them to better understand drainage design concepts and to make better decisions on drainage design and installation.

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
111	Conservation and Efficient Use of Water
112	Watershed Protection and Management
132	Weather and Climate
133	Pollution Prevention and Mitigation
405	Drainage and Irrigation Systems and Facilities
605	Natural Resource and Environmental Economics

Outcome #4

1. Outcome Measures

Number of swine operations that intend to increase size using environmental and economic techniques.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	29

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Building and growing swine operations in Iowa offers young farm families an entry point into agriculture and strengthens the diversity of farms; it also creates supplier and processor jobs. Key themes to growing any successful and responsible livestock farm are to grow them in an economic, environmental and socially sustainable manner. Manure nutrients from livestock farms supply nutrients back to crop fields and crop fields supply the feedstuffs for livestock. Together, animals and crops provide food, fuel and fiber for consumers. Livestock producers must design and site new structures where they do not adversely impact the quality of life of neighbors.

What has been done

The Community Assessment Model (CAM) was designed by the ISU Agricultural and Biosystems Engineering Department to address the potential impact of a proposed swine barn on neighboring residents and other receptors of interest. Estimates of time and intensity of odor exposure are calculated using localized historic weather data along with size, type and coordinates of the proposed barn(s), existing barns and receptors in the community. Dissemination of CAM to Iowa farmers occurs via Extension and Outreach resources and the Iowa Pork Industry Center. The CAM program provides feedback to farmers in selecting a site to minimize odor impact on neighbors. About 29 new or expanding site options were evaluated in 2015.

Results

The 29 site options evaluated during 2015 totaled a construction cost of ~\$840,000 per farm; a total investment of \$24.3M has been influenced by CAM assessment. Previous post-use survey results indicated that for the majority of producers who used CAM, the potential impacts to their neighbors factored heavily into decisions. A high majority (95%) of producers clearly understood the model results. Over half communicated these results to their neighbors; 1/3 of these were considered positive interactions. Overall, for producers who went on to build at sites that were modeled, there was a significant improvement in neighbor relations. About 15% of producers modified building considerations as a result of ideas and results obtained from CAM. The impacts to the economy and livelihood of Iowa are innumerable; hog farming alone represents \$7.5 billion in total economic activity.

4. Associated Knowledge Areas

KA Code	Knowledge Area
133	Pollution Prevention and Mitigation
141	Air Resource Protection and Management
605	Natural Resource and Environmental Economics

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Economy

Brief Explanation

A recent downturn in commodity prices coupled with increased land values and rental rates over the past 5-7 years has put an increasing economic pressure on Iowa farmers. This has reduced financial resources available for conservation work, including the planting of cover crops. These economic factors have placed an increased pressure on Iowa soil and water resources.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

Data for measuring the impact of the Iowa State University Extension programs was gathered through end of meeting evaluations during Manure Applicator Certification Meetings and Iowa Learning Farm surveys 1 month and 6-18 months following participation in field events.

In the end of meeting survey of the participants in manure applicator training 1300 participants returned surveys reporting that:

- 82% of the farmers reported they are testing manure for nutrient content on an annual or more frequent basis.
- 67% of farmers reported having an emergency action plan and an additional 32% reported they will be preparing an emergency action plan.

In follow-up mailed evaluations, participants in Iowa Learning Farm field activities reported that since 2010, 87% of farmers attending Iowa Learning Farm field days have made a change in their behavior including:

- 38% of farmers increased surface residue management on 97,331 new acres of strip-till or no-till.
- 47% of farmers increased surface residue management on 77,492 new acres of cover crops.
- 73% of Field Day participants reported discussing the use of no-till/strip-till or use of cover crops with their landowner/tenant.

Key Items of Evaluation

Educational events by Iowa State University have resulted in 97,331 new acres of strip-till or no-till and 77,492 new acres of cover crops since 2010. Through education in manure applicator training, 82% of farmers now report testing manure for nutrient content on an annual or more frequent basis.

V(A). Planned Program (Summary)

Program # 6

1. Name of the Planned Program

Sustainable and Renewable Energy

Reporting on this Program

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
102	Soil, Plant, Water, Nutrient Relationships	8%		8%	
111	Conservation and Efficient Use of Water	8%		0%	
125	Agroforestry	8%		0%	
131	Alternative Uses of Land	8%		0%	
136	Conservation of Biological Diversity	8%		0%	
202	Plant Genetic Resources	0%		13%	
205	Plant Management Systems	5%		7%	
302	Nutrient Utilization in Animals	8%		0%	
402	Engineering Systems and Equipment	8%		24%	
403	Waste Disposal, Recycling, and Reuse	8%		0%	
404	Instrumentation and Control Systems	0%		38%	
511	New and Improved Non-Food Products and Processes	8%		10%	
601	Economics of Agricultural Production and Farm Management	8%		0%	
602	Business Management, Finance, and Taxation	8%		0%	
605	Natural Resource and Environmental Economics	7%		0%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2015	Extension		Research	
	1862	1890	1862	1890
Plan	1.9	0.0	3.5	0.0
Actual Paid	2.6	0.0	4.2	0.0
Actual Volunteer	0.0	0.0	0.0	0.0

2. Actual dollars expended in this Program (includes Carryover Funds from previous years)

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
318930	0	636351	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
318930	0	636351	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
84460	0	7388171	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

Iowa State University will focus resources and efforts on developing improved crops and plant materials for use as feedstocks to produce biofuels and biobased products while still producing adequate food and feed supplies; developing agronomic practices to produce these feedstocks in sustainable ways to mitigate environmental risks; developing new harvesting, storing and transporting systems for these new feedstocks; and adopting new conversion processes that are more efficient, use less energy and water, and produce value-added co-products. These technologies will be integrated so that they work as a complete system and the ISU BioCentury Research Farm will play a key role. Extension programming will focus on advising farmers interested in biomass production on the risks and benefits of crops as biofuels. Two commercial cellulosic biofuel facilities are near completion; farmers are being asked to contract to supply the biomass that the plants will need to operate. Extension's corn stover team is educating producers and landowners on sustainable stover harvest. The team is made up of multiple partners with interests in biomass.

Faculty participated in relevant multistate research committees NC213, NC1194, S1041, and W2006.

2. Brief description of the target audience

Efforts in this program focus on basic human needs for environmentally sustainable energy and consumer goods (e.g. building construction materials, plastics and adhesives), producers with more efficient crops and production systems, rural communities with new employment opportunities and economic development, processing companies with advanced conversion technologies, and all Iowans because of the need for inexpensive and environmentally acceptable forms of energy. Producers and landowners need to know the opportunities and risks associated with biomass production and harvest.

3. How was eXtension used?

eXtension was not used in this program

V(E). Planned Program (Outputs)

1. Standard output measures

2015	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	1079	0	0	0

2. Number of Patent Applications Submitted (Standard Research Output)

Patent Applications Submitted

Year: 2015

Actual: 1

Patents listed

Materials and Methods for Using an Acyl-Acyl Carrier Protein Thioesterase and Mutants and Chimeras Thereof in Fatty Acid Synthesis. Nikolau et al. Patent # 8,951,762 issued 2/10/2015. Also applies to the Food Security program.

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2015	Extension	Research	Total
Actual	0	0	12

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Number of people who attend an educational activity to learn about energy sustainability.
Not reporting on this Output for this Annual Report

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Number of producers who increase their awareness of crop production strategies appropriate for bioenergy production.
2	Number of individuals who increase their knowledge in production/harvesting systems related to biomass crops.
3	Number of individuals who increase their knowledge in understanding business systems relating to renewable energy (VAA).

Outcome #1

1. Outcome Measures

Number of producers who increase their awareness of crop production strategies appropriate for bioenergy production.

Not Reporting on this Outcome Measure

Outcome #2

1. Outcome Measures

Number of individuals who increase their knowledge in production/harvesting systems related to biomass crops.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Among renewable energy sources, only biomass can provide fuel and electricity in a form and scale compatible with existing transportation and power generation infrastructure. Unlike wind and solar energy, biomass can be converted into liquid fuel similar that made from petroleum, or it can be stored to generate electricity on-demand, as is currently done with coal. Further, biomass, particularly lignocellulosic biomass, can be produced in such a way as to deliver economic, social and environmental sustainability.

What has been done

Insufficient planting material and overwintering losses are the key bottlenecks limiting *M. x giganteus* production in the Midwest. Researchers have worked to remove knowledge limitations associated with crop choice and best management practices and identify novel methods of *Miscanthus* propagation.

Results

This work has filled key information gaps about yield and survival of *M. x giganteus* in Iowa, leading to increased adoption of the crop in Iowa and Missouri (from ~10 to ~2000 ha during

reporting period). Our findings have influenced the behavior of farmers considering planting *M. x giganteus*, helping them to decide between planting rhizomes or transplants. Now farmers can choose whichever material is makes the most sense for their land, equipment and finances, without worrying that they will sacrifice yield or biomass quality in doing so. We have used these results in our collaboration with the University of Iowa power plant to inform potential *M. x giganteus* farmers of their crop establishment options. The University is targeted ~1,000 ha of *M. x giganteus* to be planted in a 75 km radius of the power plant by 2020, with an expected direct value of \$10 million y-1 to the Iowa economy. >100 ha of *M. x giganteus* were planted under this project in 2015.

4. Associated Knowledge Areas

KA Code	Knowledge Area
131	Alternative Uses of Land
205	Plant Management Systems

Outcome #3

1. Outcome Measures

Number of individuals who increase their knowledge in understanding business systems relating to renewable energy (VAA).

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	3000

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

In a highly volatile industry, access to information is a critical element in maintaining profitability. Information for the general public and direct technical assistance is provided to help sustain the industry's growth.

What has been done

Working with a network of land-grant universities and experts around the country including the Livestock Information Center at CSU and the US Departments of Energy and Agriculture, 3000 subscribers receive a renewable newsletter that keeps stakeholders informed about trends and current issues in the renewable energy industry sector that can impact the profitability of

renewable energy production facilities and livestock producers that depend on feedstocks and by-products used by or produced by these facilities. 10 media interviews were generated from these newsletters.

Results

3000 subscribers received 11 newsletters; 10 media interviews were conducted as a result of the newsletter. Information from the newsletter was reprinted or used by permission in more than 20 additional publications or reports. Email correspondence from subscribers continues to validate this newsletter as a valuable resource for current and relevant information.

4. Associated Knowledge Areas

KA Code	Knowledge Area
601	Economics of Agricultural Production and Farm Management
602	Business Management, Finance, and Taxation

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Economy
- Appropriations changes
- Public Policy changes
- Government Regulations
- Competing Public priorities

Brief Explanation

{No Data Entered}

V(I). Planned Program (Evaluation Studies)

Evaluation Results

{No Data Entered}

Key Items of Evaluation

{No Data Entered}

V(A). Planned Program (Summary)

Program # 7

1. Name of the Planned Program

Youth Development

Reporting on this Program

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
806	Youth Development	100%		0%	
	Total	100%		0%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2015	Extension		Research	
	1862	1890	1862	1890
Plan	4.8	0.0	0.0	0.0
Actual Paid	9.7	0.0	0.0	0.0
Actual Volunteer	190.3	0.0	0.0	0.0

2. Actual dollars expended in this Program (includes Carryover Funds from previous years)

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
990048	0	0	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
990048	0	0	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
2496994	0	0	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

- Broaden all youths' short-term and long-term learning opportunities in the program priorities of healthy living (including childhood obesity), STEM (including food safety), citizenship and leadership, and

communication and the arts.

- Organize 4-H staffing structure based on the four program priorities and outreach to all Iowa children and youth.
- Transition staff time from activity management to program design, delivery, and evaluation; community and volunteer capacity building; and narrowing the achievement gap of Iowa's underserved youth audiences.
- Improve engagement with ISU colleges and faculty to increase youth program offerings, while reaching diverse children and youth using current research and educational design methodologies.
- Strengthen statewide volunteer management infrastructure to reach diverse volunteer pools.
- Enhance welcoming and inclusive communication and partnerships among 4-H staff, partners, families, children, youth, and volunteers.
- Expand ISU and community partnerships to leverage resources for improved access to 4-H educational programs.
- Design learning experiences and conduct training with 4-H staff, county/regional Extension youth staff, volunteers, ISU faculty, and community and state partners that contribute to cultural competency and the life skill outcomes of leadership, citizenship, communication, and learning in environments that meet youths' needs.
- Build state and community level capacity to ensure policies and educational opportunities are based on cultural competency and positive youth development principles and practices.
- Train staff, faculty, and volunteers on how to create positive youth development and culturally competent learning environments in after school programs, camps, clubs, events, school, and other out-of-school time settings.
- Analyze county enrollment trends and identify barriers that limit diverse youth enrollment, retention, and participation in after school, camp, club, special event, and school delivery modes.
- Implement multi-faceted marketing infrastructure to communicate positive youth development principles, practices, and programming successes via news releases, brochures, on-line training, webinars, etc. with 4-H staff, county/regional Extension youth staff, community partners, Iowa State University faculty, families, youth, and volunteers.
- Partner with state and national entities to collect and report youth development and achievement gap impact data.
- Redesign Clover Kids in order to strengthen the consistency of its curricular research base, and to better reach underserved and under represented audiences.

2. Brief description of the target audience

K - 12 Youth

- 40 high school youth are members of the State 4-H Council; youth participate in leadership and communication training and serve as 4-H ambassadors across the state
- 1,238 youth participated in day and overnight camping experiences
- 23,338 youth in grades 4th - 12th enrolled as 4-H club members
- 29,192 youth participated in special interest/short-term educational experiences
- 26,720 children and youth participated in afterschool programs utilizing 4-H curricula

K - 12 Teachers

- 1613 K-12 teachers participated in STEM workshops focused on argument-based inquiry and alignment of practices with Next Generation Science Standards
- 298 county Extension youth and 4-H state staff participated in training shifting youth programming to relevant STEM foci

Extension and Outreach Educators

- 49 county Extension youth and 3 4-H state staff were trained in 4HOnline enrollment data collection

and management procedures

- 158 county, regional, and state 4-H staff participated in 3 days of professional development focused on Iowa 4-H's program priorities of healthy living, STEM, citizenship and leadership, and communication and the arts
- 900 election extension council members, 267 county 4-H staff members, 40 campus and regionally based 4-H staff, and 20 regional directors collaborated on the development and implementation of a population based staff deployment plan
- 150 county youth and state 4-H staff participated in educational youth development monthly webinars
- 32 4-H staff representing multiple states enrolled in the on-line course Grow 4-H - Building Partnerships to Benefit Youth

4-H Volunteers

- 1,407 volunteers participated in youth development principles and practices training
- 84 volunteers participated in risk management training
- 97 volunteers and 4-H staff participated in New Volunteer Training
- 37 volunteers participated in Safety Education in Shooting Sports training
- 6,908 adult and 3,258 youth volunteers assisted in the implementation of youth development programs
- 79 volunteers and 4-H staff attended state level volunteer training implemented by volunteers

Federal, State, and ISU Partners

- 4-H state staff serve on the National 4-H GPS/GIS task force and NAE4-HA task forces for Animal Science, Communication/Arts, and 4-H Hall of Fame
- Iowa State 4-H Leader provided leadership to the National State Leader Group in the areas of inclusion and diversity
- 4-H staff served on the Iowa Collaboration for Youth Development Council
- 4-H staff served on ISU's university-wide K-12 Working Group
- Iowa 4-H volunteer specialists collaborated with NC Region volunteer specialists to develop the NC Region Volunteer e-Forum training series and an online cohort course
- 4-H staff facilitated Youth Activities Program (YAP) policies training with 39 ISU faculty and staff
- 4-H staff trained 102 Iowa Department of Human Services staff in the area of positive youth development and inclusiveness
- 4-H staff implemented collaborative youth programming with ISU Colleges of Agriculture & Life Sciences, Business, Design, Engineering, Human Science, Liberal Arts & Sciences, and Veterinary Medicine
- Partnered with National 4-H Council and Chicago Mercantile Exchange to offer Ag Commodity Carnival at 13 county fairs and the Iowa State Fair, reaching over 7,500 youth participants

3. How was eXtension used?

eXtension was not used in this program

V(E). Planned Program (Outputs)

1. Standard output measures

2015	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	6908	65389	99538	21007

2. Number of Patent Applications Submitted (Standard Research Output)

Patent Applications Submitted

Year: 2015
 Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2015	Extension	Research	Total
Actual	0	0	1

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Enrollments in 4-H Citizenship and Leadership curricula areas.

Year	Actual
2015	27836

Output #2

Output Measure

- Enrollments in 4-H Communications and Arts curricula areas.

Year	Actual
2015	27404

Output #3

Output Measure

- Enrollments in 4-H Foods, Nutrition, Physical Health, and Fitness curricula areas.

Year	Actual
2015	47980

Output #4

Output Measure

- Enrollments in 4-H Science, Engineering, and Technology (SET) curricula areas.

Year	Actual
2015	129529

Output #5

Output Measure

- Number of 4-H livestock exhibitors certified in Food Safety and Quality Assurance (FSQA).

Year	Actual
2015	8318

Output #6

Output Measure

- Number of children and youth who participate in 4-H Afterschool.

Year	Actual
2015	26720

Output #7

Output Measure

- Number of local 4-H partnerships initiated or strengthened.

Year	Actual
2015	4247

Output #8

Output Measure

- Number of unduplicated youth engaged in 4-H learning opportunities.

Year	Actual
2015	99538

Output #9

Output Measure

- Number of volunteers completing one professional development training per year.

Year	Actual
2015	1405

Output #10

Output Measure

- Percentage of 4-H club members in their senior year of high school who will be attending a college/university/professional school/trade school/institute of higher education within 12 months

of their high school graduation.

Year	Actual
2015	90

Output #11

Output Measure

- Number of children and youth who participate in the camping delivery mode.

Year	Actual
2015	5161

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Average percentage of youth who self-report improved healthy living practices after engaging in 4-H learning experiences.
2	Average percentage of youth in grades 4 - 6 who self-report improved food safety and quality assurance practices after engaging in 4-H learning experiences.
3	Average percentage of youth who self-report improved science attitudes/aspirations/interests after engaging in 4-H STEM learning experiences.
4	Average percentage of youth who self-report improved STEM processing practices after engaging in 4-H STEM learning experiences.
5	Average percentage of youth who self-report improved communication practices after engaging in 4-H learning experiences.
6	Average percentage of youth who self-report improved citizenship practices after engaging in 4-H learning experiences.
7	Average percentage of youth who self-report improved leadership practices after engaging in 4-H learning experiences.
8	Average percentage of youth who self-report improved learning practices after engaging in 4-H educational experiences.

Outcome #1

1. Outcome Measures

Average percentage of youth who self-report improved healthy living practices after engaging in 4-H learning experiences.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	32

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Iowa ranks 16th highest in obesity/overweight prevalence and is in the bottom 10% of fruit and vegetable consumption in the United States, according to the Gallup-Healthways Well-Being Index. Youth across the U.S. ages 8 to 18 sit in front of a screen for an average of seven and a half hours each day and are spending up to two hours each day on mobile devices (Boyse, 2010). Youth and adults are becoming disconnected with the natural environment, where food comes from, and the ability to make good decisions regarding their health and well-being. Together, these situations dramatically increase physical, mental, behavioral, and learning problems.

What has been done

Sixteen youth across the state participated in a four-day healthy living camp which provided youth the opportunity to further develop their nutritional knowledge and culinary skills through hands-on activities as they tasted and prepared ethnic cuisines. In addition, 53 high school youth took part in a 4-H yoga workshop at the Iowa 4-H Youth Conference to learn how yoga can be used to enhance mind and body health. These Iowa 4-H Healthy Living experience sought to provide youth with a greater understanding of nutritional, social, emotional and physical well-being.

Results

Youth indicated being involved in 4-H helped them strengthen their healthy living practices of...1) eating a variety of fruits and vegetables, 2) making healthy food/snack choices, 3) working safely in gardens, 4) participating in physically active events, and 5) helping their family make healthy food choices and meals.

A sample of 53 youth enrolled in 4-H healthy living educational programming completed the Iowa 4-H Healthy Living Self-Assessment Tool. On average, 28% of youth indicated a 1-point increase and 3.8% indicated a 2-point increase in their healthy living behaviors and practices after participating in 4-H.

Evaluation methodology is described in the evaluation section of this report.

4. Associated Knowledge Areas

KA Code	Knowledge Area
806	Youth Development

Outcome #2

1. Outcome Measures

Average percentage of youth in grades 4 - 6 who self-report improved food safety and quality assurance practices after engaging in 4-H learning experiences.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	95

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Providing a safe and healthy food supply has always been a key issue to the American consumer, but in recent years this issue has become even more important to consumers, wholesale distributors, restaurant chains, and foreign export markets. Not only details on treatments and/or medications given to animals, but also how animals have been raised and treated throughout their lives has become front page news. Consequently, livestock producers continue to improve management practices to ensure American citizens have the safest food supply in the world. Recent reports indicate that 50 percent of antibiotics prescribed for people are not needed or are not optimally effective (Center for Disease Control, Sept. 2013). Livestock producers strive for the judicious use of antibiotics in animals and only use them when necessary. A recent recommendation from the FDA, which has been supported by the agriculture industry, has asked that antibiotics used as growth-promotants should be phased out. Food distributors and restaurant chains are providing economic incentives to producers that fall within their set of guidelines. Whether producers decide to fit into these guidelines, a single food-borne illness or drug residue found in meat can cause severe damage to the U.S. markets both economically and by harming the livestock industry's reputation. Iowa produces more than \$13 billion in livestock sales across all commodities, and ranks #1 in both egg layer and hog production (Iowa Department of Ag Statistics, 2012). Iowa's 4-H youth are the future livestock producers of this state and are needed to increase job growth and economic development.

What has been done

A comprehensive food safety and quality assurance curriculum program (FSQA) is conducted each year with 4-H'ers. Through the use of a variety of educational materials including video tutorials to hands-on learning, youth learn about animal identification, source verification (when and where the animals are born and raised), biosecurity measures (cleanliness techniques, disease contamination, on-farm disease transmission), drug treatments and injections, quality record keeping, and appropriate animal handling and welfare requirements.

Results

Youth indicated being involved in 4-H FSQA training strengthened their techniques and practices in the areas of feeling confident when sharing information with others; administering animal medications; proper livestock handling.

In the 2014/2015 program year, youth from 33 randomly selected counties enrolled in the Food Safety and Quality Assurance training were asked to complete a post-learning survey regarding how their FSQA techniques and practices were changed in the areas of communication skills, administering animal medications, and proper livestock handling. 922 youth completed the survey. Survey results showed an average of 94.9% of youth indicated a 1- to 4-point increase in their communication techniques. An average of 93.2% indicated a 1- to 4-point increase in their animal medical administration practices, and an average of 98.2% youth indicated a 1- to 4-point increase in their animal handling techniques. Additionally, 72.1% of youth agreed or strongly agreed they want to continue to learn about animal science, 66.2% agreed or strongly agreed they would like to have an animal science job, and 65.7% agreed or strongly agreed they participate in science activities that are not for school.

Evaluation methodology is described in the evaluation section of this report.

4. Associated Knowledge Areas

KA Code	Knowledge Area
806	Youth Development

Outcome #3

1. Outcome Measures

Average percentage of youth who self-report improved science attitudes/aspirations/interests after engaging in 4-H STEM learning experiences.

Not Reporting on this Outcome Measure

Outcome #4

1. Outcome Measures

Average percentage of youth who self-report improved STEM processing practices after engaging in 4-H STEM learning experiences.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	43

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

According to the Committee on Prospering in the Global Economy of the 21st Century's report *Rising above the Gathering Storm*, (The National Academies Press, 2007), the United States faces a critical shortage of young people with the skills and training to meet 21st century workforce needs and make scientifically informed decisions. In 2008 a Congressional Research Service (CRS) report (Kuenzi, 2008) urged the immediate need for STEM-related workforce development. The Iowa Department of Economic Development reports: The state's manufacturing sector contributes the largest share of state gross domestic product (GDP) of any major sector with \$23 billion contributed in 2009. In order for Iowa youth to be successful in the 21st century they must be prepared with the skills and meet workforce needs.

STEM workers drive our state and national economy and provide the needed innovation and global competitiveness by generating new ideas, new companies and new industries. Over the last ten years, growth in STEM jobs was three times as fast as growth in non-STEM jobs. STEM workers are also less likely to experience joblessness than their non-STEM counterparts. STEM workers play a key role in the economic wellbeing of the state and nation and are critical to helping the U.S. thrive moving forward. In 2010, there were 7.6 million STEM workers in the United States, representing about 1 in 18 workers. STEM occupations are projected to grow by 17.0 percent from 2008 to 2018, compared to 9.8 percent growth for non-STEM occupations. STEM workers command higher wages, earning 26 percent more than their non-STEM counterparts. More than two-thirds of STEM workers have at least a college degree, compared to less than one-third of non-STEM workers. Over the past 10 years, growth in STEM jobs was three times as fast as growth in non-STEM jobs. STEM workers are also less likely to experience joblessness than their non-STEM counterparts. Science, technology, engineering and mathematics workers play a key role in the sustained growth and stability of the U.S. economy, and are a critical component to helping the U.S. win the future. STEM degree holders enjoy higher earnings, regardless of whether they work in STEM or non-STEM occupations. (Langdon, D0., McKittrick, G., Beede, D., Khan, B., Doms, M. *STEM: Good Jobs Now and for the Future*. ESA Issue Brief #03-11. July 2011)

What has been done

Throughout the state of Iowa, Extension 4-H programs offer STEM learning opportunities for Iowa youth to increase their STEM process skills, improve their positive attitudes toward STEM education and careers, while also increasing exposure to STEM content in context. The STEM opportunities in Iowa 4-H are being done in cooperation with the Iowa Governor's STEM Initiative, Regents partners, and the formal education community. The experiences include workshops for

youth and educators, school enrichment activities, STEM themed camps, after school programs, and clubs as well as individual project work on STEM related topics. Programming provided during these in- and out-of-school opportunities utilized national 4-H curriculum such The Power of Wind, Iowa State University and other Land Grant University resources such as GEAR Tech 21 and the Governor's Advisory Council STEM Initiative Scale-Up programs, and other available science education resources such as those available through NASA and NOAA.

Results

Youth indicated being involved in 4-H helped them strengthen their STEM processing skills in the areas of... 1) asking questions that can be answered by scientific investigation; 2) designing an investigation to answer a question; 3) explaining to others how to do an investigation; 4) creating a graph, table, picture, or display to share information with others; 5) explaining why things happen in an investigation; 6) using evidence to defend their ideas; 7) using evidence to evaluate other people's ideas; 8) developing a design or model for solving a problem; 9) developing a way to test a design and use the results to improve the design; 10) sharing responsibilities with team members and letting others do some of the work; 11) using technology in a safe and appropriate manner; and 12) considering ethical implications of technology after engaging in 4-H STEM learning experiences.

274 youth enrolled in 4-H STEM programming, including a state science fair and summer camps, completed the Iowa 4-H STEM Self-Assessment Tool. On average, 36.24% of youth indicated a 1-point increase, 5.8% indicated a 2-point increase, and .7% indicated a 3-point increase in their science processing practices after participating in 4-H.

Evaluation methodology is described in the evaluation section of this report.

4. Associated Knowledge Areas

KA Code	Knowledge Area
806	Youth Development

Outcome #5

1. Outcome Measures

Average percentage of youth who self-report improved communication practices after engaging in 4-H learning experiences.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	52

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

According to the study, "Are They Really Ready to Work? Employer's Perspectives on the Basic Knowledge and Applied Skills of New Entrants to the 21st Century Workforce (2006)", "the future workforce is here, and it is ill-prepared." Business leaders reported that "while the three 'R's' are still fundamental to every employee's ability to do the job, applied skills such as team work, critical thinking, and communication are essential for success at work. In fact, at all education levels, these applied skills trump back knowledge skills such as reading and mathematics in importance in the view of employers." High percentages of surveyed employers indicated that high school graduates entering the workforce are deficiently prepared in the most important skills -- written/oral communications (written = 81% and oral = 53%), professionalism/work ethic (70%), critical thinking/problem solving (70%), ethics/social responsibility (44%), and teamwork/collaboration (35%).

What has been done

All 100 counties offered a county communication event program. 1,654 4-H members participated in public speaking and performance events at the 2014 Iowa State Fair. Competitive events including Robotics Challenge and Livestock Judging contests include oral communication opportunities as part of the event. Increasing communication skills and communication opportunities in the local 4-H club continued to be emphasized at 4-H leader trainings. All Iowa 4-H'ers are expected to demonstrate learning by giving a presentation or demonstration before a group, typically at a club or group meeting. Participants in all delivery modes are provided the opportunity to share what they have learned during the program. More than 20,000 4-H members demonstrated written, oral and visual communication skills as they prepared and presented fair exhibits for evaluation.

Results

Youth commonly indicated being involved in 4-H helped a young person strengthen communication practices such as...1) feeling confident when speaking in front of others, 2) feeling comfortable asking questions, 3) using good listening skills when others are talking, 4) using technology to express interests, and 5) creating products to share ideas/information.

920 youth who participated in various 4-H camps and 4-H special events completed the Iowa 4-H Citizenship, Leadership, Communication, and Learning Self-Assessment Tool. On average, 33.8% of youth indicated a 1-point increase, 17.8% indicated a 2-point or more point increase in their communication practices after participating in 4-H.

Evaluation methodology is described in the evaluation section of this report.

4. Associated Knowledge Areas

KA Code	Knowledge Area
806	Youth Development

Outcome #6

1. Outcome Measures

Average percentage of youth who self-report improved citizenship practices after engaging in 4-H learning experiences.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	56

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Campbell and Erbsstein (2012) found that youth's civic engagement can deepen their civic commitment, extend social capital, create meaningful relationships with adults, foster self-esteem and identity development and build a sense of self and collective efficacy. Henness, Ball, & Moncheski (2013) articulate the value of community youth development through 4-H in their case study regarding community youth development's effects on building social capital. They found both youth and adults benefit from a community youth development approach to service learning. In addition, both community recognition and community capacity increased. From their study of a 4-H club in Lamar, MO, Henness, Ball, & Moncheski (2013) found that when a core team of 4-Hers participated in community service learning activities, the community's level of civic engagement increased. Individuals' involvement in the community positively impacts not just the participants, but also the larger community.

What has been done

4,038 Iowa youth are enrolled in the 4-H Citizenship project. 862 youth and adults contributed 3,057 volunteer hours to improve their communities through the State 4-H Youth Conference and DuPont Pioneer Community Improvement grants. Fourteen Iowa 4-H clubs leveraged \$2,725 in DuPont Pioneer Community Improvement grants into nearly \$8,431 in community improvement projects. Four 4-H members served as delegates to National 4-H Conference; 84 Iowa 4-H'ers participated in the national Citizenship Washington Focus program. Twenty-two members interviewed for state level Citizenship project awards. Participation in a service activity is an expectation of all Iowa 4-H members and Iowa 4-H clubs.

Results

Youth commonly indicated being involved in 4-H helped a young person strengthen citizenship practices such as...1) making a difference in communities through service learning projects, 2) applying knowledge in ways that solve real-life problems through service learning projects, 3)

working on service projects to meet needs in their communities, and 4) gaining skills that will help them in the future through service their communities, 5) listen to various viewpoints whether they agree or not, and 6) learning about people who are different from themselves.

792 youth enrolled in various 4-H camps and 4-H special events completed the Iowa 4-H Citizenship, Leadership, Communication, and Learning Self-Assessment Tool. On average, 36% of youth indicated a 1-point increase, and 19.71% indicated a 2-point or greater increase in their citizenship practices after participating in 4-H.

Evaluation methodology is described in the evaluation section of this report.

4. Associated Knowledge Areas

KA Code	Knowledge Area
806	Youth Development

Outcome #7

1. Outcome Measures

Average percentage of youth who self-report improved leadership practices after engaging in 4-H learning experiences.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	51

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

According to Wehmeyer, Agran, & Hughes (1998), youth leadership is part of the youth development process and supports youth in developing: (a) the ability to reflect upon his or her strengths and weaknesses; establish personal and occupational goals; and have the self-esteem, confidence, motivation, and ability to carry them out (including the capacity to develop support networks in order to fully participate in community life and effect positive social change); and (b) the competence to point or direct others on a course of action, influence individuals' opinions and behaviors, and serve as a role model. Evaluations of youth development programs have demonstrated that young people who participate in youth leadership and civic engagement activities consistently get the supports and opportunities needed for healthy youth development (Innovation Center for Community and Youth Development, 2003). Additionally, research shows that youth who participate in developmentally appropriate decision making activities and those

who have access to meaningful youth development supports and opportunities are better prepared to make a successful transition to adulthood (Gambone, Klem, and Connell 2002).

What has been done

2,421 Iowa youth are enrolled in the 4-H Leadership project. More than 2,029 community and project clubs provide leadership experiences for members. 610 youth and 81 adults received leadership training during the Iowa 4-H Youth Conference; 53 youth and adults completed Youth-Adult Partnerships training; 19 4-H members represented Iowa at the National 4-H Congress. Forty high school youth provide leadership as members of the State 4-H Council, planning the 4-H Youth Conference and serving as ambassadors for the 4-H program. 116 youth had volunteer leadership positions with 4-H events during the 2015 Iowa State Fair.

Results

Youth commonly indicated being involved in 4-H helped a young person strengthen leadership practices such as...1) working together in a team, 2) listening and talking to others before making decisions, and 3) handling conflict respectfully.

920 youth enrolled in 4-H camps and 4-H special events completed the Iowa 4-H Citizenship, Leadership, Communication, and Learning Self-Assessment Tool. On average, 34.7% of youth indicated a 1-point increase, and 15.8% indicated a 2-point or more increase in their leadership practices after participating in 4-H.

Evaluation methodology is described in the evaluation section of this report.

4. Associated Knowledge Areas

KA Code	Knowledge Area
806	Youth Development

Outcome #8

1. Outcome Measures

Average percentage of youth who self-report improved learning practices after engaging in 4-H educational experiences.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	55

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

According to the study, "Are They Really Ready to Work? Employer's Perspectives on the Basic Knowledge and Applied Skills of New Entrants to the 21st Century Workforce" (2006), "the future workforce is here, and it is ill-prepared." Business leaders reported that "while the three 'R's" are still fundamental to every employee's ability to do the job, applied skills such as team work, critical thinking, and communication are essential for success at work. In fact, at all education levels, these applied skills trump back knowledge skills such as reading and mathematics in importance in the view of employers." High percentages of surveyed employers indicated that high school graduates entering the workforce are deficiently prepared in the most important skills -- written/oral communications (written = 81% and oral = 53%), professionalism/work ethic (70%), critical thinking/problem solving (70%), ethics/social responsibility (44%), and teamwork/collaboration (35%). Additionally, nearly 75% of surveyed business leaders identified creativity/innovation as a top applied skill rising in importance for new entrants in the workforce.

What has been done

23,338 4-H'ers enrolled in one or more of the 38 project areas offered; 76,354 other youth participated in other 4-H educational programs. All curriculum materials available to Iowa 4-H members is selected from the National 4-H Curriculum Directory and/or other peer reviewed resources. The experiential learning and inquiry based learning models are used as the primary instructional methods. All 4-H clubs and members are expected to set goals, evaluate progress towards goals, and keep records of activities and evaluate experiences. 100 counties provide a county fair exhibit opportunity for members to share what they have learned. Participating members share their exhibit goals, what was done, and what was learned as part of exhibit conference judging. Camps, conferences, contests and pilot events for targeted populations provided additional learning opportunities for selected members to enhance and demonstrate skills learned.

Results

Youth commonly indicated being involved in 4-H helped a young person strengthen learning practices such as...1) creating learning goals; 2) reviewing a variety of resources related to a topic; 3) identifying the strengths and weaknesses of different ideas, solutions, or approaches; 4) thinking about what is going well and what needs to change to achieve goals; and 5) applying what was learned to new experiences.

530 youth enrolled in 4-H camps and 4-H special events completed the Iowa 4-H Citizenship, Leadership, Communication, and Learning Self-Assessment Tool. On average, 36.3% of youth indicated a 1-point increase, 18.5% indicated a 2-point or greater increase in their learning practices after participating in 4-H.

Evaluation methodology is described in the evaluation section of this report.

4. Associated Knowledge Areas

KA Code	Knowledge Area
806	Youth Development

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Natural Disasters (drought, weather extremes, etc.)
- Economy
- Appropriations changes
- Public Policy changes
- Competing Public priorities
- Competing Programmatic Challenges

Brief Explanation

Onset of the avian flu epidemic necessitated emergency collaboration with five Midwestern Cooperative Extension Units in the development of alternative youth poultry exhibition activities due to the ban on all poultry exhibitions and events which affected over 3,600 Iowa poultry project members

52.8% of Iowa's school-aged youth reside in Iowa's 11 most populous counties compared to 49.5% in 2007. High rates of staff turnover have reduced consistent outreach capacity targeted toward these counties. As a result, the number of youth reached in more urban counties has dropped by 1/3 since 2007 while the number of youth reached in non-urban counties has remained relatively static. Persistent staffing fluctuations have also presented barriers in initiating and sustaining educational programs to address youth diversity outreach goals that more effectively serve Iowa's growing ethnic and racial minority audiences.

Aligning program outcomes with NIFA priorities while maintaining and improving a comprehensive 4-H Youth Development Program remains a challenge. The Iowa 4-H Youth Program emphasizes broader youth development and life skills outcomes, while NIFA priorities are typically more narrowly focused. The Iowa 4-H Program has increased efforts to measure program participants' knowledge and behavior changes in selected educational programs that match NIFA priority areas (ex: food safety and childhood obesity). Efforts were broadened to identify STEM opportunities within current educational programs and strong partnerships were built with Iowa STEM Hubs and Iowa State University faculty.

Revision of the Iowa Core by the Iowa Department of Education and local school districts presents challenges in the ability of the Iowa 4-H Program to partner with schools. Because local school districts emphasize formal education models, they are often hesitant to engage in non-formal youth development educational offerings. ISU Extension and Outreach 4-H staff continue to evaluate 4-H curricula to identify Iowa Core standards being addressed by 4-H curricula, and revise curricula, when necessary, to meet Iowa Core standards required by local school districts.

Implementation of innovative programs to reach all Iowa children and youth depends heavily on 4-H staff's and volunteers' ability to develop welcoming and inclusive relationships with diverse children, youth, families, community partners, and volunteers. In order for the Iowa 4-H Program remain relevant and sustainable, support is required from 4-H county Extension youth staff, 4-H partners, and 4-H volunteers for emerging 4-H delivery models, varied program content, unique partnerships, and diverse program

audience outreach.

In FY15 significant time and attention was required to improve operational and staffing efficiencies. A top priority for the Iowa 4-H Program was to develop welcoming and inclusive partnerships and educational experiences with all Iowa children and youth. Iowa 4-H is striving to be the K-12 leader at Iowa State University, and across the state, by focusing on diverse internal and external partnerships with the intent to narrow the achievement gap of Iowa's underserved youth audiences.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

The Iowa 4-H Program uses logic models as program development road maps in the areas of planning, implementation, and evaluation. Logic models have been created for STEM, healthy living, citizenship and leadership, and communication and the arts constructs. Self-assessment tools with indicators corresponding to each construct were completed by 4-H youth participants. The self-assessment tools examined self-reported changes in youths' knowledge and/or practices after participating in 4-H as compared to before participating in 4-H.

- Self-assessment tools were based on a 5-point Likert scale (where 1 = "not at all" and 5 = "great deal").
 - For the healthy living, citizenship, leadership, communication, and learning constructs, and nearly all corresponding individual indicators, youth reported statistically higher "After" scores than "Before" scores.
 - For the STEM processing practices construct, and 37 of the 39 corresponding individual indicators, youth reported statistically higher "After" scores than "Before" scores.
 - On average, 28% of youth indicated a 1-point increase and 3.8% indicated a 2-point increase in their healthy living behaviors and practices after participating in 4-H.
 - An average of 93% of youth indicated a 1- to 4-point increase in their animal medication administration practices, and an average of 98.2% youth indicated a 1- to 4-point increase in their animal handling techniques.
 - On average, 36.24% of youth indicated a 1-point increase, 5.8% indicated a 2-point increase, and .7% indicated a 3-point increase in their science processing practices after participating in 4-H.
 - On average, 33.8% of youth indicated a 1-point increase and 17.8% indicated a 2-point or more increase in their communication practices after participating in 4-H.
 - On average, 36% of youth indicated a 1-point increase and 19.7% indicated a 2-point or more increase in their citizenship practices after participating in 4-H.
 - On average, 34.7% of youth indicated a 1-point increase and 15.8% indicated a 2-point or more increase in their leadership practices after participating in 4-H.
 - On average, 36.3% of youth indicated a 1-point increase and 18.5% indicated a 2-point or more increase their learning practices after participating in 4-H.

Key Items of Evaluation

Bio Energy

C6 BioFarm teaches youth and adults about carbon, renewable energy, and STEM careers using an iPad app that allows a person to design their own farm. The program is sponsored by Iowa State University Extension and Outreach, CenUSA Bioenergy (USDA-NIFA), and Iowa NSF EPSCoR. A curriculum for middle school agriculture and science classrooms is also being developed. Following C6 BioFarm outreach, 2,635 youth have learned about carbon

and STEM careers. 87% of respondents reported that they learned something about carbon, 82% of respondents learned something about STEM careers, and 62% were interested in playing the C6 BioFarm again in the future.

Food Safety

The Iowa 4-H Program uses logic models that act as program development road maps in the areas of planning, implementation, and evaluation. The results indicated in this section are based on animal science-identified logic model outcomes. In the 2014/2015 program year, youth from 33 randomly selected counties enrolled in the Food Safety and Quality Assurance training were asked to complete a post-learning survey based on a 5-point Likert scale. Youth in grades 4 - 6 were administered a survey of eight questions regarding how their FSQA techniques and practices were changed in the areas of communication skills, administering animal medications, and proper livestock handling. 922 youth completed the survey. Survey results showed an average of 94.9% of youth indicated a 1- to 4-point increase in their communication techniques. An average of 93.2% indicated a 1- to 4-point increase in their animal medical administration practices, and an average of 98.2% youth indicated a 1- to 4-point increase in their animal handling techniques. Additionally, 72.1% of youth agreed or strongly agreed they want to continue to learn about animal science, 66.2% agreed or strongly agreed they would like to have an animal science job, and 65.7% agreed or strongly agreed they participate in science activities that are not for school.

Youth indicated being involved in 4-H FSQA training strengthened their techniques and practices in the areas of feeling confident when sharing information with others; administering animal medications; proper livestock handling.

VI. National Outcomes and Indicators

1. NIFA Selected Outcomes and Indicators

Childhood Obesity (Outcome 1, Indicator 1.c)	
0	Number of children and youth who reported eating more of healthy foods.
Climate Change (Outcome 1, Indicator 4)	
0	Number of new crop varieties, animal breeds, and genotypes with climate adaptive traits.
Global Food Security and Hunger (Outcome 1, Indicator 4.a)	
0	Number of participants adopting best practices and technologies resulting in increased yield, reduced inputs, increased efficiency, increased economic return, and/or conservation of resources.
Global Food Security and Hunger (Outcome 2, Indicator 1)	
0	Number of new or improved innovations developed for food enterprises.
Food Safety (Outcome 1, Indicator 1)	
0	Number of viable technologies developed or modified for the detection and
Sustainable Energy (Outcome 3, Indicator 2)	
0	Number of farmers who adopted a dedicated bioenergy crop
Sustainable Energy (Outcome 3, Indicator 4)	
0	Tons of feedstocks delivered.