

South Dakota (South Dakota State University)

Plan of Work for 2023-2027

Status: Final (Approved 10/5/2022)

Executive Summary Overview

(No significant change.) The College of Agriculture, Food and Environmental Sciences at South Dakota State University is home to both SDSU Extension and the South Dakota Agricultural Experiment Station. One of eight colleges that make up SDSU, our college has an integral role in fulfilling the land grant mission of the university. The solutions for South Dakotans are found through the collaborative partnership of SDSU Extension and SDSU Agricultural Experiment Station.

SDSU Extension and the South Dakota Agricultural Experiment Station achieve their goals with researchers and state specialists located on the SDSU campus in eastern South Dakota, eight Extension regional centers operating across the state, with Extension Field specialists and six research field stations. Outreach is also achieved with four Tribal Extension program offices. 4-H Youth Development begins on campus with the South Dakota State 4-H office and has 4-H Extension field specialists in Extension regional centers and 4-H youth advisors in county-owned offices.

South Dakota's agriculture industry has a \$32.5 billion economic impact each year (2019), with agriculture generating 20 percent of the state's economic activity. There are more than 19 million acres of cropland and 23 million acres of pastureland in the state. According to the South Dakota Department of Agriculture, in 2020 the average size farm in South Dakota

was 1,459 acres; 83% of South Dakota's farms and ranches are family-owned and operated. In 2021, there were 29,400 farm operations in South Dakota. Although the tools have changed through the years, agriculture remains the common thread linking citizens, businesses, and communities within South Dakota.

According to the USDA Economic Research Service (ERS), South Dakota covers 75,885 square miles, with an estimated population of 895,376 people (2021), with 445,958 living in rural South Dakota (49.8%). It ranks 46th among states in total population size. According to 2021 data from the U.S. Census Bureau, an estimated 84.2% of the state's population is White, 2.5% is African-American, 1.7% is Asian, 9.0% is American Indian or Alaska Native, 0.1% is Native Hawaiian or Other Pacific Islander, and 4.6% is of Hispanic or Latino origin. The average per capita income for South Dakotans in 2020 was \$48,021. The poverty rate in rural South Dakota is 14.5%, compared with 8.6% in urban areas of the state. 9.2% of the rural population has not completed high school, while 6.4% of the urban population lacks a high school diploma according to 2016-2020 ACS data reported by ERS.

With six field stations and more than 17,000 acres of land across the state devoted to scientific exploration, the SD Agricultural Experiment Station is the largest public and privately funded research organization in the state. In addition to enhancing the quality of life in South Dakota, the SD AES directly

supports the teaching programs offered by the College of Agriculture, Food and Environmental Sciences, the College of Education and Human Sciences, and the educational programs delivered by SDSU Extension.

The mission of SDSU Extension provides unbiased, scientific knowledge and innovation to families, communities and industries across the state. SDSU Extension engages citizens in dynamic learning environments, connecting people who share a common interest in order to learn information, interact with technology, and explore innovation.

The combined South Dakota Agricultural Experiment Station and SDSU Extension plan of work will focus on 5 critical issues:

Families, Youth, and Communities

Food Systems, Nutrition, Health, and Well-Being

Regenerative Agronomic Systems

Regenerative Livestock Systems

Natural Resources and Environmental Systems

The capstone groups are:

Agriculture and Natural Resources

Food & Families

4-H Youth Development

Community Vitality

Families, Youth, and Communities

South Dakota communities need assistance to identify strategies to address the changing social, environmental, human, and economic landscape. According to the US Census Bureau, the U.S. and SD are growing older. Currently, 16.3% of South Dakotans are age 65+. Changes to meet the demands of this aging demographic are expected in health and wellness; home and work relationships; agriculture; community life and the economy. Too many individuals and families are experiencing financial crisis because of inadequate savings and too much debt. Research and Extension strategies can enhance family life issues such as building financial security, community leadership, youth development, and connect individuals and families to mental and emotional support resources.

Food Systems, Nutrition, Health, and Well-Being

Heart disease, cancer, stroke, and diabetes are included in the top leading seven causes of death in South Dakota and stress-related health problems are on the rise. Living a healthy lifestyle greatly reduces a person's risk for developing chronic disease. Local gardens, high-tunnels, and greenhouse facilities help increase fruit and vegetable consumption in the state. Aquaponics, a sustainable food production method that combines advanced aquaculture with hydroponics, is on the rise in SD to meet

the need for more fresh produce. Natural fermentation processes replace chemical additives for extending shelf-life of foods and beverages. Research and Extension strategies that promote dietary and lifestyle changes can reduce the incidence of chronic disease across the state's population.

Regenerative Agronomic Systems

Regenerative agriculture builds the soil through proper management which includes minimizing or eliminating tillage, diversified rotations, and integrating livestock into cropping systems, which results in increased topsoil, soil carbon, and biological activity. Using regenerative methods can allow South Dakota farmers to prioritize caring for the soil in order to put high-quality, nutritious food directly into the hands of the people who lack access. Research and Extension strategies lead to increased agricultural productivity, an increased understanding of plant diseases, pests, and new plant varieties. Farmers rely on the dissemination of science-based knowledge on soil fertility, precision agriculture, genetics, genomics, horticulture, environmental preservation, weed science, and preserving water quality.

Regenerative Livestock Systems

Due to shifting population demographics, and changing cultural and societal standards, the perceptions of livestock utilization and husbandry continue to be under scrutiny. In addition, the demand to produce more food with fewer resources continues to be a challenge to livestock health and productivity. According to the USDA Census of Agriculture, the average age of U.S. producers is 58.3. Producers want to learn more about crop and livestock reintegration, precision livestock production in confined and range settings, as well as factors that impact effectiveness of their feeding programs. Research and Extension strategies can increase profitability, optimize resource management, enhance learning communities, and increase awareness of the consumer and food service side of the beef industry.

Natural Resources and Environmental Systems

There are approximately 19 million acres of cropland and 23 million acres of permanent pasture and rangeland in South Dakota. Rangeland is the lifeline of streams, ponds, and lakes, and it is a source of wildlife habitat, recreation, and scenic beauty. As an agricultural resource, cropland has a significant impact on the economic, as well as the environmental well-being of the state. Healthy soil contributes to a healthy ecosystem, which in turn impacts society. Research and Extension continue to develop programs that improve the understanding of natural resources, environmental, economic, and social impact of changing climate and energy needs. Protecting soil and water quality in agricultural, rural, and urban landscapes and watersheds is essential.

Merit and Scientific Peer Review Processes

No significant change.

Stakeholder input: Action Taken to Seek Stakeholder Input

No significant change.

Stakeholder input: Methods to Identify Individuals and Groups

No significant change.

Stakeholder input: Methods for Collecting Stakeholder Input

No significant change.

Stakeholder input: A Statement of How the Input Will Be Considered

No significant change.

Critical Issues

Families, Youth, and Communities

Initiated on: Nov 26, 2019

State: South Dakota

Term Length: Long-term (>5 years)

South Dakota communities need assistance to identify strategies to address the changing social, environmental, human, and economic landscape. According to the US Census Bureau, the U.S. and SD are growing older. Currently, 16.3% of South Dakotans are age 65+. Changes to meet the demands of this aging demographic are expected in health and wellness; home and work relationships; agriculture; community life and the economy. Too many individuals and families are experiencing financial crisis because of inadequate savings and too much debt. Research and Extension strategies can enhance family life issues such as building financial security, community leadership, youth development, and connect individuals and families to mental and emotional support resources.

Science Emphasis Area

Family & Consumer Sciences

Food Systems, Nutrition, Health, and Well-Being

Initiated on: Nov 26, 2019

State: South Dakota

Term Length: Long-term (>5 years)

Heart disease, cancer, stroke, and diabetes are included in the top leading seven causes of death in South Dakota and stress-related health problems are on the rise. Living a healthy lifestyle greatly reduces a person's risk for developing chronic disease. Local gardens, high-tunnels, and greenhouse facilities help increase fruit and vegetable consumption in the state. Aquaponics, a sustainable food production method that combines advanced aquaculture with hydroponics, is on the rise in SD to meet the need for more fresh produce. Natural fermentation processes replace chemical additives for extending shelf-life of foods and beverages. Research and Extension strategies that promote dietary and lifestyle changes can reduce the incidence of chronic disease across the state's population.

Science Emphasis Area

Family & Consumer Sciences, Food Safety, Human Nutrition

Natural Resources and Environmental Systems

Initiated on: Nov 26, 2019

State: South Dakota

Term Length: Long-term (>5 years)

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Science Emphasis Area

Environmental Systems

Regenerative Agronomic Systems

Initiated on: Nov 26, 2019

State: South Dakota

Term Length: Long-term (>5 years)

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Science Emphasis Area

Sustainable Agricultural Production Systems

Regenerative Livestock Systems

Initiated on: Nov 26, 2019

State: South Dakota

Term Length: Long-term (>5 years)

Due to shifting population demographics, and changing cultural and societal standards, the perceptions of livestock utilization and husbandry continue to be under scrutiny. In addition, the demand to produce more food with fewer resources continues to be a challenge to livestock health and productivity. According to the USDA Census of Agriculture, the average age of U.S. producers is 58.3. Producers want to learn more about crop and livestock reintegration, precision livestock production in confined and range settings, as well as factors that impact effectiveness of their feeding programs. Research and Extension strategies can increase profitability, optimize resource management, enhance learning communities, and increase awareness of the consumer and food service side of the beef industry.

Science Emphasis Area

Sustainable Agricultural Production Systems