

2008 University of Wyoming Combined Research and Extension Annual Report of Accomplishments and Results

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I. Report Overview

1. Executive Summary

Agriculture is at a crossroads and faces many challenges and opportunities in the 21st century. Agriculture, as well as land-grant institutions, is challenged to compete in a global economy while still responding to the needs of a diverse U.S. population. Ensuring that agriculture remains profitable and sustainable, while addressing environmental concerns, places new demands on the industry. Issues involving production agriculture, natural resource management, and quality of life generate diverse research and extension directives. Stakeholders play a vital role in identification and prioritization of needs at the University of Wyoming.

The College of Agriculture has a mission to serve the educational and information needs of students, Wyoming citizens and communities, and the global community by providing and distributing unbiased, scientifically sound information. Research and Extension programs at the University of Wyoming focus on five initiatives: 4-H and Youth Development, Community Development Education, Nutrition and Food Safety, Profitable and Sustainable Agriculture Systems, and Sustainable Management of Rangeland Resources.

Fiscal year 2008, the University of Wyoming research and extension programs reported success in all five initiative areas. The College of Agriculture is second at the University of Wyoming in total grant dollars brought in for research and extension. In-depth educational programs such as the Master Cattleman, the High Plains Ranch Practicum, Range 101 school, Dining with Diabetes, Wyoming Youth Leadership Education (WYLE) and Extension Volunteer Organization for Leadership, Vitality, and Enterprise (EVOLVE) institutes report strong impacts for citizens of the state. Each of the above CES programs are multi-session educational classes with 8 – 70 hours of class contact time with participants. These are just a few examples of high impact educational efforts by the University of Wyoming. Research and Extension Centers at UW and across the state are producing research which is relevant and vital to agriculture, families and communities in the state. Being an energy rich state, UW researchers are looking at possible alternative fuels. Reclamation of mined lands is an important issue being addressed through the Department of Renewable Resources and CES.

The College of Agriculture brought in over \$14.5 million in external grants in these five areas of emphasis in 2008. These funds, along with state and federal formula funds, greatly add to the success of our programs.

During 2008 both research and extension at UW began the process of academic planning for 2009 – 2013. With stakeholder input and a structured process, objectives and action plans are being developed to guide College efforts over the next five years. Emerging issues such as energy and management of small acreage land which was once farmland, forest, or rangeland are topics for UW to address.

This accomplishment report will provide data and impacts on 2008 research and extension efforts.

Total Actual Amount of professional FTEs/SYs for this State

Year:2008	Extension		Research	
	1862	1890	1862	1890
Plan	93.0	0.0	47.6	0.0
Actual	101.4	0.0	47.6	0.0

II. Merit Review Process

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

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

2. Brief Explanation

The merit review process for extension programs covers all programs conducted by UW CES. A team leadership model is utilized to review program plans and chart direction for CES educational programs. Program initiative teams develop and review programs on an annual basis. Teams make decisions to maintain, modify, or create new programs to meet the needs identified through external and internal stakeholder input. Seven area external advisory boards comprised of stakeholders review CES programs annually. Spring, 2007 UW CES held a CSREES program review of the total extension program. The review report is being used as CES moves forward in academic planning for 2009 – 2013. Spring 2008, CES met for a week long academic planning session which included stakeholders. All projects supported with formula funds (Hatch, Multi-State, McIntire-Stennis, Animal Health) must be approved projects. The project proposal is transmitted to the department head and the head appoints a minimum of two internal scientific reviewers who are knowledgeable in the field to review the proposal. After a proposal is revised based on the above review, it is transmitted to the Experiment Station Director. The director's office assigns three external scientific reviewers who are knowledgeable in the field to review the proposal. The Wyoming Agriculture Experiment Station also administers an internal competitive grants program using a portion of federal dollars. Proposals are reviewed by a ten member university-wide committee. Each proposal is also sent to a minimum of two external reviewers. During FY-2008 CES implemented a competitive grants program to provide funds for innovative programs. All proposals are reviewed by a three member committee comprised of both internal and external professionals.

III. Stakeholder Input

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

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

During the past year stakeholder input came to the College of Agriculture Cooperative Extension Service and Agriculture Experiment Station through a variety of methods. The joint research and extension needs assessment conducted in 2004 was used as a baseline for determining efforts for this POW. The surveys (mail and telephone) addressed preferred methods for receiving information. Stakeholder input gathered through all methods is shared with CES educators, specialists, department heads, and administrators. All counties participate in annual area advisory committee meetings with representatives from each of the five initiative areas who meet in sub-groups to identify specific needs and issues. This input is summarized and shared statewide with both CES and AES. All counties have had targeted advisory meetings to gather stakeholder input on reaching limited resource audiences in the Cent\$ible Nutrition program. County 4-H educators conducted 4-H Expansion and Review committees to specifically address outreach efforts toward underserved youth audiences. County personnel also utilize collaborative partners to learn the needs within communities of the state. In 2007 UW CES had a CSREES program review of the total extension system. In 2008 both research and cooperative extension went through an academic planning process which was integrated into the College of Agriculture plan. The College of Agriculture academic plan is currently in review as part of the 2009 – 2013 University of Wyoming Academic Plan. Each of the four Research & Extension Centers held an advisory committee meeting to gather input on existing research and outreach programs and to identify new priorities in relation to research. The College of Agriculture maintains a separate statewide advisory committee which meets annually. Three departments, Animal Science, Family and Consumer Sciences, and Veterinary Sciences, have separate advisory committees that provide input on programs in those departments.

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

1. Method to identify individuals and groups

- Use Advisory Committees
- Use Internal Focus Groups
- Use External Focus Groups
- Open Listening Sessions
- Needs Assessments
- Use Surveys

Brief Explanation

Originally, CES advisory committees were formed in the nine Extension areas. In FY 2008 the areas in the western side of Wyoming were reconfigured to allow for greater efficiency in program delivery and to meet needs of all counties. There are currently seven extension areas. Current academic planning efforts may revise area boundary lines in eastern Wyoming in 2009. Advisory committee members are nominated by extension staff by subject matter interest. Selection to serve on advisory committees is based on gender, geographic representation, race, national origin, and underserved audiences. In 2008, the Northwest Area piloted an on-line survey to assess needs in the area. A focus group was held in one county with over 120 attendees for more in-depth input on issues. In addition, the Wyoming County Commissioners Association has formed an advisory committee of county commissioners who meet with the CES Director during quarterly meetings of their association. Research and Extension Center Advisory committees are represented by CES educators, industry leaders, and landowners (government and private) in all counties that they service. Advisory committee members are nominated by CES, AES, and administrative personnel and meet one to two times per year. In addition to these systematic methods of gathering stakeholder input, both AES and CES utilize both individuals and groups throughout the state to identify relevant issues of critical importance. Just a few examples include: Commodity groups - such as Wyoming Wool Growers, Stock Growers, Wyoming Wheat Growers, Wyoming Crop Improvement Association, local and state nutrition councils, youth organizations such as Big Brothers, Big Sisters, and School Districts. These groups and individuals provide input through both formal and informal discussions with both research and extension personnel. Faculty and CES specialists also gather relevant input from professional colleagues in Wyoming and across the nation.

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

1. Methods for collecting Stakeholder Input

- Meeting with traditional Stakeholder groups
- 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

Stakeholder input is collected through a variety of methods to reach the broadest scope of individuals and groups in Wyoming. CES utilizes annual area advisory meetings which involve both traditional and non-traditional stakeholders. The AES also utilizes annual advisory meetings to gain input on research activities. Surveys, both mail and on-line are used to assess needs. CES educators and researchers target key stakeholders such as agriculture commodity groups, youth organizations, and schools through meetings where discussion is held on needs and issues. University of Wyoming educators and faculty access needs throughout the year based on individual contact with citizens at meetings and in local communities. Faculty and CES specialists gather relevant input from professional colleagues through personal contact and interaction at professional meetings.

3. A statement of how the input was 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

Stakeholder input is used by AES and CES initiative teams to identify emerging issues. Input gathered is used in program planning, evaluation of current programs, and redirection of programs when applicable. Stakeholder input from area advisory groups, county commissioners, and area teams assist in staffing priorities. Search committees comprised of local stakeholders provide input on screening, interviewing and hiring decisions for CES. Input from all sources is used in development, implementation, and evaluation of extension and research programs. Stakeholder input is collected through a variety of methods to reach the broadest scope of individuals and groups in Wyoming. CES utilizes annual area advisory meetings which involve both traditional and non-traditional stakeholders. The AES also utilizes annual advisory meetings to gain input on research activities. Surveys, both mail and on-line are used to assess needs. CES educators and researchers target key stakeholders such as agriculture commodity groups, youth organizations, and schools through meetings where discussion is held on needs and issues. University of Wyoming educators and faculty assess needs throughout the year based on individual contact with citizens at meetings and in local communities.

Brief Explanation of what you learned from your Stakeholders

4-H and Youth Development - 1) increase volunteer training, 2) develop Master Volunteer 4-H Leader program, 3) continue life skill training for youth, 4) initiate workforce skill training for youth; 5) increase marketing efforts to reach underserved youth and retain older youth in the program.

Community Development Education - 1) broaden scope of board training, 2) continue financial management training efforts to include youth, 3) expand efforts in leadership development including leadership institutes in rural areas, 4) research on economic analysis of federal land management planning is essential to the state, 5) conflict management training for all initiatives.

Nutrition and Food Safety - 1) expand efforts in food safety at both food service and consumer level. 2) obesity continues to be identified as a priority issue for adults and youth. 3) basic nutrition and cooking skills are a priority as many schools have eliminated family and consumer science curriculums, 4) research on the safety of food is essential to consumer confidence, 5) sustainable food and agriculture systems – growing, preserving, preparing foods.

Profitable and Sustainable Agriculture Systems - 1) agriculture education for youth for retention in agriculture careers in collaboration with 4-H, 2) identified changing demographics and lifestyle changes in rural areas, 3) increased need for educational programming for small acreage owners, 4) mediation training is needed for agriculture producers due to increased land use for energy expansion and federal land agencies. 5) new methods to deliver information are needed such as newspaper inserts, current information on website, and utilize the Northern Ag Network radio stations to reach producers, 6) water management, livestock/wildlife interface, and National Animal Identification program were also issues identified, 7) coalbed Methane water quality.

Sustainable Management of Rangeland Resources - 1) hands-on range monitoring workshops, 2) water management including quality, quantity and efficient use 3) drought and ranch sustainability 4) small acreage workshops to educate new land owners 5) renewable energy - energy development and reclamation.

IV. Expenditure Summary

1. Total Actual Formula dollars Allocated (prepopulated from C-REEMS)			
Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
1365333	0	1600072	0

2. Totaled Actual dollars from Planned Programs Inputs				
Extension			Research	
	Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
Actual Formula	1365333	0	929826	0
Actual Matching	12238429	0	970472	0
Actual All Other	0	0	0	0
Total Actual Expended	13603762	0	1900298	0

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

V. Planned Program Table of Content

S. NO.	PROGRAM NAME
1	Community Development Education
2	Nutrition and Food Safety
3	4-H and Youth Development
4	Profitable and Sustainable Agriculture Systems
5	Sustainable Management of Rangeland Resources (SMRR)

Program #1**V(A). Planned Program (Summary)****1. Name of the Planned Program**

Community Development Education

V(B). Program Knowledge Area(s)**1. Program Knowledge Areas and Percentage**

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
601	Economics of Agricultural Production and Farm Management	5%		5%	
602	Business Management, Finance, and Taxation	5%		5%	
604	Marketing and Distribution Practices	5%		5%	
608	Community Resource Planning and Development	50%		50%	
801	Individual and Family Resource Management	25%		25%	
802	Human Development and Family Well-Being	5%		5%	
803	Sociological and Technological Change Affecting Individuals, Families and Communities	5%		5%	
Total		100%		100%	

V(C). Planned Program (Inputs)**1. Actual amount of professional FTE/SYs expended this Program**

Year: 2008	Extension		Research	
	1862	1890	1862	1890
Plan	11.0	0.0	2.1	0.0
Actual	12.4	0.0	2.1	0.0

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

Extension		Research	
Smith-Lever 3b & 3c 167007	1890 Extension 0	Hatch 77924	Evans-Allen 0
1862 Matching 638322	1890 Matching 0	1862 Matching 82935	1890 Matching 0
1862 All Other 0	1890 All Other 0	1862 All Other 0	1890 All Other 0

V(D). Planned Program (Activity)**1. Brief description of the Activity**

Educational and research activities and efforts of the CDE program include:

Development of models to explain the impact changes have on the ability of communities to capture and retain dollars such as the impact of eliminating snowmobiling in Yellowstone National Park or the impact of reducing grazing permits in Bridger Teton National Forest.

Family resource management programs will reach out to a broad spectrum of constituents throughout Wyoming using a variety of anticipated programs. Outputs include methods such as train-the-trainer workshops, home-study courses, and such approaches as the Internet (www.uwyo.edu/CES/FRM/), and satellite. Also included are publications, meetings, news releases, and feature articles.

Community-based leadership training institutes – (EVOLVE) Extension Volunteer Organization for Leadership, Vitality and Education. Skill training workshops – i.e. board training. General public information and educational efforts – i.e. public media materials; information/educational meetings and workshops; books, booklets, bulletins, training materials; providing data. Facilitation of community processes. Analyses of community data and economic impact. Assessments to identify individual strengths and areas to be strengthened to guide personal development and grow talent. Media resources to promote community capital development Extension education and increase awareness of Extension resources.

Outputs for entrepreneurship programs include publications, meetings, classes, workshops, conferences, one-on-one consultations, and web sites.

Research efforts will include economic analysis of Federal land management planning. These efforts provide important information that is used to assist in the planning process to make decisions that are critical to the future of Wyoming.

2. Brief description of the target audience

The University of Wyoming College of Agriculture is committed to reaching underrepresented groups and individuals and to implementing the objectives of equal opportunity regulations relative to the consideration and treatment of clientele for participation in programs regardless of their race, national origin, gender, age, religion, or disability. The ultimate consumer of the educational products for financial management programs will be all individuals (including youth and senior citizens), families (including low-income families), and in general people at risk of experiencing financial stress. The group of educators, specialists, and faculty responsible for leading and delivering the outputs in the program is the smallest of the University of Wyoming's Cooperative Extension Service groups. A priority for program development is to use methods of information and instruction that make it possible for the most constituents to be assisted while minimizing face-to-face work. Thus the team will emphasize train-the-trainer courses, newsletters, and electronic delivery of information and programming.

Targeted audiences for leadership development include: Elected officials. Members and leaders of formal and informal community organizations. Faith-based leaders and members. Business owners/managers/employees. Trade/produce groups. Educational entities. Federal/state/local agency leaders/members.

Entrepreneurship programs targets audiences who will manage or may develop ventures relating to food and agricultural systems, a non-farm extension of a farm business, forestry, home trades, crafts, services, etc. Other audiences through which Wyoming CES program may be delivered include: teachers, public and private agencies, business owners/managers/employers, trade/produce groups, educational entities, identified publics, youth groups/students, and small acreage owners.

V(E). Planned Program (Outputs)

1. Standard output measures

Target for the number of persons (contacts) reached through direct and indirect contact methods

	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
Plan	500	2000	200	1000
2008	3318	4000	474	1000

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

Year	Target
Plan:	0
2008 :	0

Patents listed**3. Publications (Standard General Output Measure)****Number of Peer Reviewed Publications**

	Extension	Research	Total
Plan	1	2	
2008	1	4	5

V(F). State Defined Outputs**Output Target****Output #1****Output Measure**

- Family Resource Management programs will ultimately benefit all families in Wyoming. Short term effects may be increased grant funding and increased involvement in regional and multi-state projects. Target is number of programs.

Year	Target	Actual
2008	0	72

Output #2**Output Measure**

- Number of individuals participating in programs. Target is number of individuals.

Year	Target	Actual
2008	250	1148

Output #3**Output Measure**

- Number of programs delivered. Target is number of programs.

Year	Target	Actual
2008	25	90

Output #4**Output Measure**

- Entrepreneurship output targets include: number of individuals assisted.

Year	Target	Actual
2008	5	6

Output #5**Output Measure**

- Participation in entrepreneurship programs designed for specific audiences including beginning farmers, multi-generation farm families, part-time farmers, and existing farmers. Target is number of participants.

Year	Target	Actual
2008	20	40

Output #6**Output Measure**

- Research efforts will include community economic analysis which includes improving efficiency of existing firms, improve efficiency to capture and retain dollars and attract new businesses. Targets show number of projects.

Year	Target	Actual
2008	1	2

V(G). State Defined Outcomes**V. State Defined Outcomes Table of Content**

O No.	OUTCOME NAME
1	Permanent changes in practices as determined by follow-up surveys with those attending meetings, events, and workshops. Target is number of participants.
2	Financial stability and security in Wyoming households. Target is number of households.
3	Improved quality of life for participants through adoption of management principles. Target is number of participants reporting outcome.
4	One or more management principles from educational programs on personal finance management are adopted by workshop participants. Target is number of participants reporting outcome.
5	Wyoming schools will increase awareness of UW CES as a source of financial management curriculum. Target is number of schools contacted.
6	Improved credit debt-management skills reported by participants in workshops. Target is number of participants reporting outcome.
7	Increased public interest in personal finance as determined by attendance at meetings, workshops, events, and demonstrations. Target is number of participants.
8	Knowledge and confidence gained as measured by end of workshop evaluations. Target is number of participants.
9	Participants of leadership classes will develop skills and confidence necessary for community participation, find resources to enhance community capital, recognize the needs for community vision, capacity building, and direction, and strengthen inner-community relationships. Target is number of participants.
10	Leadership participants will be able to utilize collaborative/coalition building practices to implement visionary community programs in order to provide the community with leaders, officials, and volunteers who are able to affect desired change or stability. Target is number of participants reporting outcome.
11	Increased rural economic diversification. Target is number of participants implementing change.
12	Enhanced incomes and jobs through business expansion or new businesses. Target is participants reporting outcome.
13	Long term changes in action documented through follow-up surveys of program participants regarding planning, improved management of risk, insurance, and labor. Improved confidence and ability to market, produce and finance, and promote products from new enterprises. Target is number of participants reporting outcome.
14	Short term outcome of research efforts include increased grant funding and increased involvement on regional and multi-state projects. Target is number of projects.
15	Development of impact models which will improve community economic analysis as well as mitigate unwanted consequences. Target is number of impact models developed.

Outcome #1**1. Outcome Measures**

Permanent changes in practices as determined by follow-up surveys with those attending meetings, events, and workshops. Target is number of participants.

2. Associated Institution Types

•1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2008	50	188

3c. Qualitative Outcome or Impact Statement**Issue (Who cares and Why)**

Many county-appointed board members want to complete their assigned duties yet lack the skills and training needed to perform to the best of their ability. County commissioners across the state have expressed the desire to provide training to current and new members appointed to county boards so they might more properly fulfill their duties and responsibilities. The University of Wyoming Cooperative Extension Service's Community Development Education (CDE) initiative team developed materials to support training programs for county boards.

What has been done

The CDE team developed curriculum and educational materials to support the program. Area educators used these materials to develop a four-hour educational program for county-appointed boards in the state. Four training sessions were held reaching 50 individuals. The CDE area educator presented the subjects of board vs. executive director duties, officer roles, effective meetings, and parliamentary procedure during the four-hour session. Board members received written and verbal instruction on the proper functions of boards, board members, and executive directors.

Results

Participants ended by drawing a visual representation of how they wanted their board to be functioning in five years. Using a Likert scale of 1 to 5, with 5 being high, the following average ratings were secured through written evaluations:

Work activities 4.52

Handouts 4.70

Effective class 4.72

A sample of participant comments: I was surprised at how much I learned. I was not looking forward to an evening training. Once I was there and it started, I was shocked at how fast the time seemed to fly! The small groups were great.

4. Associated Knowledge Areas

KA Code	Knowledge Area
608	Community Resource Planning and Development
803	Sociological and Technological Change Affecting Individuals, Families and Communities

Outcome #2**1. Outcome Measures**

Financial stability and security in Wyoming households. Target is number of households.

Not reporting on this Outcome for this Annual Report

Outcome #3

1. Outcome Measures

Improved quality of life for participants through adoption of management principles. Target is number of participants reporting outcome.

Not reporting on this Outcome for this Annual Report

Outcome #4**1. Outcome Measures**

One or more management principles from educational programs on personal finance management are adopted by workshop participants. Target is number of participants reporting outcome.

2. Associated Institution Types

•1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2008	25	164

3c. Qualitative Outcome or Impact Statement**Issue (Who cares and Why)**

In the last ten years Wyoming has experienced significant economic growth. Sound financial management will increase the stability and security of households as well as the happiness of household members. The first critical need is the management of credit and debt. Seven out of 10 low and middle income households report using their credit cards as a safety net. In Wyoming about 2,500 people file for bankruptcy protection each year. The second critical issue is the spending habits of adolescents. Many adolescents earn income, of which they spend 98 percent, and do not have to pay for many living expenses such as housing.

What has been done

Family resource management programs will reach out to a broad spectrum of constituents throughout Wyoming using a variety of programs. Four courses were held which were six to eight week series in addition to nine single session programs totaling sixty-two classes reaching 328 individuals.

Results

End of session evaluations indicated 100 percent of the participants increased knowledge and awareness of financial principles. Over 50 percent reported adopting and implementing at least one financial practice principal as a result of the classes. These included better credit management; financial recovery after bankruptcy; and initiating a savings plan.

4. Associated Knowledge Areas

KA Code	Knowledge Area
801	Individual and Family Resource Management

Outcome #5**1. Outcome Measures**

Wyoming schools will increase awareness of UW CES as a source of financial management curriculum. Target is number of schools contacted.

2. Associated Institution Types

•1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2008	25	5

3c. Qualitative Outcome or Impact Statement**Issue (Who cares and Why)**

In Wyoming, the 2006 National Endowment for Financial Education's (NEFE) national personal finance survey of high school students found participants could only answer 52 percent of finance questions correctly. No corresponding study of the adult population exists, but it is expected results would be similar.

What has been done

To help overcome the financial educational deficiencies in the state's population, the Wyoming Jump\$tart Coalition was created in 2005. Coalition activities cover a range of audiences, from legislators to educators to youths directly. The University of Wyoming Cooperative Extension Service (UW CES) is a key partner in the coalition providing leadership, expertise, and resources. These activities have been supported by a \$15,000 grant from the Daniels Fund, for which UW CES led the application, as well as financial support of 107 coalition funding partners.

Results

Four hundred and fifty eighth graders in southeast Wyoming are now aware of financial literacy basics, legislative leaders are more aware of the need for education in personal financial management, and teachers are better able to provide education to their students using the training the coalition provides. Specific outcomes include those below.

The eighth-grade audience of Jump\$tart Your Money Conference

1. Learned the value of savings and deferred gratification,
2. Learned the power of compounding, and
3. Received a tool to facilitate savings.

The teacher training made it possible for high school educators to maximize their teaching ability of the High School Financial Planning Program teaching resources. Informal evaluation at the conclusion of the training indicated all participants became familiar and comfortable with using the materials in their classroom.

4. Associated Knowledge Areas

KA Code	Knowledge Area
801	Individual and Family Resource Management

Outcome #6**1. Outcome Measures**

Improved credit debt-management skills reported by participants in workshops. Target is number of participants reporting outcome.

2. Associated Institution Types

•1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2008	25	201

3c. Qualitative Outcome or Impact Statement**Issue (Who cares and Why)**

In the last ten years Wyoming has experienced significant economic growth. Sound financial management will increase the stability and security of households as well as the happiness of household members. The first critical need is the management of credit and debt. Seven out of 10 low and middle income households report using their credit cards as a safety net. In Wyoming about 2,500 people file for bankruptcy protection each year.

What has been done

Fifteen classes focusing on credit, debt reduction, and bankruptcy were held in FY 2008 reaching 201 individuals.

Results

One hundred percent of participants reported learning something new. 85 percent indicated they would begin using a spending plan.

4. Associated Knowledge Areas

KA Code	Knowledge Area
801	Individual and Family Resource Management

Outcome #7

1. Outcome Measures

Increased public interest in personal finance as determined by attendance at meetings, workshops, events, and demonstrations. Target is number of participants.

2. Associated Institution Types

•1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2008	100	1322

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

In the last ten years Wyoming has experienced significant economic growth. Sound financial management will increase the stability and security of households as well as the happiness of household members. The first critical need is the management of credit and debt. Seven out of 10 low and middle income households report using their credit cards as a safety net. In Wyoming about 2,500 people file for bankruptcy protection each year. The second critical issue is the spending habits of adolescents. Many adolescents earn income, of which they spend 98 percent, and do not have to pay for many living expenses such as housing. The third critical issue is improving the financial health of Wyoming households.

What has been done

Sixty-eight classes were held for adults reaching 328 individuals and seven classes were held for 497 youth on financial management topics. Over half of the classes were multi-session ranging from 4 - 8 weeks.

Results

One hundred percent of participants indicated through both formal and informal evaluation gaining awareness and knowledge as a result of the courses. End of session evaluations and surveys indicated a request for more classes on money management.

4. Associated Knowledge Areas

KA Code	Knowledge Area
801	Individual and Family Resource Management

Outcome #8

1. Outcome Measures

Knowledge and confidence gained as measured by end of workshop evaluations. Target is number of participants.

2. Associated Institution Types

•1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2008	50	100

3c. Qualitative Outcome or Impact Statement**Issue (Who cares and Why)**

In the last ten years Wyoming has experienced significant economic growth. Sound financial management will increase the stability and security of households as well as the happiness of household members. The first critical need is the management of credit and debt. Seven out of 10 low and middle income households report using their credit cards as a safety net. In Wyoming about 2,500 people file for bankruptcy protection each year. The second critical issue is the spending habits of adolescents. Many adolescents earn income, of which they spend 98 percent, and do not have to pay for many living expenses such as housing. The third critical issue is improving the financial health of Wyoming households.

What has been done

Over 75 programs including multi-session classes ranging from 4 - 8 weeks in length were conducted reaching over 1300 individuals. Topics covered included Debtor education for individuals filing for bankruptcy, credit, basic money management for youth and adults, and financial planning.

Results

End of session evaluations showed that 100 participants in classes and workshops increased their confidence in financial management.

4. Associated Knowledge Areas

KA Code	Knowledge Area
801	Individual and Family Resource Management

Outcome #9**1. Outcome Measures**

Participants of leadership classes will develop skills and confidence necessary for community participation, find resources to enhance community capital, recognize the needs for community vision, capacity building, and direction, and strengthen inner-community relationships. Target is number of participants.

2. Associated Institution Types

•1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2008	100	94

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Leadership development was identified as a need by the Wyoming Rural Development Council's Community Assessments. This was later reaffirmed by Area Advisory Committees and the Extension Research Needs Assessment in 2004. The Wyoming Business Council has shared their vision of community economic development using a building block model. At the base are three blocks - leadership development, workforce development, and community capacity building. The second level has two blocks, existing business development and entrepreneur development, and one block on the top for recruiting.

What has been done

In FY 2008 four EVOLVE leadership institutes were conducted. Each institute meets monthly for 8 sessions ranging from 6 - 8 hours in length. Topics covered include teambuilding, communication, conflict management, a fishbowl simulation of leadership assessment, community involvement, and overall leadership.

Results

In early 2008, 83 EVOLVE graduates from six community leadership institutes in Wyoming completed a survey reflecting their perceptions of the institutes. More than 90 percent (75 respondents) reported they were more aware of their strengths and weaknesses. In fact, respondents reported they agreed leadership behavior improved in all areas listed. 'Has your overall involvement in the community strengthened (in quality or quantity) through participation in the Institute?' Fifty-six respondents (69.1 percent) agreed or strongly agreed. There was also a doubling in the number who reported participating in five to six leadership roles after the institute. Respondents estimated a total of 586 hours in volunteer participation prior to the institute. After institute participation, the estimated hours of volunteering increased to 890 hours - an increase of 304 hours.

4. Associated Knowledge Areas

KA Code	Knowledge Area
803	Sociological and Technological Change Affecting Individuals, Families and Communities

Outcome #10**1. Outcome Measures**

Leadership participants will be able to utilize collaborative/coalition building practices to implement visionary community programs in order to provide the community with leaders, officials, and volunteers who are able to affect desired change or stability. Target is number of participants reporting outcome.

2. Associated Institution Types

•1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2008	10	38

3c. Qualitative Outcome or Impact Statement**Issue (Who cares and Why)**

Leadership development was identified as a need by the Wyoming Rural Development Council's Community Assessments. This was later reaffirmed by Area Advisory Committees in 2004-2005 and the Extension Research Needs Assessment in 2004. The Wyoming Business Council has shared their vision of community economic development using a building block model. At the base are three blocks - leadership development, workforce development, and community capacity building.

What has been done

Strong leaders are the foundation of sustainable rural communities and form a base for economic and community development. Attempts have been made to measure the impact of EVOLVE (Extension Volunteer Organization for Leadership, Vitality, and Enterprise) in Wyoming through a study of participants one year after graduation. The team developed a survey specific to the EVOLVE program. The survey included three themes: leadership in personal skill building and confidence, leadership in community involvement, and leadership in commitment to community building.

Results

Respondents were asked to estimate the number of leadership roles they were involved in before and after participation in the leadership institutes. Prior to the institute, the greatest number of participants (48 respondents) indicated one to two leadership roles. After participation, the largest number of respondents (38) reported three to four leadership roles compared to 19 respondents who reported the same number prior to institute participation. There was also a doubling in the number who reported participating in five to six leadership roles after the institute. Respondents estimated a total of 586 hours in volunteer participation prior to the institute. After institute participation, the estimated hours of volunteering increased to 890 hours - an increase of 304 hours.

4. Associated Knowledge Areas

KA Code	Knowledge Area
803	Sociological and Technological Change Affecting Individuals, Families and Communities

Outcome #11

1. Outcome Measures

Increased rural economic diversification. Target is number of participants implementing change.

Not reporting on this Outcome for this Annual Report

Outcome #12

1. Outcome Measures

Enhanced incomes and jobs through business expansion or new businesses. Target is participants reporting outcome.

Not reporting on this Outcome for this Annual Report

Outcome #13

1. Outcome Measures

Long term changes in action documented through follow-up surveys of program participants regarding planning, improved management of risk, insurance, and labor. Improved confidence and ability to market, produce and finance, and promote products from new enterprises. Target is number of participants reporting outcome.

Not reporting on this Outcome for this Annual Report

Outcome #14

1. Outcome Measures

Short term outcome of research efforts include increased grant funding and increased involvement on regional and multi-state projects. Target is number of projects.

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2008	1	0

3c. Qualitative Outcome or Impact Statement**Issue (Who cares and Why)**

As federal and state funding shifts, external funding is critical as is participation in multi-state projects.

What has been done

The UW College of Agriculture increased external grant funding by over two million dollars in FY08. Participation in multi-state projects has increased.

Results

These funds greatly enhance the success of our programs. Multi-state participation benefits faculty research and regional collaborative efforts as well as pooling resources.

4. Associated Knowledge Areas

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

Outcome #15**1. Outcome Measures**

Development of impact models which will improve community economic analysis as well as mitigate unwanted consequences. Target is number of impact models developed.

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2008	1	1

3c. Qualitative Outcome or Impact Statement**Issue (Who cares and Why)**

Prices in many business-to-business transactions are not discovered through the simultaneous interaction of numerous sellers and/or buyers, such as in an auction or well-developed posted-price market. Instead, prices and possibly other terms of trade are decided through negotiation, for which histories and outcomes are proprietary. An important feature of a trading institution is the amount of information it makes available. In private negotiation it is often the case that bids, offers, and product qualities are known only by the agents directly involved. Information is private. Information is not shared with other traders in the market, and the information that agents accumulate comes from a personal history of continued trading.

What has been done

The objective of this research was to assess how selected reports of past trading behavior, such as prices and units traded released as common knowledge, influence market outcomes in private negotiation with advance production and limited bargaining matches. A bilateral or private negotiation trading environment was created in the laboratory. The laboratory market was designed to capture the important features of the market environment in which many transactions in the food supply chain occur.

Results

Additional focus on alternatives that might improve a seller's negotiating position and equity in returns between buyers and sellers in private negotiation trading with spot delivery is warranted. The results of this research also suggest that mandatory reporting aggregate negotiated price, by itself, under the Livestock Mandatory Price Reporting Act may neither help nor hinder the bargaining position of cattle producers relative to buyers (processors). We do not recommend abolishing LMPR. Instead, consideration should be given to supplementing the information base under LMPR with measures that would alleviate risks borne by sellers (producers) associated with advance production and limited matches in private negotiation trading.

4. Associated Knowledge Areas

KA Code	Knowledge Area
601	Economics of Agricultural Production and Farm Management
608	Community Resource Planning and Development
803	Sociological and Technological Change Affecting Individuals, Families and Communities
604	Marketing and Distribution Practices

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Economy
- Appropriations changes
- Public Policy changes
- Government Regulations
- Competing Public priorities
- Competing Programmatic Challenges
- Populations changes (immigration,new cultural groupings,etc.)
- Other (changes in technology)

Brief Explanation

Staffing for the CDE initiative is limited, this initiative team has the smallest number of educators and specialists. Due to limited staffing, programs on entrepreneurship were not fully implemented.

V(I). Planned Program (Evaluation Studies and Data Collection)

1. Evaluation Studies Planned

- After Only (post program)
- Retrospective (post program)

Evaluation Results

Key Items of Evaluation

Program #2**V(A). Planned Program (Summary)****1. Name of the Planned Program**

Nutrition and Food Safety

V(B). Program Knowledge Area(s)**1. Program Knowledge Areas and Percentage**

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
703	Nutrition Education and Behavior	50%		50%	
704	Nutrition and Hunger in the Population	10%		10%	
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins	20%		20%	
724	Healthy Lifestyle	20%		20%	
	Total	100%		100%	

V(C). Planned Program (Inputs)**1. Actual amount of professional FTE/SYs expended this Program**

Year: 2008	Extension		Research	
	1862	1890	1862	1890
Plan	15.0	0.0	3.5	0.0
Actual	16.4	0.0	3.5	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
221247	0	138635	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
843057	0	147553	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	0	0	0

V(D). Planned Program (Activity)**1. Brief description of the Activity**

EFNEP adult curriculum taught in a series of lessons; adult one-time lessons; youth curricula taught in a series of lessons and day camps; displays and demonstrations; State and community partnerships with agencies serving the low-income; training for educators ; evaluation of program; Ongoing- Updating of curricula and materials.

Other nutrition efforts will focus on educational programs; media outreach; health fairs; training; assessment/data collection; and research in human health and disease (specifically type 2 diabetes) and N-3 Polyunsaturated fatty acids.

Since skeletal muscle is the main site for utilization of glucose and fatty acids in the body and insulin resistance in skeletal muscle is the key step in the incidence of type 2 diabetes, we hypothesize that impaired fetal skeletal muscle growth due to nutrient deficiency plays an important role. Our goal is to understand how the development of fetal skeletal muscle affects the properties of skeletal muscle of adulthood, and to develop effective strategies to mitigate or avoid incidence of diabetes and obesity caused by impaired skeletal muscle development due to fetal nutrient deficiency.

2. Brief description of the target audience

The University of Wyoming is committed to reaching underrepresented groups and individuals and to implementing the objectives of equal opportunity regulations relative to the consideration and treatment of clientele for participation in all programs regardless of their race, national origin, gender, age, religion, or disability. Specific target audience groups for the CNP (EFNEP) program: Low-income adults, Youth in Title I schools.

Targeted audiences for food safety programs include:

- General Public (Youth and Adults)
- Food Handlers: Commercial and Temporary Food Service
- In-Home and Child Care Center Providers. Dining with Diabetes program targets the general public (youth and adults) with Type 2 Diabetes.

All other nutrition efforts targeted audience includes: general public, both adults and youth and policy makers.

V(E). Planned Program (Outputs)

1. Standard output measures

Target for the number of persons (contacts) reached through direct and indirect contact methods

	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
Plan	1000	4000	1500	3000
2008	5796	5000	1503	3000

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

Patent Applications Submitted

Year	Target
Plan:	1
2008 :	1

Patents listed

Individualized Treatment for Leukotriene Asthma Subtypes - UW Tech #08-025 (applied for)

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

	Extension	Research	Total
Plan	1	4	
2008	3	3	6

V(F). State Defined Outputs**Output Target****Output #1****Output Measure**

- Number of Dining with Diabetes, food safety and programs which promote healthier food choices and lifestyles offered in Wyoming communities. Target is number of programs.

Year	Target	Actual
2008	35	9

Output #2**Output Measure**

- Number of participants in educational programs offered in NFS initiative. Target is number of participants.

Year	Target	Actual
2008	500	7299

Output #3**Output Measure**

- Number of partnerships formed with environmental health specialists (food safety); public health of other agencies, and Diabetes coordinators. Target is number of partnerships.

Year	Target	Actual
2008	5	15

Output #4**Output Measure**

- Increased adoption of healthy food practices and participation in regular physical activities. Target is number of participants reporting outcome.

Year	Target	Actual
2008	100	630

Output #5**Output Measure**

- Effectiveness of research programs will be based on integration into extension programs, patents, grant dollars, and publications. The ultimate research goal is to provide tools for detection of food contaminated products. (target is number of research projects in NRI)

Year	Target	Actual
2008	2	1

Output #6**Output Measure**

- Improve ability to detect and analyze for the presence of food borne pathogens. Target is number of research projects.

Year	Target	Actual
2008	0	1

V(G). State Defined Outcomes**V. State Defined Outcomes Table of Content**

O No.	OUTCOME NAME
1	Improved attitude related to diabetes self care, food, and physical activity. Targets are number of participants reporting outcome.
2	Increased knowledge of healthy food choices for optimal diabetes management, and health. Targets are number of participants reporting outcome.
3	Improved skill in selection of healthy foods. Targets are number of participants reporting outcome.
4	Improved eating behavior practices, food choices , and lifestyle habits. Targets are number of participants reporting outcome.
5	Individuals participating in Dining with Diabetes programs will have improved blood glucose control which will improve health and diabetes management resulting in decreased chronic disease risk factors. Targets are number of participants reporting outcome.
6	Nutrition programs will result in decreased medical costs. Targets are number of participants reporting outcome.
7	Using a variety of food resources to reduce food costs. Providing culturally acceptable meals that are balances for cost as well as for nutritional value. Target is number of participants reporting outcome.
8	Improved personal hygiene such as hand washing. Avoidance of cross-contamination resulting in keeping foods safe. Target is number of participants reporting outcome.
9	Increased availability of personal/family food resources. Target is number of participants reporting outcome.
10	Individuals gain awareness, knowledge and skills related to: improved attitude about healthy eating; increased knowledge of healthy food choices; improved skill in selection of healthy foods; improved body image. Target is number of participants reporting outcome.
11	Individuals incorporate skills and change behaviors related to: increased participation in physical activity; increased knowledge of healthy food choices; improved skill in selection of healthy foods; improved body image. Target is number of participants reporting outcome.
12	Individuals and families experience: improved nutritional health; reduced medical costs; health improved through improved community opportunities; healthier weight; decreased risk factors for nutrition-health related problems. Target is number of participants reporting outcome.
13	Increased awareness and knowledge of food safety practices. Target is number of participants reporting outcome.
14	Behavior or practice changes that improve food safety. Target is number of participants reporting outcome.
15	Reduced health care cost and economic loss to restaurants as a result of food-borne outbreaks. Target is number of participants reporting outcome.
16	Decreased incidence of food-borne illness outbreaks in food service establishments. Target is number of food service establishments reporting outcome.
17	The short term goal of research efforts is to increase grant funding and to patent detective process. Target is number of projects.
18	Research will result in easier, more rapid methods of detection of food borne pathogens such as E.coli and Listeria. Ultimately, deliniate genes that promote survival in the environment and result in disease contamination of food. Target is number of projects.

Outcome #1**1. Outcome Measures**

Improved attitude related to diabetes self care, food, and physical activity.

Targets are number of participants reporting outcome.

2. Associated Institution Types

•1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2008	100	127

3c. Qualitative Outcome or Impact Statement**Issue (Who cares and Why)**

Nearly 21 million Americans - about 7 percent of the population - have diabetes. The Centers for Disease Control and Prevention's Behavioral Risk Factor Surveillance System reports for Wyoming that the rate of diabetes in adults has more than doubled from 1997 (3 percent) to 2007 (7 percent). This percentage represents about 28,000 Wyoming adults. Estimated economic costs of diabetes in 2002 were \$132 billion; on a per-capita basis, that translates to an economic burden in Wyoming of \$22 million.

What has been done

In response, University of Wyoming Cooperative Extension Service (UW CES) nutrition and food safety educators, with support from the Wyoming Diabetes Prevention and Control Program, teamed with local diabetes educators to conduct Dining with Diabetes in Wyoming. This five-session program combines education on diabetes self-care with recipe demonstrations, food tasting, nutrition information, and low-impact physical activity for people of all fitness levels. Participants complete questionnaires at the beginning of the first class (pre), at the end of the fourth class (post), and at the beginning of the fifth class (follow-up - two to four months after the fourth class).

Results

Shorter term (by the end of the program)

Better understanding of . . . the plate method for portioning their food; Feeling more strongly . . . that they can eat their favorite foods; Longer term (at three-month follow-up)

Decreasing the proportion of participants . . .

who drink whole or 2% milk

who are never physically active

Feeling more strongly . . . that physical activity comes more easily to them.

Selected comments:

I have definitely made changes in serving sizes.

I have changed my cooking style, modifying recipes to be more healthy.

I realize I need to be more serious about what I'm eating - not just once in awhile but all the time.

I have really learned a lot about how to cook for my husband (and) how important exercise is. (I also) understand more about how he feels with higher and lower blood sugars.

4. Associated Knowledge Areas

KA Code	Knowledge Area
703	Nutrition Education and Behavior
724	Healthy Lifestyle

Outcome #2**1. Outcome Measures**

Increased knowledge of healthy food choices for optimal diabetes management, and health. Targets are number of participants reporting outcome.

2. Associated Institution Types

•1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2008	500	225

3c. Qualitative Outcome or Impact Statement**Issue (Who cares and Why)**

Nearly 21 million Americans - about 7 percent of the population - have diabetes. The Centers for Disease Control and Prevention's Behavioral Risk Factor Surveillance System reports for Wyoming that the rate of diabetes in adults has more than doubled from 1997 (3 percent) to 2007 (7 percent). This percentage represents about 28,000 Wyoming adults. Estimated economic costs of diabetes in 2002 were \$132 billion; on a per-capita basis, that translates to an economic burden in Wyoming of \$22 million.

What has been done

In response, University of Wyoming Cooperative Extension Service (UW CES) nutrition and food safety educators, with support from the Wyoming Diabetes Prevention and Control Program, teamed with local diabetes educators to conduct Dining with Diabetes in Wyoming. This five-session program combines education on diabetes self-care with recipe demonstrations, food tasting, nutrition information, and low-impact physical activity for people of all fitness levels. Participants complete questionnaires at the beginning of the first class (pre), at the end of the fourth class (post), and at the beginning of the fifth class (follow-up - two to four months after the fourth class).

Eight programs were completed in 2008, an additional 12 programs were held since inception in 2006. Over the three-year period, 170 individuals took the course. Additionally educators participated in health fairs and one time sessions to promote diabetes prevention.

Results

One hundred percent of participants reported increasing knowledge as a result of educational efforts. Over half of evaluation respondents indicated they had changed at least one dietary behavior.

4. Associated Knowledge Areas

KA Code	Knowledge Area
703	Nutrition Education and Behavior

Outcome #3**1. Outcome Measures**

Improved skill in selection of healthy foods. Targets are number of participants reporting outcome.

2. Associated Institution Types

•1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2008	200	371

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Wyoming has more than 22,579 food stamp recipients living in 9,587 households, which is only 45 percent of the households eligible to receive food stamps. Due to Wyoming's large geographic size and low population, food security is a challenge for those with limited resources making nutrition education, including food resource management, very important.

What has been done

The University of Wyoming's CES's Cent\$ible Nutrition Program, which is the umbrella title for the Expanded Food and Nutrition Extension Program had the following outputs over the past year:

141 adults participated in a series of lessons, averaging 8.1 lessons per person (1142 teaching contacts).

230 adults participated in one-time lessons with 80 percent reporting intended behavior change.

Results

53 percent reported thinking about healthy food choices more often when deciding what to feed their families.

65 percent reported using the 'Nutrition Facts' labels more often to make food choices.

40 percent reported they or their children more often eat something in the morning within two hours of waking.

53 percent reported serving more than one kind of fruit to their families each day more often.

50 percent reported serving more than one kind of vegetable to their families each day more often.

46 percent reported when eating bread, they eat whole-grain bread more often.

4. Associated Knowledge Areas

KA Code	Knowledge Area
703	Nutrition Education and Behavior

Outcome #4**1. Outcome Measures**

Improved eating behavior practices, food choices , and lifestyle habits.

Targets are number of participants reporting outcome.

2. Associated Institution Types

•1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2008	100	300

3c. Qualitative Outcome or Impact Statement**Issue (Who cares and Why)**

Wyoming residents are at risk as reflected by various health-related data: For example, over 20 percent of Wyoming adults report no leisure time physical activity, 47 percent of Wyoming high school students report not being enrolled in a physical education class, and 78 percent of both Wyoming adults and high school students do not eat recommended amounts of fruits and vegetables.

What has been done

UW CES educators conducted over 300 classes which emphasized a holistic approach including proper nutrition, increasing physical activity and healthy food choices. Strong Bones - Strong People, basic nutrition, and Steps to a New You were all programs focused on objectives.

Results

782 individuals participated in 38 classes of which 10 were multi-session with four to eight sessions in length. 300 participants reported improved eating behavior practices, food choices, and lifestyle habits through end of session evaluations.

4. Associated Knowledge Areas

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

Outcome #5**1. Outcome Measures**

Individuals participating in Dining with Diabetes programs will have improved blood glucose control which will improve health and diabetes management resulting in decreased chronic disease risk factors. Targets are number of participants reporting outcome.

Not reporting on this Outcome for this Annual Report

Outcome #6**1. Outcome Measures**

Nutrition programs will result in decreased medical costs. Targets are number of participants reporting outcome.

Not reporting on this Outcome for this Annual Report

Outcome #7**1. Outcome Measures**

Using a variety of food resources to reduce food costs. Providing culturally acceptable meals that are balances for cost as well as for nutritional value. Target is number of participants reporting outcome.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2008	100	141

3c. Qualitative Outcome or Impact Statement**Issue (Who cares and Why)**

Wyoming has more than 22,579 food stamp recipients living in 9,587 households, which is only 45 percent of the households eligible to receive food stamps. Due to Wyoming's large geographic size and low population, food security is a challenge for those with limited resources making nutrition education, including food resource management, very important.

What has been done

141 adults participated in a series of lessons, averaging 8.6 lessons per person (1410 teaching contacts). A monthly one-page flyer was produced featuring one of the commodity foods and distributed during food demonstrations. Ten issues of Cent\$ible Nutrition News were distributed. Three issues were mailed directly to food stamp recipient households.

Results

85 percent showed improvement in one or more food-resource management practices.

50 percent reported planning meals ahead of time more often.

40 percent reported running out of food before the end of the month less often.

Families reported saving an average of \$45.75 per month.

4. Associated Knowledge Areas

KA Code	Knowledge Area
704	Nutrition and Hunger in the Population

Outcome #8**1. Outcome Measures**

Improved personal hygiene such as hand washing. Avoidance of cross-contamination resulting in keeping foods safe. Target is number of participants reporting outcome.

2. Associated Institution Types

•1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2008	200	841

3c. Qualitative Outcome or Impact Statement**Issue (Who cares and Why)**

Microbial contamination of food is a serious public health problem: Each year in the U.S, food-borne diseases cause approximately 76 million illnesses, 325,000 hospitalizations, and 5,000 deaths. With approximately 60% of food-borne illness outbreaks nationwide attributable to food-service establishments, food-service personnel are key to reducing the risk of food-borne illness. Additionally, home food preparers and consumers are important groups to reach with food safety education because their behaviors greatly affect the safety of food that they serve to others and/or eat themselves.

What has been done

37 classes ranging from school handwashing lessons to consumer food safety, beginning, intermediate food safety for food service workers and ServSafe food safety certification classes were conducted.

Results

100 percent of participants reported learning at least one new concept. Youth were able to demonstrate proper hand washing techniques. Food service workers and consumers reported understanding cross-contamination and indicated they planned to change at least one food handling practice as a result of classes.

4. Associated Knowledge Areas

KA Code	Knowledge Area
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins

Outcome #9**1. Outcome Measures**

Increased availability of personal/family food resources. Target is number of participants reporting outcome.

Not reporting on this Outcome for this Annual Report

Outcome #10**1. Outcome Measures**

Individuals gain awareness, knowledge and skills related to: improved attitude about healthy eating; increased knowledge of healthy food choices; improved skill in selection of healthy foods; improved body image. Target is number of participants reporting outcome.

2. Associated Institution Types

•1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2008	100	451

3c. Qualitative Outcome or Impact Statement**Issue (Who cares and Why)**

The United States Department of Agriculture recently released the Dietary Guidelines for Americans 2005. Tommy G. Thompson, Secretary of Health and Human Services, identified the number one message of the new guidelines as getting the most nutrition out of calories consumed. Number two was finding a balance between food and physical activity. The key recommendations include an emphasis on increased consumption of fruits and vegetables, whole grains, and low-fat dairy and increased physical activity.

What has been done

Nutrition and food safety educators conducted 22 educational programs on basic nutrition, health, and food selection.

Results

End of session evaluations indicated 100 percent of participants gained awareness, knowledge, and skills as result of educational programs. Over 200 individuals indicated they planned to change one nutrition practice for their family. 90 percent reported they now understand nutrition fact labels.

4. Associated Knowledge Areas

KA Code	Knowledge Area
703	Nutrition Education and Behavior

Outcome #11**1. Outcome Measures**

Individuals incorporate skills and change behaviors related to: increased participation in physical activity; increased knowledge of healthy food choices; improved skill in selection of healthy foods; improved body image. Target is number of participants reporting outcome.

2. Associated Institution Types

•1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2008	100	1223

3c. Qualitative Outcome or Impact Statement**Issue (Who cares and Why)**

Wyoming residents are at risk as reflected by various health-related data: For example, over 20 percent of Wyoming adults report no leisure time physical activity, 47 percent of Wyoming high school students report not being enrolled in a physical education class, and 78 percent of both Wyoming adults and high school students do not eat recommended amounts of fruits and vegetables. Additionally, research in Wyoming, Montana, and Idaho documented body dissatisfaction as a significant predictor of self-consciousness keeping respondents from participating in physical activity.

What has been done

87 classes (which included over 20 which were multi-session) were held on Steps to a New You, Basic Nutrition, Size Acceptance, Strong Bones -Strong People, Steps to Weight Management, and Healthy Eating Habits. In addition, educators published educational articles in newsletters, newspaper columns, and produced educational displays used at health fairs.

Results

Participants reported incorporating skills and changing behaviors related to: increased participation in physical activity; increased knowledge of healthy food choices; improved skill in selection of healthy foods; improved body image as a result of educational efforts. 100 percent of participants listed at least one behavior change they incorporated to improve their health.

4. Associated Knowledge Areas

KA Code	Knowledge Area
724	Healthy Lifestyle
703	Nutrition Education and Behavior

Outcome #12

1. Outcome Measures

Individuals and families experience: improved nutritional health; reduced medical costs; health improved through improved community opportunities; healthier weight; decreased risk factors for nutrition-health related problems. Target is number of participants reporting outcome.

2. Associated Institution Types

•1862 Extension

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2008	10	22

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Wyoming residents are at risk as reflected by various health-related data: For example, over 20 percent of Wyoming adults report no leisure time physical activity, 47 percent of Wyoming high school students report not being enrolled in a physical education class, and 78 percent of both Wyoming adults and high school students do not eat recommended amounts of fruits and vegetables. Additionally, research in Wyoming, Montana, and Idaho documented body dissatisfaction as a significant predictor of self-consciousness keeping respondents from participating in physical activity.

What has been done

A variety of classes (many multi-session) on Steps to a New You, Healthy Eating, Weight Management and basic nutrition were conducted by nutrition educators. Articles were published in newsletters, newspaper columns and educational displays were developed. UW CES sponsored Shaping a Healthy Futures Conference to provide training to health and nutrition professionals reaching over 300 people.

Results

36 percent reported being physically active for at least 30 minutes per day, on four or more days per week, more often.

39 percent reported getting a 'super-sized' portion less often. (A 'super-sized' portion of food or beverage is one that is much bigger but costs only a little more money.).

92 percent showed improvement in one or more nutrition practices.

22 individuals reported weight loss as a result of changes in eating, meal planning, and increasing physical activity.

4. Associated Knowledge Areas

KA Code	Knowledge Area
703	Nutrition Education and Behavior
724	Healthy Lifestyle

Outcome #13

1. Outcome Measures

Increased awareness and knowledge of food safety practices. Target is number of participants reporting outcome.

2. Associated Institution Types

•1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2008	500	841

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Microbial contamination of food is a serious public health problem: Each year in the U.S, food-borne diseases cause approximately 76 million illnesses, 325,000 hospitalizations, and 5,000 deaths. With approximately 60% of food-borne illness outbreaks nationwide attributable to food-service establishments, food-service personnel are key to reducing the risk of food-borne illness. Additionally, home food preparers and consumers are important groups to reach with food safety education because their behaviors greatly affect the safety of food that they serve to others and/or eat themselves.

What has been done

37 classes ranging from ServSafe certification courses, Going for the Gold food safety classes for food service handlers, consumer food safety classes and school workshops on proper handwashing methods were conducted.

Results

100 percent of participants reported through both formal and informal evaluations increased awareness and knowledge of food safety practices.

4. Associated Knowledge Areas

KA Code	Knowledge Area
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins

Outcome #14

1. Outcome Measures

Behavior or practice changes that improve food safety. Target is number of participants reporting outcome.

2. Associated Institution Types

•1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2008	250	841

3c. Qualitative Outcome or Impact Statement**Issue (Who cares and Why)**

Microbial contamination of food is a serious public health problem: Each year in the U.S, food-borne diseases cause approximately 76 million illnesses, 325,000 hospitalizations, and 5,000 deaths. With approximately 60% of food-borne illness outbreaks nationwide attributable to food-service establishments, food-service personnel are key to reducing the risk of food-borne illness. Additionally, home food preparers and consumers are important groups to reach with food safety education because their behaviors greatly affect the safety of food that they serve to others and/or eat themselves.

What has been done

37 educational classes ranging from school hand washing programs to food safety classes for food service workers, ServSafe certification classes and food safety for consumers were conducted.

Results

Follow-up evaluations were conducted for food service worker classes and ServSafe. 100 percent reported adapting at least one behavior change that would positively impact food safety in their establishment. Youth and consumers reported learning new skills and youth demonstrated proper hand washing techniques.

4. Associated Knowledge Areas

KA Code	Knowledge Area
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins

Outcome #15**1. Outcome Measures**

Reduced health care cost and economic loss to restaurants as a result of food-borne outbreaks. Target is number of participants reporting outcome.
Not reporting on this Outcome for this Annual Report

Outcome #16**1. Outcome Measures**

Decreased incidence of food-borne illness outbreaks in food service establishments. Target is number of food service establishments reporting outcome.
Not reporting on this Outcome for this Annual Report

Outcome #17**1. Outcome Measures**

The short term goal of research efforts is to increase grant funding and to patent detective process. Target is number of projects.

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2008	0	1

3c. Qualitative Outcome or Impact Statement**Issue (Who cares and Why)**

E. coli O157:H7 is a major safety threat for beef and its associated products. Frequent recalls due to E. coli O157:H7 contamination cause huge losses to beef industry. Because fecal shedding of E.coli O157:H7 is the major source of contamination in beef, it is extremely important to reduce E. coli O157:H7 colonization in gastrointestinal (GI) tract of beef cattle, which depends on our understanding of underlying mechanisms. However, up to now, mechanisms governing E. coli O157:H7 colonization in GI tract is unclear.

What has been done

Currently, we are defining mechanisms regulating E. coli O157:H7 colonization in epithelial cells and GI tracts. We hypothesize that c-di-GMP signaling has a crucial role in regulating E. coli O157:H7 colonization in GI epithelium.

Results

Elucidation of mechanisms regulating E. coli O157:H7 colonization is crucial for us to develop strategies to reduce E. coli O157:H7 prevalence in the GI tract of beef cattle. Due to the huge losses associated with frequent recalls of beef products contaminated by E. coli O157:H7, reducing E. coli O157:H7 will have profound impact on beef industry, as well as provide consumers with safer beef.

4. Associated Knowledge Areas

KA Code	Knowledge Area
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins

Outcome #18**1. Outcome Measures**

Research will result in easier, more rapid methods of detection of food borne pathogens such as E.coli and Listeria. Ultimately, delineate genes that promote survival in the environment and result in disease contamination of food. Target is number of projects.

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2008	1	1

3c. Qualitative Outcome or Impact Statement**Issue (Who cares and Why)**

Regulation of Carbohydrate Metabolism in the Foodborne Pathogen, *Listeria monocytogenes*, by a Novel Group of Crp-Fnr-type Regulatory Proteins is important to food consumers who are at risk of acquiring a *L. monocytogenes* infection (pregnant women, immunocompromised individuals). The research ultimately is important to the development of better methods for food preservation and safety.

What has been done

Genes associated with resistance to food preservatives known as bacteriocins have been isolated and characterized.

Results

Knowledge of resistance mechanisms will permit better application of multifactorial preservation methods involving bacteriocins.

4. Associated Knowledge Areas

KA Code	Knowledge Area
703	Nutrition Education and Behavior
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Economy
- Appropriations changes
- Government Regulations
- Competing Public priorities
- Competing Programmatic Challenges
- Populations changes (immigration,new cultural groupings,etc.)
- Other (Global conditions)

Brief Explanation

V(I). Planned Program (Evaluation Studies and Data Collection)

1. Evaluation Studies Planned

- Retrospective (post program)
- Before-After (before and after program)
- During (during program)
- Time series (multiple points before and after program)
- Case Study

Evaluation Results

{No Data Entered}

Key Items of Evaluation

{No Data Entered}

Program #3**V(A). Planned Program (Summary)****1. Name of the Planned Program**

4-H and Youth Development

V(B). Program Knowledge Area(s)**1. Program Knowledge Areas and Percentage**

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
801	Individual and Family Resource Management	10%		10%	
802	Human Development and Family Well-Being	25%		25%	
806	Youth Development	65%		65%	
	Total	100%		100%	

V(C). Planned Program (Inputs)**1. Actual amount of professional FTE/SYs expended this Program**

Year: 2008	Extension		Research	
	1862	1890	1862	1890
Plan	29.0	0.0	0.0	0.0
Actual	31.8	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
427716	0	0	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
1630182	0	0	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	0	0	0

V(D). Planned Program (Activity)**1. Brief description of the Activity**

Activities include volunteer training on the following topics: Ages and stages of youth; Risk Management; Youth Development Concepts; Non-Profit Management/Coordination; Financial Management/IRS Issues; Project Training; Learning Styles; Club Maintenance; Recruitment and Retention.

Traditional 4-H will focus on project or leadership activities; teach and/or facilitate educational programs; recruitment of new members, training, camps, clinics, contests, media, and assessment.

Non-traditional 4-H activities will include: Cloverbuds (pre 4-H); After school programs; School enrichment; Youth Leadership; Marketing; and Camps.

2. Brief description of the target audience

The University of Wyoming College of Agriculture is committed to reaching underrepresented groups and individuals and to implementing the objectives of equal opportunity regulations relative to the consideration and treatment of clientele for participation in Extension programs regardless of their race, national origin, gender, age, religion, or disability. 4-H Volunteers will be recruited from the following groups: adults in the community, other agencies, civic groups, youth groups, and the general public.

Traditional 4-H youth audiences will target:

- Youth
- Volunteers
- Families
- Community.

The target audience for non-traditional 4-H will include: Underserved and high risk youth who do not participate in the traditional 4-H Youth program in Wyoming.

V(E). Planned Program (Outputs)

1. Standard output measures

Target for the number of persons (contacts) reached through direct and indirect contact methods

	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
Plan	3000	5000	7000	10000
2008	2793	5000	154301	20000

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

Patent Applications Submitted

Year	Target
Plan:	0
2008 :	0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

	Extension	Research	Total
Plan	0	0	
2008	2	0	2

V(F). State Defined Outputs

Output Target

Output #1**Output Measure**

- Number of youth enrolled in the traditional 4-H program. Target is number of youth enrolled.

Year	Target	Actual
2008	7000	10938

Output #2**Output Measure**

- Number of educational events, camps, training workshops, clinics implemented. Target is number of programs and events.

Year	Target	Actual
2008	100	708

Output #3**Output Measure**

- Number of volunteers enrolled as leaders in the 4-H program. Target is number of volunteers.

Year	Target	Actual
2008	3000	4688

Output #4**Output Measure**

- Number of volunteers participating in formal training programs. Target is number of volunteers.

Year	Target	Actual
2008	600	2793

Output #5**Output Measure**

- Number of non-traditional programs established. Target is number of programs.

Year	Target	Actual
2008	10	15

Output #6**Output Measure**

- Number of youth enrolled in non-traditional youth development programs. Target is number of youth.

Year	Target	Actual
2008	5000	16291

V(G). State Defined Outcomes**V. State Defined Outcomes Table of Content**

O No.	OUTCOME NAME
1	Increased knowledge, skills, self-esteem, awareness, motivation, belonging, and diversity. Target is number of youth participating.
2	Wyoming youth will acquire knowledge which builds life skills including critical thinking, public speaking, teamwork, self-discipline, responsibility, decision making, self-esteem, communication, and leadership. Target is number of youth reporting outcome.
3	Youth will be empowered to make logical decisions, develop a positive behavior (according to traditional values), effectively communicate, and establish a working relationship with others. Target is number of participants reporting outcome.
4	Wyoming youth build assets and essential life skills to lead productive, responsible, and healthy lifestyles. Target is number of participants reporting outcome.
5	Decreased incidence of youth engaging in high risk behavior. Youth become responsible, productive adults. Target is number of participants reporting outcome.
6	Non-traditional youth participating in programs serve in leadership roles, serve on governing bodies, act as mentors, and teach other youth. Target is number of participants reporting outcome.
7	Volunteers demonstrate increased knowledge in project areas. Target is number of participants reporting outcome.
8	Volunteers become key players in 4-H and youth development programs. Target is number of participants reporting outcome.
9	Volunteers demonstrate knowledge of youth development principles. Target is number of participants reporting outcome.
10	Volunteers will learn and apply the experiential learning model. Target is number of participants reporting outcome.
11	Trained adult volunteers will demonstrate skills and abilities in which they are able to foster youth to become responsible adults. Target is number of participants reporting outcome.

Outcome #1**1. Outcome Measures**

Increased knowledge, skills, self-esteem, awareness, motivation, belonging, and diversity. Target is number of youth participating.

2. Associated Institution Types

•1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2008	1000	3000

3c. Qualitative Outcome or Impact Statement**Issue (Who cares and Why)**

In Wyoming there are an estimated 75,000 youth between the ages of 8 and 18 according to the U.S. Census Bureau. According to the Search Institute 'youth who have ten or fewer of the 40 external and internal assets are at high risk of developing at-risk behaviors'. All of the 40 external and internal assets are likely to be developed by youth involved in the 4-H program. Youth in the traditional 4-H program have the opportunity to expand their knowledge base, increase their life skills and develop leadership abilities in order to become responsible, contributing citizens.

What has been done

4-H youth educators working with volunteers conducted 624 educational activities including workshops, camps, clinics, judging contests, and other events which promote increased knowledge, skills, self-esteem, awareness, motivation, belonging, and diversity. In addition educators publish educational articles in 4-H newsletters.

Results

Youth participating in educational activities reported through both formal and informal evaluations an increase in knowledge, skills, self confidence as a result of belonging to 4-H. County, state, regional and national event participation identifies diversity as one of the benefits. Observation is used to document increased self-esteem, greater motivation, and sense of belonging with youth participants. All 23 counties and the Wind River Indian Reservation report impact in this area.

4. Associated Knowledge Areas

KA Code	Knowledge Area
806	Youth Development

Outcome #2**1. Outcome Measures**

Wyoming youth will acquire knowledge which builds life skills including critical thinking, public speaking, teamwork, self-discipline, responsibility, decision making, self-esteem, communication, and leadership. Target is number of youth reporting outcome.

2. Associated Institution Types

•1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2008	1000	1902

3c. Qualitative Outcome or Impact Statement**Issue (Who cares and Why)**

In Wyoming there are an estimated 75,000 youth between the ages of 8 and 18 according to the U.S. Census Bureau. According to the Search Institute 'youth who have ten or fewer of the 40 external and internal assets are at high risk of developing at-risk behaviors'. All of the 40 external and internal assets are likely to be developed by youth involved in the 4-H program. Youth in the traditional 4-H program have the opportunity to expand their knowledge base, increase their life skills and develop leadership abilities in order to become responsible, contributing citizens.

What has been done

4-H youth educators conducted 49 educational activities including 4-H camps, Junior Leader programs, leadership retreats and special interest sessions, judging programs, training on public speaking and presentations and implemented Character Counts training statewide.

Results

Over 300 youth participating in 4-H judging programs reported increased confidence and skills in decision making and communication.

Junior leader (youth age 13 - 18) reported through formal and informal evaluations increased awareness and skills in teamwork, decision making, self-discipline, leadership, communication, and responsibility. Youth participating in educational programs, camps, and other activities demonstrate increased knowledge and skills.

4. Associated Knowledge Areas

KA Code	Knowledge Area
806	Youth Development

Outcome #3**1. Outcome Measures**

Youth will be empowered to make logical decisions, develop a positive behavior (according to traditional values), effectively communicate, and establish a working relationship with others. Target is number of participants reporting outcome.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2008	1000	1902

3c. Qualitative Outcome or Impact Statement**Issue (Who cares and Why)**

In Wyoming there are an estimated 75,000 youth between the ages of 8 and 18 according to the U.S. Census Bureau. According to the Search Institute 'youth who have ten or fewer of the 40 external and internal assets are at high risk of developing at-risk behaviors'. All of the 40 external and internal assets are likely to be developed by youth involved in the 4-H program. Youth in the traditional 4-H program have the opportunity to expand their knowledge base, increase their life skills and develop leadership abilities in order to become responsible, contributing citizens.

What has been done

40 external and internal assets identified by the Search Institute are utilized in all 4-H curriculum used in Wyoming. Educators had in-depth training in 2008 on Character Counts which has been implemented statewide. 4-H camps, clinics, judging programs, junior leader programs including WYLE - Wyoming Youth Leadership Education are conducted. Educators write educational articles for 4-H newsletters.

Results

100 percent of youth participating in educational programs report an increase in being empowered to make logical decisions, develop a positive behavior, effectively communicate, and have skills to establish a working relationship with others.

4. Associated Knowledge Areas

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

Outcome #4

1. Outcome Measures

Wyoming youth build assets and essential life skills to lead productive, responsible, and healthy lifestyles. Target is number of participants reporting outcome.

2. Associated Institution Types

•1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2008	500	755

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

In Wyoming there are an estimated 75,000 youth between the ages of 8 and 18 according to the U.S. Census Bureau. According to the Search Institute 'youth who have ten or fewer of the 40 external and internal assets are at high risk of developing at-risk behaviors'. All of the 40 external and internal assets are likely to be developed by youth involved in the 4-H program. Youth in the traditional 4-H program have the opportunity to expand their knowledge base, increase their life skills and develop leadership abilities in order to become responsible, contributing citizens.

What has been done

4-H educators work with youth ages 13 - 18 in Junior Leader programs which target development of assets. A variety of methods are used including training, camps, workshops, leadership retreats, and on-going monthly junior leader meetings. Developing assets in youth is an objective of all educational activities.

Results

Junior leader age youth (13 - 18) report through formal and informal evaluation increased skills, knowledge, and assets such as self esteem, communication, responsibility, and decision making. Wyoming Youth Leadership Education retreats had the following impact: daily evaluations as well as a final overall evaluation were used to evaluate the overall impact of the program. The evaluations showed that 72 percent of youth said that their knowledge was improved or greatly improved by the True Colors assessment, 61 percent for learning styles, 89 percent for body language, and 94 percent from extreme leadership, 42 percent for youth in governance, 58 percent for business etiquette, 90 percent for senior sensitivity, 65 percent for Character Counts, and 90 percent for communication.

4. Associated Knowledge Areas

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

Outcome #5

1. Outcome Measures

Decreased incidence of youth engaging in high risk behavior. Youth become responsible, productive adults. Target is number of participants reporting outcome.

Not reporting on this Outcome for this Annual Report

Outcome #6

1. Outcome Measures

Non-traditional youth participating in programs serve in leadership roles, serve on governing bodies, act as mentors, and teach other youth. Target is number of participants reporting outcome.

Not reporting on this Outcome for this Annual Report

Outcome #7

1. Outcome Measures

Volunteers demonstrate increased knowledge in project areas. Target is number of participants reporting outcome.

2. Associated Institution Types

•1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2008	200	1500

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Adult volunteers are the mainstay of the 4-H program. The success of the program depends on the knowledge and skills volunteer leaders have and can then pass on to the youth and parents in their clubs. These leaders can directly accomplish the goals the program has for positive youth development of all youth participants. In the 2007-2008 program year in Wyoming there were 3000 active leaders at all stages of experience and expertise. Over one-third of these leaders joined the 4-H program within the last three years. Program assessments compiled over three years revealed the need for leadership training beyond the basics of 4-H. New and experienced leaders identified the following topics as essential for success within their clubs: behavioral management of youth, teaching youth of different ages within the same club, record books, and making meetings fun for all.

What has been done

With topics identified by the current 4-H leaders, curriculum was created to match these needs as well as incorporate the essential elements of 4-H and positive youth development theories. A variety of training classes, workshops, on-line training were offered. In addition educators wrote educational articles in 4-H newsletters. All 23 counties and the Wind River Indian Reservation 4-H programs conducted training for volunteers.

Results

After completing the Leader Training Workshops, 100 percent of participants said the training was beneficial in helping them in their role as a 4-H Leader. Some of their testimonials included:

'The information about conducting meetings was most helpful to me.'

'I will use the Record Book as a structure to plan my year - set goals, plan community service, set a schedule.'

'I learned a lot about the 4-H structure and what is expected of leaders as well as members.'

'I have never thought about planning for different age groups, the ages and stages information was most helpful.'

'This training reinforced the notion that the 4-H members are all different and I need to be thoughtful in various ways to teach them.'

247 leaders completed on-line certification training. 100 percent reported increased awareness and knowledge of risk management in working with youth.

4. Associated Knowledge Areas

KA Code	Knowledge Area
802	Human Development and Family Well-Being
801	Individual and Family Resource Management

Outcome #8**1. Outcome Measures**

Volunteers become key players in 4-H and youth development programs.

Target is number of participants reporting outcome.

Not reporting on this Outcome for this Annual Report

Outcome #9**1. Outcome Measures**

Volunteers demonstrate knowledge of youth development principles. Target is number of participants reporting outcome.

2. Associated Institution Types

•1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2008	200	400

3c. Qualitative Outcome or Impact Statement**Issue (Who cares and Why)**

Adult volunteers are the mainstay of the 4-H Program. The success of the program depends on the knowledge and skills volunteer leaders have and can then pass on to the youth and parents in their clubs. These leaders can directly accomplish the goals the program has for positive youth development of all youth participants. Area advisory meetings, 4-H expansion and review committees and program assessments compiled over three years revealed the need for leadership training beyond the basics of 4-H.

What has been done

4-H Youth Educators conducted 83 training sessions for 4-H volunteers. Wyoming hosts a state 4-H leaders conference annually which provides training and support to volunteers. Youth development principles are incorporated into all training sessions to provide tools to volunteers to meet needs of youth enrolled in the 4-H program.

Results

Formal end of session evaluations report that volunteers participating in leader training sessions have increased knowledge and awareness of youth development principles.

4. Associated Knowledge Areas

KA Code	Knowledge Area
806	Youth Development

Outcome #10

1. Outcome Measures

Volunteers will learn and apply the experiential learning model. Target is number of participants reporting outcome.

2. Associated Institution Types

•1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2008	100	1000

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Adult volunteers are the mainstay of the 4-H Program. The success of the program depends on the knowledge and skills volunteer leaders have and can then pass on to the youth and parents in their clubs. These leaders can directly accomplish the goals our program has for positive youth development of all youth participants. Area advisory meetings, 4-H Expansion and Review committees, and program assessments compiled over three years revealed the need for leadership training beyond the basics of 4-H. New and experienced leaders identified the understanding the experiential learning model as essential for success within their clubs.

What has been done

4-H youth educators in all 23 counties and the Wind River Indian Reservation conducted targeted training for volunteers. Emphasis is placed on developing competency in the experiential training model.

Results

100 percent of volunteers demonstrated understanding of the model. Over 2700 volunteers participated in training and 1000 completed formal end of session evaluations which reported an increase in knowledge and skills in implementing 4-H project training using the experiential learning model. Retention in the 4-H program has increased due to positive learning environments created by volunteer leaders.

4. Associated Knowledge Areas

KA Code	Knowledge Area
801	Individual and Family Resource Management
806	Youth Development
802	Human Development and Family Well-Being

Outcome #11

1. Outcome Measures

Trained adult volunteers will demonstrate skills and abilities in which they are able to foster youth to become responsible adults. Target is number of participants reporting outcome.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2008	100	500

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Adult volunteers are the mainstay of the 4-H Program. The success of the program depends on the knowledge and skills volunteer leaders have and can then pass on to the youth and parents in their clubs. Leaders can directly accomplish goals of the program for positive youth development of all participants. In the 2007-2008 program year in Wyoming there were 3000 leaders at all stages of experience and expertise. Area advisory meetings, 4-H councils, program assessments compiled over three years revealed the need for leadership training beyond the basics of 4-H.

What has been done

4-H youth educators conducted 83 training activities including state 4-H leaders conference, project and general leader training. Objectives and goals of 4-H youth development principles are incorporated into all training sessions.

Results

Volunteers stated increased understanding of youth development principles which foster youth to become productive adults. Testimonials from 4-H leaders and youth indicate the positive influence adult volunteers have on the life of 4-H members.

4. Associated Knowledge Areas

KA Code	Knowledge Area
802	Human Development and Family Well-Being
806	Youth Development
801	Individual and Family Resource Management

V(H). Planned Program (External Factors)

External factors which affected outcomes

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

Brief Explanation

Scheduling conflicts for volunteers prevented the 4-H Master Volunteer program from being implemented as planned in 2008. The training will be implemented in 2009. High staff turnover in the 4-H program also impacts continuity of youth development programs.

V(l). Planned Program (Evaluation Studies and Data Collection)

1. Evaluation Studies Planned

- After Only (post program)
- Retrospective (post program)
- Before-After (before and after program)
- During (during program)
- Time series (multiple points before and after program)
- Case Study

Evaluation Results

{No Data Entered}

Key Items of Evaluation

{No Data Entered}

Program #4**V(A). Planned Program (Summary)****1. Name of the Planned Program**

Profitable and Sustainable Agriculture Systems

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	5%		5%	
104	Protect Soil from Harmful Effects of Natural Elements	5%		5%	
111	Conservation and Efficient Use of Water	5%		5%	
202	Plant Genetic Resources	5%		5%	
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants	5%		5%	
204	Plant Product Quality and Utility (Preharvest)	5%		5%	
205	Plant Management Systems	5%		5%	
206	Basic Plant Biology	5%		5%	
211	Insects, Mites, and Other Arthropods Affecting Plants	5%		5%	
212	Pathogens and Nematodes Affecting Plants	5%		5%	
213	Weeds Affecting Plants	5%		5%	
214	Vertebrates, Mollusks, and Other Pests Affecting Plants	5%		5%	
215	Biological Control of Pests Affecting Plants	5%		5%	
216	Integrated Pest Management Systems	5%		5%	
301	Reproductive Performance of Animals	5%		5%	
302	Nutrient Utilization in Animals	5%		5%	
305	Animal Physiological Processes	5%		5%	
307	Animal Management Systems	5%		5%	
311	Animal Diseases	5%		5%	
601	Economics of Agricultural Production and Farm Management	5%		5%	
Total		100%		100%	

V(C). Planned Program (Inputs)**1. Actual amount of professional FTE/SYs expended this Program**

Year: 2008	Extension		Research	
	1862	1890	1862	1890
Plan	26.0	0.0	30.0	0.0
Actual	25.6	0.0	30.0	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
344267	0	493234	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
1312048	0	505799	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	0	0	0

V(D). Planned Program (Activity)**1. Brief description of the Activity**

Any or all channels of the media will be used to familiarize the public with UW College of Agriculture areas of research and extension programming and personnel. Media releases in local newspapers, radio spots and television advertisements will inform the public of upcoming Extension programs and research field days including contact persons. Newsletter articles distributed both electronically and through the mail by county offices, area teams, and the University of Wyoming will reach producers locally, regionally, and state-wide. Reflections, a yearly publication by AES showcases research, extension, and education programs in the College. This publication is distributed to over 6,000 households and businesses throughout the state. Public educational programs with invited speakers and Extension specialists and educators presenting research-based information will continue to be held in response to local, state, and national crop and livestock production, horticultural and small acreage issues. Demonstrations of technology and skills training will be included in education curriculum to enhance educational effectiveness. Field tours will be organized to provide producers with the opportunity to observe industry procedure (i.e., tour of an ethanol plant).

Areas of focus in livestock systems: emphasis will be placed on the four main areas; herd management and traceability, herd development, cropping systems and livestock development, risk and operation management techniques and alternatives to enhance the stability of Wyoming livestock producers. The new Sustainable Agriculture Research and Extension Center (SAREC) located at Lingle, Wyoming will provide a resource base for integrating livestock/forage based programs.

From the Ground Up television news segments will continue to be developed by UW CES field staff and aired on statewide television stations to disseminate horticulture information. Newsletter articles distributed both electronically and through the mail by county offices, Master Gardener organizations, area teams, and UW will reach producers, consumers and volunteers. UW CES specialists will continue to develop Horticultural Train the Trainer events for the benefit of training UW CES field staff and long term Master Gardener volunteers. Recruitment of Master Gardener, 4-H leaders, and youths as well as other volunteers will occur on an ongoing basis. With on-going recruitment Wyoming will see an increase in the number of Master Gardeners. 4-H Vegetable and Forestry judging programs will provide youth with opportunities to evaluate the value of fresh produce and forest products. 4-H gardening project leaders and youth will receive training in proper gardening practices.

Development of a statewide database of defining characteristics of small acre owners. Educational programs targeted at small acreage landowners emphasizing sustainable land management practices. Individual interaction with small acreage landowners educating them on resources available to assist them with sustainable land management practices. Development and distribution of a targeted, user friendly publication providing education on sustainable land management practices. Coordination with other interested agencies to provide education to this clientele, and funding for this effort. Provide educational opportunities for professionals involved with small acreage landowners. Seek external funding to provide education to natural resource professionals, and small acreage landowners.

2. Brief description of the target audience

The University of Wyoming is committed to reaching underrepresented groups and individuals and to implementing the objectives of equal opportunity regulations relative to the consideration and treatment of clientele for participation in all programs regardless of their race, national origin, gender, age, religion, or disability. Participants will include policy makers for County, State, and Federal government agencies, crop producers, livestock producers, ag lenders, potential investors, and the scientific community. An existing secondary audience will be the media, general public, and interest groups not directly involved in production agriculture (i.e., environmental groups).

The targeted audience for horticulture programs include: horticultural crop producers and consumers, Master Gardener and 4-H volunteers, youths, lenders, and potential investors. An existing secondary audience will be the media, general public, and interested groups not directly involved in the production of horticultural crops or products.

The target audience for small acreage programming is individuals who reside on small acreages of 40 acres or less.

V(E). Planned Program (Outputs)**1. Standard output measures****Target for the number of persons (contacts) reached through direct and indirect contact methods**

	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
Plan	20000	50000	500	1000
2008	8810	50000	896	1000

2. Number of Patent Applications Submitted (Standard Research Output)**Patent Applications Submitted****Year Target****Plan:** 4

2008 : 2

Patents listed

Release of NH03614 CL Hard Red Winter Wheat (NE, SD,WY)

Release of Great Northern Germplasm - Western Yarrow (NRCS BPMC)

3. Publications (Standard General Output Measure)**Number of Peer Reviewed Publications**

	Extension	Research	Total
Plan	2	25	
2008	4	30	34

V(F). State Defined Outputs**Output Target**

Output #1**Output Measure**

- Number of horticulture contacts reached. Target is the number of contacts.

Year	Target	Actual
2008	15000	20741

Output #2**Output Measure**

- Research efforts will develop new and improved forages for high elevation livestock systems. Target measures are new or improved forages.

Year	Target	Actual
2008	1	0

Output #3**Output Measure**

- Ultimately, this program will improve livestock value through cropping practices, herd selection, and management for Wyoming livestock producers. Targets include number of programs conducted, livestock producers reporting change in practices as a result of educational efforts.

Year	Target	Actual
2008	0	40

Output #4**Output Measure**

- Number of subscriptions to Barnyards and Backyards publication. Target is paid subscription numbers for magazine.

Year	Target	Actual
2008	2500	2011

Output #5**Output Measure**

- Develop improved methods of estimating forage base under varying environmental conditions. Targets included new methods developed for assessing forage base and growth.

Not reporting on this Output for this Annual Report

Output #6**Output Measure**

- Number of Master Gardener Volunteers statewide. Target measure is new volunteers recruited and trained.

Year	Target	Actual
2008	100	165

Output #7**Output Measure**

- Research will develop more sustainable dryland cropping systems using extended rotations, ley pastures and narrow row fallow systems. Short term goals include increased grants and demonstration projects. Target is the number of demonstration projects implemented.

Year	Target	Actual
2008	2	2

Output #8**Output Measure**

- Research: Wildlife/livestock disease interaction and transfer: long term goal to maintain Wyoming's Brucellosis free status and determine CWD transfer from cervids to domestic livestock. Targets are defined as projects developed.

Year	Target	Actual
2008	2	2

Output #9**Output Measure**

- Research: Improve pest management practices. Long term goal is to reduce pesticide applications and increase use of IPM practices. Targets are programs implemented.

Year	Target	Actual
2008	1	2

Output #10

Output Measure

- Research: Development of biological control practices that effectively reduce populations of invasive weeds. Targets are listed as new programs developed on various weed species.

Year	Target	Actual
2008	1	1

Output #11**Output Measure**

- Research: Development of simple blood test for diagnosis of brisket disease. Short term goals include increased grant funding and demonstration results. Target is grant funding obtained.

Year	Target	Actual
2008	1	1

Output #12**Output Measure**

- Research: Determine the impact environment has on the ability of female ewes to produce healthy offspring. The long term goal is to develop models to predict production performance under different environments. Targets listed are new projects intended.

Year	Target	Actual
2008	1	1

Output #13**Output Measure**

- Develop profitable and sustainable forage based livestock systems for the High Plains. Targets are defined as new systems developed.

Not reporting on this Output for this Annual Report

V(G). State Defined Outcomes**V. State Defined Outcomes Table of Content**

O No.	OUTCOME NAME
1	Awareness created through extension and research efforts. Target is number of participants in extension and R&E programs.
2	Pasture land owners and/or managers will be able to recognize indicators of pasture condition and will possess decision-making skills necessary to make needed management decisions. Target is number of participants reporting outcome.
3	Producers with the resources to irrigate their crops and/or pasture will know and understand costs and returns associated with their irrigation practices and systems. Target is number of producers reporting outcome.
4	Wyoming producers will implement electronic animal identification to gain advantages in herd management. Target is number of producers implementing outcome.
5	Producers will gain an understanding of heifer development as well as opportunities for matching genetic improvement with successful marketing strategies. Target is number of producers.
6	Wyoming producers will benefit through an increased value of livestock and crops related to improved cropping practices, herd selection, and management. Target is number of producers.
7	Wyoming crop producers will be able to substitute traditional or current crop production with alternative horticultural crops to market if increased profitability may result. Target is number of crop producers.
8	Water conservation will improve the profitability and sustainability of Wyoming's green industry and municipal water supplies. Target is number of participants reporting outcome.
9	Youth and their families will choose gardening as a healthy choice for active living. Target is number of participants reporting outcome.
10	Research: Awareness created; change in knowledge through publications and integration into extension programs. Target is number of research projects.
11	Research - Awareness created in animal systems; Change in knowledge through publications and integration into extension programs. Target is number of projects.
12	Research - Awareness created on IPM; change in knowledge through publications and integration into extension programs. Target is number of projects.
13	Research - Awareness created in plant systems; change in knowledge through publications and integration into extension programs. Target is number of projects.
14	Research in animal reproduction - awareness created; change in knowledge through publications and integration into extension activities. Target is number of projects.

Outcome #1**1. Outcome Measures**

Awareness created through extension and research efforts. Target is number of participants in extension and R&E programs.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2008	500	8810

3c. Qualitative Outcome or Impact Statement**Issue (Who cares and Why)**

The value of agriculture to Wyoming's economy approaches \$1 billion each year, and agriculture's contribution to open spaces, wildlife, and recreation is even greater. Livestock producers throughout the state of Wyoming face an ever changing industry with issues such as; increasing cost of production, increasing pressure for individual animal identification, changing requirements for marketing knowledge. All of the issues are coupled with the need for producers to be able to raise livestock in a sustainable operation with limited resources.

What has been done

Extension Educators in Profitable and Sustainable Agriculture Systems conducted 452 educational programs including field days, workshops, classes, multi-session courses, and volunteer training. In addition media is utilized to reach citizens through television, newspaper inserts, magazines, news columns and special articles, and radio. Educators also write educational newsletters distributed by mail and on-line.

Results

Formal and informal evaluations were used to determine outcome. 100 percent of agriculture producers participating in educational activities reported increased awareness.

4. Associated Knowledge Areas

KA Code	Knowledge Area
215	Biological Control of Pests Affecting Plants
204	Plant Product Quality and Utility (Preharvest)
202	Plant Genetic Resources
206	Basic Plant Biology
102	Soil, Plant, Water, Nutrient Relationships
205	Plant Management Systems
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants
212	Pathogens and Nematodes Affecting Plants
111	Conservation and Efficient Use of Water
104	Protect Soil from Harmful Effects of Natural Elements
211	Insects, Mites, and Other Arthropods Affecting Plants
213	Weeds Affecting Plants
216	Integrated Pest Management Systems
214	Vertebrates, Mollusks, and Other Pests Affecting Plants

Outcome #2**1. Outcome Measures**

Pasture land owners and/or managers will be able to recognize indicators of pasture condition and will possess decision-making skills necessary to make needed management decisions. Target is number of participants reporting outcome.

2. Associated Institution Types

•1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2008	100	134

3c. Qualitative Outcome or Impact Statement**Issue (Who cares and Why)**

The value of agriculture to Wyoming's economy approaches \$1 billion each year, and agriculture's contribution to open spaces, wildlife, and recreation is even greater. The largest component of Wyoming agriculture is the beef cattle industry, accounting for approximately 70 percent of all cash receipts and 86.5 percent of all livestock production. Sheep, lamb, and wool receipts in 1998 were \$29 million. Forage sustains the Wyoming livestock industry. Hay is the leading crop in Wyoming with 1998 production valued at \$185 million, mostly marketed through livestock.

What has been done

CES educators conducted 10 classes, workshops, tours on pasture management and grazing for Wyoming producers. In addition, educators published articles in local newspapers, newsletters, special newspaper inserts and discussed the topic on radio programs.

Results

100 percent of pasture land owners and/or managers reported being able to recognize indicators of pasture condition. They also indicated through formal and informal evaluations that they increased confidence in decision-making skills necessary to make needed management decisions. Producers reported increased knowledge and awareness of pasture conditions.

4. Associated Knowledge Areas

KA Code	Knowledge Area
213	Weeds Affecting Plants
102	Soil, Plant, Water, Nutrient Relationships
204	Plant Product Quality and Utility (Preharvest)
205	Plant Management Systems
104	Protect Soil from Harmful Effects of Natural Elements
601	Economics of Agricultural Production and Farm Management

Outcome #3**1. Outcome Measures**

Producers with the resources to irrigate their crops and/or pasture will know and understand costs and returns associated with their irrigation practices and systems. Target is number of producers reporting outcome.

2. Associated Institution Types

•1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2008	50	86

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Crop producers across Wyoming are challenged with increasing production costs, global market competition, environmental pressure, and decreased labor availability. Alternative markets, improved management practices, and cost efficiency is critical to ensure profitability and sustainability for Wyoming producers. Irrigation is a key factor identified by CES area advisory committees and AES advisory groups.

What has been done

CES educators in the Profitable and Sustainable Agriculture Systems initiative conducted classes, workshops and taught at conferences. Topics included pasture management, introduction to irrigation, and the Wyoming Water Conference, and Wyoming Water Association tour.

Results

All 86 participants in educational activities reported gaining knowledge and awareness of resources and methods of irrigation and cost related to each method. Because Wyoming is in a severe drought, information was rated as extremely valuable to producers.

4. Associated Knowledge Areas

KA Code	Knowledge Area
601	Economics of Agricultural Production and Farm Management

Outcome #4**1. Outcome Measures**

Wyoming producers will implement electronic animal identification to gain advantages in herd management. Target is number of producers implementing outcome.

Not reporting on this Outcome for this Annual Report

Outcome #5**1. Outcome Measures**

Producers will gain an understanding of heifer development as well as opportunities for matching genetic improvement with successful marketing strategies. Target is number of producers.

2. Associated Institution Types

•1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2008	10	40

3c. Qualitative Outcome or Impact Statement**Issue (Who cares and Why)**

In 2006, there were approximately 4,800 operations producing beef cattle in Wyoming, with more than 735,000 head of beef cows. In 2001, there were approximately 5,500 producers, with more than 835,000 head. Thus, in five years, Wyoming's beef cow herd was reduced by nearly 100,000 head and 700 fewer producers were actively involved in cattle production. Many factors contributed to the decline including drought, market pressure, and trade issues. Improving sustainability of the livestock industry in Wyoming has been identified by area advisory committees and industry groups as a priority.

What has been done

The Master Cattleman Class, which met weekly for eight weeks, provided 24 hours of classroom instruction. Over a two year period classes have been held in all seven areas of the state. The Wyoming Master Cattleman program was designed to help producers focus on their goals while helping to improve ranch management skills. Producers will not only be able to analyze the production strategies presented in this program for individual applicability and success but will also be given tools to analyze future production strategy options presented to them.

Results

Producers were asked to evaluate each of the sessions on a Likert scale (1=Poor, 5=Excellent): The average score for the sessions was 4.56.

Forty producers from throughout Wyoming participated in the Master Cattleman program. All took part in the weekly discussions.

End of 2008 program evaluations reported:

96 percent gained knowledge of production strategies
92 percent gained knowledge of enterprise analysis and risk management
100 percent plan to implement one or more ideas

Comments included:

'The flow of ideas and alternative solutions to problems was terrific.'

'This has been an excellent program. Lots of new information. Great exchanges with other participants and the presenters.'

Follow up surveys conducted five months after the program to all participants provided the following impact:

100 percent have implemented a practice or changed a practice because of attending this program.

100 percent felt the program has made or will make a positive impact on the profitability of their operation.

4. Associated Knowledge Areas

KA Code	Knowledge Area
601	Economics of Agricultural Production and Farm Management
301	Reproductive Performance of Animals
307	Animal Management Systems
305	Animal Physiological Processes

Outcome #6

1. Outcome Measures

Wyoming producers will benefit through an increased value of livestock and crops related to improved cropping practices, herd selection, and management. Target is number of producers.

2. Associated Institution Types

•1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2008	0	2191

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

The value of agriculture to Wyoming's economy approaches \$1 billion each year. The largest component of Wyoming agriculture is the beef cattle industry, accounting for approximately 70 percent of all cash receipts. Sheep, lamb, and wool receipts in 1998 were \$29 million. Forage sustains the Wyoming livestock industry. Hay is the leading crop in Wyoming with 1998 production valued at \$185 million, mostly marketed through livestock. Crop producers across Wyoming are challenged with increasing production costs, global market competition, environmental pressure, and decreased labor availability. Alternative markets, improved management practices, and cost efficiency is critical to ensure profitability and sustainability for Wyoming producers.

What has been done

CES educators in the Profitable and Sustainable Agriculture team conducted 160 workshops, classes, tours, and conferences reaching 2191 Wyoming producers. Topics ranged from Master Cattleman 8 week class to weed management, bio-fuels, marketing options, genetic tools, nutrition and feeding of livestock, cost control and risk, natural resource tours and the Wyoming Agrability conference. Educators also publish educational articles in newspaper inserts, news columns, and newsletters.

Results

All participants in educational activities reported gaining knowledge and awareness. Because of the depth and breadth of programs presented a variety of evaluations were used. A sample of responses: Participants in the Master Cattleman course reported a 56 percent increase in knowledge as a result of the course. Over 90 percent implemented use of the analysis tool.

4. Associated Knowledge Areas

KA Code	Knowledge Area
301	Reproductive Performance of Animals
204	Plant Product Quality and Utility (Preharvest)
205	Plant Management Systems
307	Animal Management Systems
601	Economics of Agricultural Production and Farm Management

Outcome #7

1. Outcome Measures

Wyoming crop producers will be able to substitute traditional or current crop production with alternative horticultural crops to market if increased profitability may result. Target is number of crop producers.

Not reporting on this Outcome for this Annual Report

Outcome #8

1. Outcome Measures

Water conservation will improve the profitability and sustainability of Wyoming's green industry and municipal water supplies. Target is number of participants reporting outcome.

2. Associated Institution Types

•1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2008	100	249

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

In Wyoming, horticulture involves commercial production of vegetables, fruits, herbaceous and woody ornamentals, turf grass sod and seed. The commercial green industry in Wyoming is young, diverse, and widely dispersed. It is comprised of greenhouses, florists, garden centers, landscape care companies, nurseries, tree care companies, interior landscapers, etc. Wyoming's environment include less than optimal soil conditions, a very harsh climate for many horticultural crops and growing practices, the variation in elevation across the state as well as short to very short growing seasons all contribute to difficult growing conditions.

What has been done

CES educators and specialists conducted 14 educational sessions on water-wise gardening, Xeriscape landscape design, dealing with drought, water cycles, flowers and grasses for the High Plains Gardener, and Wyoming climate. In addition, water conservation in horticulture is a topic of the Master Gardener volunteer training program. UW CES produces 70 second TV spots 'From the Ground Up' which airs on a commercial station in Casper, which also covers water conservation topics.

Results

Over 60 percent of participants in educational programs targeting water conservation and efficiency reported implementing at least one idea from sessions. 100 percent of participants reported gaining knowledge and awareness. Master Gardener participants take pre and post session test to measure knowledge gained. Average test scores were 87 percent, which showed a 35 percent increase in knowledge.

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
111	Conservation and Efficient Use of Water

Outcome #9

1. Outcome Measures

Youth and their families will choose gardening as a healthy choice for active living. Target is number of participants reporting outcome.

Not reporting on this Outcome for this Annual Report

Outcome #10

1. Outcome Measures

Research: Awareness created; change in knowledge through publications and integration into extension programs. Target is number of research projects.

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2008	2	2

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Research is examining the ability of native plant populations to compete with exotic weed invasions in the West. The issue for restoration of invaded wildlands is accomplishing return of native plants that are less susceptible to new weed invasions.

What has been done

UW researchers are examining native genotypes using greenhouse, field plantings, and molecular DNA fingerprinting techniques. Documenting contemporary evolution of native species in response to invasives and selecting promising native grasses for restoration is in process. The research has shown promise in that we have found particularly competitive genotypes of native grasses that seem to compete well against two weed species.

Results

Grants associated with this research have supported one PhD and five MS students. Finding native grass species that compete well with weeds is a powerful tool for restoration and revegetation of vast expanses of western wildlands. These revegetation efforts have consequences for mitigating the loss of agricultural forage production on rangelands, improving water quality by reducing herbicide application in watersheds and changing the nature of native plant industry seed collection and selection.

4. Associated Knowledge Areas

KA Code	Knowledge Area
202	Plant Genetic Resources
111	Conservation and Efficient Use of Water
102	Soil, Plant, Water, Nutrient Relationships
206	Basic Plant Biology
205	Plant Management Systems

Outcome #11

1. Outcome Measures

Research - Awareness created in animal systems; Change in knowledge through publications and integration into extension programs. Target is number of projects.

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2008	2	2

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

In 2007 a wildlife biologist in Arizona died of plague after performing a necropsy (autopsy or postmortem examination) on a mountain lion killed by the disease. The death of this biologist has alarmed a broad spectrum of the population, ranging from wildlife professionals to hunters, trappers, outdoor enthusiasts, and domestic and wildlife disease diagnosticians and experts, and served as an alarm call about the need for more interdisciplinary research and communication on the threats posed by zoonotic diseases (those transmitted between animals and humans), including new, emerging, and re-emerging diseases.

What has been done

Wyoming State Veterinary Laboratory (University of Wyoming) began to survey and test all dead mountain lions submitted to the laboratory for evidence of plague (*Yersinia pestis* infection).

Information on our cases has been disseminated widely to appropriate audiences through scientific presentations, articles in newsletters and non-scientific publications, and interviews with radio, television, and print media. We also provided a short course on Wildlife Diseases to employees of the National Park Service in September 2008.

Results

Many local, state, and federal agencies and institutions have begun the process implementing plans and procedures to prevent exposure to plague and other serious zoonotic diseases in their employees, especially those who work with live or dead animals in a field or laboratory setting.

4. Associated Knowledge Areas

KA Code	Knowledge Area
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307	Animal Management Systems
311	Animal Diseases
305	Animal Physiological Processes

Outcome #12**1. Outcome Measures**

Research - Awareness created on IPM; change in knowledge through publications and integration into extension programs. Target is number of projects.

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2008	2	3

3c. Qualitative Outcome or Impact Statement**Issue (Who cares and Why)**

Malt barley is an important cash crop in the Big Horn and Wind River Basins. Broadleaf and grassy weed competition in barley constitutes a major obstacle that prevents the achievement of maximum crop yield. Weeds not only reduce yield by competing with barley plants for light, nutrients and water but also interfere with harvesting through increased harvest losses and reduce malt barley quality.

What has been done

Several field studies have been conducted at the Powell Research and Extension Center to evaluate broadleaf and grassy weed control and barley response to Bronate, 2,4-D, MCPA, Huskie, Orion, and Starane in combination with reduced rates of Puma, Axial, and Achieve herbicides.

Results

Starane is an excellent broadleaf herbicide for controlling Als-resistant kochia, while Puma, Axial, and Acheive are very effective in controlling wild oat. Excellent weed control without barley injury was achieved with the combinations: Starane + half rate of Puma, Axial, or Acheive when applied at 3 to 5 barley leaf stage. Similar findings were obtained with the other broadleaf herbicides. By using these combinations barley growers will reduce the cost of application and increase their barley yield by 10 to 20 bushels/Acre. Information was disseminated at the Powell Research & Extension Center field day, advisory meetings, reports, and the AES Web site.

4. Associated Knowledge Areas

KA Code	Knowledge Area
214	Vertebrates, Mollusks, and Other Pests Affecting Plants
211	Insects, Mites, and Other Arthropods Affecting Plants
205	Plant Management Systems
216	Integrated Pest Management Systems
206	Basic Plant Biology
212	Pathogens and Nematodes Affecting Plants

Outcome #13**1. Outcome Measures**

Research - Awareness created in plant systems; change in knowledge through publications and integration into extension programs. Target is number of projects.

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2008	2	1

3c. Qualitative Outcome or Impact Statement**Issue (Who cares and Why)**

Four crops (corn, sugarbeet, dry edible beans, and wheat) represent over \$100 million worth of production to the state of Wyoming. It is estimated that in these four crops alone, weeds result in a \$14 million loss of potential crop yields in the state. This figure does not include significant additional costs spent to manage weeds.

What has been done

Twenty-four research trials were conducted at the James C. Hageman Sustainable Agriculture Research and Extension Center near Lingle, Wyoming with the goal of finding the most effective, economical, and sustainable weed management practices in corn, sugarbeet, dry beans, and winter wheat.

Results

This research will help producers in Wyoming make informed decisions about when and how to manage weeds in these crops.

4. Associated Knowledge Areas

KA Code	Knowledge Area
205	Plant Management Systems
215	Biological Control of Pests Affecting Plants
206	Basic Plant Biology
216	Integrated Pest Management Systems
213	Weeds Affecting Plants

Outcome #14**1. Outcome Measures**

Research in animal reproduction - awareness created; change in knowledge through publications and integration into extension activities. Target is number of projects.

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2008	2	3

3c. Qualitative Outcome or Impact Statement**Issue (Who cares and Why)**

Of the 196,000 rams nationwide, approximately 23% are expected to be non-breeders, resulting in an annual loss of \$13.5 million to U.S. producers (98% have small or medium sized operations).

What has been done

Ram selection rarely includes an evaluation of sexual behavior even though the ability and desire to mate with ewes in estrus is required for the incorporation of superior genetics into a flock. The development of marker assisted methods of identification and/or the use of mating behavior tests to identify low- and non-sexually performing rams would allow producers to reduce ram costs and accelerate the incorporation of desired genetics into their flocks. The use of behavior identified rams would decrease overall ram costs while increasing genetic progress and profitability and, therefore, sustainability of sheep production.

Results

The overall objective of this integrated project is to increase the profitability of sheep producers by eliminating non- and low- sexually performing rams from producer flocks.

4. Associated Knowledge Areas

KA Code	Knowledge Area
301	Reproductive Performance of Animals
305	Animal Physiological Processes

V(H). Planned Program (External Factors)

External factors which affected outcomes

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

Brief Explanation

Drought continues to be an issue in Wyoming for all agriculture producers, both livestock and crop. It also impacts the green industry and horticulture for consumers.

V(I). Planned Program (Evaluation Studies and Data Collection)

1. Evaluation Studies Planned

- After Only (post program)
- Retrospective (post program)
- Before-After (before and after program)
- During (during program)

Evaluation Results

Key Items of Evaluation

Program #5**V(A). Planned Program (Summary)****1. Name of the Planned Program**

Sustainable Management of Rangeland Resources (SMRR)

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	5%		5%	
102	Soil, Plant, Water, Nutrient Relationships	5%		5%	
103	Management of Saline and Sodic Soils and Salinity	5%		5%	
104	Protect Soil from Harmful Effects of Natural Elements	5%		5%	
111	Conservation and Efficient Use of Water	5%		5%	
112	Watershed Protection and Management	5%		5%	
121	Management of Range Resources	5%		5%	
123	Management and Sustainability of Forest Resources	5%		5%	
131	Alternative Uses of Land	5%		5%	
132	Weather and Climate	5%		5%	
135	Aquatic and Terrestrial Wildlife	5%		5%	
136	Conservation of Biological Diversity	5%		5%	
205	Plant Management Systems	5%		5%	
206	Basic Plant Biology	5%		5%	
211	Insects, Mites, and Other Arthropods Affecting Plants	5%		5%	
213	Weeds Affecting Plants	5%		5%	
306	Environmental Stress in Animals	5%		5%	
311	Animal Diseases	5%		5%	
314	Toxic Chemicals, Poisonous Plants, Naturally Occurring Toxins, and Other Hazards Affecting Animals	5%		5%	
605	Natural Resource and Environmental Economics	5%		5%	
	Total	100%		100%	

V(C). Planned Program (Inputs)**1. Actual amount of professional FTE/SYs expended this Program**

Year: 2008	Extension		Research	
	1862	1890	1862	1890
Plan	12.0	0.0	12.0	0.0
Actual	15.2	0.0	12.0	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
205096	0	220033	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
7814820	0	234185	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	0	0	0

V(D). Planned Program (Activity)**1. Brief description of the Activity**

Natural resource programs will reach out to a broad spectrum of constituents throughout Wyoming using a variety of sources. Workshops on sustainable rangeland and animal management principles will be offered in each extension area within the state. Provide professional development opportunities for rangeland professionals. Develop written educational materials on rangeland and animal management practices and principles (fact sheets, bulletins, media, presentations, Web). Conduct technical consultation on rangeland and animal management, and monitoring of rangelands. Develop media on rangeland management principles (radio, TV, press). Conduct research and demonstrations on sustainable natural resource management principles. Work with individual rangeland managers on developing, implementing, and evaluating sustainable management practices.

Develop and/or present programs on natural resources at youth activities. Produce, or update currently produced educational materials targeted to youth on natural resource education. Produce information/education modules emphasizing natural resource topics for 4-H leader use in 4-H project with large enrollment.

2. Brief description of the target audience

The University of Wyoming is committed to reaching underrepresented groups and individuals and to implementing the objectives of equal opportunity regulations relative to the consideration and treatment of clientele for participation in programs regardless of their race, national origin, gender, age, religion, or disability. The College of Agriculture is committed to transmitting unbiased scientific-based information to solve local and regional natural resource conflicts involving state, Federal, and private resources. All efforts will be made to provide information through direct contact and through publications, newsletters, Web sites and other methods. The general public and exurban landowners, agricultural producers and federal and state land management agency personnel.

General youth and traditional 4-H are among the target audiences for natural resource youth programs.

V(E). Planned Program (Outputs)**1. Standard output measures****Target for the number of persons (contacts) reached through direct and indirect contact methods**

	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
Plan	100	2000	50	500
2008	5665	30000	287	500

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

Year	Target
Plan:	1
2008 :	2

Patents listed

A Novel Method to Sequester Flue Gas Carbon Dioxide - UW Tech #06-041 (disclosed)

Method for Removing Arsenic from Water - UW Tech Number 04-003 (issued)

3. Publications (Standard General Output Measure)**Number of Peer Reviewed Publications**

	Extension	Research	Total
Plan	0	8	
2008	4	26	30

V(F). State Defined Outputs**Output Target**

Output #1**Output Measure**

- Number of programs implemented. Target is number of programs.

Year	Target	Actual
2008	5	425

Output #2**Output Measure**

- Documented media efforts implemented. Target is number of media efforts such as magazines, TV, radio, newspaper inserts.

Year	Target	Actual
2008	3	4

Output #3**Output Measure**

- Number of individuals participating in educational programs or activities. Target is number of participants.

Year	Target	Actual
2008	100	5665

Output #4**Output Measure**

- Number of agency personnel, range professionals, and general public participating in training. Target is number of participants.

Year	Target	Actual
2008	100	762

Output #5**Output Measure**

- Number of youth related natural resource programs implemented. Target is number of programs.

Year	Target	Actual
2008	5	4

Output #6**Output Measure**

- Number of youth participating in natural resource educational programs or activities. Target is number of participants.

Year	Target	Actual
2008	100	287

Output #7**Output Measure**

- Research: The ability of producers to adopt economically and environmentally sustainable production practices in the face of persistent drought will improve the economic viability while reducing potential resource damage. The long term goal will be to model scenarios of long term drought on economic viability of rural communities. Target is number of producers implementing practices.

Year	Target	Actual
2008	1	1

Output #8**Output Measure**

- Research - Impacts of natural resource development on long term rural water quality. Long term goals will be to integrate knowledge gained into environmental regulations and improved water quality. Target is number of projects.

Year	Target	Actual
2008	1	2

Output #9**Output Measure**

- Research - One of the major environmental controversies is rising CO2 levels. There is a large potential to increase C storage in disturbed and reclaimed land. Long term goals will be to develop improved soil properties on these sites. Target is number of projects.

Year	Target	Actual
2008	1	1

Output #10**Output Measure**

- Research - Matching animal productivity to actual resources available rather than modifying resources to match animal nutrient needs. The long term goal is to develop more sustainable grazing systems. Target is number of projects.

Year	Target	Actual
2008	1	1

V(G). State Defined Outcomes**V. State Defined Outcomes Table of Content**

O No.	OUTCOME NAME
1	Increase public knowledge and appreciation of natural resources and public awareness of sustainable resources. Target is number of participants reporting outcome.
2	General public understands the impact of resource use and management on the quality and quantity of the resources. (i.e. water, rangeland, wildlife, viewsheds). Target is number of participants reporting outcome.
3	Raise the understanding of the general public on the interaction of natural resource use in Wyoming's economy. Citizens will make better informed decisions on natural resource issues and topics. Target is number of participants reporting outcome.
4	Greater public consensus of management of private and public lands resulting in less litigation and burden on the system, through unbiased information that will reduce conflict and contribute to the economic and biological sustainability of Wyoming communities. Target is number of participants reporting outcome.
5	Youth participating in natural resource programs will have increased interest in careers in natural resources. Target is youth participants choosing natural resource careers.
6	Increased enrollment in 4-H natural resource programs (projects, camps, activities). Target is number of participants.
7	Increase knowledge, awareness and skills among youth on natural resources, their management and associated issues. Target is number of participants reporting outcome.
8	Raise awareness, knowledge, and skills for development, implementation and evaluation of land management plans that include management of grazing and browsing animals, and adjusting management as to necessary to meet objectives. Target is number of participants reporting outcome.
9	Land managers, public and private, will develop, implement, and evaluate plans for improved management of rangeland resources and associated herbivores. Target is number of participants reporting outcome.
10	Increased profit for range-based agriculture enterprises. Target is number of participants reporting outcome.
11	Improved rangeland health, productivity, and profitability including value of rangeland for multiple use. Target is number of participants reporting outcome.
12	Research - Increased knowledge and appreciation of sustainable production practices. Change in knowledge through publications and integration into extension programs. Target is number of projects.
13	Research - Increase knowledge and appreciation of resource development on water quality. Outcomes will be change in knowledge through publications, bulletins, reports and long term to integrate research into extension programs. Target is number of projects.
14	Research - Increase public awareness on long term CO2 levels and integrate findings into extension programs. Target is number of projects.
15	Research - Increase producers ability to match resources to animal productivity. Target is number of projects.

Outcome #1**1. Outcome Measures**

Increase public knowledge and appreciation of natural resources and public awareness of sustainable resources. Target is number of participants reporting outcome.

2. Associated Institution Types

•1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2008	500	5665

3c. Qualitative Outcome or Impact Statement**Issue (Who cares and Why)**

Wyoming's tremendous natural resources support an abundance of recreational opportunities but they also provide the basis for a number of industries that are very important to the state's economy. Forty-eight percent of the land area in Wyoming is publicly-owned and is managed by government agencies. Livestock on public rangelands is managed by producers in cooperation with government agencies. Continuing educational opportunities are essential for both agricultural producers and agency personnel to maintain or improve their management skills, to minimize producer-agency conflict and, ultimately, to keep the land healthy and productive, and to maintain or increase the profitability of range livestock production operations.

What has been done

CES educators and specialists in the Sustainable Management of Rangeland Resources initiative team conducted 178 educational programs on topics including range monitoring, Range 101 schools, land management for small acreages, poisonous plants and weed management, tours, mineral content of NE Wyoming upland range grass, and ecosystem management. In addition the SMRR team produces weekly 70 second TV spots 'Exploring the Nature of Wyoming' aired on commercial TV to reach non-agriculture residents with information on natural resources.

Results

Participants indicated that, from attending these classes, they had learned the importance of not allowing grazing in the same place at the same time each year and how to determine proper stocking to improve and/or sustain pasture forage productivity. Attendees stated that changes in management they planned to make included fencing to implement a grazing rotation, monitoring grass growth and residual leaf material so overgrazing does not occur, and include use of their corrals in their grazing plans so pasture forage supply can be balanced with their livestock forage needs.

Knowledge level of participants prior to the grass growth and re-growth class averaged 2.9 and afterward 4.2; for the time and timing class, 2.5 prior and 4.3 afterward. More than 97 percent of the participants indicated the workshop met their expectations. With regard to their questions being effectively answered and using what they learned on their property, the average response for both was 4 out of a possible score of 5.

4. Associated Knowledge Areas

KA Code	Knowledge Area
131	Alternative Uses of Land
123	Management and Sustainability of Forest Resources
121	Management of Range Resources
605	Natural Resource and Environmental Economics

Outcome #2**1. Outcome Measures**

General public understands the impact of resource use and management on the quality and quantity of the resources. (i.e. water, rangeland, wildlife, viewsheds). Target is number of participants reporting outcome.

2. Associated Institution Types

•1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2008	100	403

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Forty-eight percent of the land area in Wyoming is publicly-owned and is managed by government agencies. Livestock on public rangelands is managed by producers in cooperation with government agencies. Continuing educational opportunities are essential for both agricultural producers and agency personnel to maintain or improve their management skills, to minimize producer-agency conflict and, ultimately, to keep the land healthy and productive, and to maintain or increase the profitability of range livestock production operations.

What has been done

Drought reduces the amount of available forage, irrigation supplies, and drinking water for livestock. Reductions in any of these cause reductions in the number of livestock a producer can raise and could force additional expenditures for supplementary feeds and hauling water. Research shows these problems can be mitigated by implementing a plan before impacts become insurmountable. With a plan in hand, ranchers are better prepared to survive and even thrive through Wyoming's recurring droughts. UW CES SMRR educators conducted 15 educational programs addressing range and natural resource management topics.

Results

Just one example of impact included changing the thought processes of livestock producers to think of success in terms of profit and not just production numbers. The sale of one producers cattle brought \$42,000 in revenue. Additionally, the sale of hay, which would have been fed to these cattle, brought \$19,440 in revenue. The producer strongly believed this sale of cattle helped put the operation in good financial standing. There is also the potential now for long-term ecological benefits. By reducing the cow herd, the demand on pastures and rangelands was reduced. This will allow these lands to recover faster from drought and maintain the health of the plants and watershed.

4. Associated Knowledge Areas

KA Code	Knowledge Area
135	Aquatic and Terrestrial Wildlife
121	Management of Range Resources
112	Watershed Protection and Management
111	Conservation and Efficient Use of Water
123	Management and Sustainability of Forest Resources

Outcome #3

1. Outcome Measures

Raise the understanding of the general public on the interaction of natural resource use in Wyoming's economy. Citizens will make better informed decisions on natural resource issues and topics. Target is number of participants reporting outcome.

2. Associated Institution Types

•1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2008	100	9000

3c. Qualitative Outcome or Impact Statement**Issue (Who cares and Why)**

Many Wyomingites are not directly tied to natural resources and agriculture. This results in lack of knowledge and experience regarding natural resource systems, their management and the industries they support. Unfortunately, a segment of the general public appears to believe that any use of even renewable resources is damaging. There is often conflict and occasional litigation among interest groups that differ on how resources should be used and managed. Natural resources are important to all segments of the Wyoming population.

What has been done

The Sustainable Management of Rangeland Resources initiative team has produced over 150 seventy second TV spots which air twice weekly on commercial TV station in Casper. The segment titled 'Exploring the Natural Wonders of Wyoming' (ENOW) covers natural resource topics to provide education to the general public. The ENOW spots have also been placed on You-Tube to reach a national audience.

Results

In the third year of airing these spots, the team receives regular feedback from Wyoming citizens and now national viewers on the positive aspects of the spots. It is difficult to measure impact, though the audience response has generated enough impact that the Wyoming Petroleum Association now provides funding for the segments aired twice weekly.

4. Associated Knowledge Areas

KA Code	Knowledge Area
135	Aquatic and Terrestrial Wildlife
112	Watershed Protection and Management
121	Management of Range Resources
131	Alternative Uses of Land
123	Management and Sustainability of Forest Resources
605	Natural Resource and Environmental Economics
111	Conservation and Efficient Use of Water

Outcome #4**1. Outcome Measures**

Greater public consensus of management of private and public lands resulting in less litigation and burden on the system, through unbiased information that will reduce conflict and contribute to the economic and biological sustainability of Wyoming communities. Target is number of participants reporting outcome.

Not reporting on this Outcome for this Annual Report

Outcome #5**1. Outcome Measures**

Youth participating in natural resource programs will have increased interest in careers in natural resources. Target is youth participants choosing natural resource careers.

2. Associated Institution Types

•1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2008	5	3

3c. Qualitative Outcome or Impact Statement**Issue (Who cares and Why)**

Extension is uniquely positioned in that we have existing volunteer youth development programming infrastructure already built in the 4-H program. These youth present an immediate natural resource education audience and an opportunity to reach the broader youth audience with the educational resources we have. Building stronger natural resource programs, enhancing natural resource teaching opportunities within existing high-interest projects (like market livestock and shooting sports projects) and increasing youth development opportunities are key. This will continue to foster interest in natural resource careers.

What has been done

CES Educators participate in the annual WYORed camp which has a natural resource emphasis sponsored by NRCS. In addition educators have conducted five youth specific programs on natural resources. This topic is also incorporated into 4-H camps held statewide. All area SMRR educators have a 15 percent youth assignment and encourage youth participation in educational events.

Results

Livestock and shooting sports projects have large enrollments in Wyoming 4-H. These projects lend themselves to a 'teachable moment' for natural resource topics. Educators have reported that 3 youth have chosen career or education paths in natural resources as a result of exposure to these topics.

4. Associated Knowledge Areas

KA Code	Knowledge Area
131	Alternative Uses of Land
135	Aquatic and Terrestrial Wildlife
123	Management and Sustainability of Forest Resources
121	Management of Range Resources
132	Weather and Climate

Outcome #6**1. Outcome Measures**

Increased enrollment in 4-H natural resource programs (projects, camps, activities). Target is number of participants.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2008	25	433

3c. Qualitative Outcome or Impact Statement**Issue (Who cares and Why)**

Extension is uniquely positioned in that we have existing volunteer youth development programming infrastructure already built in the 4-H program featuring offices in all of Wyoming's 23 counties, several thousand volunteer staff and thousands of youth already acquainted with the 4-H program. These youth present an immediate natural resource education audience and an opportunity to reach the broader youth audience with the educational resources we have. Building stronger natural resource programs, enhancing natural resource teaching opportunities within existing high-interest projects (like market livestock and shooting sports projects) and increasing youth development opportunities are key. This will continue to foster interest in natural resource careers.

What has been done

Educators conducted 9 educational programs including an ag expo, GPS training, plant anatomy, native plants and noxious weeds, and nature awareness.

Results

Enrollment in 4-H livestock projects continues to increase. Shooting sports which is also closely tied to natural resources is also experiencing increased enrollment. All youth participating in targeted natural resource education programs report increased knowledge and skills.

4. Associated Knowledge Areas

KA Code	Knowledge Area
121	Management of Range Resources
132	Weather and Climate
135	Aquatic and Terrestrial Wildlife
123	Management and Sustainability of Forest Resources

Outcome #7

1. Outcome Measures

Increase knowledge, awareness and skills among youth on natural resources, their management and associated issues. Target is number of participants reporting outcome.

2. Associated Institution Types

•1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2008	100	433

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Extension is uniquely positioned in that we have existing volunteer youth development programming infrastructure already built in the 4-H program featuring offices in all of Wyoming's 23 counties, several thousand volunteer staff and thousands of youth already acquainted with the 4-H program. These youth present an immediate natural resource education audience and an opportunity to reach the broader youth audience with the educational resources we have. Building stronger natural resource programs, enhancing natural resource teaching opportunities within existing high-interest projects (like market livestock and shooting sports projects) and increasing youth development opportunities are key. This will continue to foster interest in natural resource careers.

What has been done

Educators conducted 9 workshops including an Ag expo, GPS, plant anatomy, native plants and noxious weeds, and nature awareness. In addition natural resources are a component of over 3/4 of all 4-H camps held throughout the state.

Results

100 percent of youth participating in special programs relating to natural resource education report an increase in knowledge, skills, and awareness.

4. Associated Knowledge Areas

KA Code	Knowledge Area
306	Environmental Stress in Animals
123	Management and Sustainability of Forest Resources
135	Aquatic and Terrestrial Wildlife
121	Management of Range Resources
311	Animal Diseases

Outcome #8**1. Outcome Measures**

Raise awareness, knowledge, and skills for development, implementation and evaluation of land management plans that include management of grazing and browsing animals, and adjusting management as to necessary to meet objectives. Target is number of participants reporting outcome.

2. Associated Institution Types

•1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2008	20	25

3c. Qualitative Outcome or Impact Statement**Issue (Who cares and Why)**

Rangelands comprise over 80 percent of Wyoming's land base. Range livestock production, recreation, and wildlife habitat are some of the dominant uses of rangelands. Rangelands also provide water for homes and municipalities, irrigation, industries, fisheries, wildlife and livestock. In semi-arid Wyoming, rangeland uses need to be compatible with maintaining the quality and quantity of water resources. Livestock grazing and wildlife habitat management must also be compatible as both are important for the sustainability of the State's rangeland resources and its economy.

What has been done

Extension educators in the SMRR initiative conducted 11 educational programs, tours, or workshops on range monitoring. Most classes were targeted toward permittees reaching 334 individuals.

Results

100 percent of participants in educational programs reported increased awareness, knowledge, and skills of range monitoring. Twenty five individuals reported implementing or adjusting management plans as a result of the workshops. One range technician with BLM reported that by having producers understand and implement monitoring, provided one less technician needed in the field.

4. Associated Knowledge Areas

KA Code	Knowledge Area
123	Management and Sustainability of Forest Resources
121	Management of Range Resources
131	Alternative Uses of Land
111	Conservation and Efficient Use of Water
112	Watershed Protection and Management

Outcome #9**1. Outcome Measures**

Land managers, public and private, will develop, implement, and evaluate plans for improved management of rangeland resources and associated herbivores. Target is number of participants reporting outcome.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2008	10	23

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Subdivision of agricultural land, especially rangeland, into small acreages continues to occur within Wyoming counties. Many of these acreages are grazed by horses whose owners have little or no experience in grazing management, especially in a semiarid region, and thus are in need of grazing management information.

What has been done

CES educators conducted classes which were approximately two hours long, and topics presented were: Class 1) Grass growth and regrowth; Class 2) Time and timing of grazing; and Class 3) Balancing forage demand with forage supply.

Results

Participants indicated that they had learned the importance of not allowing grazing in the same place at the same time each year and how to determine proper stocking to improve and/or sustain pasture forage productivity. Attendees stated that changes in management they planned to make included fencing to implement a grazing rotation, monitoring grass growth and residual leaf material so overgrazing does not occur, and include use of their corrals in their grazing plans so pasture forage supply can be balanced with their horses' forage needs.

Knowledge level of participants prior to the grass growth and re-growth class averaged 2.9 and afterward 4.2; for the time and timing class, 2.5 prior and 4.3 afterward. More than 97 percent of the participants indicated the workshops met their expectations. With regard to their questions being effectively answered and using what they learned on their property, the average response for both was 4 out of a possible score of 5.

4. Associated Knowledge Areas

KA Code	Knowledge Area
112	Watershed Protection and Management
123	Management and Sustainability of Forest Resources
135	Aquatic and Terrestrial Wildlife
121	Management of Range Resources
605	Natural Resource and Environmental Economics
311	Animal Diseases
306	Environmental Stress in Animals

Outcome #10

1. Outcome Measures

Increased profit for range-based agriculture enterprises. Target is number of participants reporting outcome.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2008	0	1

3c. Qualitative Outcome or Impact Statement**Issue (Who cares and Why)**

Drought is a normal part of Wyoming's climate. While not occurring every year, droughts should be considered a recurring theme in Wyoming and not an exception to the rule. Planning for drought is important to livestock producers. Drought reduces the amount of available forage, irrigation supplies, and drinking water for livestock. Reductions in any of these cause reductions in the number of livestock a producer can raise and could force additional expenditures for supplementary feeds and hauling water. This reduces revenues and profits. Research shows these problems with drought can be mitigated by implementing a plan before impacts become insurmountable. With a drought plan in hand, ranchers are better prepared to survive and even thrive through Wyoming's recurring droughts.

What has been done

Agricultural economic and rangeland ecology research from the University of Wyoming and other entities were drawn upon to create the information for a range management course. The educational material was presented at Range Management 101 and 301 schools in four locations in Wyoming. The information was also given through personal contacts with ranchers and landowners.

Results

One reported impact that was realized from this programming was a producer reducing his cattle stocking rate and selling expensive hay. The Big Horn Basin, like much of Wyoming, is gripped in severe drought. This producer's pastures and rangelands produced very little forage. By selling cattle, not only was the demand reduced on drought-stricken rangelands, but near record-high prices for the 30 cow/calf pairs sold were realized. The sale of these cattle brought \$42,000 in revenue to this producer. Additionally, the sale of hay, which would have been fed to these cattle, brought \$19,440 in revenue. The producer strongly believed this sale of cattle helped put the operation in good financial standing. By reducing the cow herd, the demand on pastures and rangelands was reduced. This will allow these lands to recover faster from drought and maintain the health of the plants and watershed.

4. Associated Knowledge Areas

KA Code	Knowledge Area
605	Natural Resource and Environmental Economics

Outcome #11**1. Outcome Measures**

Improved rangeland health, productivity, and profitability including value of rangeland for multiple use. Target is number of participants reporting outcome.

Not reporting on this Outcome for this Annual Report

Outcome #12**1. Outcome Measures**

Research - Increased knowledge and appreciation of sustainable production practices. Change in knowledge through publications and integration into extension programs. Target is number of projects.

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2008	2	2

3c. Qualitative Outcome or Impact Statement**Issue (Who cares and Why)**

Degradation of our environment, be it manipulation of soil and water, or modification of air resources, has the potential to impact ecosystem function, including agroecosystems, at local and regional levels. The various energy industries drive much of the economy of Wyoming, but extraction often has negative surface and sub-surface impacts. Scaling of these impacts to national and global levels have the attention, although controversial and many faceted, of peoples across the planet. Amelioration of these impacts is the central core of this program and is manifest especially in the Wyoming Reclamation and Restoration Center.

What has been done

Organization and administration of the Wyoming Reclamation and Restoration Center (the WRRRC) and efforts are under way, with support from the School of Energy Resources to bring together governmental agencies, energy producers, reclamation companies, consultants and the university in a manner where reclamation can be accommodated expeditiously and findings distributed among the cooperating organizations. The draft strategic plan developed for the center at http://uwadmnweb.uwyo.edu/UWAG/Academic_Plans/WRRRCStrategic%20Plan.pdf has nine action items.

Results

The workings of the WRRRC have the potential to affect natural and agroecosystems across much of Wyoming. Reclamation of energy disturbances is a major focus, but fire effects, over grazing impacts, drought related damage are all areas to be addressed by the WRRRC. The climate change, soil, and water work has the potential to impact controls on atmospheric and hydrological emissions. The efforts with legumes may provide a useful tool for the reclamation industry in revegetation of drastically disturbed lands.

4. Associated Knowledge Areas

KA Code	Knowledge Area
121	Management of Range Resources
213	Weeds Affecting Plants
132	Weather and Climate
111	Conservation and Efficient Use of Water
605	Natural Resource and Environmental Economics

Outcome #13**1. Outcome Measures**

Research - Increase knowledge and appreciation of resource development on water quality. Outcomes will be change in knowledge through publications, bulletins, reports and long term to integrate research into extension programs. Target is number of projects.

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2008	2	2

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

A significant challenge the West faces is to satisfy local, state, and national energy needs, while ensuring adequate quantity and quality water supplies and minimizing negative environmental impacts associated with management of co-produced water, often of substantially impaired quality. Wyoming has the highest potential impact from CBM development with over 13,600 wells in production in 2004 and over 20,900 wells projected for production by 2010. Each CBM well produces 5-20 gallons of water per minute. In 2005, approximately 374,000 acre-feet of CBM water was produced in Wyoming.

What has been done

Integrated research was conducted by regional team members and collaborators across the northern region to address questions regarding the potential short and long-term impacts of the discharge water to soil, vegetation, and water resources and management alternatives. Integral to the success of this project was the coordination of research efforts and sharing of information and knowledge across the region through team member meetings and conference calls, development of Web sites, and dissemination of reports and publications. Individual and state strengths and expertise were integrated to develop effective education and extension program tools to address the identified needs across the region and in individual states.

Results

The most significant indicator of success resulting from the Produced Water Management Project is the adoption of these water quality standards, which are a direct result of project efforts such as the development of resource materials, research-based publications, participation in public hearings on the issue, outreach education of the public and regulatory agency personnel, and influence of policy makers. Though adopted, research and outreach activities are ongoing to address questions and issues that continue to arise regarding implementation and interpretation of these standards. Currently, materials and documents produced in Wyoming and Montana during the development of the water quality standards are being shared with Colorado.

4. Associated Knowledge Areas

KA Code	Knowledge Area
104	Protect Soil from Harmful Effects of Natural Elements
123	Management and Sustainability of Forest Resources
111	Conservation and Efficient Use of Water
121	Management of Range Resources
112	Watershed Protection and Management
131	Alternative Uses of Land

Outcome #14**1. Outcome Measures**

Research - Increase public awareness on long term CO2 levels and integrate findings into extension programs. Target is number of projects.

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2008	1	2

3c. Qualitative Outcome or Impact Statement**Issue (Who cares and Why)**

Flue gas emissions from different industrial processes (e.g., coal fired power plants, paper mills, cement kilns, municipal and hospital solid waste incinerators, steel plants, and oil shale fired plants) are a major source for anthropogenic CO2 to the atmosphere.

What has been done

The data from our field studies suggest that CO₂ from flue gas can be directly captured and stored in alkaline solid waste. This invention is an environmentally safe and permanent storage for anthropogenic CO₂. The estimated CO₂ sequestration capacity of proposed gas-solid reaction, based on CO₂ removed from flue gas and typical coal fly ash compositions, is approximately 241 Kg of CO₂ per ton of ash, which is much better or comparable to aqueous mineral carbonation processes of paper mill ash (218.17 Kg/ton) or coal fly ash (26.1 Kg/ton). this invention is ideal for retrofitting existing coal power plants as post combustion CO₂ sequestration operation i.e., a continuous operation with flow of both flue gas and fly ash into and out of the unit over time. Preliminary cost estimates indicate that this is an economically viable alternative to other means of capturing and storing flue gas CO₂. Further work is underway to optimize the process on a larger scale.

Results

The direct mineralization of CO₂ method discussed in here can help simultaneously separate, capture, and mineralize anthropogenic CO₂ into carbonates. Furthermore, this process is environmentally safe and a permanent storage for anthropogenic CO₂. The proposed CO₂ capture and storage process has wide applications for different combustion processes including coal fired power plants, paper mills, cement kilns, municipal and hospital solid waste incinerators, steel plants, and oil shale fired plants. Direct capture and storage of flue gas CO₂ as well as other pollutants (Hg, As, Se) at industrial point sources (stack flue gases) is an essential first step to reduce anthropogenic CO₂ emissions and other pollutants to the atmosphere.

4. Associated Knowledge Areas

KA Code	Knowledge Area
103	Management of Saline and Sodic Soils and Salinity
132	Weather and Climate
131	Alternative Uses of Land
121	Management of Range Resources
102	Soil, Plant, Water, Nutrient Relationships
101	Appraisal of Soil Resources

Outcome #15

1. Outcome Measures

Research - Increase producers ability to match resources to animal productivity. Target is number of projects.

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2008	1	1

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Preservation of and the continuing effort to improve the condition and stability of our natural resources.

What has been done

Applied research dealing with animal size and behavior along with grazing systems to improve the efficiency of resource use has demonstrated that the grazing animal is simply a tool we can use to better manage the total resource unit. The end result is to match the animal to the resource and not try to manipulate the resource to fit the individual animal. Educational programs, workshops, and schools for producers were based on scientific information and practical application, with systems and methods designed to improve livestock and wildlife productivity while preserving, maintaining and improving the resource.

Results

Information dealing with matching the animal (considering body size, production status, age, behavioral activities, and nutritional needs for specific food nutrients and water) to the available resource has provided a useful mechanism for exploring management alternatives that might replace currently utilized and accepted practices while improving animal productivity and sustainability of the family agricultural operation.

4. Associated Knowledge Areas

KA Code	Knowledge Area
136	Conservation of Biological Diversity
111	Conservation and Efficient Use of Water
132	Weather and Climate
112	Watershed Protection and Management
102	Soil, Plant, Water, Nutrient Relationships
605	Natural Resource and Environmental Economics
314	Toxic Chemicals, Poisonous Plants, Naturally Occurring Toxins, and Other Hazards Affecting Animals
121	Management of Range Resources
306	Environmental Stress in Animals
123	Management and Sustainability of Forest Resources

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Natural Disasters (drought, weather extremes, etc.)
- Economy
- Public Policy changes
- Government Regulations
- Competing Public priorities
- Competing Programmatic Challenges
- Other (Technology changes)

Brief Explanation

Drought continues to be an issue in Wyoming.

V(I). Planned Program (Evaluation Studies and Data Collection)

1. Evaluation Studies Planned

- After Only (post program)
- Retrospective (post program)
- Time series (multiple points before and after program)
- Case Study
- Comparison between locales where the program operates and sites without program intervention

Evaluation Results

{No Data Entered}

Key Items of Evaluation

{No Data Entered}