



SOUTH DAKOTA
STATE UNIVERSITY

Investigating Rangeland Systems and Practices: Enhancing Sustainable Agriculture Curriculum in South Dakota

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INTRODUCTION

- 1988 National Research Council (NRC)¹
 - “...most Americans know very little about agriculture, its social and economic significance...links to human health and environmental quality.”
 - “...few systematic educational efforts are made to teach or otherwise develop agricultural literacy in students of any age...”
- **No change in our educational systems since 1988.**
- Problems compounded by the internet, social media, special interest groups, changing environmental and political climates.^{2,3}
 - **Absent from the conversation is the farmer/rancher.**
- Educating youth through a sustainable agriculture curriculum can serve as direct link to future sustainability of rangelands in Northern Great Plains (NGP).
- Increased agricultural literacy fosters critical thinking and challenges current ways of knowing.

OBJECTIVES

The aim of this project is to:

- Objective #1
 - Promote sustainable agriculture curriculum through **educational events for teachers and 4-H Youth Program Advisors.**
- Objective #2
 - Educate youth in grades 6, 7, and 8 about sustainable agriculture **through a lens of rangeland systems and practices.**
- Objective #3
 - **Provide opportunities to ranchers to connect and communicate** with youth about challenges, management practices, livelihood, and community impact.



South Dakota rangeland.

MATERIALS AND METHODS

- **Two-pronged approach**
 - **1) Workshops for teachers, 4-H Youth Program Advisors**
 - **2) “Adopt-a-rancher”**
- **Workshops**
 - Statewide
 - Lower capacity to provide quality instruction
 - Continuing education units (CEUs)
- Curriculum development
 - Utilize local groups:
 - NRCS
 - SD Grassland Coalition
 - SD Soil Health Coalition
 - Teacher review
- Modular lesson plans
 - Laboratory/field exercises
 - Materials needed to complete activities
 - Alignment w/ Next Generation Science Standards (NGSS) and South Dakota Standards of Learning
- **“Adopt-a-rancher”**
 - Compliments lesson and laboratory exercises
 - Video blogs (“vlogs”)
 - Provides students with a face of agriculture
 - Ranch field trips will bookend the school year

OUTPUTS

- **Curriculum modules**
 - **Mod 1 – Overview of Rangelands**
 - **Mod 2 – Rangeland Plants**
 - **Mod 3 – Rangeland Animals**
 - **Mod 4 – Soil Health**
 - **Mod 5 – Changes and Threats**
- Example: Mod 2 – Rangeland Plants, Activity #2
 - “The Starch Test” demonstrates that to form starch, a plant needs to conduct photosynthesis.
 - 1 plant placed in dark room, 1 plant placed in sunlight
 - Aligns with NGSS MS-LS1-6: Construct scientific explanation based on evidence for role of photosynthesis in cycling of matter and flow of energy into and out of organisms
- Mod 2 – Rangeland Plants, Activity #4
 - “Range Plant Discovery”
 - Students initially compare forbs vs grasses
 - Students grow sets of native grassland forbs and grasses
 - Each set receives different environmental treatments
 - Drought
 - Flood
 - Normal precipitation
 - Half of plants are “grazed”
 - Students assess the impact of different precipitation regimes
 - Students discover the effect of grazing on root development



A favorite forb among ranchers, Winterfat.



A video blog demonstrating rotational grazing.

NEXT STEPS



A South Dakota ranch students will visit on the field trips.

- Curriculum review by teachers.
- COVID-19 pushed the project timeline approximately 9 months.
- Host workshops for educators late summer 2021.
- First ranch field trips fall 2021.
- Curriculum pilot during the 2021-2022 school year.
- Reevaluate curriculum based on feedback and conduct second round of field trips and curriculum execution 2022-2023 school year.

EXPECTED IMPACTS

- Students and educators will learn about local, national, worldwide impacts of sustainable agriculture.
- Increased awareness of sustainable agriculture among youth, including:
 - Challenges faced by producers,
 - Impacts of management strategies,
 - Career opportunities.
- **After project completion, youth and their families will gain an objective understanding of how farmers and ranchers are land stewards and thus will be:**
 - **Informed citizens,**
 - **Cognizant neighbors,**
 - **Educated future voters.**

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