

RUTGERS COOPERATIVE EXTENSION

Salem County GreenKeepers Plan

Precision Agriculture

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What is Precision Agriculture?

Precision Agriculture is a term that refers to utilizing Global Positioning Systems (GPS), Geographic Information Systems (GIS), and Remote Sensing (RS) technologies to improve agricultural productivity and decrease the environmental impact of agricultural inputs. These technologies provide a means for collecting data, such as nitrogen, phosphorus, insect counts, and disease presence at precise locations in fields. The “site-specific” information is entered into a computer to become a “spatial map”. Using this map, farmers, growers, and researchers can draw direct links between soil characteristics, fertilizer application, plant health, and yield. In addition, accurate spatial maps provide guidance for precise ‘variable rate’ application of pesticides and other agricultural chemicals. This decreases the amount of chemical inputs used, providing benefits to both the grower and the environment.

What is a Global Positioning Systems?

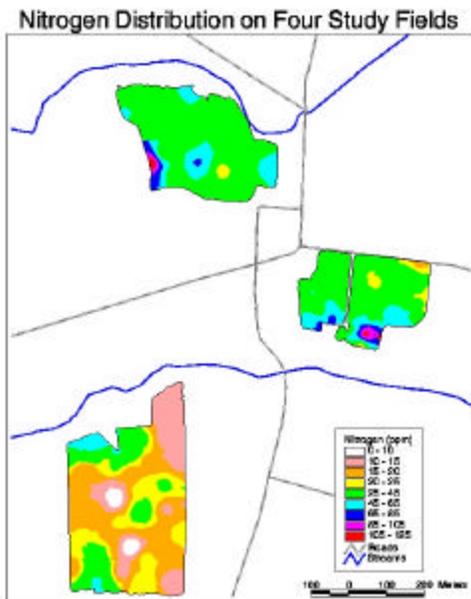
The Global Positioning System (GPS) is a worldwide highly accurate radio-navigation system of 24 satellites and their ground stations that provides three dimensional positioning, velocity, and time information.

GPS uses satellites in space as reference points for determining the precise locations of points here on earth. Rutgers Cooperative Extension of Salem County has purchased two Trimble GPS units that are accurate to within 1 meter (3 feet).



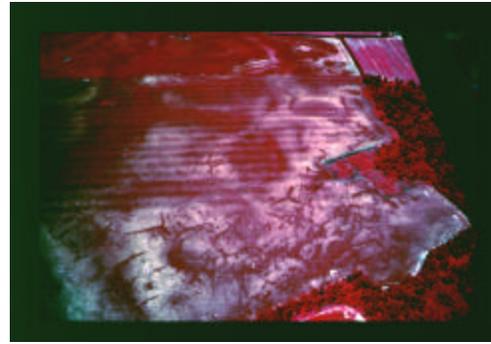
What is Geographic Information Systems?

A geographic information system (GIS) is a computer-based tool capable of using data identified according to their locations. Data can be from state agencies, aerial photography, a GPS unit, or an existing spreadsheet. GIS technology integrates common database operations such as query and statistical analysis with the ability to visualize and interrelate data from a variety of sources. For example, by relating information about soil type and nutrient distribution on a field, a grower may be able to significantly improve under-performing parts of the fields and increase yield at harvest.



What is Remote Sensing?

Remote Sensing (RS) is obtaining geographic information using a sensing device such as a camera or scanner at a substantial distance from the target area. Typically, the sensing equipment is attached to an aircraft or satellite. All types of land features absorb a portion of the electromagnetic spectrum, giving it a “spectral” signature for identification. The colors we see around us are simply reflection of light in the visible part of the electromagnetic spectrum. In general, chlorophyll in plants strongly absorbs energy in the blue and red portion of the electromagnetic spectrum and reflects in the green, giving plants their green color. Healthy vegetation also reflects strongly in the near-infrared part of the spectrum (just past the visible light portion). Using GIS and image processing software, indicators of plant stress can be developed.



Color infrared picture of drought stress in a corn field in Southern New Jersey, 82000. Taken from an airplane.

How can GPS/GIS/RS Technologies Improve Watershed Management?

GIS/GPS/RS technologies can be used to identify areas within the Salem River Watershed that contribute to significant nutrient runoff into the river, and to work with the growers in these areas to adopt better farm management practices. Over the past two years Rutgers Cooperative Extension of Salem County in cooperation with the Center for Remote Sensing and Spatial Analysis at Rutgers has mapped over X fields within the watershed using a Trimble Ag122 GPS unit, and those boundaries input into a GIS database. GIS data for this are including 1995/1997 Updated Land use/Land cover, floodprone lands, elevation, soils, and septic systems have been obtained from the New Jersey Department of Environmental Protection. These data sets are being integrated with farm operations data to identify areas of potentially high NPS pollution.

For more information....

The Salem County Greenkeepers Plan is a partnership of state and local organizations working to improve the water resources in Salem County. To learn more, please contact Dave Lee, Salem County Agricultural Agent at (856)-769-0090

