

University of Nevada Reno Combined Research and Extension Plan of Work 2022-2026

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I. Plan Overview

1. Executive Summary

The College of Agriculture, Biotechnology and Natural Resources (herein referred to as "CABNR", or "the College"), Nevada Agricultural Experiment Station (herein referred to as "Experiment Station") and University of Nevada, Reno Cooperative Extension (herein referred to as "Extension") are founding branches of Nevada's Land-Grant University. Experiment Station and Extension are part of CABNR. All three branches have a long and distinguished record of fulfilling the tripartite mission of teaching, research, and outreach education benefiting the health and economic vitality of Nevada's citizens.

In an effort to be relevant and accountable, CABNR, Experiment Station and Extension have continuously and systematically reviewed and focused on programs to address Nevada's highest priority needs. Experiment Station and Extension fully subscribe to and support the University's goal to achieve recognition as a "fully engaged" institution and are committed to the principles of accessibility and program utility that have guided the Land Grant University System for more than 150 years.

Our plan of work focuses on addressing six critical issues in the state: (1) sustainable dryland agriculture, (2) natural and environmental resources, (3) horticulture and food systems, (4) health, nutrition and food safety, (5) community and economic development, and (6) children, youth and families. This joint plan of work addresses the highest priorities put forth by Nevada's stakeholders. These issues also align with the six state legislative mandates for Extension.

Full implementation of this plan will require adequate time and sufficient funding. In order to effectively address the complex issues facing citizens in Nevada, the US, and globally; CABNR, Experiment Station and Extension must continue to increase their interdisciplinary and multidisciplinary problem-solving approaches. These goals presume that all three units maintain and grow collaborative partnerships with diverse community organizations, university academic units, local leadership, under-served populations, and federal and state agencies.

Extension has educators located in or responsible for every county in the state of Nevada. At the local level, additional staff or faculty are hired to deliver programs to address identified county needs. Extension educators are academic faculty with the majority on a tenure-track. Specialists are all tenure-track academic faculty. Most specialists have 100% Extension appointments, while others are split appointments with Experiment Station, CABNR or other colleges in the University, as deemed necessary to address the aforementioned critical issues. Likewise, the majority of Experiment Station appointments are split appointments with CABNR. Experiment Station also has several faculty located in the Colleges of Business, Liberal Arts and Science, and in Extension. This staffing model reflects the collaborative partnerships in place and facilitates interdisciplinary, multidisciplinary and integrated problem-solving approaches.

As the outreach unit of the land-grant university, it is especially important that Extension and the Nevada System of Higher Education (the governing body of Nevada's colleges and universities) seek and seize opportunities to integrate university research with Extension programming. The University of Nevada, Reno, as Nevada's Land Grant institution, must recognize Extension's value as a connection between all the state's communities and the university research base and support and reward efforts to meet community needs.

2. FTE Estimates

Year	1862 Extension	1862 Research
2022	12.5	5.3

2023	12.5	5.3
2024	13.0	7.2
2025	13.5	7.2
2026	13.5	7.2

II. Merit / Peer Review Process

Extension's annual evaluation process

Annually, academic faculty prepare a Role Statement detailing their teaching, research, and service activities. Role Statements are reviewed by the Area Director and/or Department Chair, who ensure the quality and relevance of programming efforts based on formally identified needs. The Area Director, Director of Extension, and Dean of the college review and approve the plan. Annually, Extension faculty evaluate their peers' teaching, research and service activities to assess overall performance and program quality. Peers consider the results of formal needs assessments, programs developed in response, and the documented outcomes and impacts in rating peer performance and providing narrative feedback. Area Directors also conduct an annual review of faculty performance and provide narrative feedback. Area Directors meet individually with faculty to discuss the documented results of the peer review and their review. The Director of Extension and Dean also review and sign off on the evaluation documents. For joint appointments with other colleges, the faculty's annual evaluation is submitted to the Director for review and input.

Promotion and tenure documents follow the same process but are also reviewed by the University Promotion and Tenure Committee for a final determination.

Extension's scientific peer review process Publications fall under two main categories:

Peer-reviewed publications are educational materials that are research-based, referenced and peer reviewed. They include fact sheets, special publications, curriculum materials, audio-visual/electronic materials, computer software programs, apps, and web-based programs. Peer review allows experts within the field to review the author's publications and verify information. Each type of peer reviewed publication requires a different number of reviewers, ranging from three to five. All require subject matter experts as well as one intended audience member. Editorially reviewed publications are educational materials that are informational and do not include any scholarly application of research-based information. They include informational publications, newsletters, and training materials/workbooks.

All publications undergo periodic review of no greater than five years but may be more frequent.

Experiment Station's research review process

Scientific peer review drives the initial selection of research projects that comprise the Experiment Station research portfolio. The Director of the Experiment Station solicits applications from Experiment Station appointed scientists in a general call for proposals that identify annual priority areas. Faculty submit proposals through an in-house, web-based content management system. Based upon research priority area, expert peer reviewers are assigned by Experiment Station administration to rate proposals based upon merit in the field of research, principal investigator's qualifications, projected outcomes, degree of multi-disciplinary activity, and budget feasibility. The Experiment Station administration concurrently sends proposals to its external advisory board panel representing stakeholder interests for evaluation and ranking based upon their constituents' inputs.

Tabulated results, comments, recommendations, and proposals are then sent to the principal investigator's home department administration for internal review. Departmental recommendations are then sent forward to Experiment Station administration. All findings are then compiled by Experiment Station administration and final decisions are made based on the rankings, comments and stakeholder input.

III. Stakeholder Input

1. Actions to Seek

Faculty target the general public, traditional and non-traditional stakeholders through email, personal and postal mail invitations, local newspapers, radio and other media to participate in advisory committees, public meetings, listening sessions, surveys, focus groups, and individual interviews. Additionally, poster announcements are placed in public places frequented by traditional and non-traditional audiences.

2. Methods to Identify

Extension and Experiment Station have advisory committees with membership guidelines that articulate groups of people needed to represent the state. Extension has a needs assessment framework that guides the needs assessment process. As part of the needs assessment plan, stakeholders are defined and identified, as well as the target audience for needs assessments. This determines who should be targeted in communications and how input will be obtained. Lists are developed utilizing existing data sources, listserves and contacts. Both Extension and Experiment Station faculty reach out to new and under-served audiences to identify specific needs to be addressed. Both also utilize faculty and staff, associates from support organizations and political leaders to help identify individuals and groups with whom they should be interacting. These contacts are logged and maintained by staff. As new contacts are made, they are asked to identify others who should be included. Experiment Station field stations attract large numbers of visitors and volunteers annually and are used as open channels of communication with new clientele and stakeholders.

3. Methods to Collect

Two advisory boards have been established to counsel Experiment Station and Extension in matters of research and outreach. The boards' qualifications cover a wide spectrum of interest, from local ranchers to federal agencies. Board members are asked to conduct focus groups, based upon their home district, to ascertain viewpoints and ideas on the needs and deficiencies of their local region. Both advisory committees meet and provide input multiple times per year.

Experiment Station and Extension faculty develop partnerships with a variety of stakeholder groups as part of program planning, development and implementation. These community and organizational partnerships provide an ongoing venue for receiving stakeholder input and feedback for the research project and/or program.

For Experiment Station, input is collected primarily through meetings with stakeholder groups and individuals including concerned citizens, ranchers, agricultural organizations, natural resources professionals and managers, state and federal agency representatives, food industry representatives, and Cooperative Extension administrators, specialists and educators. Stakeholder's review and provide input on research proposals, and research project participants provide direct and indirect stakeholder input through varied avenues, such as questionnaires. Stakeholder input for other projects is collected through comments and questions at workshops, conferences and topical meetings for end users. Comments are also received through the website.

Experiment Station also holds public events during the year to gather information from stakeholders. When possible, efforts are made to coordinate with Extension to avoid duplication. For example, both sponsor exhibitor booths at annual meetings held by numerous commodity groups and local/state agencies and host joint efforts like the annual Cattlemen's Update, a program designed to bring the researcher to the rancher, and Beginning Famers and Rancher events throughout the state.

Extension meets frequently with stakeholders throughout the state. This includes formal presentations to county commissions, the Nevada Association of Counties and community groups. Extension also participates in state panels and commissions and executive boards, such as the Nevada Sagebrush Ecosystem Council, the Nevada Governor's Drought Forum, the Nevada Governor's Council on Food Security and the Food Bank of Northern Nevada. County-based Extension Educators, Extension Specialists and Extension administrators meet formally and informally with county commissioners, citizens, and public service groups, such as Rotary Clubs.

Extension's needs assessment framework requires formal needs assessments be conducted every 5 years. Mixed methods are utilized, such as stakeholder surveys, use of existing data sources, input from advisory committees, interviews and focus groups with stakeholders. Additionally, faculty continually assess stakeholders' needs and perceived program priorities through formal (survey) and informal (one- on-one conversations) means.

4. How Considered

Extension uses needs assessments and stakeholder input to help establish program priorities, allocate and acquire necessary funding to support priorities, design, deliver, and evaluate programs. More specifically, Extension's five Program Teams set priorities based on the needs assessments and establish working groups to develop and implement

programs to address the priorities. Membership includes faculty, staff, and stakeholders. Working Groups are responsible for developing and carrying out a Workplan that informs the State Plan of Work. Extension's stakeholder input is routinely used to identify emerging issues, to direct and redirect programs, and aid in hiring. Specifically, stakeholder input is used to determine the necessary qualifications of those hired, to create new positions, and in faculty searches.

The Experiment Station collects information from stakeholders to adjust issue areas that are influencing future direction. These stakeholder priorities also directly affect applied research activity, while influencing which departments or areas of expertise get hiring priority. Successful strategic hires enable Experiment Station to meet existing needs and at the same time reposition for those on the horizon.

IV. Critical Issues

1 Sustainable Dryland Agriculture

Description:

The livestock, forage, and specialty crop industry in Nevada comprise an essential component of the economic stability in rural communities. Nearly 95% of all land in Nevada is devoted to farming and ranching activities (79% rangeland, 13% cropland). There are 6,128,153 land and farm acres in Nevada producing primarily cattle and/or hay including alfalfa, timothy, and other hay products. Cattle and calves rank number one in cash sales for Nevada.

Sustainable dryland agriculture is the application of plant and animal production practices in dry areas of the world where lack of moisture limits crop production. Dry areas of the world make up about 42% of the earth's surface. Nevada, the driest state in the nation, is considered one of these regions. Additionally, Nevada's livestock industry operates on a thin profit margin and faces many challenges relative to economically producing and marketing livestock for long-term ranch sustainability.

Growing a strong agriculture economy in the driest state requires research and Extension programs addressing topics such as pest management, efficient irrigation, sustainable range management, alternative crops for high-desert areas, agricultural entrepreneurship, business and financial management and risk management for producers.

For the Experiment Station, efforts will be made to identify crops and animal breeds best adapted to production in these hot and dry conditions as well as development of new crop varieties and animal breeds better suited to tolerate and thrive under these conditions. The Experiment Station will also study plant and animal production practices to increase yields under these conditions.

Extension will address these topics and others to develop strong educational programs around forages, livestock, new and/or alternative crops for our state's producers, soil health, water education and improving farmer/rancher profitability and efficiency.

Term: Long

Science Emphasis Areas

Agroclimate Science

Bioeconomy, Bioenergy, and Bioproducts

Sustainable Agricultural Production Systems

2 Natural and Environmental Resources

Description:

Issues that impact Nevada's natural and environmental resources, include drought, floods, watershed and riparian management, wildfires, invasive species, noxious weeds, and conservation wildlife and their associated habitats. In particular, management of the rangelands and forest/woodlands are critically important; rangeland health is under attack by competition between livestock production, wildlife, feral horses/burros, and special interests. Competing interests present challenges to maintaining a healthy balance particularly when limited resources are available – such as water. Protection and management of these resources is necessary to the

economic and ecological well-being of the state.

The Experiment Station will conduct studies to develop management practices to protect these natural resources. They will develop ways to better detect fires in order to provide a more rapid response and minimize their spread. Researchers will conduct studies to evaluate surface and groundwater quantity and quality along with seasonal snowpack. Additional studies to access water usage, storage, and water reclamation will be supported. Research assessing population growth, movement patterns, habitat selection, and resource competition will improve game animals and endangered species.

Extension will provide educational programs related to living with drought, water sustainability, rangeland management, noxious weed control and management, fuels management, use of native plant materials in rangeland restoration, and preparing homeowners and communities for fire. Extension will provide facilitation among multiple stakeholders to help them develop policies that will sustain our natural and environmental resources for multiple uses. With more than 90% of Nevada's land publicly owned, this is one of our state's largest challenges.

Term: Long

Science Emphasis Areas

Environmental Systems

Sustainable Agricultural Production Systems

3 Horticulture and Food Systems

Description:

Nevada has food deserts in 40 of 687 census tracts with 154,623 Nevadans living in low-income food deserts. Homeowners want information on growing their own food. There is also a growing specialty crop industry in the state, as well as urban horticulture/agriculture and hoop-house and greenhouse growing. With an increased interest in locally grown food, science-based education for growing in Nevada's climate and soils is needed for successful backyard gardens and urban farms to grow produce locally and alleviate the impact of food deserts in Nevada. This will help improve food security and contribute to economic development.

Homeowners and green industry professionals also want information on taking care of lawns, yards, and landscapes. Topics of interest include plant diagnostics, , pest management, native plant landscaping, pruning and water conservation. Landscape water use is of particular importance as it accounts for greater than two-thirds of residential water use.

For the Experiment Station, funding will support studies to improve the growing, harvesting, packaging, transporting, and marketing of fruits and vegetables grown in Nevada. Studies will also look at the economics of food production and how this production affects the natural environment.

Extension will provide the latest research-based information for growers, producers, green industry professionals, and homeowners to contend with drought, pests, and water use issues. Extension will provide education and information to homeowners and others on growing food locally, along with home and commercial landscape horticulture. Furthermore, Extension will provide educational programs to help move specialty crops and urban agriculture/horticulture industries forward.

Term: Long

Science Emphasis Areas

Agroclimate Science

Bioeconomy, Bioenergy, and Bioproducts

Education and Multicultural Alliances

Environmental Systems

Food Safety

4 Health, Nutrition and Food Safety

Description:

Improving the health of all Nevadans and making a safe and nutritious source of food available are critical issues to be addressed. A priority of the state is reducing the risks and behaviors that contribute to chronic disease with an emphasis on decreasing obesity through increased physical activity and the promotion of healthy diets. Nearly 32% of the children entering the Nevada school system are obese (21%) or overweight (11%); 7% of high school students report no fruit or vegetable consumption in the past week; only 13% of adults meet the daily fruit intake recommendations and 11% vegetable intake; and over 75% of Nevadans 18 and above do not meet physical activity guidelines and the prevalence generally increases with age. Additionally, over 12% of households in Nevada are food insecure, where access to healthy food is limited or uncertain.

For the Experiment Station, food security is an important issue and projects that seek to improve food security for various communities or segments of the population will be supported. Projects evaluating and improving the nutritional value of food will be supported. Studies to evaluate the health benefits of various nutrients will be conducted. Research into issues pertaining to pre- and post-harvest food safety for cattle and sheep will be supported.

For Extension, programs will help address a wide variety of issues, including: obesity and other related conditions, lack of physical activity, unhealthy behaviors, lack of fruit and vegetable availability and intake, and food safety and security. Educational programs like SNAP-Ed that provide nutrition education and promote an active lifestyle will be provided. Additional programs will encourage Nevadans to test their homes for cancer-causing radon; educate women who have abused opioids on healthy body image and eating; food safety training; and hands-on gardening and nutrition programs for youth.

Term: Long

Science Emphasis Areas

Education and Multicultural Alliances

Family & Consumer Sciences

Food Safety

Human Nutrition

5 Community and Economic Development

Description:

Nevada is the seventh largest state in the country in terms of land mass and one of the least densely populated states. It has the vast majority of its population concentrated in two counties (Clark and Washoe - Las Vegas and Reno, respectively) with relatively small communities scattered throughout the rest of the state. To complicate matters, Public Lands encompass nearly 87 percent of Nevada's land mass. These lands are managed by the Federal Government (Bureau of Land Management, Forest Service and Department of Defense) and land decisions can have a significant impact on economic development opportunities for communities of all sizes.

The culture and economics of rural Nevada are vastly different from that of the two metropolitan areas. Clark County alone represents over 73 percent of the state's total population and approximately 70 percent of total business licensees. As such, improving the economic and community development of rural areas as well as business development in urban areas are strategic priority in Nevada.

For the Experiment Station, funding will be provided to projects that evaluate and assist in the community and economic development of rural areas. Support will also be provided for projects that support agricultural economic development in both rural and metropolitan areas.

For Extension, programs will provide career development, research, education, facilitation, and services for business and industry startups, as well as existing businesses. Extension will partner with other organizations and lead efforts to model impacts of things such as public land policy changes, regional medical facilities, and other endeavors, including mines and processing plants. Extension will also collect and analyze demographic, social, economic, fiscal, and environmental data for Nevada counties and present the information in easy-to-read

formats to stakeholders and decision-makers.

Term: Long

Science Emphasis Areas

Bioeconomy, Bioenergy, and Bioproducts
Education and Multicultural Alliances
Environmental Systems
Family & Consumer Sciences
Sustainable Agricultural Production Systems

6 Children, Youth and Families

Description:

Nevada ranks 46th among the 50 states for children’s well-being. Issues affecting children, youth, and families include early literacy, science and math proficiency, college readiness, healthy child and adolescent development, and domestic violence.

Literacy is the fundamental skill upon which school and future work success are based. Less than one-third of Nevada’s school age children are reading at or above proficiency, placing Nevada’s children at extremely high risk for developing literacy-related problems, such as grade retention, school failure and dropout, delinquency, and unemployment or underemployment. Approximately, only one-third are proficient in science and less than one-quarter in math. Early exposure to STEM supports children’s overall academic growth, develops early critical thinking and reasoning skills, and enhances later interest in STEM study and careers. Additionally, children need safe environments for optimal social, emotional, physical and cognitive development – inclusive of the family, child care facility, and school setting. Nevada’s increasing rates of child abuse and neglect and high rate of domestic violence and fatalities are of key concern for healthy child and adolescent development.

Extension programs will focus on parenting education, education for childcare providers, early literacy development, STEM enrichment, college and career readiness, 4-H youth development, and family violence prevention programming. In partnership with the fifth largest school district in the country (Clark County – Las Vegas), Extension’s 4-H youth program will also focus on urban youth development through school-based interventions targeting improved college and career readiness.

Term: Long

Science Emphasis Areas

Education and Multicultural Alliances
Family & Consumer Sciences
Youth Development