

# Sustainable Food & Bioenergy Systems

The Sustainable Food and Bioenergy Systems (SFBS) program offers an interdisciplinary, hands-on curriculum focused on the ecological, cultural, economic, and health aspects of food and bioenergy systems from production through consumption. The degree plan is intended to prepare and motivate students as agents of change to address society's most pressing food and bioenergy issues towards sustained environmental and human well-being. Students of the program are provided with broad interdisciplinary training founded on a core SFBS curriculum while gaining disciplinary training by selecting one of four program options housed in either the College of Agriculture, or the College of Education, Health and Human Development: (1) Sustainable Food Systems, (2) Agroecology, (3) Sustainable Crop Production and (4) Sustainable Livestock Production. The SFBS program seeks to enhance students' practical and critical thinking skills to approach food systems through service-based learning internships, hands-on production, training on research methods, independent and group projects, storytelling, and community engagement. Students must receive a grade of "C" or higher in all required courses as outlined in the major.

## **Agroecology Option (<http://catalog.montana.edu/undergraduate/education-health-human-development/sustainable-food-bioenergy-systems/agroecology-option>)—Department of Land Resources and Environmental Sciences**

Agroecology explores how crops and pest organisms interact with their environment, and the application of technology to efficiently and sustainably produce crops. Agroecology focuses on application of population principles and community ecology, environmental science, and cropland ecosystems. The curriculum is based on the philosophy that to be able to successfully predict management outcomes and thus make informed recommendations, one must understand fundamental principles of evolution, ecology, soil science, agronomy, and pest management.

The curriculum originates from a base in biological science which includes a broad knowledge of organisms (including plants, animals and microorganisms), and the physical and chemical characteristics of environments. In the Agroecology curriculum, students will develop a knowledge of the diversity of organisms and how they interact in natural and managed ecosystems. Furthermore, the curriculum will build on this knowledge in courses that demonstrate the application of ecology and environmental science principles. Students will also learn how new technologies like remote sensing and geographic information systems are modernizing agriculture. In later stages of the curriculum, students may select from an array of upper division courses in natural ecosystems, cropping systems, pest management, applied ecology, soil and water science, biochemistry, and policy and planning courses that enable them to specialize in food or bioenergy-related areas best suited to their own career vision.

### **Career Opportunities**

Graduates from this option find careers in environmental industries and consulting firms that solve problems associated with agroecosystems or agricultural practices; government jobs in environmental management and policy making; agricultural industry positions associated with precision agriculture, pest management, general agronomy, and information services. Students will be prepared for graduate training that leads to independent research in basic and applied ecology, environmental biology, cropping systems, precision agriculture, ecologically-based pest management, weed science, or agricultural entomology (pest management science).

## **Sustainable Crop Production Option (<http://catalog.montana.edu/undergraduate/education-health-human-development/sustainable-food-bioenergy-systems/sustainable-crop-production-option>)—Department of Plant Sciences and Plant Pathology**

Where does our food come from? Are there ways to sustainably maintain production levels and yet protect our natural resources? Is it possible to improve the quality and nutrition of our food supply? Are local food systems a viable alternative to corporate agricultural production? Can crops grown for bioenergy production reduce our use of fossil fuels and lessen carbon dioxide emissions? The answers to these questions and many more are discovered by students in the Sustainable Crop Production option. The curriculum is designed to train students in a broad range of principles and practices in sustainable crop production, including agronomy, soil fertility, plant genetics, plant physiology, greenhouse production, plant propagation, integrated pest management, and small business management. Both large- and small-scale food and bioenergy production systems are examined.

### **Career Opportunities**

Graduates from this option find careers in conventional and organic farming; as crop production specialists and consultants; in pest management; in seed, fertilizer, and chemical industries; with banks and other lending institutions; and as managers of CSAs and local food organizations. Other career opportunities exist in the Extension Service, state and federal agencies, and private or nonprofit organizations.

## **Sustainable Food Systems Option (<http://catalog.montana.edu/undergraduate/education-health-human-development/sustainable-food-bioenergy-systems/sustainable-food-systems-option>)—Department of Health and Human Development**

The Sustainable Food Systems option trains students in the natural and social sciences to evaluate and mitigate outcomes of complex interactions in the food system for human health and nutrition. This option focuses on the interconnections between production, policy, food security, and health. Courses in this option provide disciplinary foundation in food and nutrition while providing an interdisciplinary framework that draws from ecology, environmental sciences, plant biology and chemistry, anthropology, sociology, economics, family and consumer sciences, and political science. Students develop practical and critical thinking skills through hands-on experience in service-based learning internships, organic farming, culinary fundamentals and management, training on research methods, and carrying out research projects in surrounding communities.

Previous service-based learning experiences in this option have involved assessment of food access and food quality in health disparate environments, food processing, food cooperative management, alternative food distribution systems, and small business operations. It is expected that the multiple lenses and tools provided by this option to assess and manage food system outcomes for human health will empower graduates who are capable and enthusiastic to address food and health challenges such as obesity, food insecurity and poverty, food safety, and vulnerability of indigenous food systems.

### **Career Opportunities**

Graduates from this option are prepared for a wide range of careers in basic and applied scientific research, community nutrition, community food security, public health, Extension education, food and nutrition policy, food enterprise, culinary arts and management, community-supported agriculture, food processing, food marketing, retailing, and distribution.

**Sustainable Livestock Production Option (<http://catalog.montana.edu/undergraduate/agriculture/sustainable-food-bioenergy-systems/sustainable-livestock-production-option>)—Department of Animal and Range Sciences**

Sustainable Livestock Production focuses on the biological understanding of animal agriculture and its continued presence in sustainable grazing systems as well as its potential role in sustainable farming systems. Students will be introduced to the principles, practices and issues impacting the production, processing and preservation of safe, wholesome, nutritious, and palatable meat along with the regulatory requirements for selling animal products. Sustainable Livestock Production focuses on the science of animal production but expands students' learning to a larger system of understanding, including the role of domestic livestock in sustainable systems. In addition, students will be exposed to the role of strategic grazing in landscape management as well as using livestock to manage potential waste streams from other industries.

**Career Opportunities**

Graduates from this option are prepared for careers in both the production and allied industries associated with animal agriculture.

Graduates will also be prepared for opportunities in extension and graduate work.

**Undergraduate Programs**

- Agroecology Option (<http://catalog.montana.edu/undergraduate/agriculture/sustainable-food-bioenergy-systems/agroecology-option>)
  - Sustainable Food Systems Option (<http://catalog.montana.edu/undergraduate/education-health-human-development/sustainable-food-bioenergy-systems/sustainable-food-systems-option>)
  - Sustainable Crop Production Option (<http://catalog.montana.edu/undergraduate/agriculture/sustainable-food-bioenergy-systems/sustainable-crop-production-option>)
  - Sustainable Livestock Production Option (<http://catalog.montana.edu/undergraduate/agriculture/sustainable-food-bioenergy-systems/sustainable-livestock-production-option>)
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### **Font Notice**

This document should contain certain fonts with restrictive licenses. For this draft, substitutions were made using less legally restrictive fonts. Specifically:

Times was used instead of Adobe Garamond Pro.

The editor may contact Leepfrog for a draft with the correct fonts in place.