

2017 Iowa State University Combined Research and Extension Plan of Work

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I. Plan Overview

1. Brief Summary about Plan Of Work

Agriculture in the state of Iowa has grown beyond traditional production of crops and livestock to encompass the revolution in 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 agricultural, food, value-added, environmental, and community endeavors.

Iowa's abundance is astonishing, ranking second nationally (behind California) with cash farm receipts (2014) of over \$31 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. Iowa is the fourth largest producer of cattle and in the top dozen for dairy and turkey production. Nearly 90 percent of Iowa's total land area is farmland. The power of that abundance stretches beyond Iowa's farms. It provides deep roots for a larger agri-food industry. In 2014, 7.1 percent of Iowa's gross state product came directly from agriculture; this grows to 27 percent if you consider all agriculture, ag-related manufacturing, and the associated economic activity linked to the supply of inputs and the household spending of workers in these industries and their supplying industries.

While the population of Iowa has been stable over the past years, the population is shifting from rural communities to urban and suburban communities. The shift has resulted in needs and opportunities related to communities, families and youth. Likewise, Iowa's 946 cities and 99 counties continue to struggle with identifying and seizing economic and social opportunities and improving quality of life for their residents. 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.

Effective management of natural resources, including soil, water, land, and air, is required for sound environmental stewardship, enhancing communities and people, and creating economic vitality given the demands for the production and manufacturing associated with agricultural, food and horticultural systems.

Agriculture will continue to be a perennial base of economic, social, and cultural pride for the state. The reason is because Iowa agriculture is more than just a world-renowned mixture of soil and climate. It also is dedicated citizens, producers, scientists, educators, business people, and community and organizational leaders who believe in the future of Iowa. Iowa's current and future competitive advantage lies with the value-added areas of agricultural, food, horticultural, and natural resource-based products.

The Iowa Agriculture and Home Economic Experiment Station and ISU Extension and Outreach work together to plan, discover, and deliver science-based knowledge for the benefit of the citizens and stakeholders of Iowa.

Significant cuts over the last two decades to state appropriations to ISU have further resulted in a large reorganization of Extension in 2009. This impacted all extension programs to varying degrees. The

experiment station suffered similar reductions in state funding and has been developing a strategic plan for focusing resources on and streamlining priority programs. Thus while our Plan of Work continues to represent an explicit statement on the planning, discovery, and delivery process, our capacity to do each has been hampered by the loss of operating funds, faculty and staff.

The Iowa State University (ISU) Combined Extension and Research Plan of Work for 2017-2021 continues to be organized under seven broad program areas:

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

The Plan of Work reflects an integration of ISU extension and research programs, particularly in the plant systems, animal systems, and natural resources themes. The programs show the uniqueness associated with both extension and research activities in terms of resources, existing organization structure, and faculty tenure. They also reflect the results of dialogues held among research and extension personnel. The result is a Plan of Work based on both research and extension goals and activities, rather than a single orientation toward one or the other area. The Experiment Station's work represents the efforts of scientists in more than 35 departments, centers, and programs across the Iowa State University campus. Although the work primarily focuses on areas in the College of Agriculture and Life Sciences, the Experiment Station also supports research in the College of Engineering, the College of Human Sciences, the College of Liberal Arts and Sciences, and the College of Veterinary Medicine. The Experiment Station cooperates with other states' agricultural experiment stations to ensure attention to critical problems, to share research results, and to avoid unnecessary duplication.

Likewise, as Iowa State University's primary conduit for transferring science and technology to Iowans, ISU Extension and Outreach is meeting critical needs through the teamwork of campus faculty, a statewide corps of regional specialists, local Extension leaders and educators, and thousands of trained volunteers. ISU Extension cooperates with similar units across the nation, but with particular focus on the North Central Region in terms of coordination of programs, activities, and metrics to measure impact. Extension staff are engaged on a daily basis with Iowans, receiving direct feedback from citizens, businesses, and communities that shape ISU research and help ISU Extension and Outreach develop innovative programs and efficient delivery mechanisms to meet the needs of an increasingly knowledge-based economy.

As demonstrated by this Plan of Work, Iowa State University is committed to creating, sharing, and applying knowledge to make Iowa, and the world, a better place. With its broad portfolio of science-based knowledge and its commitment to partnerships internally and with external stakeholders, Iowa State's research and extension programs are providing the science and education to address new challenges and opportunities.

We recognize the added value that multistate research and extension projects bring to addressing important food, feed, fiber, fuel, family, and community issues, and thus for many of our programs, there will be Iowa State University personnel (research and extension specialists) engaged in one or more multistate research and extension projects.

One clarification regarding research SYs: We classify the administrative portion of research faculty salaries (i.e., deans, department chairs, center directors, etc.) as "Professional", thus are now excluded. This much

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.

Estimated Number of Professional FTEs/SYs total in the State.

Year	Extension		Research	
	1862	1890	1862	1890
2017	371.0	0.0	187.3	0.0
2018	371.0	0.0	187.3	0.0
2019	371.0	0.0	187.3	0.0
2020	371.0	0.0	187.3	0.0
2021	371.0	0.0	187.3	0.0

II. Merit Review Process

1. The Merit Review Process that will be Employed during the 5-Year POW Cycle

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

2. Brief Explanation

Merit Review:

Iowa's rapidly changing political, social, and economic environment demands a dynamic program development process that incorporates the following:

- self-directed work teams,
- continuous needs assessment to inform program design and implementation,
- public and private partnerships,
- an increased focus on reporting outcomes,
- aggressive funding mechanisms to grow new programs,
- a strong connection with multiple program partners.

Needs Assessment:

ISU Extension will continue to follow this three-point approach:

- Engagement of key statewide constituencies. Program Directors develop a plan to identify needs working with statewide constituencies. State level governmental agencies and non-governmental organizations will be involved.
- Engagement of the general population. Surveys and listening sessions will be used to obtain input from a broad-base of Iowans.

- Engagement of local stakeholders. County Extension Councils and local stakeholder groups will participate in formal activities to confirm, prioritize, or regionalize the needs assessment.

State POW merit review:

North Central Regional Program Directors will continue to provide oversight, guidance, and course corrections on the logic models and joint program implementation and evaluation. Also, program leaders monitor feedback from stakeholders in report mechanisms including departmental reviews, program evaluation by Plan of Work teams and program evaluation as part of externally funded projects, and works with team leaders to make necessary course corrections.

Scientific Peer Review:

Project Proposals: Each project proposal will be endorsed by the department chair and Associate Director of the Experiment Station. The Assoc. Director will send the proposal to peers internal to ISU (typically 3 to 4 faculty) for a thorough review of the scientific merit, linkage with the POW, and the strategic plan of the college. Depending upon the reviews, the project is either approved, modified somewhat to significantly based on review comments, or rejected. Project proposals may be submitted by individuals, small groups, or a large group but must align with one or more programs under the POW.

Program Review Teams: Ad Hoc teams will be asked to periodically review all programs under the broad themes. The teams will be asked if the research activities, outputs and outcomes are in alignment with the POW and if there are emerging research programs that the Experiment Station should be incorporating into the POW within the five-year period.

III. Evaluation of Multis & Joint Activities

1. How will the planned programs address the critical issues of strategic importance, including those identified by the stakeholders?

The planned programs are based on input from the general public, stakeholder groups, educators and scientists who identified the most critical issues. This has resulted in Extension focusing efforts on four signature issues: Food and the Environment, K-12 Youth Outreach, Health and Wellbeing, and Economic Development that map directly to Plan of Work planned programs. In many cases, stakeholders are involved in the implementation of applied research efforts and educational/demonstration programs. In other situations, stakeholders through their commodity groups and organizations, provide additional funding to address issues of strategic importance. Results of planned programs are shared with stakeholders to determine if they continue to meet stakeholder needs. A program development process has been created and articulated with stakeholders to help them enter into the process at a number of points. A program catalog has been developed and organized by four critical issues identified by stakeholders.

Periodic academic program reviews on a department-by-department basis provide unbiased feedback on the portfolio of research, outreach, and education activities within a given department. Stakeholder groups are identified and participate in these reviews to provide their input on priorities and direction and help shape the research enterprise.

The Hatch Multistate research system provides an opportunity and a mechanism for the directors and individual faculty to connect, share, and inform the experiment station research program.

2. How will the planned programs address the needs of under-served and under-represented populations of the State(s)?

In addition to people of color, our programs have been expanded to include members of other traditionally underrepresented audiences; people with disabilities; men in family service/care programs; women in agriculture, individuals and families in poverty, older Iowans, families of incarcerated adults and military families. ISU Extension and Outreach has been designated one of six STEM hubs in Iowa with a focus to help under-represented populations enter into STEM occupations. During FY15, ISU Extension and Outreach hired a half-time diversity officer and formed a Civil Rights Employment Task Force and a Civil Rights Program Task Force. In 2016, ISU Extension and Outreach developed a Diversity and Inclusion Strategic Plan. In FY14, the College of Agriculture and Life Sciences established an Assistant Dean for Diversity.

Individuals from traditionally underserved and/or underrepresented groups were included in the initial identification process and in the program allocation process by a variety of means. The 2010 Extension state wide needs assessment survey specifically over sampled underserved groups to assure representation. The statewide needs assessment of 2014 also identified and included underserved groups in local communities. All programs include activities that support efforts in underserved and underrepresented populations. In some instances program materials are being translated into Spanish to meet the needs of the growing Latino population in the state. ISU Extension and Outreach and each of its program units have developed diversity committees, related plans, and report progress on these plans annually to intentionally address the needs of underserved populations. Several extension specialists of color have been hired to provide programs specifically targeted for underserved and underrepresented audiences. In addition, ISU equity advisors in each college are available to help faculty and staff address these groups.

There is a long history of diversity in the College of Agriculture and Life Sciences. One aspect is the Graduate Research Assistantship Match (GRAM) Program, which provides financial assistance to US citizens who are members of ethnic groups historically underrepresented in American higher education, overseen by the assistant dean for diversity.

3. How will the planned programs describe the expected outcomes and impacts?

Programs are focused on extension activities and have long-term outcomes. Programs focused on research activities tend to have short-term outcomes with the expectation that transference of the scientific knowledge will occur through extension programming. Goals for both outputs and impacts have been identified, often using logic models, and are closely monitored. Program goals, objectives and milestones are reviewed as part of the annual evaluation. New and emerging programs focus mostly on learning changes in clients while core or mature programs focus on developing and reporting behavior change outcomes. A recent focus on articulating the public value of programs is resulting in the measuring and reporting of social, economic, or environmental condition changes.

4. How will the planned programs result in improved program effectiveness and/or

Our POW and the process used to develop it and adjust it via merit and scientific reviews allows for closer coordination between researchers and extension. The program area teams have a better understanding of what citizens of the state believe to be the key issues. We continue to work on program effectiveness and efficiency. We are also constantly monitoring the outcomes in regard to inputs and outputs, as well as growing evidence based efforts, when possible. Planned program evaluations range from pre, post, and retrospective surveys, to interviews, focus groups, observations, and use of secondary data to document learning, behavior, and condition changes.

IV. Stakeholder Input

1. Actions taken to seek stakeholder input that encourages 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
- Targeted invitation to selected individuals from general public
- Survey of traditional stakeholder groups
- Survey of traditional stakeholder individuals
- Survey of the general public
- Survey specifically with non-traditional groups
- Survey specifically with non-traditional individuals
- Survey of selected individuals from the general public

Brief explanation.

Building on the strong tradition of stakeholder engagement with the experiment station and cooperative extension, we continually interact with traditional and nontraditional stakeholder groups through normal activities as well as inviting the public's participation in specific surveys and focus groups. No extraordinary efforts are necessary to engage various groups.

To respond to the needs of minority and underrepresented groups, Extension has increased access by hiring more bilingual staff that are representative of the target population, and continually seeks to have broader, more inclusive representation on advisory teams.

2(A). A brief statement of the process that will be 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
- Use External Focus Groups
- Open Listening Sessions
- Needs Assessments
- Use Surveys

Brief explanation.

The experiment station will use the existing dean's advisory groups, consisting of key leaders from stakeholder groups. Using a variety of statistical methods, focus group and survey participants will be identified. Academic program reviews provide external input to departments regarding the relevancy, innovation, and impact of their research enterprise. Thus, on a rotational basis, all seven program areas receive periodic external input.

Extension uses state-wide advisory committees representative of the population and stakeholder groups in each program area. At the county level, elected county Extension council officials review needs and plans on an annual basis, involving citizens using a variety of formal and informal processes to assure broad representation.

2(B). A brief statement of the process that will be 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
- Survey of traditional Stakeholder groups
- Meeting with traditional Stakeholder individuals
- Survey of traditional Stakeholder individuals
- Meeting with the general public (open meeting advertised to all)
- Survey of the general public
- Meeting specifically with non-traditional groups
- Survey specifically with non-traditional groups
- Meeting specifically with non-traditional individuals
- Survey specifically with non-traditional individuals
- Meeting with invited selected individuals from the general public
- Survey of selected individuals from the general public

Brief explanation.

- Meetings with traditional stakeholder groups and individuals are by far the most common method used.
 - Activities specifically for non-traditional groups and individuals.
 - Open listening sessions and conferences.
 - Targeted and random surveys.
 - Contacts are ongoing by field specialists, regional directors, county staff, and state specialists who work with individual private sector partners.
 - Meetings with agencies, professional associations and advisory boards, and other various groups across the state.
 - Selected 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.
 - Webcasts serve to share information and new policy direction and receive input from stakeholders. Participants are often surveyed.
 - Participants are asked to complete a survey at the beginning and end of the training to assess their training needs and how the training series can be improved, as well as a self-assessment to identify specific knowledge and skills participants gained from the training. 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.
 - Personal contacts initiated by the stakeholders.
 - One-on-one interaction, surveys from clients at public meetings, discussions with

Advisory Board members, e-mail communications including responses to Web and other origination sources.

- Surveys allowed those unable to attend meetings to voice opinions about needs and program planning processes. Follow-up meetings with selected individuals who might provide 'missing voices' are conducted in order to gather broad-based input.
- Each community determined how they would collect input, and choose 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
- In the Action Plans
- To Set Priorities

Brief explanation.

The input provides an opportunity to reassess specific objectives and the research projects and extension programs under each planned program, and to redirect as appropriate. Feedback will be used to confirm or reject the expected values associated with outcomes and impacts of the programs. The process of engaging stakeholders allows us to deliver very targeted and relevant information in response to their stated needs.

ISU Extension and Outreach:

The partnerships we build and the learning opportunities we provide have one overarching goal - to improve the quality of life in Iowa. Periodically we need to step back; to take a look at the research-based educational programs we offer to see if we are meeting our goal. Conducting needs assessments - county-by-county and by program area - gives us useful information to consider. We just completed both types of assessments, reviewed the findings, and are weighing that data against the finite resources available.

The ISU Extension and Outreach portfolio should include programs and services that address real needs in the here-and-now by providing education, while also generating knowledge that can be used in the future and making the most of our resources.

Examining our portfolio:

- At the heart of our portfolio are programs that are **fundamental** to our agriculture-based cooperative extension system and long-term partnerships.
- Next are programs **responsive** to recent needs assessments and changing Iowa demographics. The top five priorities that emerged from statewide assessment were: strengthening families; youth who are productive citizens and effective leaders; economic development in communities; youth who are literate and ready in STEM; and increasing family financial capability.

- We initiate **strategic** programs that integrate resources across the university and land-grant system and are multi-disciplinary, diversified, and address signature issues.
- We take on **emerging** program opportunities that need an educational response. We explore non-traditional engagement and reflect today's Iowa in our delivery.
- Programs that can be spun off to a partner, sustained locally, or for which an educational need no longer exists must be **transitioned**.

Over-laying the progressive curves of our portfolio model are the funds available to support programs and services. We are limited in terms of what we can do by the funds we have. We are guided by core principles that we agreed upon at our Leadership Summit: Our programs must be (1) relevant, (2) needs driven, (3) research-based, (4) educational, and (5) create impact.

The process was used to identify both significant challenges and emerging opportunities. The information collected was evaluated by the subject matter teams, prioritized and, where appropriate, incorporated into programming for the coming one to one to five year period. In many cases the information is affirmation of current program priorities, although some teams did change priorities in the 2016 plan of work.

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

2. Brief summary about Planned Program

Community visioning and design -- We will pursue a program of participatory research and outreach, working with communities to develop concepts and strategies for creating a shared vision of the future that includes social as well as physical design strategies. Programs such as Iowa's Living Roadways Community Visioning, PLACE, and I-WALK will continue to involve participatory research and outreach. The Community Design Lab, funded by Vice President for Extension and Outreach Initiative funds, will assist communities with design challenges at multiple scales and see projects through to implementation.

Community planning -- We will conduct research and provide outreach to communities on community planning, zoning, geographic information systems and community resource management. We will provide training to local officials on local government topics that contribute to the efficient management and operation of community assets. Through the Iowa Government Finance Initiative (IFGI) and the Data Portal Project, ISU Extension CED provide local governments with a wide range of products using local finance, economic, and demographic data, all available from one website, to help them more easily access analyses of their financial situation.

Community economic development -- We will conduct economic analyses and applied research for communities and regions, disseminate the information, and provide training on entrepreneurship and small business development and management. CED partnered with University of Wisconsin Extension to create the University Extension Community Development Collaborative, an initiative with the City of Dubuque, Iowa, designed to strengthen development efforts in the area and share successful strategies for supporting more sustainable economies.

We will pursue a program of participatory research and outreach, working with community and nonprofit organizations to train individuals to assume leadership roles in these organizations.

3. Program existence : Mature (More than five years)

4. Program duration : Long-Term (More than five years)

5. Expending formula funds or state-matching funds : Yes

6. Expending other than formula funds or state-matching funds : Yes

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 (Situation and Scope)

1. Situation and priorities

SITUATION

Many small Iowa communities lack resources to do effective planning for the future. Issues facing communities are numerous and include changing demographics (immigration), changing economic structures, wellness issues such as adult and childhood obesity, and the lack of leadership capacity in both the public and nonprofit sectors. Severe storm and flood damage, a problem that has been increasing in recent years, exacerbates these issues. In the current economic climate, local governments face shrinking budgets and need to learn strategies for doing more with less. Life in Iowa's small communities is also affected by global issues such as climate change, the price of fossil fuels, and instability in the global economy.

There is a need for better community programming. Community programming is often not intuitively related to what is seen as Agricultural Extension.

PRIORITIES

Demographic Shifts Caused by Immigration

Communities need assistance in engaging immigrants so that they become an asset to the community in terms of social and economic development.

Wellness Issues

Working with communities to diffuse the obesity epidemic in the state with strategies for improved walkability (trails, complete streets), safe routes to school, and education on diet and nutrition.

Housing/Poverty

Helping families make the transition to home ownership and to help low-income families improve their living conditions. Many rural communities in Iowa also struggle to reduce poverty.

Leadership Development

Building capacity of local officials, municipal professionals, county officials, planners and other community leaders to deal effectively with financial management, long-term planning, disaster recovery, economic development strategies and other issues through leadership training workshops.

Planning/Community Economic Development

Assisting communities with economic development strategies in economically distressed areas, such as southern Iowa through communication networks WE-LEAD and shared Extension positions in Cedar County, Des Moines County, Sioux City, West Liberty, and Keokuk; Latino business networks; and other

resources. Assisting underserved and immigrant entrepreneurs in rural communities with business plans, permitting, and retail analysis, and so on. Increasing outreach to underserved populations with the additions of Latino community development specialists in West Liberty and Sioux City.

2. Scope of the Program

- In-State Extension
- In-State Research
- Multistate Research
- Multistate Extension
- Integrated Research and Extension
- Multistate Integrated Research and Extension

V(D). Planned Program (Assumptions and Goals)

1. Assumptions made for the Program

Iowa population is becoming more diverse. Over the last two decades, the Hispanic young-child population in Iowa has more than doubled, and, in fact, people of Hispanic descent are now the largest minority group in the state. All other minority groups, including people who identify two or more races, have grown significantly as well. The influx of immigrants to the state presents an opportunity for entrepreneurship to flourish.

Many communities in Iowa lack the resources necessary to develop innovative projects and initiatives designed to improve their economic growth. Communities need assistance in dealing with issues related to community entrepreneurship, community philanthropy and rural/urban policy. Southern Iowa is considered one of Iowa's economically distressed regions and is in need of assistance in economic development. The region's shares of the state income, jobs, and people are on a downward trend. The workforce is older; many younger workers have relocated.

Iowa municipal employees must deal with constantly changing legislation and procedures. Evidence supporting this assumption is the popularity of the city finance and advanced accounting workshops, planning and zoning workshops, and the Iowa Municipal Professionals Institute offered by ISU Extension Office of State and Local Government Programs. Training evaluations show that 95% of participants rated the program as very good or excellent. Roughly 250 municipal professionals participate in the Municipal Professionals Institute and several thousand attend finance courses and budget workshops every year.

Community planning and design assistance is more effective when participatory processes are employed. Impact assessments of the Community Visioning Program have shown that 94 percent of communities that participate in community visioning complete at least one project proposed during the process. The demand is high for assistance from College of Design studio classes and the PLACE program, and the Community Design Lab has added another dimension to design outreach. Extension and the College of Design established two satellite facilities that are bringing outreach services directly to the public. ISU Design West in Sioux City has been the venue for design workshops for high school and middle school students. With the addition of a Latino community development specialist in Sioux City, ISU Design West will also support outreach to immigrant communities. Town/Craft in Perry has hosted community conversations between the Anglo and Latino populations in the community, as well as roundtable meetings that address issues facing rural communities such as housing, aging, and underserved entrepreneurs.

2. Ultimate goal(s) of this Program

To close the gap that exists between demand for planning services to rural Iowa communities and the availability of those services by continuing to offer community planning assistance through College of Design studios, the PLACE program, the Community Design Lab, GIS imaging workshops, and planning and zoning workshops for city officials and planners. The Community Visioning Program will continue to assist small Iowa communities to develop enhancement plans that reflect the values and identity of the community, as well as to offer focused long-term planning assistance to communities affected by natural disasters.

To effectively address Iowa's changing demographics, including underserved populations:

- Continue to revise and expand the Spanish-language DVD series, *Éxito en el Norte*, designed to help immigrants adjust to life in Iowa and the United States. Continue to provide educational programs for the immigrant population, including US citizenship courses, training for immigrant entrepreneurs. Assist communities in integrating new immigrant populations. Educate Latino families through the JUNTOS program. Increase outreach to the Latino population through Spanish-speaking community development specialists in Fairfield, Ottumwa, Perry, West Liberty, and Sioux City.
- Provide training in leadership and entrepreneurship and provide assistance in addressing issues of education and poverty to communities of color throughout Iowa. Develop and foster partnerships with organizations such as the Iowa Black Business Coalition, Children and Family Urban Movement, Evelyn K. Davis Center, and Creative Visions to more effectively conduct outreach to communities of color.

To assist Iowa communities with economic development. Many small Iowa communities lack resources to do effective planning for the future. Communities need assistance in dealing with issues related to community entrepreneurship, community philanthropy and rural/urban policy. Southern Iowa is considered one of Iowa's economically distressed regions and is in need of assistance in economic development. The region's shares of the state income, jobs, and people are on a downward trend. The workforce is older; many younger workers have relocated.

To enhance the ability of communities to do economic development planning through the quarterly newsletter, the Program Builder website, and a data services program that includes ICIP (Iowa Community Indicators Program), the Iowa Government Finance Initiative, and STATCOMM. CD-DIAL (Community Development Data Information and Analysis Laboratory) provides technical assistance in program evaluation, research methods and data analysis to communities, agencies and organizations. To provide decision makers at the local and regional levels one-stop information through the Extension and Outreach Indicators Data Portal website.

V(E). Planned Program (Inputs)

1. Estimated Number of professional FTE/SYs to be budgeted for this Program

Year	Extension		Research	
	1862	1890	1862	1890
2017	8.9	0.0	1.8	0.0
2018	8.9	0.0	1.8	0.0
2019	8.9	0.0	1.8	0.0
2020	8.9	0.0	1.8	0.0

2021	8.9	0.0	1.8	0.0
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V(F). Planned Program (Activity)

1. Activity for the Program

Workshops and educational efforts will be conducted with community organizations, individuals and leaders to assist developing and implementing plans for physical and social community improvements. Research and outreach to communities will be done on planning, zoning, resource management, and community and economic development activities using a variety of information dissemination methods. Training sessions will be conducted to improve skills of local government officials, community leaders and individuals. Special services will be developed to aid Iowa communities that suffered from future flooding or other disasters. We will conduct participatory research, outreach and training with leaders, workers and individuals to improve the effectiveness and skills of leaders and volunteers in community organizations. We will do special projects in communities that address issues such as economic development strategies, downtown revitalization, retail assistance, design strategies, and public and nonprofit capacity building.

2. Type(s) of methods to be used to reach direct and indirect contacts

Extension

Direct Methods	Indirect Methods
<ul style="list-style-type: none"> ● Education Class ● Workshop ● Group Discussion ● One-on-One Intervention ● Demonstrations 	<ul style="list-style-type: none"> ● Public Service Announcement ● Newsletters ● Web sites other than eXtension ● Other 1 (Social media)

3. Description of targeted audience

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

V(G). Planned Program (Outputs)

NIFA no longer requires you to report target numbers for standard output measures in the Plan of Work. However, all institutions will report actual numbers for standard output measures in the Annual Report of Accomplishments and Results. The standard outputs for which you must continue to collect data are:

- Number of contacts
 - Direct Adult Contacts
 - Indirect Adult Contacts
 - Direct Youth Contacts
 - Indirect Youth Contact
- Number of patents submitted
- Number of peer reviewed publications

Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(H). State Defined Outputs

1. Output Measure

- Number of articles, publications, reports, plans.
- Number of communities receiving planning and design assistance.
- Number of jobs created/retained.
- Number of people in underserved populations assisted.

Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(I). State Defined Outcome

O. No	Outcome Name
1	Community visioning and design: Number of communities receiving planning and design assistance.
2	Community economic development: Number of jobs created or retained.
3	Minority community and economic development: Number of people in underserved populations served.

Outcome # 1

1. Outcome Target

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

2. Outcome Type : Change in Condition Outcome Measure

3. Associated Knowledge Area(s)

- 608 - Community Resource Planning and Development

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 2

1. Outcome Target

Community economic development: Number of jobs created or retained.

2. Outcome Type : Change in Condition Outcome Measure

3. Associated Knowledge Area(s)

- 608 - Community Resource Planning and Development

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 3

1. Outcome Target

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

2. Outcome Type : Change in Condition Outcome Measure

3. Associated Knowledge Area(s)

- 608 - Community Resource Planning and Development

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

V(J). Planned Program (External Factors)

1. External Factors which may affect Outcomes

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

Description

Activities undertaken and expected results could be affected by the economy 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, and CED has assisted in starting new businesses throughout the state. Natural disasters continue to affect Extension CED outcomes. CED specialists have been working with disaster 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 providing training on parenting skills, budgeting, and language.

V(K). Planned Program - Planned Evaluation Studies

Description of Planned Evaluation Studies

Individual programs such as planning and zoning workshops, Municipal Professionals Institute and Academy, annual fiscal reporting workshops, and budget workshops are assessed annually through participant evaluation forms. Our online reporting system measures the reach of community and economic development programming throughout the state and in different geographic areas. The Community Visioning Program conducts follow-up interviews with past participants, as well as site visits to measure implementation.

V(A). Planned Program (Summary)

Program # 2

1. Name of the Planned Program

Expanding Human Potential

2. Brief summary about Planned Program

Iowa cares deeply about its families and their mental, physical, social, and economic well-being. Iowans recognize the value of high quality, affordable early childhood care and education, the need for effective parenting, the importance of competent family caregivers, and the ability to manage and plan for personal and family finances. Iowa is changing, with an increase in older adults and increased racial, ethnic and socioeconomic diversity. Iowans support working collaboratively with local, state and federal partners to impact public issues such as poverty, financial instability, economic development, support for older adults, quality of family, and child and youth success academically, socially, and emotionally.

ISU Extension and Outreach educational programs delivered in a variety of ways will help Iowans improve knowledge and change behavior to reduce negative consequences brought about by inequalities, a weak economy and labor market, and practices. Families across socioeconomic status and race/ethnicity will increase knowledge and develop skills to improve decision making related to caring for children and other family members, parenting effectively, helping children and youth succeed academically, supporting older adults, adopting less risky behaviors and lifestyle choices, and managing and maximizing financial resources.

Extension education will increase community awareness about critical issues facing families and involve community members in processes that address needs especially the needs of underserved families.

Programs will be directed to professionals, volunteers, community leaders, individuals, and families through multiple delivery methods. Delivery methods include educational classes, workshops, study circles, action team meetings, discussions, online learning, one-on-one interventions, and telephone hotlines. Indirect delivery methods included public service announcements, social media, newsletters, radio/television media programs and websites.

3. Program existence : Mature (More than five years)

4. Program duration : Long-Term (More than five years)

5. Expending formula funds or state-matching funds : Yes

6. Expending other than formula funds or state-matching funds : Yes

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	70%		22%	
803	Sociological and Technological Change Affecting Individuals, Families, and Communities	0%		22%	
	Total	100%		100%	

V(C). Planned Program (Situation and Scope)

1. Situation and priorities

In 2030, 88 of Iowa's 99 counties will have more than 20% of their population age 65 and older. Iowa continues to experience reduced K-12 academic achievement, poverty remains a persistent problem, family stress continues, and use of TANF is down dramatically and food stamp use fluctuates. The 2013 four year high school graduation rate in Iowa was 89% overall, but was lower for Hispanic (79.5%) and African American (73.2%) students. Iowa is ranked second in the nation for the percentage of families with children under age 6 years that have all parents in work force. An estimated 75% of Iowa children ages 0-5 are in childcare, much of it unregulated and home-based. Of note, 93% of teens and young adults are online, 56% of youth report being bullied at school, and 45% of Iowa youth report living in a supportive neighborhood. Billions of dollars are spent annually to address the societal costs of child abuse. One-third of the population provides caregiving for older family members. One third of Iowa births are to unmarried women and 26% of Iowa children live in single parent families.

The number of working poor is increasing and the rural urban gap is growing. Rural communities face growing challenges in retaining well-paying job opportunities and the array of services needed and desired by families across the lifespan. Population growth and per capita incomes lag national averages. Low savings rates, high debt levels, and a lack of planning for potential major life events leave many Iowans financially vulnerable. In 2012, 60% of Iowans lacked an emergency saving fund; more than 1 in 4 (27%) make only the minimum payment each month on credit cards. Uninsured Iowans face the challenge of making appropriate health insurance decisions. Low-income consumers are at greatest risk of economic instability. Economic pressures have long term negative consequences for children and families. Solutions lie in both individual and collective/community response. Iowa's diversity is also changing, which is also affecting communities. Poverty threatens the well-being of families. Citizens and community organizations together can make more informed decisions, collaborate, and take action to improve the quality of life of economically vulnerable families.

More than 40% of Iowans are over the age of 45, 27% are aged 45-64, and 15% are over the age of 65. Iowa is 5th in the nation for the proportion of people 65 and over and 3rd in the proportion of "oldest-old" persons aged 85 and over. Iowa is at the forefront of an aging revolution yet ill prepared to handle the social and economic consequences of this demographic transformation. Iowa cannot fulfill the goal of being the healthiest state in the nation without addressing the needs of an aging citizenry. Iowa communities and businesses need enhanced tools to support whole-person wellness throughout the life

span including midlife and beyond to promote individual quality of life, family well-being, and ultimately economic savings to Iowa.

2. Scope of the Program

- In-State Extension
- In-State Research
- Multistate Research
- Multistate Extension
- Integrated Research and Extension
- Multistate Integrated Research and Extension

V(D). Planned Program (Assumptions and Goals)

1. Assumptions made for the Program

- Education improves economic, environmental, and social conditions for individuals, families, and communities.
 - Iowans can gain knowledge and develop skills to help them make decisions to improve their lives and their communities.
 - Research- and evidence-based information and educational programs are a good investment of resources to produce intended outcomes.
 - Communities value using an empowerment approach to manage critical issues.
 - The national focus on educational attainment, early learning, healthy relationships and family development, financial education and security and public awareness will mobilize communities to adopt behaviors and support change.
 - Diversity enhances Iowa's culture and supports economic vitality.
 - Changing demographics in Iowa will impact program audiences and delivery methods.
 - Federal and state legislation and policy will support family environments that strengthen families.
 - Continued resources and funding can be secured to support these programs.

2. Ultimate goal(s) of this Program

Individuals, families, and community institutions work collaboratively to improve early learning, family functioning and financial stability among Iowans through child and family development, financial education, and community development.

V(E). Planned Program (Inputs)

1. Estimated Number of professional FTE/SYs to be budgeted for this Program

Year	Extension		Research	
	1862	1890	1862	1890
2017	12.1	0.0	3.6	0.0
2018	12.1	0.0	3.6	0.0
2019	12.1	0.0	3.6	0.0

2020	12.1	0.0	3.6	0.0
2021	12.1	0.0	3.6	0.0

V(F). Planned Program (Activity)

1. Activity for the Program

Short term and in-depth sequential educational programs will be directed toward individuals, families, professionals, and community leaders through one-on-one education, workshops, meetings, conferences, online learning, and social and mass media to strengthen their knowledge and skills. We will develop products, curricula, on-line tools, and other educational resources for use in training, technical assistance, and facilitation of community-based processes.

2. Type(s) of methods to be used to reach direct and indirect contacts

Extension

Direct Methods	Indirect Methods
<ul style="list-style-type: none"> ● Education Class ● Workshop ● Group Discussion ● One-on-One Intervention 	<ul style="list-style-type: none"> ● Public Service Announcement ● Newsletters ● Web sites other than eXtension ● Other 1 (Blogs) ● Other 2 (Podcasts)

3. Description of targeted audience

Parents of children, teens, 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.

V(G). Planned Program (Outputs)

NIFA no longer requires you to report target numbers for standard output measures in the Plan of Work. However, all institutions will report actual numbers for standard output measures in the Annual Report of Accomplishments and Results. The standard outputs for which you must continue to collect data are:

- Number of contacts
 - Direct Adult Contacts
 - Indirect Adult Contacts
 - Direct Youth Contacts
 - Indirect Youth Contact
- Number of patents submitted
- Number of peer reviewed publications

Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(H). State Defined Outputs

1. Output Measure

- Number of parents and family members participating in educational programs related to child care, parenting, couple relationships, and aging.
- Number of professionals or volunteers trained to work with programs related to child care, aging, couple relationships, and parenting.
- Number of individuals participating in family finance educational programs.
- Number of professionals or community volunteers trained to work with families on financial management.
- Number of adults participating in educational programs that increase awareness of public issues.

Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(I). State Defined Outcome

O. No	Outcome Name
1	Percent of parents improving parenting skills.
2	Number of professionals trained to provide education and/or support to families.
3	Percent of early child care providers improving learning environments and teaching strategies.
4	Percent of caregivers better able to manage later life issues.
5	Percent of individuals improving personal and family financial management practices.
6	Percent of individuals making progress toward financial goals.
7	Percent of professionals or volunteers who are better prepared to apply or teach financial management skills.

Outcome # 1

1. Outcome Target

Percent of parents improving parenting skills.

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 802 - Human Development and Family Well-Being

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 2

1. Outcome Target

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

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 802 - Human Development and Family Well-Being

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 3

1. Outcome Target

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

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 802 - Human Development and Family Well-Being

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 4

1. Outcome Target

Percent of caregivers better able to manage later life issues.

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 802 - Human Development and Family Well-Being

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 5

1. Outcome Target

Percent of individuals improving personal and family financial management practices.

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 801 - Individual and Family Resource Management

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 6

1. Outcome Target

Percent of individuals making progress toward financial goals.

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 801 - Individual and Family Resource Management

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 7

1. Outcome Target

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

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 801 - Individual and Family Resource Management

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

V(J). Planned Program (External Factors)

1. External Factors which may affect 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.)

Description

A weak economy continues to constrain income growth and limit economic mobility; Iowa's high proportion of multiple job holders reduces time available for participation in Extension and Outreach programs. Additionally, there are fewer trained volunteers to implement programs as widely and as effectively as desired. An increasingly diverse population challenges our ability to meet diverse 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 increasing diverse (e.g., race, socioeconomic status, gender, age) audiences. 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. Interest in indirect delivery methods continues to increase for individuals and work organizations as does more programming via technology and train-the-trainer approaches to education. Federal and state legislation continues to impact appropriations and policy for programming initiatives. Healthcare reform will also modify the landscape for programming in this area.

V(K). Planned Program - Planned Evaluation Studies

Description of Planned Evaluation Studies

For family life programs participant attitudes, knowledge and behaviors will be assessed. The Strengthening Families Program 10-14 will conduct retrospective post then pre-tests with parents and youth. The Juntos Para Una Mejor Educacion program will conduct pre- and post-surveys with parents and youth. The Together We Can: Creating a Healthy Future for Our Family program will conduct pre- and post- surveys with parents. Post training observational assessments will be conducted for Early Childhood Environment Rating Scale training to measure the impact of quality improvements. A post-training survey of participants in the Powerful Tools for Caregiver training program will take place. Participants in family finance priority programs will complete surveys to assess change in knowledge and skills at the conclusion of sequential programs. In addition, this state plan of work has identified and implemented core programming. Criteria for educational offerings include a review of a number of statuses, including research- or evidence-base, timeliness, relevance, uniqueness (services not offered by other organizations), sequential design, and potential for impact. Sequential programming is privileged to best demonstrate impact. Online surveys are capturing evaluation/impact data for some of the core programs.

V(A). Planned Program (Summary)

Program # 3

1. Name of the Planned Program

Food Security

2. Brief summary about Planned Program

Agricultural production and related up and down stream industries make up the single largest sector of Iowa's economy and is particularly important to the rural communities in the state. Its long term viability is a critical mission of Iowa State University which has a successful history of assisting farmers, suppliers, processors and policy makers and other key decision makers in addressing opportunities and challenges facing agriculture. Technology development via scientific discovery, both basic and applied, has been the hallmark of modern agriculture that has consistently improved the efficiency, safety and sustainability of food, fiber and now fuel production to a growing global population. Adoption of new technologies and practices by farmers holds economic, environmental and social implications at the farm, community and market level. Production, marketing and business skills are needed by farmers to effectively evaluate new opportunities and navigate emerging challenges. Demand for locally produced food including fruits and vegetables as well as livestock products, has shown substantial growth. The ability to enter the local market on a small scale and retain higher farm-to-consumer margins provides opportunities for smaller farms and beginning farmers and other agricultural entrepreneurial businesses. Growth in local farming and associated businesses enhances local community economic development through job creation and general economic activity. Thus, to ensure economic and environmental sustainability of producers and thus enhance food security, Iowa State University's research and extension program must continue to find new discoveries to add value to Iowa commodities, reduce costs through improved efficiency, improve business and marketing skills, develop and apply production efficiencies, model policy outcomes, encourage human capital training and leadership development, and anticipate emerging trends and challenges facing Iowa agriculture. In addition to increasing the knowledge and skills of producers and the agribusiness sector, production capacity will be enhanced through the adoption of practices that improve yields, reduce input costs, and mitigate the effects of adverse weather conditions on crop and livestock systems.

Of all natural hazards, floods, water-logged soils, and droughts have the highest impact on Iowa's economy. Drought in 2012 significantly reduced crop and pasture fields in parts of Iowa. Excess spring rainfall in 2013 resulted in prevented plantings and reduced crop production. Unusually high precipitation in the fall of 2014 delayed harvest and leached nutrients from soils to streams and rivers. Above average temperatures and near record rainfall in November and December 2015 again caused nutrient and soil loss to surface water. More research is needed to better understand whether Iowa's precipitation extremes will continue and how to mitigate the impact. Improvements in seasonal climate predictions would enable Iowa decision-makers to better prepare for these extremes and reduce their economic and environmental impacts when they occur. Extreme weather conditions will increase stress on our natural resources, require adaptations in our agricultural practices, and create economic and public policy challenges.

The complex issue of extreme weather requires multi-disciplinary perspectives. ISU faculty and specialists in water quality, the environment, and communities along with agricultural researchers, planners, economists, and climate and soil specialists will work together to develop the needed information. Researchers will develop conservation strategies, risk management strategies and practical information on best responses to extreme weather. Extension will provide outreach to provide Iowans information for responding to extreme weather effects.

Experiment Station researchers and Extension will provide key information and support:

- Investigating natural environment responses to warming and wildlife responses to changing habitats.
- Developing plant diversity and production strategies to reduce crop vulnerability.
- Developing conservation strategies in agricultural inputs to slow or lessen the impact of extreme weather.
- Evaluating and demonstrating in-field and edge-of-field practices and land use alternatives to reduce the loss of nutrients to surface water.
- Monitoring climate and using tools such as remote sensing to map and monitor resources.
- Analyzing carbon sequestration and biomass.

Making recommendations to farmers on how to respond to fluctuations and stresses created by extreme weather that result in pest pressures.

3. Program existence : Mature (More than five years)

4. Program duration : Long-Term (More than five years)

5. Expending formula funds or state-matching funds : Yes

6. Expending other than formula funds or state-matching funds : Yes

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	18%		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	9%		16%	
212	Diseases 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	4%		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 (Situation and Scope)**1. Situation and priorities**

ISU agricultural programs address and enhance the economic, environmental and human health priorities of Iowa. Iowa's economy is heavily dependent upon agriculture as the state ranks second in farm receipts

(USDA NASS). The majority of Iowa counties are rural and are dependent on agricultural production, marketing and agribusiness for employment and economic activity. Livestock and poultry production have historically represented half of farm cash receipts. Increased energy production from land-based renewable sources (biofuels and wind) provides new opportunities for crop producers and land owners. Yet this new crop demand coupled with extreme weather events has increased the volatility in grain prices creating greater risk for crop producers, livestock producers and beginning farmers. Research-based education assists these economic transitions.

Much of the employment and economic activity occurs beyond the farm gate in the agricultural input and further processing sectors. The success of Iowa farmers depends heavily on these up and down stream firms. They are also important users and deliverers of research-based knowledge originating at Iowa State University and through its collaborations with other land-grant institutions.

ISU programs also address emerging socio-economic, environmental and human health situations in Iowa: As Iowans seek to address issues of childhood obesity and diseases conditions related to poor nutrition or poor eating habits, demand for locally produced food including fruits and vegetables as well as livestock products, has shown substantial growth. Meat, dairy and egg production in Iowa are significant value-added enterprises. Processing these products creates jobs and economic activity across the state. Livestock are also important to successful ethanol production as the distillers dried grains and solubles are highly valued in rations. Likewise, animal agriculture must become more efficient to compete for grains, forages and land from alternative uses. In order for this emerging new environment of regional and local food systems to grow, there is a need for educational programs, technical assistance, supporting infrastructure, leadership capacity building, organizational development and engaging youth, adults and communities.

Agricultural research and education regarding new discoveries and adoption in crop and livestock production efficiencies, policy analysis, farm level decision tools, biofuel production, and new local small-scale production and distribution systems contributes to Iowa's economic health, opens new opportunities in rural communities, and supports enhancement of human health and well-being.

Maintaining profitability in the livestock industry enhances the sustainability of those producers, thus safeguarding the nation's food security. Any potentially widespread threat to livestock jeopardizes the stability of those industries. For example, the emergence of a new swine disease shifted the educational effort of the Iowa Pork Industry Center to increase programming in animal health, specifically disease prevention strategies to ensure producers are able to make the best informed decisions. Likewise, the national beef cow herd is the smallest since 1962 due to high feed costs, national droughts, and reduced profitability, but is primed for expansion. The Iowa Beef Center will focus on better management of the replacement heifer and first-calf heifer to improve both conception and retention to put that industry on a stronger footing.

Extreme weather research and extension activities are widely dispersed across departments and programs at ISU. As needs develop and awareness of extreme weather effects increase, better coordination of activities and evaluation of efforts will be needed. It will be developed in the coming years as educators are convened, research is assessed, and effective education and outreach are planned. The goal of this coordinated effort is to:

1. Discover the actual and potential implications of extreme weather on crop, livestock and ecological systems, economies and other sectors.
2. Enhance the public's engagement and receptivity to implications of extreme weather regardless of causality, and
Transfer knowledge that allows producers and environmental control agents to adapt to extreme weather

by seizing the opportunities of new crops, new varieties and new management practices that maintain the viability of production economics and infrastructures while minimizing damage from invasive pests, diseases and changes in the hydrologic system.

2. Scope of the Program

- In-State Extension
- In-State Research
- Multistate Research
- Multistate Extension
- Integrated Research and Extension
- Multistate Integrated Research and Extension

V(D). Planned Program (Assumptions and Goals)

1. Assumptions made for the Program

Iowa has natural resources and a climate well suited for agricultural production of food, fiber and fuel for a growing global population. It has well established infrastructure to market and process existing crops and livestock. Farmers and agribusinesses are well educated and have ready access for information. Iowa State University is a leader in research discovery in production, processing, marketing and risk management of agricultural commodities. ISU Extension and Outreach is well respected by farmers as a source of research based knowledge to improve their decision making ability. The program's goal is to help farmers achieve long-term profitability of their operations by providing profit enhancing technologies and teaching farmers to evaluate the adoption and implementation of the technology within the farms' resource base. Alongside this well-established traditional agricultural infrastructure is a growing regional foods production and distribution system. Regional food systems are valued by communities because of increased job growth and access to fresh fruit and vegetables. Program goals in the regional foods program include providing education for and about regional food systems to support new growers' efforts, and education to enhance individual, family, community, and environmental health.

The program of work in ensuring profitable producers is an integrated research/extension program focused on farmer success that addresses both opportunities and challenges facing Iowa's agricultural producers. The program is driven by committed individuals working together to achieve a common goal. They are directed by the latest scientific discoveries and direct communication with Iowa farmers to prioritize research and educational needs. The program will use a combination of traditional delivery methods, web-based tools and innovative public-private partnerships to reach farmers. The program will be implemented in an era of declining public funding for agricultural research and education and volatile prices and narrow margins in Midwest agriculture.

Extreme weather may affect a myriad of aspects of the condition of agricultural production, environmental control, and family and community life. It is sometimes a contentious issue. Neutrality regarding cause and blame must undergird the program, while proactive thinking engages stakeholders in addressing its effects. Responding to these issues involves many disciplines. Baseline research and needs assessment must be examined in order to chart the future of programming.

2. Ultimate goal(s) of this Program

The ultimate goals of the program are:

- to ensure the long term sustainability and profitability of Iowa agricultural producers,
- to increase production capacity of the agricultural sector,
- to encourage producers to select and use efficient technologies appropriate for their farm,
- to foster a resilient regional food system that increases opportunities for stakeholders of regionally produced food,
- to encourage participation in value -added opportunities to improve household income,
- to encourage adoption of profitable agricultural practices while at the same time protecting natural resources,
- to mitigate the economic consequences of extreme weather on agricultural producers, and
- to assure that decision-makers across selected target audiences are practicing adaptive practices that address the effects of extreme weather.

V(E). Planned Program (Inputs)

1. Estimated Number of professional FTE/SYs to be budgeted for this Program

Year	Extension		Research	
	1862	1890	1862	1890
2017	21.3	0.0	30.8	0.0
2018	21.3	0.0	30.8	0.0
2019	21.3	0.0	30.8	0.0
2020	21.3	0.0	30.8	0.0
2021	21.3	0.0	30.8	0.0

V(F). Planned Program (Activity)

1. Activity for the Program

- 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 the public regarding the interaction between farming practices and water quality.
 - Priorities for 2017-2021 will be to assist farmers and landowners in adapting to the impacts of extreme weather fluctuations (drought and high temperatures and excessive and unseasonable rainfall) on crop and livestock production.

2. Type(s) of methods to be used to reach direct and indirect contacts

Extension

Direct Methods	Indirect Methods
<ul style="list-style-type: none"> ● Education Class ● Workshop ● Group Discussion ● One-on-One Intervention ● Demonstrations 	<ul style="list-style-type: none"> ● Public Service Announcement ● Newsletters ● Web sites other than eXtension ● Other 1 (radio)

3. Description of targeted 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 working to reduce the loss of nutrients to surface water using science-based strategies, and crop and livestock farmers impacted by the 2012 drought and the excessively wet conditions in 2013, 2014, and 2015.

V(G). Planned Program (Outputs)

NIFA no longer requires you to report target numbers for standard output measures in the Plan of Work. However, all institutions will report actual numbers for standard output measures in the Annual Report of Accomplishments and Results. The standard outputs for which you must continue to collect data are:

- Number of contacts
 - Direct Adult Contacts
 - Indirect Adult Contacts
 - Direct Youth Contacts
 - Indirect Youth Contact
- Number of patents submitted
- Number of peer reviewed publications

Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(H). State Defined Outputs

1. Output Measure

- Number of producers and agribusiness professionals who attended face-to-face educational activities, including individual consultations.
 - Number of producers and agribusiness professionals who subscribed to newsletters and access web-based resources.
 - Number of producers receiving ISU research based information from their ag retail or professional consultant.
 - 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.
 - Number of local food producers attending extension programs.
 - Number of popular press articles and publications authored by Extension specialists.
 - Number of lowans receiving food safety certification.
 - Number of adult participants in Extension programs on food safety.
 - Number of visits on Iowa State University Extension and Outreach food safety project websites.
- Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(I). State Defined Outcome

O. No	Outcome Name
1	Number of producers indicating adoption of recommended practices.
2	Number of producers reporting increased dollar returns per unit of production.
3	Number of producers and landowners who adopt BMPs to address extreme weather events.
4	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).

Outcome # 1

1. Outcome Target

Number of producers indicating adoption of recommended practices.

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 216 - Integrated Pest Management Systems
- 302 - Nutrient Utilization in Animals
- 401 - Structures, Facilities, and General Purpose Farm Supplies
- 131 - Alternative Uses of Land
- 602 - Business Management, Finance, and Taxation
- 603 - Market Economics
- 601 - Economics of Agricultural Production and Farm Management

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 2

1. Outcome Target

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

2. Outcome Type : Change in Condition Outcome Measure

3. Associated Knowledge Area(s)

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

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 3

1. Outcome Target

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

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 102 - Soil, Plant, Water, Nutrient Relationships
- 132 - Weather and Climate

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 4

1. Outcome Target

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. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 603 - Market Economics
- 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

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

V(J). Planned Program (External Factors)

1. External Factors which may affect 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)

Description

The success of the program to ensure profitable producers and increase production capacity will depend upon many factors beyond the control of Iowa State University and the faculty and staff of the program. These include external forces that impact farmers as well as Iowa State University. Farmers and their ability or willingness to adopt new technologies or implement new practices are impacted by factors that affect production and prices and thus short-term profitability. These include natural disasters (drought, flood, frost, etc.), market forces that influence input and output prices (supply and demand, trade agreements, exchange rates, interest rates, monetary policy, consumer preferences etc.), and regulation and policy changes (Farm Bill, EPA, FDA, DOE, etc.). Likewise, Iowa State University's ability to deliver the program of work is somewhat dependent on funding levels from conventional federal and state sources, competing priorities of public funding agencies, how competitive faculty and staff are at external grants, and short term priorities caused by natural disasters.

The Gulf Hypoxia Task Force (HTF) has required states along the main stem of the Mississippi and Ohio Rivers to develop and implement a strategy to reduce the loss of nitrogen and phosphorus reaching the Gulf. Iowa State University research and extension are partners in the Iowa Nutrient Reduction Strategy and is working with agencies, NGOs, farmers and agribusinesses to achieve the HTF goal. In addition to the focus on reducing the impact on the Gulf, cities in Iowa are increasingly concerned about the impact of upstream farming practices on water quality and flooding potential. Their responses range from partnering with to lawsuits against agriculture. Thus, the challenges of increasing agricultural capacity and efficiency while reducing negative externalities is coming at a time of narrowing and negative economic margins for farmers.

Regarding regional and local foods, additional external factors are a concern: Locally produced foods often sell at a higher price than foods made through conventional production and marketing systems. A weak economy will hinder the growth in demand for local foods. Conversely, economic growth will improve the demand for local foods. Location has been identified by the press and media as a significant driver of consumer food purchasing decisions. Changes in consumer preferences for local food will impact the growth potential for local demand in Iowa. In late 2010 Congress passed legislation giving FDA more oversight of food safety regulations and specified exemptions for small volume producers, processors and marketers of foods. If implementation of these regulations is more onerous than expected, or if the buyers in the market place choose to hold small firms to the same standards as

the regulated larger firms, then the cost per unit of food sold will make it difficult for smaller firms to compete. Health care cost and nutrition related health problems are getting significant attention in the press and in public policy. If the focus of public policy shifts to other priorities, the attention on healthy diets and funding for research, education and public feeding programs will decline.

Drought in 2012 forced cattle producers to find alternative forage sources, test for nitrates, place cover crops and cull herds. Extremely wet weather conditions during the 2013 planting months delayed or prevented planting in a significant number of acres in Iowa. Extension responded with timely meetings in collaboration with crop insurance representatives and ag retailers to reach farmers. The resulting impact on farm profitability and soil conditions for the 2014 growing season required continued research input from ISU regarding pest and soil management. Increased production in 2013 and 2014 has depressed commodity prices, which in turn, will negatively impact farm profitability, especially following the record high prices of 2012. These economic conditions will likely limit many farmers' ability to respond to efforts at sustainability if added costs are involved. Extension anticipates programming will be needed in risk management. Conversely, lower commodity prices will help many livestock producers as the cost of feed decreases. This group of producers will likely be open to adopting Extension recommendations for sound management practices.

V(K). Planned Program - Planned Evaluation Studies

Description of Planned Evaluation Studies

Extension will monitor changes in knowledge, behavior and/or conditions related to continuing programs in all disciplines and cross-discipline programs through surveys (After only/Retrospective pre & post), focus groups, and case studies. Extension will track the number of popular articles published, the number of participants who attend field days and demonstrations on reclaiming soils and extreme weather conditions, and dealing with the resulting pest infestations. Changes in knowledge, behavior and conditions will be noted.

V(A). Planned Program (Summary)

Program # 4

1. Name of the Planned Program

Health and Well-being

2. Brief summary about Planned Program

Iowans are practicing behaviors that lead to a high risk of obesity, which leads to increased incidence of heart disease, diabetes, certain types of cancer, and chronic diseases that can lead to disability. These chronic diseases not only exert an economic strain (healthcare and work productivity), but decrease longevity and quality of life. A variety of audiences (parents, youth, health professionals, school personnel, childcare providers) will learn about the myriad of factors in the current socioeconomic environment contributing to overweight and obesity including genetics, the feeding relationship, lack of physical activity, technology, portion distortion, and food availability.

Direct delivery of education will occur through educational classes, workshops, discussions, webinars, one-on-one interventions, online interventions, and hotlines as well as indirect delivery methods through social media, newsletters, radio/television media programs and websites. Training and technical assistance will be provided to school districts throughout the state to enhance and improve implementation of local school wellness policies. Additionally, childcare providers statewide will have the opportunity to receive training for state licensure and Child and Adult Care Food Program certification. Finally, adult wellness will be targeted through general nutrition and wellness programs as well as the EFNEP and SNAP-Ed nutrition education programs.

Food safety education is an important component of ensuring good health for Iowans. It is important to ensure safe food handling behaviors are practiced by consumers, and producers, and retail foodservices. Implementing safe food handling from farm to fork will reduce incidences of foodborne illness. We plan to continue direct delivery of education through educational classes, workshops, discussions, webinars, one-on-one interventions, online education and hotlines as well as indirect delivery methods through newsletters, radio/television media programs, social media, apps, and websites. National food safety certification programs, such as ServSafe® will continue to be offered. Food safety information based on the most recent scientific evidence will serve as the content for programming. Concerns of food safety risks from fresh produce coupled with emphasis on increased fruit and vegetable consumption and interest in school gardens, farm-to-school, and food preservation as well as continuing increases in food consumed that is prepared away from home, food safety programming is an integral component of nutrition and health. Because a large percentage of the US population lives in an urban or suburban environment, they have little awareness or knowledge of the processes involved in growing food at the production level. Yet there is concern among consumers regarding food safety and quality during production phases, as well as animal health and well-being. Consumers need access to information and education in these areas so they can be reassured as to the safety and humane measures embedded in American agriculture production.

3. Program existence : Mature (More than five years)

4. Program duration : Long-Term (More than five years)

5. Expending formula funds or state-matching funds : Yes

6. Expending other than formula funds or state-matching funds : Yes

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%		23%	
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%		5%	
	Total	100%		100%	

V(C). Planned Program (Situation and Scope)

1. Situation and priorities

Youth and Adult Wellness: The current dietary and physical activity (PA) practices of Iowans compromises their well-being. The percentages of Iowan children, youth and adults who are overweight/obese are 31.7%, 27.7% and 64.7%, respectively. Fruits and vegetables are important for optimal weight management and chronic disease prevention. The percentage of Iowa youth and Iowa adults consuming less than 5+ fruits and vegetables daily is 86.8% and 81.5% respectively. Of Iowa's 21 "completely rural" counties, almost half have health outcomes ranking of < 50 indicating poorer health of those residents. Iowa's households considered food insecure is 12.6%, slightly below the national average of 14.5%. Regular PA and physical fitness are important to an individual's health, sense of well-being, management of stress and maintenance of a healthy body weight. Regular PA in can attenuate numerous chronic diseases and improves physical fitness. Many Iowa youth do not engage in this amount of PA, five days (51.5%) or seven days (29.1%) a week. Presently, 82.8% of adult Iowans do not meet recommended PA guidelines. Furthermore, currently 12.8% of all Iowans are living in poverty; of this about 7% of older Iowans live at or below the federal poverty level.

Food Safety: Health can be compromised by a foodborne illness (FBI) and in some cases long term complications or even death can result. Further, costs of FBI for medical expenses and due to lost productivity can cause hardship to families. An estimated 48 million FBI are contracted annually in the U. S.; about 46% of reported FBI were attributed to fresh produce and nuts. An NPR poll found that 57% of Americans are concerned about the safety of food. Thus, research-based, educational opportunities that address prevention of FBI at points of production, at retail foodservices and at home are timely and relevant, and, with pending regulatory changes, the necessity of these programs will increase in the future. Recent regulatory changes in Iowa January 2014 with adoption of Food Code 2009 with 2011 Supplement requires one employee in each licensed foodservice operation to be a Certified Food Protection Manager - ServSafe® is one of four programs approved by Conference on Food Protection as meeting CFPM

requirements. Pending produce safety rules may require fruit and vegetable growers to participate in good agriculture practices programs.

Human Sciences Extension and Outreach will continue to provide research-based educational programming for nutrition, wellness, and food safety to youth and adults in collaboration with the Iowa Department of Education and Iowa 4-H Youth Programming and Development. Nutrition and health educational programming for adults will continue in collaboration with the Iowa Department of Public Health, Iowa Department on Aging, Iowa Department of Human Services, Area Agencies on Aging, Iowa Restaurant Association, etc. Programming will be provided using a variety of methods including workshops, meetings, presentations, exhibits, individual consultation, and media as well as static and dynamic online resources.

2. Scope of the Program

- In-State Extension
- In-State Research
- Multistate Research
- Multistate Extension
- Integrated Research and Extension
- Multistate Integrated Research and Extension

V(D). Planned Program (Assumptions and Goals)

1. Assumptions made for the Program

- Federal and state legislation and policy will continue to support health promoting environments.
- Research/evidence-based information produces expected outcomes.
- Education improves individual, family, community, and environmental health.
- Education increases knowledge and influences attitudes, which can lead to behaviors consistent with recommended safe food handling practices and weight management behaviors.
 - A national focus on overweight/obesity and greater public awareness will continue to mobilize communities to adopt behaviors that combat overweight/obesity.
 - A national focus on overweight/obesity and greater public awareness about good nutrition will encourage individuals and foodservices to offer more fresh produce menu items.
 - Continued resources and funding can be secured to support nutrition and food safety programs.
 - Multiple communication methods and styles will be necessary to address changing demographics in Iowa and the U.S.

2. Ultimate goal(s) of this Program

- Slow or stop increasing rates of childhood and adult overweight and obesity through nutrition education, promotion of physical activity opportunities, and community advocacy for health promoting nutrition, physical activity, and food availability.
 - Increase consumer knowledge about safe home food preservation practices.
 - Reduce the number of reported foodborne illnesses.
 - Increase the number of food producers and workers certified in food safety.
 - Ensure consumers are aware of current safe practices at the farm level of food production.

V(E). Planned Program (Inputs)

1. Estimated Number of professional FTE/SYs to be budgeted for this Program

Year	Extension		Research	
	1862	1890	1862	1890
2017	4.9	0.0	1.4	0.0
2018	4.9	0.0	1.4	0.0
2019	4.9	0.0	1.4	0.0
2020	4.9	0.0	1.4	0.0
2021	4.9	0.0	1.4	0.0

V(F). Planned Program (Activity)

1. Activity for the Program

- Conduct workshops and meetings. Workshops include ServSafe® Certification food safety, food preservation, HACCP implementation, GAPS preparation, childcare provider training, etc.
- Develop educational materials, resources and curriculum including web based tools, social media and Extension publications.
- Provide training and technical assistance such as fundamental food safety training for volunteer staffed events, line level employees, and childcare providers, and respond to specific questions related to application of food safety principles.
- Provide nutrition and food resource management education through EFNEP and SNAP-Ed programs.

2. Type(s) of methods to be used to reach direct and indirect contacts

Extension

Direct Methods	Indirect Methods
<ul style="list-style-type: none"> • Education Class • Workshop • Group Discussion • One-on-One Intervention • Demonstrations • Other 1 (Team Nutrition training) • Other 2 (online education) 	<ul style="list-style-type: none"> • Newsletters • TV Media Programs • Web sites other than eXtension • Other 1 (Blogs; apps) • Other 2 (SafeFood Fairs)

3. Description of targeted audience

- School aged youth, child care providers, school staff and other adult mentors of youth.
- Adult Iowans in the workforce, participating in food assistance programming and community health

outreach programs.

- Food growers, foodservice management and staff in commercial and noncommercial operations, consumers, and food stand volunteers.

V(G). Planned Program (Outputs)

NIFA no longer requires you to report target numbers for standard output measures in the Plan of Work. However, all institutions will report actual numbers for standard output measures in the Annual Report of Accomplishments and Results. The standard outputs for which you must continue to collect data are:

- Number of contacts
 - Direct Adult Contacts
 - Indirect Adult Contacts
 - Direct Youth Contacts
 - Indirect Youth Contact
- Number of patents submitted
- Number of peer reviewed publications

- Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(H). State Defined Outputs

1. Output Measure

- Number of youth receiving educational programming related to nutrition, physical activity, and health promotion.
- Number of adults who impact youth receiving educational programming related to nutrition, physical activity and health promotion.
- Number of adults receiving educational programming related to nutrition, physical activity, and health promotion.
- Number of professionals working with youth and/or adults receiving training related to nutrition, physical activity, and health promotion.
- Number of unique visitors on Iowa State University Extension and Outreach nutrition/health websites and publication downloads.
- Number of lowans receiving education related to home food preservation.
- Number of lowans receiving food safety certification.
- Number of adult participants in Extension and Outreach programs on food safety.
- Number of unique visitors on Iowa State University Extension and Outreach food safety project websites.

- Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(I). State Defined Outcome

O. No	Outcome Name
1	Percent of youth participants reporting increased knowledge/intake of vegetables.
2	Percent of youth participants reporting increased physical activity.
3	Percent of childcare training participants reporting preparedness to apply or teach health promoting dietary behaviors.
4	Percent of adults reporting increased fruit and vegetable intakes.
5	Percent of adults reporting increasing minutes of physical activity.
6	Percent of adult EFNEP/SNAP-Ed graduates who made a positive change in food resource management skills such as not running out of food.
7	Number of people receiving food safety certification.
8	Percent of adults reporting increased knowledge of safe home food preservation techniques.
9	Percent of adult EFNEP/SNAP-Ed graduates with a positive change in food safety practices.
10	Number of food handlers receiving food safety training and education in safe food practices.

Outcome # 1

1. Outcome Target

Percent of youth participants reporting increased knowledge/intake of vegetables.

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 703 - Nutrition Education and Behavior
- 704 - Nutrition and Hunger in the Population

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 2

1. Outcome Target

Percent of youth participants reporting increased physical activity.

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 703 - Nutrition Education and Behavior
- 704 - Nutrition and Hunger in the Population

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 3

1. Outcome Target

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

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 703 - Nutrition Education and Behavior

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 4

1. Outcome Target

Percent of adults reporting increased fruit and vegetable intakes.

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 703 - Nutrition Education and Behavior
- 704 - Nutrition and Hunger in the Population

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 5

1. Outcome Target

Percent of adults reporting increasing minutes of physical activity.

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 703 - Nutrition Education and Behavior
- 704 - Nutrition and Hunger in the Population

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 6

1. Outcome Target

Percent of adult EFNEP/SNAP-Ed graduates who made a positive change in food resource

management skills such as not running out of food.

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 703 - Nutrition Education and Behavior
- 704 - Nutrition and Hunger in the Population

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 7

1. Outcome Target

Number of people receiving food safety certification.

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

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

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 8

1. Outcome Target

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

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 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

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 9

1. Outcome Target

Percent of adult EFNEP/SNAP-Ed graduates with a positive change in food safety practices.

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 704 - Nutrition and Hunger in the Population
- 503 - Quality Maintenance in Storing and Marketing Food Products
- 723 - Hazards to Human Health and Safety
- 703 - Nutrition Education and Behavior
- 712 - Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 10

1. Outcome Target

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

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 712 - Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins
- 723 - Hazards to Human Health and Safety
- 503 - Quality Maintenance in Storing and Marketing Food Products
- 703 - Nutrition Education and Behavior

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

V(J). Planned Program (External Factors)

1. External Factors which may affect 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 (loss of staff)

Description

A weak economy continues to constrain income growth and limit economic mobility, and Iowa's high proportion of multiple job holders reduces time available for participation in Extension and Outreach programs. Additionally, there are fewer trained volunteers to implement programs as widely and as effectively as desired. An increasingly diverse population challenges our ability to meet diverse 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 increasing diverse (e.g., race, socioeconomic status, gender, age) audiences. 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. Interest in indirect delivery methods continues to increase for individuals and work organizations as does more programming via technology and train-the-trainer approaches to education. Federal and state legislation continues to impact appropriations and policy for EFNEP, SNAP-Ed, and school health programs/environments, and federal and state regulations to improve food safety will impact number of participants. Federal legislation is encouraging farm to school and school garden programs. Healthcare reform will also modify the landscape for programming in this plan of work. A proposed state food and farm plan encourages regional food systems and stresses infusion of food safety trainings from farm to fork. A number of programs promoting increased physical activity continue to compete with Live Healthy Iowa and Live Healthy Iowa Kids (e.g., Shape Up America, Walk Across America, Alliance to a Healthier Generation, PE4Life, etc.).

V(K). Planned Program - Planned Evaluation Studies

Description of Planned Evaluation Studies

For health and well-being programs participant attitudes, knowledge and behaviors will be assessed. Childcare provider training will be evaluated via online surveys capturing evaluation/impact data. EFNEP and SNAP-Ed will continue to collect required pre/post data for federal reports. Food safety priority

programs include certification programs and a program with fundamental food safety messages. Numbers of participants in certification classes and state pass rate are collected. Number of participants in non-certification program classes is tracked. Criteria for educational offerings include a review of a number of statuses, including research- or evidence-base, timeliness, relevance, uniqueness (services not offered by other organizations), sequential design, and potential for impact. Sequential programming is privileged to best demonstrate impact.

V(A). Planned Program (Summary)

Program # 5

1. Name of the Planned Program

Natural Resources and Environmental Stewardship

2. Brief summary about Planned Program

Wise management of all natural resources, including water, soil, air, and other resources is needed to sustain our nation's ability to produce food, feed, fiber, and biofuels as well as support environmental goods and services and economic and social functions. Without attention to environmental goods and services our quality of life would be greatly impacted. The focus areas of this program encompass all of the natural resources within the highly human-modified agroecosystem. Proper stewardship of natural resources that provide the base inputs for modern agricultural production is foundational to sustaining the desired quantity and quality of food, feed, fiber, and biofuels. This program is designed to facilitate research and extension activities and impacts from the field to the globe and depends on an integration of knowledge, science and technology across social, economic bio-physical and agronomic disciplines.

3. Program existence : Mature (More than five years)

4. Program duration : Long-Term (More than five years)

5. Expending formula funds or state-matching funds : Yes

6. Expending other than formula funds or state-matching funds : Yes

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	13%		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	4%		0%	
125	Agroforestry	4%		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 (Situation and Scope)**1. Situation and priorities****Theme 1: Protecting Soil and Water Resources**

With the growing demands to produce food, feed, fiber and biofuels from our high quality soils, there comes added responsibility to ensure that the soil remains productive and the water is of sufficient quantity and quality to meet the diverse needs of society. To maintain economic viability of agricultural operations there will be an increased need to ensure environmental stewardship. Unintended consequences associated with agriculture such as nitrate-nitrogen, phosphorus, and pathogens cause environmental degradation and costs to society. Soil erosion continues to be the number one pollutant of water resources in the state of Iowa. Intensified production systems in the Midwest are adding to a broad range of environmental stressors including pollutant loadings, which, in general, are a primary concern at state and

federal levels. Gulf of Mexico hypoxia and nutrients in metro water supply systems are among the key off-site impacts of agriculture.

Theme 2: Protecting Air Quality

As animal agriculture has grown and concentrated in Iowa, there have been added environmental challenges relating to air quality. Odor along with nitrogen (NH₃, NO_x, N₂O), methane, hydrogen sulfide and particulate emissions are most pertinent to reducing air quality. The sustainability of animal agriculture in Iowa and elsewhere depends on industrial and governmental entities' collective ability to apply appropriate technology, science and policy to ameliorate odor and emission nuisances. Uncertainties of health impacts and nuisance related to exposure to agricultural odors and emission of other gases are a prominent concern in rural and rural/urban fringe parts of Iowa.

Theme 3: Protecting Wildlife, Fisheries, Forests and Wildlands

Whereas Iowa has a small proportion of its land in public ownership, the land that is public is extremely valuable and contributes greatly to the quality of life. Fish and wildlife conservation requires innovative and science-based management solutions. Threatened, endangered and rare plants and animals located in Iowa require special care and management and often coordination across various public and private organizations and individuals. The potential increase of perennial crops could impact wild habitat in many ways. Development of strategies to address utilization and preservation of these natural resources and education on the issues surrounding adverse consequences will help Iowans to better understand and practice environmental stewardship.

2. Scope of the Program

- In-State Extension
- In-State Research
- Multistate Research
- Multistate Extension
- Integrated Research and Extension
- Multistate Integrated Research and Extension

V(D). Planned Program (Assumptions and Goals)

1. Assumptions made for the Program

This program depends on and stems from these assumptions or guiding principles:

- Food, feed, fiber, biofuels and environmental goods and services may be provided from the same acre of land.
- Stewardship of soil resources is critical to the long-term production of food, feed, fiber, biofuels and environmental goods and services.

- Water quality and quantity are vital to food, feed, fiber, and biofuels productivity.
- Water resources provide a variety of market and non-market goods.
- Environmental, socio-economic and institutional-political factors must be integrated so as to achieve sustainable natural resources.
- Public and private partnerships must be developed to ensure attainment of the goals of this program.
- Public policy related to agriculture, energy and environment will be drivers of change to which the private and public sectors must respond/adapt.

2. Ultimate goal(s) of this Program

The goals of this program are to:

- Develop productive, resilient and diverse plant and livestock/poultry production systems that ensure social, economic and environmental goals are met, especially with climate change impacts considered. Addresses Themes 1 and 2.
- Develop effective models of environmental stewardship to protect air, soil, wildlife, woodland, and water quality in concert with a variety of private and public land uses including agricultural, recreational, forestry, wildlife and wildlands and urban. Addresses Themes 1 and 2.
- Enhance energy conservation and production of energy from Iowa's renewable resources. Addresses Themes 1, 2, and 3.
- Improve management of Iowa's public lands and natural resources ensuring economic, social, and environmental sustainability. Addresses Theme 3.

V(E). Planned Program (Inputs)

1. Estimated Number of professional FTE/SYs to be budgeted for this Program

Year	Extension		Research	
	1862	1890	1862	1890
2017	15.6	0.0	7.0	0.0
2018	15.6	0.0	7.0	0.0
2019	15.6	0.0	7.0	0.0
2020	15.6	0.0	7.0	0.0
2021	15.6	0.0	7.0	0.0

V(F). Planned Program (Activity)

1. Activity for the Program

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.
- 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 conservation in the new Farm Bill.
- Develop and execute educational programs about implementing the Iowa Nutrient Reduction Strategy by farmers, watershed coordinators, elected officials and agency staff.
- 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.

2. Type(s) of methods to be used to reach direct and indirect contacts

Extension

Direct Methods	Indirect Methods
<ul style="list-style-type: none"> • Education Class • Workshop • Group Discussion • One-on-One Intervention • Demonstrations 	<ul style="list-style-type: none"> • Public Service Announcement • Newsletters • Web sites other than eXtension • Other 1 (radio)

3. Description of targeted 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.

V(G). Planned Program (Outputs)

NIFA no longer requires you to report target numbers for standard output measures in the Plan of Work. However, all institutions will report actual numbers for standard output measures in the Annual Report of Accomplishments and Results. The standard outputs for which you must continue to collect data are:

- Number of contacts
 - Direct Adult Contacts
 - Indirect Adult Contacts
 - Direct Youth Contacts
 - Indirect Youth Contact
- Number of patents submitted
- Number of peer reviewed publications

Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(H). State Defined Outputs

1. Output Measure

- Number of producers, agribusiness professionals, and land-owners who attend face-to-face educational activities, including individual consultations.
 - Number of producers, agribusiness professionals and land-owners who subscribe to newsletters and access web-based resources.
- Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(I). State Defined Outcome

O. No	Outcome Name
1	Number of acres where the adoption of BMPs, Nutrient Reduction Strategy and conservation practices were implemented.
2	Number of producers increasing the efficiency of manure and crop nutrient utilization while minimizing surface run-off and preserving ground water quality.

Outcome # 1

1. Outcome Target

Number of acres where the adoption of BMPs, Nutrient Reduction Strategy and conservation practices were implemented.

2. Outcome Type : Change in Condition Outcome Measure

3. Associated Knowledge Area(s)

- 133 - Pollution Prevention and Mitigation
- 112 - Watershed Protection and Management
- 101 - Appraisal of Soil Resources
- 605 - Natural Resource and Environmental Economics
- 102 - Soil, Plant, Water, Nutrient Relationships
- 403 - Waste Disposal, Recycling, and Reuse
- 111 - Conservation and Efficient Use of Water
- 405 - Drainage and Irrigation Systems and Facilities

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 2

1. Outcome Target

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

2. Outcome Type : Change in Condition Outcome Measure

3. Associated Knowledge Area(s)

- 405 - Drainage and Irrigation Systems and Facilities
- 111 - Conservation and Efficient Use of Water
- 112 - Watershed Protection and Management
- 133 - Pollution Prevention and Mitigation
- 403 - Waste Disposal, Recycling, and Reuse
- 102 - Soil, Plant, Water, Nutrient Relationships

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

V(J). Planned Program (External Factors)

1. External Factors which may affect Outcomes

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

Description

The external factors most likely to impact the outcomes and impacts of this program include the federal agricultural, energy, and environmental policies, advances in technologies such as more accurate climate models, and the general health of the world economy. At the local level, the outcomes depend on the appropriate mix of funded basic and applied research tied strongly to effective extension and outreach programming. Because of the compelling and complex nature of protecting natural resources while meeting food, feed, fiber, and biofuels demands, without sufficient collaboration and innovation between the private and public sectors, attainment of the program goals may be thwarted.

V(K). Planned Program - Planned Evaluation Studies

Description of Planned Evaluation Studies

Follow-up surveys after the growing season will be conducted to determine actions taken by producers who increase the adoption of conservation systems on their crop acreage. Similar surveys will be given to livestock producers to determine the number of livestock production sites that adopt practices that reduce impacts to air resources.

V(A). Planned Program (Summary)

Program # 6

1. Name of the Planned Program

Sustainable and Renewable Energy

2. Brief summary about Planned Program

Agriculture continues its movement into production of crops for fuels, energy, industrial chemicals and materials, without compromising its capability to produce safe and abundant food. At the same time, we are faced with global climate change and deteriorating water and soil resources and wildlife habitat. New production, processing and product technologies to support advanced biorefineries are needed. Unlike today's biofuels industry, these advanced biorefineries will need to be able to use a variety of feedstocks; employ a blend of thermochemical, biological and bioprocessing technologies to efficiently produce biofuels; and produce a portfolio of primary products (biofuels) and value-added co-products (industrial chemicals, materials, food and feed ingredients, etc.) that can be adjusted to maximize profits.

Research and Extension personnel have access to the Iowa State University BioCentury Research Farm, the first-in-the-nation integrated research and demonstration facility dedicated to biomass (lignocellulosic crops, crop residues, and grain) production and processing. It will accelerate innovation and production capacity associated with biobased fuels, chemicals, and products. Collaborations for developing sustainable technologies will provide solutions that pave the way to meet national energy, economic, and environmental directives. Key components are:

- Research that brings together scientific expertise to address biomass cropping systems, biofuel and bioproduct processing, logistics of biomass supply, and positive environmental effects such as nutrient recycling back to the land.
- Facilities for educating future scientists, producers, and extension experts.
- Outreach that demonstrates economic, social, and environmental viability of biorenewable energy and biobased products production to producers, manufacturers, policy makers, and the public.
- Partner with companies that will work with Iowa State in collaborative research, development, and demonstration.

Iowans need high-quality, unbiased and accurate information when making informed and sustainable energy choices. Extension has staff who develop reliable energy resources based on research, conduct workshops, demonstrations and deliver education to energy users, primarily utility companies.

3. Program existence : Intermediate (One to five years)

4. Program duration : Long-Term (More than five years)

5. Expending formula funds or state-matching funds : Yes

6. Expending other than formula funds or state-matching funds : Yes

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 (Situation and Scope)**1. Situation and priorities**

Agriculture continues its movement in the production of fuels, energy, industrial chemicals and materials, without compromising its capability to produce safe and abundant food. At the same time, we are faced with extreme weather conditions and deteriorating water and soil resources and wildlife habitat. New production, processing and product technologies to support advanced biorefineries are needed. Unlike today's biofuels industry, these advanced biorefineries will need to be able to use a variety of feedstocks; employ a blend of thermochemical, biological and bioprocessing technologies to efficiently produce biofuels; and produce a portfolio of primary products (biofuels) and value-added co-products (industrial chemicals, materials, food and feed ingredients, etc.) that can be adjusted to maximize profits.

We need to be aware of bioenergy issues that impact agricultural production in Iowa from the perspective of energy use and energy production. Capacity building needs to occur regarding the complexities of the biofuels supply chain so educators are able to advise or provide references to farmers with questions on the economics and environmental impacts of biofuels and can incorporate bioenergy learning activities into

their programming. In addition, we need to be able to explain the environmental and societal benefits of biofuel production.

Through funding from The Iowa Energy Center, Extension produces energy related information used by utilities and municipalities in making decisions that improve knowledge and awareness of energy efficiency issues for Iowa's rural utility providers and their customers. One example of this collaboration is the statewide task force facilitated by Extension and the Iowa Energy Center. The group meets quarterly to review energy efficiency incentive and rebate programs available to Iowa's rural customers, especially farmers, and to exchange information regarding current and emerging energy efficiency technologies that may benefit rural utility customers. The continuous upward trend of energy prices (fuel, electricity, propane) is an issue that affects all Iowans. By educating the task force members about energy efficiency practices and resources available to them and to their clients, we seek to improve the knowledge, awareness, and implementation of energy efficiency and conservation techniques among Iowa's rural utility customers using educational programming, fact sheets, and newsletters.

2. Scope of the Program

- In-State Extension
- In-State Research
- Multistate Research
- Multistate Extension
- Integrated Research and Extension
- Multistate Integrated Research and Extension

V(D). Planned Program (Assumptions and Goals)

1. Assumptions made for the Program

The 2007 Renewable Fuels Standard set the goal of producing 36 million gallons of motor fuels by 2022 (equivalent to about 25% of our motor fuel demand). While EPA has proposed slowing the rate of growth in the biofuel use, it still supports the expansion of biofuels for energy. Biotechnology and traditional plant breeding enable the tailoring of crops for biofuels and biobased products as has been done in the past for food, feed and fiber. There are many opportunities to develop cropping systems that increase production as well as improve water and soil qualities. Advances in thermochemical and biological conversion of grain and cellulosic plants and crop residues will make a new fuels and industrial chemicals possible. Some co-products (e.g. biochar) have the potential to return important nutrients to the soil.

2. Ultimate goal(s) of this Program

The 2009 Renewable Fuels Standard established very high goals. Iowa State University is committed to these goals and doing it with sustainable agricultural production systems. The new ISU BioCentury Research Farm was established as the first integrated research and demonstration farm and processing facility devoted to sustainable biomass production, processing and utilization. We will make Iowa and the Midwest "feedstock ready" for the next generation of advanced biorefineries.

Extension, through the Iowa Energy Center and the Corn Stover initiative, is focused on providing Iowans with the energy related resources, research and education they need to make sound decisions regarding sustainable energy choices.

V(E). Planned Program (Inputs)

1. Estimated Number of professional FTE/SYs to be budgeted for this Program

Year	Extension		Research	
	1862	1890	1862	1890
2017	2.6	0.0	4.2	0.0
2018	2.6	0.0	4.2	0.0
2019	2.6	0.0	4.2	0.0
2020	2.6	0.0	4.2	0.0
2021	2.6	0.0	4.2	0.0

V(F). Planned Program (Activity)

1. Activity for the Program

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 operating in Iowa; farmers are being asked to contract to supply the biomass that the plants will need to operate. Extension's corn stover team has developed comprehensive educational materials regarding stover harvest. The team is made up of multiple partners with interests in biomass.

2. Type(s) of methods to be used to reach direct and indirect contacts

Extension

Direct Methods	Indirect Methods
<ul style="list-style-type: none"> ● Education Class ● Workshop ● Group Discussion ● One-on-One Intervention ● Demonstrations 	<ul style="list-style-type: none"> ● Public Service Announcement ● Newsletters ● Web sites other than eXtension ● Other 1 (radio)

3. Description of targeted 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.

V(G). Planned Program (Outputs)

NIFA no longer requires you to report target numbers for standard output measures in the Plan of Work. However, all institutions will report actual numbers for standard output measures in the Annual Report of Accomplishments and Results. The standard outputs for which you must continue to collect data are:

- Number of contacts
 - Direct Adult Contacts
 - Indirect Adult Contacts
 - Direct Youth Contacts
 - Indirect Youth Contact
- Number of patents submitted
- Number of peer reviewed publications

Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(H). State Defined Outputs

1. Output Measure

- Number of people who attend an educational activity to learn about energy sustainability.

Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(I). State Defined Outcome

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.

Outcome # 1

1. Outcome Target

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

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 131 - Alternative Uses of Land
- 125 - Agroforestry
- 601 - Economics of Agricultural Production and Farm Management
- 205 - Plant Management Systems

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 2

1. Outcome Target

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

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 601 - Economics of Agricultural Production and Farm Management
- 302 - Nutrient Utilization in Animals

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

V(J). Planned Program (External Factors)

1. External Factors which may affect Outcomes

- Economy
- Appropriations changes
- Public Policy changes

- Government Regulations
- Competing Public priorities

Description

Probably the greatest external factor is what happens to future demand and supply of traditional energy sources, and federal policy on reducing greenhouse gasses. Price volatility in petroleum and farm commodities also adds complexity, financial risk and business uncertainty. The current economic climate does not provide much profitability and prolonged low margins could damage investor confidence. Feedstock commodities must be produced at attractive prices; drought, as experienced in 2012, and other natural disasters could be devastating to these new ventures. Infrastructure to transport biofuel crops must be in place for farmers to risk planting crops meant for biofuels. Government support and regulatory programs are important in early stages to compete against well-established industries and gain market footholds. Unwarranted adverse publicity has plagued the biofuels industry and the populace must be better educated; this will require investment in education and extension outreach. Most of all, funding for research and outreach activities is paramount.

V(K). Planned Program - Planned Evaluation Studies

Description of Planned Evaluation Studies

Plans are under development.

V(A). Planned Program (Summary)

Program # 7

1. Name of the Planned Program

Youth Development

2. Brief summary about Planned Program

The Iowa 4-H Youth Development Program empowers youth to reach their full potential through youth-adult partnerships and research-based experiences. Youth development outcomes, such as effective leaders, continue to be a high priority of stakeholders within and across Iowa's 99 counties.

Through longitudinal youth development research (Lerner et al, 2012), data show positive youth development educational experiences help young people become competent, confident, connected, contributing, and caring citizens with character through a series of progressive learning experiences with caring adults. These experiences involve meeting the four needs of youth (Brendtro et al, 1992), fostering the eight essential elements (4-H National Headquarters, 2001) and, in Iowa, achieving the outcomes of effective leadership, productive citizenship, outstanding communication, and successful learning. These outcomes are reached through the Iowa 4-H program priorities of healthy living, STEM, citizenship and leadership, and communication and the arts.

ISU Extension and Outreach 4-H Youth Program Specialists and county/regional Extension youth staff will work with diverse children, youth, families, volunteers, and youth-serving professionals to plan, implement and evaluate short-term and long-term educational programs and experiences that work toward the attainment of multiple life skill outcomes. Staff will model and intentionally integrate positive youth development principles and practices within welcoming and inclusive programming outreach and engagement. Staff will work with federal, state, community, and Iowa State University leaders and organizations to assist them in creating positive youth development learning environments and policies that engage all Iowa youth in decision-making roles.

3. Program existence : Mature (More than five years)

4. Program duration : Long-Term (More than five years)

5. Expending formula funds or state-matching funds : Yes

6. Expending other than formula funds or state-matching funds : Yes

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 (Situation and Scope)

1. Situation and priorities

Children, youth, families, and communities face a host of societal, economic, and educational issues in the absence of strong positive youth development educational learning experiences and programs. Through longitudinal youth development studies (Lerner et al, 2012), research shows that positive youth development educational experiences help young people become competent, confident, connected, contributing, and caring citizens with character through a series of progressive learning experiences with caring adults. These experiences involve meeting the four needs of youth (Brendtro et al, 1992), fostering the eight essential elements (4-H National Headquarters, 2001) and, in Iowa, achieving the outcomes of effective leadership, productive citizenship, outstanding communication, and successful learning.

These outcomes are reached through the Iowa 4-H program priorities of healthy living, STEM, citizenship and leadership, and communication and the arts. The outcomes also align with 4-H national Headquarters' mission mandates, National 4-H Council's common measures, and ISU Extension and Outreach's signature issues.

2. Scope of the Program

- In-State Extension
- Multistate Extension

V(D). Planned Program (Assumptions and Goals)

1. Assumptions made for the Program

- Modeling, coaching, and training ISU Extension and Outreach 4-H Youth Program Specialists, county/regional Extension youth staff, 4-H volunteers, ISU faculty, and youth-serving professionals on topics such as positive youth development principles and practices, experiential learning, inquiry-based learning, learner-centered theories, risk management, technology-based learning platforms, community asset building, and cultural competency will lead to high quality educational learning environments and experiences for all Iowa children and youth in grades K - 12 to develop into competent, confident, connected, contributing, and caring citizens with character.
 - Positive youth development principles and practices and cultural competency are effective in improving youth and community health and well-being.
 - Families and youth are interested in positive youth development programs and educational learning opportunities.
 - Program staffing and funding can be secured and remain consistent.
 - Research/evidence-based information produces expected outcomes.
 - National and state attention to issues helps promote behavior change.

- Volunteers can be secured and trained to reach desired outcomes and diverse audiences.
- Improving human and natural environments improves overall human health.

2. Ultimate goal(s) of this Program

Strengthen 4-H staff members' and 4-H volunteers' cultural competency and increase the number of diverse children and youth in grades K - 12 reached through positive youth development learning opportunities that help young people become competent, confident, connected, contributing, and caring citizens with character via short-term and long-term progressive learning experiences in partnership with caring adults, using research-based curricula.

Healthy Living

Youth are contributing to decreased rates of chronic disease and illness; decreased healthcare costs; and decreased rates of foodborne illnesses.

STEM

Youth are...

- enrolled in secondary and post-secondary STEM courses.
- taking STEM courses at secondary and post-secondary levels in percentages that are representative of the general population.
- highly STEM-literate.
- meeting Iowa's STEM workforce needs and supporting innovation and expansion within Iowa's STEM industries.
- innovative and are using STEM process skills and knowledge to address issues in society.

Citizenship and Leadership

Youth are competent, confident, connected, contributing, and caring citizens with character through 4-H youth-adult partnerships and research-based experiences.

Communication and the Arts

Youth are competent, confident, connected, contributing, and caring citizens with character through 4-H youth-adult partnerships and research-based experiences.

V(E). Planned Program (Inputs)

1. Estimated Number of professional FTE/SYs to be budgeted for this Program

Year	Extension		Research	
	1862	1890	1862	1890
2017	9.7	0.0	0.0	0.0
2018	9.7	0.0	0.0	0.0
2019	9.7	0.0	0.0	0.0
2020	9.7	0.0	0.0	0.0
2021	9.7	0.0	0.0	0.0

V(F). Planned Program (Activity)

1. Activity for the Program

- 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.
 - Work with other states' 4-H staff to evaluate and/or research positive impact of 4-H participation in the lives of young people and the communities in which youth live and learn.

2. Type(s) of methods to be used to reach direct and indirect contacts

Extension

Direct Methods	Indirect Methods
<ul style="list-style-type: none"> • Education Class • Workshop • Group Discussion • Demonstrations • Other 1 (Conferences, Club Activities) • Other 2 (Camps, Mentoring) 	<ul style="list-style-type: none"> • Newsletters • Web sites other than eXtension • Other 1 (Webinars, Brochures, etc.) • Other 2 (Teleconferences, On-Line Training)

3. Description of targeted audience

- K-12 youth
- K-12 teachers
- Adult and youth volunteers
- Federal, state, community, and Iowa State University leaders, collaborations, organizations, and agencies
- Extension and Outreach educators

V(G). Planned Program (Outputs)

NIFA no longer requires you to report target numbers for standard output measures in the Plan of Work. However, all institutions will report actual numbers for standard output measures in the Annual Report of Accomplishments and Results. The standard outputs for which you must continue to collect data are:

- Number of contacts
 - Direct Adult Contacts
 - Indirect Adult Contacts
 - Direct Youth Contacts
 - Indirect Youth Contact
 - Number of patents submitted
 - Number of peer reviewed publications
- Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(H). State Defined Outputs

1. Output Measure

- Enrollments in 4-H Citizenship and Leadership curricula areas.
- Enrollments in 4-H Communications and Arts curricula areas.
- Enrollments in 4-H Foods, Nutrition, Physical Health, and Fitness curricula areas.
- Enrollments in 4-H Science, Engineering, and Technology (SET) curricula areas.
- Number of 4-H livestock exhibitors certified in Food Safety and Quality Assurance (FSQA).
- Number of children and youth who participate in 4-H Afterschool.
- Number of 4-H partnerships initiated or strengthened.
- Number of volunteers completing one professional development training per year.
- 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.
- Number of children and youth who participate in the camping delivery mode.
- Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(I). State Defined Outcome

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 STEM processing practices after engaging in 4-H STEM learning experiences.
4	Average percentage of youth who self-report improved communication practices after engaging in 4-H learning experiences.
5	Average percentage of youth who self-report improved citizenship and leadership practices after engaging in 4-H learning experiences.
6	Average percentage of youth who self-report improved learning practices after engaging in 4-H educational experiences.

Outcome # 1

1. Outcome Target

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

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 806 - Youth Development

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 2

1. Outcome Target

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. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 806 - Youth Development

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 3

1. Outcome Target

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

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 806 - Youth Development

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 4

1. Outcome Target

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

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 806 - Youth Development

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 5

1. Outcome Target

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

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 806 - Youth Development

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 6

1. Outcome Target

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

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 806 - Youth Development

4. Associated Institute Type(s)

- 1862 Extension

V(J). Planned Program (External Factors)

1. External Factors which may affect Outcomes

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

Description

- Potential for another outbreak of Avian Flu.
- High rates of 4-H staff turnover, both at the state and county Extension district level.
- Changing children, youth, and family Iowa demographics.
- Realignment of Iowa 4-H's operational and programmatic resources to align with ISU Extension and Outreach and ISU's K - 12 outreach priorities.
 - Funding allocation changes at the national, state, county, ISU, and ISU Extension and Outreach levels.
 - Changes in 4-H National Headquarters' programmatic policies and/or priorities.
 - Extent of welcoming and inclusive collaborative partnerships with local, state, national, and university agencies, organizations, and institutions.
 - Competition for youth, volunteer, and partner time, funding, and expertise.

V(K). Planned Program - Planned Evaluation Studies

Description of Planned Evaluation Studies

The ISU Extension and Outreach 4-H Youth Development Program has four K - 12 program priorities upon which emphasis will be placed over the next several years; healthy living, STEM, citizenship and leadership, and communication and the arts. Several National 4-H & Youth Development indicators have been selected corresponding to core educational programs within each of the four program priorities. Data will be collected on the selected indicators during the upcoming program year as well as indicators that the Iowa 4-H Program has identified related to the constructs of citizenship, leadership, communication, and learning. Each year it is anticipated data will be collected across multiple delivery modes including afterschool programs, camps, clubs, school programs, and special events. Chosen indicators are identified below:

Healthy Living: Outcome Indicators (See Outcome 1)

1. I eat more fruits and vegetables

2. I make healthier food choices
3. When I work in a garden, I am safe and careful
4. When I prepare food to eat, I am safe and careful
5. I am more physically active
6. I help my family make healthy food choices

Science/STEM: Outcome Indicators (See Outcome 3)

1. I can ask questions that can be answered by scientific investigation
2. I can design an investigation to answer a question
3. I can explain to others how to do an investigation
4. I can explain why things happen in an investigation
5. I can create a graph, table, picture, or display to share information with others

Universal/Communications: Outcome Indicators (See Outcomes 2 and 4)

1. I feel confident when speaking in front of others
2. I am comfortable asking questions
3. I use good listening skills when others are talking
4. I can use technology to express my ideas
5. I can create products to share ideas/information

Citizenship/Service Learning: Outcome Indicators (See Outcome 5)

1. I can make a difference in my community through service learning projects
2. I can apply knowledge in ways that solve "real-life" problems through service learning projects
3. I plan to work on service projects to meet a need in my community
4. I gained skills through serving my community that will help me in the future

Leadership: Outcome Indicators (See Outcome 5)

1. I can work together in a team
2. I listen and talk to others before making decisions
3. I can handle conflict respectfully

Learning: Outcome Indicators (See Outcome 6)

1. I can create learning goals
2. I can review a variety of resources related to a topic
3. I can identify the strengths and weaknesses of different ideas, solutions, or approaches
4. I can think about what is going well and what needs to change to achieve goals
5. I can apply what was learned to new experiences