

Wyoming Production Agriculture Research Priorities – Updated June 2018

GRAND CHALLENGE—Enhance the competitiveness, profitability, and sustainability of Wyoming agricultural systems.

Goal 1. Improve agricultural productivity considering economic viability and stewardship of natural resources.

Goal 2. Develop new plant and animal production systems, products, and uses to increase economic return to producers.

Producer Recommendations developed from statewide listening sessions

I. Production Systems Objectives

- I.1. Develop and maintain baseline agriculture production systems to evaluate effects of innovations on the natural resource base, sustainability, and profitability. (2014)
- I.2. Develop best-agronomic management practices for alternative crops such as sunflower seed production and various forages (e.g., perennial and annual legumes, grasses, and legume-grass mixtures) and other oilseed crops. (2014)
- I.3. Identify synergistic effects among crops to improve crop rotation systems. (2014)
- I.4. Develop methods to deal with residue when establishing new stands in crop rotation systems. (2014)
- I.5. Evaluate effects of legumes in dryland wheat production systems. (2014)
- I.6. Evaluate incorporating crops and crop aftermath into livestock production systems. (2014)
- I.7. Evaluate and compare no till versus tillage techniques. (2014)
- I.8. Identify improved harvesting techniques. (2014)
- I.9. Evaluate the use of legumes in rotational cropping systems. (2014)
- I.10. Identify causes for annual losses of bees and other pollinators and develop management procedures that minimize their loss. (2015)
- I.11. Develop best management practices to control diseases in crops. (2015)
- I.12. Conduct crop variety trials to identify varieties best suited to Wyoming localities. (2015)
- I.13. Identify optimal crop rotations for sugarbeet producers. (2015)
- I.14. Identify seed treatments that optimize sugarbeet and dry bean production. (2015)
- I.15. Devise integrated cropping/grazing systems that optimize crop and livestock production with soil health. (2015)
- I.16. Assistance in how to use drone and precision agriculture data to make management decisions. (2018)
- I.17. Evaluate how all of the different specialties of researchers can be combined to benefit producers. (2018)
- I.18. Assist producers in learning what their peers are doing. (2018)
- I.19. Develop better collaboration between researchers and producers with on-farm projects.

II. Soil Fertility Management Objectives

- II.1. Develop methods to ameliorate poor soil pH for crop production. (2014)
- II.2. Investigate effects of fertilizer type, placement, and timing on crop production (e.g., sugarbeets, cereal grains, dry beans, and forages). (2014)
- II.3. Evaluate the efficacy of managing soil nitrogen applied by pivot irrigation. (2014)
- II.4. Determine and categorize nitrogen release times for varied forms of nitrogen. (2014)
- II.5. Discover methods to reduce dependence on commercial fertilizers. (2014)
- II.6. Develop tillage systems that minimize soil disturbance. (2014)
- II.7. Develop cheaper alternatives to commercial fertilizer (e.g., cover crops, legumes). (2014)
- II.8. Test the ability of compost and manure to enhance soil fertility. (2014)
- II.9. Identify plants such as legumes that enhance soil fertility. (2014)
- II.10. Identify crops and varieties that perform best in varied soil types and elevations. (2015)
- II.11. Evaluate effects of aerators on soil productivity. (2015)
- II.12. Identify soils best suited for farming or grazing. (2015)

III. Weed Control Objectives

- III.1. Develop control methods for weeds resistant to glyphosate (e.g., Roundup) or other herbicides especially in sugarbeet and dry bean production. (2014, revised 2015)
- III.2. Develop methods to control weed emergence that can be applied in the fall.
- III.3. Improve procedures to control noxious weeds, especially milkweed, knapweed, whitetop, curly dock (aka sour dock), and thistle. (2014, revised 2015)
- III.4. Evaluate the efficacy of weed-control chemicals applied before planting in dry bean fields. (2014)
- III.5. Develop chemical and non-chemical methods to control cheatgrass and other noxious weeds. (2014)
- III.6. Coordinate application of glyphosate with precision agriculture. (2014)
- III.7. Optimize use of herbicides economically and environmentally. (2014)
- III.8. Facilitate access to chemicals needed for special uses. (2015)
- III.9. Discover viable alternatives to pesticides. (2015)
- III.10. Determine chemical carryover in no-till production. (2015)
- III.11. Continually monitor unintended consequences of weed control on plants and animals. (2015)

IV. Irrigation Objectives

- IV.1. Test and develop surge, pivot and drip irrigation techniques for specific crops, especially alfalfa, alfalfa seed, dry beans, and sugarbeets. (2014, revised 2015)
- IV.2. Test the ability and reliability of moisture monitors to indicate timing of irrigation. (2014)
- IV.3. Conduct irrigation management studies to optimize water use for specific crops (e.g., alfalfa seed, dry beans, and sugarbeets) and soils. (2014, revised 2015)

- IV.4. Develop methods to maximize (optimize) production with less water. (2014)
- IV.5. Improve irrigated pasture production at high elevations. (2014)
- IV.6. Test the ability of soil additives (e.g., surfactants) affect water absorption and retention. (2015)

V. Livestock Objectives

- V.1. Develop strategies to enhance the efficiency of feed utilization. (2014)
- V.2. Evaluate effects of additives or chemicals to feeds to influence forage and/or weed consumption. (2014)
- V.3. Train livestock to consume alternative feeds such as brush and weeds. (2014)
- V.4. Determine heifer development strategies that optimize reproduction, foraging ability, and cow longevity to maximize profitability. (2014)
- V.5. Identify strategic supplementation protocols that optimize animal production traits with costs of production. (2014)
- V.6. Develop improved methods to control flies. (2014)
- V.7. Determine how to minimize feed costs and maximize profit per unit of production. (2014)
- V.8. Develop genetic markers for feed efficiency and determine their ramifications on important production traits such as reproduction, milk production, pounds of calves produced, and carcass characteristics. (2014, revised 2015)
- V.9. Develop practical estrous synchronization methods for commercial producers.
- V.10. Determine cumulative effects of minerals, ionophores, worming, and implants on animal productivity. (2014)
- V.11. Provide cost/benefit information on grazing of irrigated pastures. (2014)
- V.12. Determine direct and indirect effects of disease and predators on livestock production. (2015)
- V.13. Develop best methods to ameliorate existing and emerging diseases in livestock. (2015)
- V.14. Optimize breeding of first-calf and re-breeding of second calf heifers. (2015)
- V.15. Develop breeding strategies that maximizes the beneficial effects of heterosis in livestock. (2015)
- V.16. Develop criteria for lamb carcasses to decrease variability and increase consumer satisfaction. (2015)
- V.17. Identify and eliminate causes for consumers having poor eating experiences with lamb. (2015)

VI. Grazing Management Objectives

- VI.1. Develop improved forage (e.g., grass/legume mixtures) based livestock production systems. (2014, revised 2015)
- VI.2. Demonstrate and evaluate benefits of strip grazing corn stalks. (2014)
- VI.3. Increase the carrying capacity of range and pastureland. (2014)
- VI.4. Evaluate effects of multi-species grazing on forage utilization and range health and productivity. (2014)
- VI.5. Develop alternative grazing strategies to enhance rangeland health. (2014)

- VI.6. Evaluate management intensive and rotational grazing strategies in dry environments. (2014)
- VI.7. Identify optimum grazing height for alfalfa aftermath and effects of grazing on stand longevity. (2014)
- VI.8. Develop forage species that are drought resistant. (2014)
- VI.9. Investigate ways to optimize wildlife-livestock interactions and receipt of value for hunting and tourism. (2014, revised 2015)
- VI.10. Provide new information on meadow management and irrigated pasture grazing in higher elevations. (2014)
- VI.11. Develop economically feasible methods to control sagebrush and greasewood. (2015)

VII. Production Economics Objectives

- VII.1. Determine the cost-effectiveness of fertilizer alternatives. (2014)
- VII.2. Determine the economics of alternative grazing systems. (2014)
- VII.3. Determine the cost-effectiveness of vaccines, mineral supplements, and pour-ons in livestock production systems. (2014)
- VII.4. Develop practical methods to assign economic values to ecological management procedures. (2014)
- VII.5. Identify obstacles and evaluate options and opportunities for marketing. (2014)
- VII.6. Identify obstacles and evaluate options and opportunities for marketing Wyoming-produced meat and other products to consumers. (2014, revised 2015)
- VII.7. Determine impacts of alternative management strategies on whole-ranch/farm economics. (2014)
- VII.8. Provide information on costs per unit of production. (2014)
- VII.9. Identify capital management alternatives for new and expanding producers. (2015)
- VII.10. Provide tools to facilitate record keeping. (2015)
- VII.11. Determine economic potentials for alternative crops (e.g., soybeans, oil crops, forage beets) and varied crop production methods (i.e. organic, no-till, and conventional) in specific Wyoming localities. (2015)
- VII.12. Determine economic impacts of grazing vs. harvesting of alfalfa and winter wheat in the fall. (2015)

VIII. Crop and Animal Genetics and Biotechnology Objectives

- VIII.1. Improve marker assisted selection procedures to identify plants and animals with desired production traits. (2014)
- VIII.2. Develop and evaluate genetically modified organisms that enhance desired production traits. (2014)
- VIII.3. Identify optimum cow size for Wyoming environments. (2014)
- VIII.4. Increase longevity and production persistence of forage legumes. (2014)
- VIII.5. Develop viable alternatives for legumes (especially alfalfa) at high elevations. (2015)
- VIII.6. Develop methods to identify cattle and sheep seed stock that possess desired economic traits. (2015)

IX. Rural Prosperity, Consumer and Industry Outreach, Policy, Markets, and

Trade Objectives

- IX.1. Analyze economic impacts of farming/ranching management decisions. (2014)
- IX.2. Consider input costs, budgets, and market risks by region and crop. (2014)
- IX.3. Conduct applied research studies with producers and develop demonstration trials with cooperators to facilitate adoption of new or changing technologies. (2014)
- IX.4. Increase dissemination of research results (e.g., Wyoming Livestock Roundup, radio programs). (2014)
- IX.5. Work with commodity groups to enhance adoption of new technologies. (2014)
- IX.6. Conduct hands-on classes at R&E Centers or with cooperators for young/new producers. (2014)
- IX.7. Provide science based information needed by policymakers to make informed decisions. (2015)
- IX.8. Educate the public about the impacts of agricultural practices. (2015)
- IX.9. Develop alternative markets and uses for agricultural by-products. (2015)
- IX.10. Investigate methods for, and impacts of, local food production. (2015)
- IX.11. Develop local processing and marketing opportunities for Wyoming livestock and crops. (2015)
- IX.12. Form venues to sell Wyoming products in international markets. (2015)
- IX.13. Enhance communication between producers, research entities, and regulatory agencies. (2015)

X. Responding to Climate Variability Objectives

- X.1. Consider regionally unique environmental conditions when designing research studies. (2014)
- X.2. Conduct integrated agricultural systems research that links environment and conservation to production and profitability. (2014)
- X.3. Develop drought resistant plants that fit the extreme environmental conditions of Wyoming. (2014)
- X.4. Devise drought management strategies that minimize detrimental effects of grazing. (2015)
- X.5. Determine effects of climate variability (e.g., lack of freeze vs. a hard winter) on plant and livestock diseases and production. (2015)

XI. Sustainable Energy

- XI.1. Conduct research on bioenergy/biofuels and bio-based products that are suitable to Wyoming's environment. (2014)

XII. Landscape-Scale Conservation and Management

- XII.1. Develop improved methods to reclaim disturbed lands. (2014)
- XII.2. Evaluate water, soil, and environmental quality using appropriate organisms as indicator species. (2014)
- XII.3. Present educational programs on environmental and societal impacts of agricultural

innovations. (2015)

XII.4. Develop methods to ameliorate the detrimental effects of poor quality water on crop and livestock production. (2015)