USDA
United States Department of Agriculture

Farm Service Agency

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Fact Sheet

Geographical Information System (GIS)

Montana State Producer Handbook

Overview

In order for the USDA Farm Service Agency (FSA) to determine producer benefits for most program areas, FSA must know the specific crop acreage or other land use information.

In the past, FSA used aerial photos or visited farms to assist producers with determining acres or other land-based information.

FSA is currently in the process of modernizing its aerial maps and implementing Geographical Information System (GIS) and Global Positioning (GPS) technology. GIS and GPS are helping FSA measure land features by allowing computer-generated maps to interact with databases that store information about land. This will assist local FSA offices in:

- Helping producers continue to exercise sensible land stewardship;
- Provide quicker, more accurate information for decision-making purposes; and
- Reduce the amount of time a producer must spend working with FSA in order to participate in FSA programs.

Geographic Information Systems

GIS is a computer-based tool for mapping and analyzing geographic information. GIS stores spatial and geographic information for three different types of areas:

- Places that have area, like farms, fields, wetlands, and neighborhoods;
- Places without area, such as the location of a grain bin, building, or tractor; and
- Places that have a beginning and end, such as major highways, private roads, and streets.

GIS stores this and other data and uses satellite imagery or aerial photography as a basemap for the overlay of these layers. GIS allows for much more detailed information than is contained in a hard copy map with a color-coded legend. Each layer can store and display vast amounts of information, such as soil types, crops, land boundaries, place names, and populations.

Common Land Unit

The most critical component of GIS is the development of the Common Land Unit (CLU) data layer. A CLU in other words is a field. The CLU layer will ultimately include all farm fields, rangeland, and pastureland.

Global Positioning Systems

GPS is an accompanying technology that can be integrated with GIS for even greater analysis of real world information. GPS handheld units can calculate the user's exact location.

Integrating GIS and GPS Technologies

FSA is integrating GIS layers and GPS information to increase the efficiency, accuracy, and timeliness of FSA program administration. GPS data layers, ortho-photography, soils layers, public land survey data, and many other data layers can be placed on top of each other inside one GIS project.

GIS and GPS help FSA store and utilize information on field boundaries of land and attributes for each field, such as field number, crop type, and producer information. Aerial photography, grain bins, private roads, and field boundaries can all be displayed in GIS at the same time. Each of these layers, excluding the aerial photography, has a database associated with it which stores detailed information.

How FSA is Using GIS and GPS

FSA is using GIS and GPS effectively in these program areas:

Farm Commodity and Conservation Programs

- Assist producers in making informed decisions about program participation and benefits,
- Measure and inventory fields, acres, and land-use categories;
- Identify and map environmentally sensitive acreage;
- Map and appraise type and extent of crop damage due to natural disaster events, such as hail, flooding, or tornados;
- Map and inventory farm site information, such as storage facilities and well heads, when needed for program implementation; and
- Maintain and share farm records and maps digitally with producers.

Farm Loan Program

- Locate farms;
- Track the location of farms under loan;
- Determine the location of farms, buildings, and structures for appraisals; and
- Locate areas of environmental concern, including easements, wetlands, and highly erodible land.

Emergency Preparedness

- Assess the impact of disasters on agricultural facilities;
- Assess the impact of weather events to help determine emergency declarations;
- Assist with homeland security; and
- Locate environmental hazards.

Compliance

- Verify compliance with program rules by checking farm acreage, field layout, and field boundaries; and
- Identify discrepancies between reported crops and actual crops.

Producer Benefits

Producers may request copies of USDA imagery, farm and field boundaries, and soils data to help them with crop planting strategies; mapping and monitoring fertilizer and herbicide application; and decision-making on the farm.

For Additional Information

Additional information may be obtained from the state FSA GIS coordinator or through the Montana FSA website at http://www.fsa.usda.gov/mt.