V(A). Planned Program (Summary)

Program # 6

1. Name of the Planned Program

Global Food Security and Hunger

☑ Reporting on this Program

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
102	Soil, Plant, Water, Nutrient Relationships	15%		0%	
131	Alternative Uses of Land	3%		0%	
201	Plant Genome, Genetics, and Genetic Mechanisms	0%		8%	
202	Plant Genetic Resources	0%		2%	
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants	0%		5%	
205	Plant Management Systems	11%		4%	
212	Pathogens and Nematodes Affecting Plants	2%		13%	
216	Integrated Pest Management Systems	9%		3%	
301	Reproductive Performance of Animals	4%		1%	
302	Nutrient Utilization in Animals	4%		11%	
303	Genetic Improvement of Animals	4%		22%	
305	Animal Physiological Processes	0%		6%	
311	Animal Diseases	1%		4%	
401	Structures, Facilities, and General Purpose Farm Supplies	8%		2%	
405	Drainage and Irrigation Systems and Facilities	12%		3%	
503	Quality Maintenance in Storing and Marketing Food Products	1%		7%	
601	Economics of Agricultural Production and Farm Management	9%		2%	
602	Business Management, Finance, and Taxation	9%		0%	
603	Market Economics	8%		1%	
702	Requirements and Function of Nutrients and Other Food Components	0%		6%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2013	Extension		Research	
	1862	1890	1862	1890
Plan	75.6	0.0	73.0	0.0
Actual Paid Professional	24.8	0.0	44.8	0.0
Actual Volunteer	51.0	0.0	0.0	0.0

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

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
2762250	0	5334978	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
2762250	0	5334978	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
9100517	0	45690850	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

• Continue to be a leading research institution on basic and applied questions impacting to increase Iowa 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.
• Support professional develop of faculty and staff to ensure that they are competitive in external funding, respected by peers and producers and proud and productive colleagues.
• Faculty participate in the following associated multistate research committees: NC0007, NC0140, NC0205, NC213, NC1023, NC1029, NC1030, NC1034, NC1040, NC1170, NC1171, NC1177, NC1183, NC1184, NC1191, NC1194, NC1197, NC1200, NE1020, NE1034, NE1042, NE1227, NRSP7, NRSP8, S0294, S1032, S1040, S1043, S1053, S1055, W1009, W2168, W2171, and others.

2. Brief description of the target audience

Agricultural producers 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 have expressed a strong interest in buying more locally produced food products. Farmers and businesses alike will face new questions and challenges as they conduct more business-to-business transactions, buy in smaller lots and sell closer to the consumer. Extension can meet their needs through applied research and engaged learning

opportunities. Consumers' lifestyles today, both adults and youth, promote inactivity and poor diet choices. Education and research-based information about healthy lifestyles will be covered in this program, as will access to and the importance of fresh fruits and vegetables.

3. How was eXtension used?

eXtension was not used in this program

V(E). Planned Program (Outputs)

1. Standard output measures

2013	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	160875	14889279	0	0

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

Patent Applications Submitted

Year:	2013
Actual:	14

Patents listed

Method for the delivery of molecules lyophilized onto microparticles to plant tissues. Inventor(s): Martin-Ortigosa, Susana; Wang, Kan. File date: 10/01/2012.

Concentric Central Pivoting Mechanism With Rack-and-Pinion Based Lateral Motion Control for Automated Mechanical Intra-Row Weed Control. Inventor(s): Tang, Lie; Ahmad, Moud Taufik; Li, Ji; Steward, Brian. File date: 11/09/2012.

Mesoporous Silica Nanoparticles Suitable for Co-delivery. Inventor(s): Wang, Kan; Trewyn, Brian; Valenstein, Justin; Martin-Ortigosa, Susana; Lin, Victor Shang-Yi. File date: 12/06/2012.

Engineered TAL Effector Proteins with Enhanced DNA Targeting Capacity. Inventor(s): Bogdanove, Adam; Bradley, Phil; Doyle, Erin; Stoddard, Barry. File date: 1/3/2013.

TAL Effector-Mediated DNA Modification. Inventor(s): Bogdanove, Adam; Voytas, Daniel; Zhang, Feng. File date: 1/10/2013.

Materials and Methods for Characterizing and Using a 3-ketoacyl-acyl Carrier Protein (ACP) Synthase III (KASIII) for Production of Bi-functional Fatty Acids. Inventor(s): Garg, Shivani; Jin, Huanan; Nikolau, Basil; Yandeau-Nelson, Marna. File date: 1/23/2013.

Molecular Cloning of brown-midrib2 (bm2) Gene. Inventor(s): Liu, Sanzhen; Schnable, Patrick; Tang, Ho Man (Holly); Wu (2011), Wei. File date: 1/28/2013.

Nematode Resistant Crops. Inventor(s): Baum, Thomas; Chen, Shiyan; Davis, Eric; Hussey, Richard; Lang, Ping; Mitchum, Melissa; Replogle, Amy; Wang, Jianying; Wang, Xiaohong. File date: 2/6/2013.

Arabidopsis Nonhost Resistance Gene(s) and Use thereof to Engineer Disease Resistant Plants. Inventor(s): Bhattacharyya, Madan; Sumit, Rishi. File date: 3/4/2013.

Method for the delivery of molecules lyophilized onto microparticles to plant tissues. Inventor(s): Martin-Ortigosa, Susana; Wang, Kan. File date: 3/5/2013.

Methods and Compositions for Plant Pest Control. Inventor(s): Baum, Thomas; Davis, Eric; Hussey, Richard; Mitchum, Melissa; Simmons, Carl; Wei, Jun-zhi; Wu, Gusui. File date: 3/13/2013.

Artificial Intelligence for Detecting and Filling Void Areas of Agricultural Commodity Containers. Inventor(s): Darr, Matthew; Kruckeberg, John; McNaull, Robert; Bonefas, Zach. File date: 7/28/2013.

Methods and Compositions for Plant Pest Control. Inventor(s): Baum, Thomas; Davis, Eric; Hussey, Richard; Mitchum, Melissa; Wu, Gusui; Simmons, Carl; Wei, Jun-zhi. File date: 9/6/2013.

Artificial Intelligence for Detecting and Filling Void Areas of Agricultural Commodity Containers. Inventor(s): Darr, Matthew; McNaull, Robert; Kruckeberg, John; Bonefas, Zach. File date: 9/30/2013.

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2013	Extension	Research	Total

Actual	62	200	0

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

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

Year	Actual
2013	101759

Output #2

Output Measure

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

Year	Actual
2013	4068491

Output #3

Output Measure

- Number of increased efficiencies or increases in yield/unit.

Year	Actual
2013	151

Output #4

Output Measure

- Adoption of BMP resulting in increased yields, reduced inputs, increased efficiency, increased economic return, and conservation of resources.
  Not reporting on this Output for this Annual Report

Output #5

Output Measure

- Number of producers indicating adoption of recommended practices.

Year	Actual
2013	5

Output #6

Output Measure

- Number of producers reporting reduction in fertilizer used/acre.
  Not reporting on this Output for this Annual Report

Output #7

Output Measure

- Number of producers reporting increased dollar returns per acre or reduced costs per acre.

Year	Actual
2013	1878

Output #8

Output Measure

- Number of acres in conservation tillage or other BMP.
  Not reporting on this Output for this Annual Report

Output #9

Output Measure

- Number of producers (and other members of the food supply chain) that have increased revenue.

Year	Actual
2013	8

Output #10

Output Measure

- Percent of privately owned agricultural acreage retained during landowner succession due to educational interventions.
  Not reporting on this Output for this Annual Report

Output #11

Output Measure

- Number of producers or agribusiness professionals who gained knowledge in safe pesticide application through pest management recommendations.

Year	Actual
2013	3748

Output #12

Output Measure

- Value (in dollars) of increased reproductive efficiency in swine operations.

Year	Actual
2013	100500

Output #13

Output Measure

- Number of women and/or landowners who learn strategies on how to mitigate risk in farming operations in existing operations, as new or beginning farms, or as farms transitioning in ownership.

Year	Actual
2013	592

Output #14

Output Measure

- Number of producers attending high tunnel workshops to learn season-extending strategies to improve overall farm profitability.

Year	Actual
2013	88

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Number of increased efficiencies _____ (i.e. (% pregnant) or increases in yield/unit - (bushels/acre; lbs product (meat, protein, milk) per animal; lbs feed per gain).
2	Adoption of best practices and technologies resulting in increased yields, reduced inputs, increased efficiency, increased economic return, and conservation of resources.
3	Number of producers indicating adoption of recommended practices.
4	Number of producers reporting reduction in fertilizer used/acre.
5	Number of producers reporting increased dollar returns per acre or reduced costs per acre.
6	Number acres in conservation tillage or other BMPs.
7	Number of farmers and agribusiness professionals who gain knowledge in safe pesticide application through pest management recommendations.
8	Number of farmers or agribusiness professionals who increase profitability or decrease input costs by adopting nutrient management recommendations.
9	Number of producers (and others in the food supply chain) that have increased revenue.
10	Percent of privately owned agricultural acreage retained during landowner succession due to educational intervention.
11	Number of women and/or landowners who learn strategies on how to mitigate risk in farming operations in existing operations, as new or beginning farms, or as farms transitioning in ownership.
12	Value (in dollars) of increased reproductive efficiency in swine operations.
13	Number of producers attending high tunnel workshops to learn season-extending strategies to improve overall farm profitability.

Outcome #1

1. **Outcome Measures**

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

Not Reporting on this Outcome Measure

Outcome #2

1. **Outcome Measures**

Adoption of best practices and technologies resulting in increased yields, reduced inputs, increased efficiency, increased economic return, and conservation of resources.

2. **Associated Institution Types**

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	151

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

A.
Proper ventilation of swine buildings is important for various reasons. Animal well-being is important, keeping them comfortable in the thermo-neutral temperature zone. Energy use is important to producers and consumers, producers to reduce cost of production and increase competitive position and the public benefits from lower energy use reducing carbon emission. Additionally, proper ventilation increases the health of the animals, reducing the need for treatment medication. Learning how to properly operate swine building ventilation systems is important and beneficial to everyone.

B.
Many Iowa dairy producers (> 40%) are milking in stall barns or antiquated milking parlors where only 25 cows per person per hour are milked. In comparison, other producers are achieving 75 cows milked per person per hour in well-designed milking parlors. This difference represents a person being three times more efficient with use of labor which translates into significant differences in farm profitability between these milking systems.

C.
Growers are interested in developing an integrated production system by adopting production techniques that enhance soil health, crop productivity, and improve long-term farm profitability. Cover crops are emerging as an effective tool to achieve those goals. Cover crops reduce soil erosion, minimize nutrient leaching, suppress weed emergence, and build soil quality and organic matter. Growers want to minimize inputs such as herbicides and fertilizers without compromising crop yield and quality. Utilization of cover crops in vegetable and fruit production adds significant soil organic matter, recycles nutrients, suppresses soil erosion, and improves soil water holding capacity. Alongside growers, consumers are equally interested in methods of crop production and the effects of production techniques on the environment. Growing number of consumers support grower practices that have minimal impact on the environment and are sustainable.

What has been done
A.
Workshop curriculum has been developed, potential audience identified, publicity materials written, invitations to the workshops delivered and workshop location/organization completed. Across the State of Iowa in 2013, eleven workshops were held. The workshops were attended by 237 operations and system flows. The number of pigs influenced by those attending the workshop was 11.7 million pigs and 700,000 sows. A follow-up survey was developed and returned by 156 participating in the workshop.

B.
Every dairy producer in Iowa, and many outside the state, received educational newsletters, factsheets and promotional materials to help increase knowledge to make more profitable decisions on their future milking system. A survey of current users of Automatic Milking Systems (AMS) and Low Cost Parlors (LCP) was done. Data collected from the survey provided economic benchmarks to develop a publication and financial decision-making spreadsheet for dairy producers wishing to implement the AMS and LCP systems. More than 300 producers, along with many industry personnel (total = 589) attended the series of 17 on-farm workshops, with another 200 producers exposed to it through ISUEO Dairy Days programs. Another 200 dairy industry individuals were reached through webinars, and an additional 120 contacts were made through Extension websites. 60 producers attended small focus group sessions and then received individual on-farm visits to assess how to incorporate the AMS or LCP on their dairy operations.

C.
Cover crop training workshops and field days were organized throughout the state that provided comprehensive and in-depth understanding of cover cropping fundamentals, selection, economics, and management criteria for fruit and vegetable cropping systems. Workshops and field days highlighted advantages of cover crops in sustainable crop rotations and their ability to improve soil quality, reduce soil erosion, increase fertility, and manage pest populations. Three on-farm cover crop demonstration plots were set up to engage growers and familiarize them with cover crops.

Results
A.
Substantial changes were reported on 93 out of the 156 returned surveys. Changes documented to the ventilation system will improve animal health while using less energy, decreasing production cost, a win-win educational program. Less energy is good for the environment, less production cost leads to increased competitive position and more jobs and economic growth. Some examples of documented changes include: adjusting inlets (critical for healthy air mixing and reducing cold air animal stress); turn off fans in curtain mode (saving energy); clearing attic opening (reduces load on fan saving energy); adjusting curtains (improves [pig health and saves

energy); improve seal on curtains (results in more efficient fan operation); use static pressure (important for monitoring ventilation performance) and change motor curves in the controller when replacing fan motors (critical for operational efficiency of variable speed fans). One-hundred-seven of the operations estimated an average value of $2400 from the program for their operations. For those 107 operations, more than $250,000 was documented as increased value from changes made due to knowledge gained at the ventilation workshop.

B.
A total of 48 dairy operations started and/or completed construction of new efficient milking facilities. 22 facilities were completed and operational by July 2013 (8 automatic milking systems and 14 low cost parlors) and an additional 26 were started and/or completed after July.

C.
Created awareness among growers, extension personnel, agricultural professionals, and organization leaders about cover cropping options, tools, and benefits. Educated and trained agricultural professionals on cover crop selection tools, cover crop characteristics and their use in fruit and vegetable production systems. One of the on-farm demonstration studies led to the grower planting 90 acres of cover crop in the Fall of 2013. Workshop and field day participants learned about developing diverse and resilient cropping systems through the integration of cover crops in fruit and vegetable cropping systems. The cover crop field day organized at the Horticulture Research Station, Ames, IA, was in collaboration with Lincoln University, Missouri. This regional cooperation increased the impact and reach of our cover cropping program. In order to extend ISUEO's involvement with underserved and underrepresented communities, one of the workshops organized in Fruitland, IA specifically targeted growers from the Amish community in Kalona, IA.

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
131	Alternative Uses of Land
216	Integrated Pest Management Systems
305	Animal Physiological Processes
311	Animal Diseases
401	Structures, Facilities, and General Purpose Farm Supplies
601	Economics of Agricultural Production and Farm Management
602	Business Management, Finance, and Taxation

Outcome #3

1. Outcome Measures

Number of producers indicating adoption of recommended practices.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	5

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Nitrate leaching is increasingly becoming a problem in Iowa. Ground water contamination due to nitrates that leach out of agricultural fields creates problem for both wildlife and humans. At the end of the growing season, excessive nutrients, especially nitrates, are leached into streams, rivers, and groundwater leading to toxic levels. Reducing excess nutrients can improve water clarity and quality, reduce dissolved oxygen deﬁciencies, which can lead to ﬁsh kills and reduce aquatic biological diversity, and minimize occurrence of taste and odor chemical compounds that impact potable drinking water supplies. Reducing nitrogen in groundwater aquifers and surface water withdrawals also protects private and public drinking water sources.

What has been done
A number of workshops and field days were organized to educate growers about cover crops and their uses. Various educational programs were offered in partnership with Iowa Fruit and Vegetable Grower Association, Practical Farmers of Iowa, and Great Plains Growers conference. On-farm cover crop trials were also set up throughout Iowa to effectively disseminate and demonstrate information on cover crops.

Results
More and more growers have adopted the practice of planting cover crops in the fall. Fruit and vegetable growers planted cover crops such as cereal rye and oilseed radish that have the ability to take up residual nitrogen that would have otherwise leached into our waterways. Apart from reducing nitrate leaching, these cover crops add soil organic matter, improve soil structure, and enhance soil quality and health.

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
131	Alternative Uses of Land
601	Economics of Agricultural Production and Farm Management
602	Business Management, Finance, and Taxation
603	Market Economics

Outcome #4

1. Outcome Measures

Number of producers reporting reduction in fertilizer used/acre.

Not Reporting on this Outcome Measure

Outcome #5

1. Outcome Measures

Number of producers reporting increased dollar returns per acre or reduced costs per acre.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	1878

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Iowa agriculture covers over 90% of the state and is a major Iowa industry. Success in ag production means success for this state. Every year farmers face different challenges -- weather, pests, new technologies, commodity prices. Managing risk in all these areas is a cornerstone to crop production profitability. The Extension goal is to prepare producers to manage these potential issues using scientific knowledge and research results.

What has been done
The Crop Advantage Series program annually covers situations that are likely to occur in production for the upcoming growing season. Farmers are alerted to potential problems that may arise so they are prepared in what to look for. Based on what may be expected to happen in the field, Extension specialists identify and research questions such as fungicide use on alfalfa, then share that information with producers to improve their decision-making. Working one-on-one, in-field, with farmers and farm advisors helps them make decisions for situations that each year can be literally as different as the weather. These are timely, situational challenges that Extension helps to solve through research-based education.

Results

A Crop Advantage Series survey conducted a year following the education that was presented the previous year showed that 86% increased per acre profits over $5 per acre, and an additional 10% increased profits over $20 per acre. Attendees represented over 1.2 million acres in crop production. An on-farm visit survey of 64 site visits showed that farmers valued the visit at $25/ acre on an average of 660 acres per farm. For visits that were done with the commercial agronomist or advisor, those advisors indicated a value of $50 per acre. Five Extension agronomists collected data from 20 farm visits with crop producers. All but one indicated increased profits of more than $500 per operation from the on-farm visit, with eleven valuing the field visit assistance at more than $2500, with a total value greater than $31,500 to these 20 operations. Research and education on alfalfa response to fungicide application increased the knowledge of leaf identification with 53% of meeting attendees, and also of fungicide resistance stewardship with 84%. Later survey results showed increased profits of $18.30 per acre on 11,600 acres over a two-year period.

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
205	Plant Management Systems
212	Pathogens and Nematodes Affecting Plants
216	Integrated Pest Management Systems
601	Economics of Agricultural Production and Farm Management
602	Business Management, Finance, and Taxation
603	Market Economics

Outcome #6

1. Outcome Measures

Number acres in conservation tillage or other BMPs.

Not Reporting on this Outcome Measure

Outcome #7

1. Outcome Measures

Number of farmers and agribusiness professionals who gain knowledge in safe pesticide application through pest management recommendations.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	3748

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Federal and state law requires that all individuals who purchase and apply restricted use pesticides and any applicator who applies pesticides for hire be certified according to established standards. This education helps protect people from the risks of direct pesticide exposures, helps them to target use only when needed, reduces off-site damage through runoff and other soil degradation, and lowers risk to families, communities and the environment.

What has been done
About 300 private pesticide applicator training sessions were held throughout Iowa reaching 15,757 individuals. In addition to face-to-face meetings, recorded training sessions in ag weed, insect, disease and seed treatment pesticide management were held 298 times, attracting 1805 applicators. Nine additional training sessions were conducted for 250 agri-businesses employees on safe pesticide use. Safety, personal protective equipment use, and currently relevant pest control issues were covered.

Results
Fifty four percent of the private pesticide applicators surveyed (n=6055) increased their understanding of the difference between mandatory and advisory statements on pesticide labels.

* 46% increased their knowledge on how to get further information on a pesticide, 20% more plan to check nozzle flow for proper application as a result of pesticide education, and 22% indicated increased pesticide label use for determining details of pesticide application.
* 95% now understand the characteristics of and potential points of water contamination in their watershed.
* 90% review label precautions to prevent water contaminations.

Surveyed commercial pesticide applicators (n=2071) indicated that they apply pesticides on as many as 10,000 acres each per person per year. Results show:

* 76% read the label to determine protective clothing needs.
* 89% developed a better understanding of new regulations with mini-bulk pesticide containers.
* 98% changed applicator cleaning procedures to reduce residues left in the sprayer that can cause crop damage.
* 93% increased their understanding on the need for adequate spray coverage and proper

product selection required when managing spider mites.

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
205	Plant Management Systems
216	Integrated Pest Management Systems

Outcome #8

1. Outcome Measures

Number of farmers or agribusiness professionals who increase profitability or decrease input costs by adopting nutrient management recommendations.

Not Reporting on this Outcome Measure

Outcome #9

1. Outcome Measures

Number of producers (and others in the food supply chain) that have increased revenue.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	8

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Rural communities need all the economic advantages they can use to strengthen their vitality. Ensuring that local businesses are able to effectively compete requires management strategies that many small communities are unable to provide.

What has been done
The Value Added Agriculture Program (VAAP) at Iowa State University Extension created a system to evaluate the feasibility of USDA loan applications from small businesses. The study is

conducted according to USDA-RD 4279-B called "A Guide for Completion of Feasibility Studies." Our scope of study is based on five areas: economic, market, technical, management and financial. In 2013, VAAP conducted four feasibility studies and four market analysis studies, looking specifically at the market potential for these 8 businesses, which ranged from aquaculture marketing to rural community housing.

Results
These companies invested $80,840,000 in Iowa, resulting in an estimated $136,900,000 in sales and the creation of 279 jobs. A marketing analysis and initial marketing campaign for the Iowa wine industry resulted in the hiring of a full-time marketing specialist for the Midwest Grape and Wine Industry Institute.

4. Associated Knowledge Areas

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

Outcome #10

1. Outcome Measures

Percent of privately owned agricultural acreage retained during landowner succession due to educational intervention.

Not Reporting on this Outcome Measure

Outcome #11

1. Outcome Measures

Number of women and/or landowners who learn strategies on how to mitigate risk in farming operations in existing operations, as new or beginning farms, or as farms transitioning in ownership.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	592

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

A.
More and more women are assuming a leadership role in farming operations. As women assume these leadership roles, greater education is needed on managing profitability, succession and risk mitigation factors for the operations. Technical assistance, training and mentoring are critical factors supplied.

B.
More than 8,000 women are the primary operators of a farm. USDA has designated women as an underserved audience. In order to better educate this group of farm operators, Extension has developed programs to reach women farmers. These programs focus on agricultural marketing, which is often seen as difficult for this audience. Because prices and production costs have been highly variable over the past few years, the ability to manage agricultural margins as crop prices decline is crucial to farm business profitability.

C.
Iowa land values have been consistently increased over the past several years. Now agricultural land stands at record high values. As a result, farm net worth has increased dramatically. With the change in farm net worth, Iowa farm family interest in estate planning has risen. Farmers are looking for assistance in planning for asset distribution to the next generation, as well as the possible transition of the farm to future generations.

What has been done

A.
In conjunction with ISU Extension and Outreach Farm Management specialists, Value Added Agriculture staff trained, prepared and participated in 18 classes for farm women, reaching 244 participants through Annie's Project, Managing for Today and Tomorrow, and Women Managing Cattle classes.

B.
Specific programming has been offered explicitly to women producers. This programming has developed along two fronts. One is through the existing Annie's Project programming effort. Modules within the Annie's framework have been augmented to provide more educational details on agricultural marketing and farm profitability. The other is through the creation of women's marketing clubs. In the clubs, the women receive more individualized training, share marketing experiences and draw support from other participants.

C.
There was a series of estate planning workshops held around the state. These workshops were designed to help people begin the process of developing an estate plan for their farms. In addition there were a series of farm transition seminars held throughout the state. These seminars focused on transitioning the farm from one generation to the next. Areas such as conflict resolution, goal setting and other salient activities to a successful transition were covered. Finally, individual consultations were provided to help people ascertain there options for transitioning the farm to the next generation.

Results

A.
Survey results showed improved awareness in estate planning, balance sheets and overall farm analysis. Participants ranked increased support networks as the most beneficial aspects of the classes.

B.
The women who participate in these programs have created marketing plans and computed production costs for their farms. The marketing plans contain details on target prices, target selling dates, and are based on current market conditions. The women have also participated in "Commodity Challenge", an online marketing simulation that allows participants to experiment with marketing strategies under real world conditions. In group discussions, the women shared experiences about crop insurance decisions and purchases, various marketing strategies that they have employed, and the changes in their approach to agricultural marketing.

C.
95% of participants indicated they now had the knowledge of what they needed to take to an attorney visit when preparing an estate plan. 84% of participants were likely to visit an attorney to revise their will based on the information provided during the meetings. More than half of the participants planned to use several of the programming exercises with their heirs and their attorneys.

4. Associated Knowledge Areas

KA Code	Knowledge Area
205	Plant Management Systems
216	Integrated Pest Management Systems
601	Economics of Agricultural Production and Farm Management
602	Business Management, Finance, and Taxation
603	Market Economics

Outcome #12

1. Outcome Measures

Value (in dollars) of increased reproductive efficiency in swine operations.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	100500

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Increasing efficiency in swine reproduction (more pigs per sow) is increasingly important to producers and consumers, and has multiple benefits. The need for affordable food is critical to food insecurity low income consumers. Other consumers are looking for food choice (niche swine production). Reproductive inefficiencies producing this choice (niche swine production) for consumers are inherent to this alternative production system because of weather variation and farrow pen layout; therefore, efforts to improve swine reproduction are beneficial to both the consumer and producer. Lowering cost of production helps provide meat protein affordably to the food insecure segment of society and can help provide cost neutral alternative to other consumers. Additionally, being cost competitive in a global economy leads to increased exports resulting in more jobs and value added economic development.

Reproductive efficiency is also important for conservation of resources. Lower pigs per sow increases resources. If more pigs per sow can be raised with less crop acres, there is less need to convert extra environmentally important acres to grow feed crops.

What has been done

Annually, reproductive efficiency is a major programming effort for the Iowa Pork Industry Center. Multi-state Extension advanced swine reproduction conferences are typically held in northeast, northwest Iowa and Nebraska. Additionally, smaller workshops, meeting and webinars have been held to help both commodity and niche swine. Help is also provided to producers through newsletters, websites, and with various one-on-one contact (such as phone, email, office visit, voice over the internet, etc.). Over 61,500 sows were reported for 20 surveys, extrapolated to 50 attenders represents approximately 15% of Iowa's sow herd at these educational events.

Results

Increased learning from the program has shown improvement in reproductive performance. For example, producers learned that chilled pigs have lower survival rates and reported increasing farrowing house temperature during farrowing. More than 50 swine operations improved reproductive efficiency and conserve resources while improving competitive position by attending the conferences. Other changes reported included management of induction, measuring water flow rates, monitoring birth process, using oxytocin properly, gestation housing management, sow feeding and nutritional management and pre-farrowing management. This year a new technology called OvuGel was introduced. Producers reported new learning regarding this technology. Additionally, reproductive changes were reported from last year's training: reproductive performance changes were cited by over 70% of those returning survey. Semen handling was changed, increasing the viability of the sperm resulting in higher farrowing rate. Intra-uterine insemination, or deep artificial insemination techniques were tested on 20% of the operations. Twelve out of the twenty surveys estimated the value of the increased efficiency for their operation averaged more than $1700 per farm. The businesses represented 150,000 sows. At $.67 per sow, the total value of the changes resulted in an efficiency increase of $100,500.

4. Associated Knowledge Areas

KA Code	Knowledge Area
301	Reproductive Performance of Animals
401	Structures, Facilities, and General Purpose Farm Supplies
601	Economics of Agricultural Production and Farm Management
603	Market Economics

Outcome #13

1. Outcome Measures

Number of producers attending high tunnel workshops to learn season-extending strategies to improve overall farm profitability.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	88

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Interest in local foods continues to grow as consumers look to foster relationships with those producing their food and increase their knowledge of how their food is produced. To assist producers in meeting this increased demand for local foods, Value Added Agriculture and the Horticulture specialists educate producers on season-extending strategies. High tunnels have become important tools for specialty crop producers to increase production of quality crops, extend the season, and increase profitability. In past years, crop production inside high tunnels has suffered due to excessive heat and soil management challenges. The desert-like environment, limited space, and climate control in a high tunnel requires a unique set of crop management skills. Growers need information on strategies that could help alleviate these challenges and risks in high tunnel production.

What has been done
State-wide advanced high tunnel training workshops were organized to educate growers and increase their skills in high tunnel crop production and management. These workshops, comprised of hands-on activities and presentations, provided growers with strategies to mitigate crop stress under high tunnel crop production. Four high tunnel workshops were held -- two introductory sessions and two advanced sessions.

Results
Advanced High Tunnel workshop participants learned about multiple aspects of crop production including fertility, cultural practices, nutrient management, foliar sampling, grafting, budgets, environmental control, post-harvest handling, marketing and pest management. Survey results showed increased knowledge and awareness of budgets, production issues and marketing plans from the high tunnel workshops. Producers indicated profitability of the farm would increase after implementing the practical strategies outlined in the workshops.

4. Associated Knowledge Areas

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

V(H). Planned Program (External Factors)

External factors which affected outcomes

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

Brief Explanation

Value Added Agriculture programs target the rural economy in Iowa. Drought, flooding and consumer preferences all impact the direction those programs may take, but locals foods continues to be driven by increased consumer preferences and trends for local foods. High tunnels allow producers to extend their growing season and mitigate some of the weather concerns that may affect production.

A new farm bill was passed in February 2014. This meant that information was not available to develop and/or present to farmers and stakeholders on components of the bill that may impact agricultural production and marketing.

The success of the program to integrate cover crops in fruit and vegetable production 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. In order to integrate cover crops growers need to learn about proper planting and terminating techniques, have the right equipment and resources, and invest in additional seed costs. 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, 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.

Increased high tunnel production is being supported by enthusiasm and activity around local foods. Economic factors such as continued weak growth of US economy will hinder the growth in demand for local foods. Conversely, an economic recovery will improve the demand for and growth of local foods. Changes in weather patterns, excessive heat, drought, and erratic weather can negatively impact fruit and vegetable production in the state. High tunnel crop production is an excellent source for season extension in Iowa, but weather factors such as excessive heat could detrimentally affect fruit and vegetable production inside them.

An extremely wet and cold spring delayed or prevented corn and soybean planting in a significant percentage of acres. These conditions resulted in an increase in the number of crop insurance meetings Extension conducted. In some cases it wasn't possible for the farmer to change direction on whether or not to buy insurance or which level would be most profitable.

Dairy margins are slim and dairy producers need to adopt and implement efficient strategies and systems to enhance profitability.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

Value Added Agriculture measures its educational impact using pre- and post-workshop surveys. One of the major issues that could not be addressed in 2013 was federal farm policy as the farm bill was not passed until 2014. Given the passage of the farm bill in February 2014, federal farm policy will be a significant area of education effort in the coming year.

A total of 48 dairy producers and farms started and/or completed construction of new efficient milking facilities. 22 facilities were completed and operational by July 2013 (8 automatic milking systems and 14 low cost parlors) and an additional 26 were started and / or completed after July.

Growers who attended cover crop field days/workshops and advanced high tunnel workshops expressed satisfaction and gained significant information and knowledge about cover crops and high tunnel crop production. The pre-workshop evaluation on specific topics showed most participants in the 'low' to 'moderate' range of knowledge, but the post-workshop evaluation shifted to 'moderate' to 'high' range. Fruit and vegetable growers who attended the cover crop field day applauded the event as they got an opportunity to see various cover crop species in the field. Growers assessed growth and development of cover crops and evaluated potential benefits such crops on soil nutrient cycling, quality, and health. On-farm cover crop demonstration trials led to growers seeding increased number of acres in cover crops. These trials served as hotspots for fruit and vegetable growers in the neighboring areas to learn and evaluate cover crops.

Advanced High Tunnel Workshop participants significantly improved their knowledge and understanding of crop management under high tunnels. They learned new techniques and strategies that could be employed to mitigate heat stress inside high tunnels. Hands-on activities during the workshop improved their skillsets on topics such as grafting, irrigation,

and soil fertility management.

Key Items of Evaluation

Visits to the Agricultural Marketing Resource Center (AgMRC) website have increased more than 200 percent in the past three years. High tunnel workshops throughout Iowa have resulted in the construction of 240 new high tunnels since 2010.

Based on a dairy financial decision-making spreadsheet, educational programs and targeted small group discussions and individual farm visits, 48 dairy producers and farms started and/or completed construction of new efficient milking facilities. 22 facilities were completed and operational by July 2013 (8 automatic milking systems and 14 low cost parlors) and an additional 26 were started and / or completed after July.