Table of Contents

Putting Researchers in the Field.................................................................3

- Agricultural Engineering/Agronomy Research Farm............................4
- Allee Memorial Demonstration Farm......................................................5
- Armstrong Memorial Research and Demonstration Farm.......................6
- Brayton Memorial Research Forest.........................................................7
- Horticulture Research Station...............................................................8
- McNay Memorial Research and Demonstration Farm...........................9
- Muscatine Island Research and Demonstration Farm..........................10
- Neely-Kinyon Memorial Research and Demonstration Farm.................11
- Iowa State University Research and Demonstration Farms Map.............12
- Northeast Research and Demonstration Farm........................................14
- Northern Research and Demonstration Farm.........................................15
- Northwest Research and Demonstration Farm.......................................16
- Southeast Research and Demonstration Farm.......................................17
- Western Research and Demonstration Farm..........................................18

Additional Units

- BioCentury Research Farm.................................................................19
- Central Iowa Research and Demonstration Farms.................................20
- Learning Centers..................................................................................22
- Borlaug Learning Center.......................................................................22
- Wallace Learning Center......................................................................22

Please turn to pages 12 and 13 for a full page pull-out map.

Types of Iowa Soil


KENYON-CLYDE-FLOYD: Loam soils over glacial till. Level to gently rolling with long slopes and low relief. Lowlands drain poorly.

SHARPSBURG-SHELBY: Loess ridges over glacial till. Mostly rolling to hilly with broad ridge tops.

GALVA-PRIMGHAR-MOODY: Loess-derived soils that are well-drained. Gentle long slopes.

TAMA-MUSCATINE-DOWNS: Nearly level to steep slopes with soils that formed in loess.

GRUNDY-HAIG: Finely textured, loess-derived soils with high clay content. Drainage is poor. Upland flats with gentle to steep side slopes.

FRUITLAND SAND: Alluvial soils occur on flood plains. Well-drained nearly level with low organic and low moisture-holding capacity.

CLARION-NICOLLET-WEBSTER: Nearly level glacial till plain with numerous wet depressions. Much of the area is tile drained.

MARSHALL: Loess with exposures of glacial till. Gently to strongly sloping well-drained soils.

OTLEY-TAINTOR-MAHASKA: Soils are fine loess or till. Land is flat to sloping. Somewhat poorly drained.

DOWNS-FAYETTE: Area characterized by deep valleys, rock outcroppings and high bluffs.

LUTON-ONAWA: Nearly level flood plain. Variable alluvial soils from clay to sand.

Definitions

LOESS: Material deposited by wind.
GLACIAL TILL: Material deposited by glaciers.
ALLUVIAL: Material deposited by streams.
Putting Researchers in the Field

Land, climate and agricultural enterprises vary considerably from one area of the state to another. To find solutions to problems in each area and to study the impacts of regional differences, the Iowa Agriculture and Home Economics Experiment Station puts researchers in the fields of research farms across Iowa. Farms near Ames are used for intensive studies and for teaching purposes.

More than 130 Iowa State faculty members use the College of Agriculture and Life Sciences’ farms for teaching, research and extension. A similar number of staff members are involved as project leaders and workers. Each year about 3,000 students receive hands-on education experiences at teaching farms, including a farm management course in which undergraduates manage a crop and livestock farm. About 20,000 people visit Iowa State’s Research and Demonstration Farms every year.

Soil and Climate: a base for research

Iowa has about 20 major soil associations, or combinations of soil types. Soil types are repeated from field to field within a geographic region. Soil types may differ in topography, texture, drainage, acidity, content of organic matter and nutrients and susceptibility to erosion. These characteristics partly determine the farm enterprises and management practices most suitable and profitable in a particular area.

Average annual rainfall in Iowa ranges from less than 26 inches in the northwest to more than 34 inches in the southeast. Annual mean temperatures range from about 46 degrees in the northern tier of counties to 52 degrees in the southern two tiers of counties. There are about 40 more days of frost-free weather in southeast Iowa compared with northeast Iowa.

Comparisons

Scientists assess the influence of soil differences and climate on agricultural practices by conducting similar experiments at several research farms. Projects at research farms often continue for many years to observe fluctuations in environmental conditions and long-term trends.

Markets and resources also vary across the state. At research farms, researchers determine the profitability of an agricultural enterprise in a given area. The research also yields clues to the potential of new crops and practices that may diversify the agricultural base.

Organization

Local nonprofit associations of farmers and business people own or lease eight of the 13 research farms. Iowa owns the other five. In central Iowa, ISU affiliate organizations own land for research.

Associations and affiliates lease the research farms to the Experiment Station. Income from farm product sales is used to offset research costs. The Experiment Station assumes the remaining costs of operating the farms.

The Experiment Station also is active in partnerships with ISU Extension and Outreach, USDA National Resource and Conservation Service, USDA Agricultural Research Service, USDA National Laboratory for Agriculture and Environment and several Iowa community colleges.

Interaction

Area producers suggest local problems that need to be studied and often offer suggestions for improving research at the farms. Producers make their suggestions as members of local advisory committees. These committees meet at least once each year with county and area extension staff and ISU researchers. The committee members are liaisons between the university and other producers.

The Experiment Station publishes research results in annual reports. Extension specialists use the reports in meetings, pamphlets, news stories, information websites and broadcasts. Local farmers can observe experiments firsthand and learn about the latest findings at field days that are held at the farms.
History
This site was opened in 1964 when the Agricultural Engineering and Agronomy Farms were relocated from South State Avenue in Story County. The Iowa Crops and Soils Research Association, a group of Iowa agricultural leaders with on-campus leadership by Professor H.D. Hughes, was instrumental in acquiring the farmland. These farms serve projects from the agricultural and biosystems engineering and agronomy departments. Projects from the entomology, biochemistry, genetics and plant pathology departments, and the USDA National Laboratory for Agriculture and the Environment also are served by these farms.

Research and Demonstration
Crops. Extensive plant breeding and genetics work related to corn, soybeans and sorghum are conducted. Crop physiology, management, sustainable agriculture and crop rotations research also is conducted.

Soils and water quality. Researchers from Iowa State and the USDA National Laboratory for Agriculture and the Environment are actively conducting projects related to tillage, nutrient management, sedimentation, runoff, soil structure, drainage and movement of compounds through soil.

Power and machinery. Agricultural engineers perform research related to farm machinery, grain storage and handling and agricultural mechanization and electronics. Specific work has been done with anhydrous ammonia applicators, tillage tools, grain combines, planters, manure spreaders, tractors and grain bins and dryers. The farm is a popular site for product testing by farm magazines of commercial pickup trucks, utility vehicles and farm machinery.

Facilities
The farm has extensive buildings with shops, offices, a meeting room, workrooms, equipment storage, threshing facility, dryers and seed cold storage. Two intensive sets of water quality plots have tile drainage sampling wells, flumes and wetlands.

Graduate and undergraduate students use the farm shop for machinery fabrication projects and building quarter-scale working tractors. The farm also has a building dedicated to studying livestock housing and manure.

The Field Extension Education Laboratory (FEEL) is a 43-acre teaching and demonstration facility that provides hands-on learning experiences for crop production professionals. Demonstration plots show a range of management problems, solutions and diagnostic challenges. Mistakes are intentionally made on these plots to enhance the learning experiences. Clinics are taught by ISU staff and faculty and invited specialists. Modern, air-conditioned classroom facilities are within walking distance of the demonstration plots.
History
The farm was started in 1958 when George M. Allee bequeathed 160 acres to ISU.

Research and Demonstration
The farm is used for whole-farm agricultural demonstrations focused on modest-sized, sustainable, family-based farming. The farm is used to develop profitable farming systems for these farm units. All the farm’s enterprises incorporate whole-farm systems rather than studying individual components.

Innovative techniques are used for growing crops and livestock. These techniques will be used to develop systems that complement the crop, livestock and management of modest-sized farms. The farm is the site of a biomass research trial involving the perennial grass miscanthus. The farm staff also is active with research projects in area farmers’ fields.

Facilities
The farm has cattle-feeding lots with a capacity of 250 head. The farm feeds cattle that are part of the university’s large beef cattle breeding project. The cattle also are part of a cover crop grazing project.

LOCATION: 2030 640th St., Newell, IA 50568 • Buena Vista County
PHONE: (712) 272-3512
SIZE: 160 acres
OWNER: Iowa State University
SOILS: The terrain is nearly level to gently sloping and contains numerous depressions and low knobs. Predominant soils are:

- **CLARION**: 2 to 5 percent slope, occurs on upland slopes, very well drained;
- **NICOLLET**: 1 to 3 percent slope, occurs between uplands and low areas, poorly drained;
- **CANISTEO**: 0 to 2 percent slope, poorly drained.

The Allee mansion was built in 1891 by George M. Allee’s parents, Jesse and Mary. The Queen Anne style features a turret with five unique fish-scale patterns, seven original stained glass windows, three sets of oak pocket doors, etched glass door windows, an open staircase and an ornate fireplace. In 1958, George Allee’s will transferred the farm and the mansion to ISU. In 1989, ISU leased the mansion to the Newell Historical Society for restoration. In 1992, the mansion was listed on the National Registry of Historic Places. It is open for tours and community events.
History
The Wallace Foundation was formed in 1990 to enhance agricultural research and education for southwest Iowa. The Armstrong Research and Demonstration Farm was established by a donation of 40 acres and the sale of 360 acres to the foundation by Gail and Glendale Armstrong in 1993. The Neely-Kinyon Research and Demonstration Farm is managed as a satellite of this farm. The Wallace Learning Center building was completed in 1997 and houses staff for ISU Extension and Outreach and the farm. (see page 22).

Research and Demonstration
Crops. Row crop and forage management studies focus on corn and soybean row spacing, strip-cropping, insecticide and herbicide trials, planting dates and populations and weed management.

Soil. Agronomists study potassium and phosphorus application rates and placement and their effect on soil fertility and crop yields. They also study timing and rates of nitrogen, lime and manure on row crops. The topography of the area makes soil erosion and tillage work important.

Livestock. Researchers study sustainable livestock production methods. Animal scientists conduct beef nutrition, health and management studies. Beef cattle are fed in a deep-bedded hoop barn.

Horticultural crops. The farm has an extensive vegetable, fruit and flower garden.

Facilities
A cattle-feeding research unit was completed in 1995. The Wallace Learning Center features a meeting place for up to 150 people and rural small-business incubator (see page 22). In 2004, a hoop barn for feeding beef cattle was constructed.
Brayton Memorial Research Forest

LOCATION: Delhi • Delaware County
SIZE: 322 acres
OWNER: Iowa State University
Managed by ISU Extension and Outreach forester (515) 294-1168 or (515) 294-5045.

SOILS: The area has a complex glacial history. The terrain is marked by limestone outcroppings, steep side-slopes and narrow ridges.

History
The research forest was donated to ISU in 1949 by Emma L. Brayton. The university purchased an additional 10 acres in 1951.

Research and Demonstration
Researchers use the native forest to study and demonstrate a variety of topics of interest to woodland owners. Studies and demonstrations include walnut establishment trials and production of valuable wood products from diseased trees salvaged from the forest.

A small area of timber is being partially harvested to study the costs and benefits of woody biomass feedstock production for the bioenergy sector. Researchers also are studying the impacts of this woody biomass removal on wildlife populations as well as on forest processes. Unwanted undergrowth is aggressively managed in demonstration areas throughout the forest, as well as a long-term study on the impacts of deer browsing on seedling survival, growth and internal wood quality. Given the current rate of oak decline in Iowa, researchers also study and demonstrate methods for re-establishing oak trees through harvesting and prescribed burning.
History

Horticultural field research has been active at Iowa State since the beginning of the institution. The work was moved to this site in 1967 from the former location at Sheldon and Knapp streets in Ames.

Research and Demonstration

Field research. The station has extensive horticultural plantings and projects, including apple orchards, vineyards, pest control in muskmelons, demonstration home gardens, vegetables, fruit, hops yards, turfgrass and ornamentals. The farm has active research related to turtles, honeybees, wasps and tree swallows. Scientists from horticulture, forestry, botany, ecology, plant pathology, entomology and natural resources are active at the station.

Facilities

The station has a headquarters building with offices, laboratory, meeting/classroom, cold storage and an apple-sorting room. Other improvements include a shop, pesticide building, equipment storage, turf research building, a 15-acre lake, extensive irrigation system and six 0.2-acre ponds.
Above: Elementary students learn about water quality at a field day. Left: Purebred Angus cattle are used for breeding, genetic, management, forage and reproduction research.

McNay Memorial Research and Demonstration Farm

LOCATION: 45249 170th Ave., Chariton, IA 50049 • Lucas County
PHONE: (641) 766-6465
SIZE: 1,968 acres
OWNER: Iowa State University

History
The farm was established by a donation of 480 acres in 1956 by Harry McNay and his sister, Winnie. Additional land acquisitions allowed researchers to broaden the scope of the research conducted.

Research and Demonstration
Cattle. The 400-cow purebred Angus herd has been selected since 1996 for increased marbling and is a valuable resource for the collection of phenotypic data for use in both short-term and long-term studies. This herd has served as the discovery platform to identify markers associated with not only growth and meat quality, but also animal disposition, resistance to respiratory and pinkeye infection, response to vaccination and fatty acid and mineral content of meat. Some outstanding offspring from this herd include a bull that is third in the American Angus Association active sire list for marbling and a significant number of Pathfinder cows, recognized by the association as elite individuals.

Forage. Researchers study yield and persistence of grasses, fertilizer requirements for hay and silage production, grazing management, intensive rotational grazing systems, pasture improvement and cool- and warm-season grass grazing systems. Researchers also conduct alfalfa variety trials and study methods for baling, binding and storing large round hay bales, year-round grazing system and stock-piled grazing.

Crops. Researchers evaluate reduced-tillage and reduced-chemical systems for controlling weeds and insects in corn and soybeans. Researchers also are evaluating systems of biomass production, measuring the energy values of crops for combustion and ethanol production. Tillage systems, strip-cropping and corn-breeding evaluation plots also are located on the farm.

Facilities
The farm includes a multiple-pen cattle-feeding unit and an automated cattle-feeding unit capable of handling several large groups of beef cattle. Grazing paddocks support forage systems and predator control studies. The farm also has facilities for developing bulls and housing mature breeding bulls, as well as facilities for breeding and calving.

SOILS: What was once a plain has eroded to a series of irregular upland flats, flanked by gentle to steep slopes. The upland flats constitute about 20 percent of the land. Predominant soils are:

- **HAIG**: level to sloping, very fine texture, poor drainage, occurs primarily on upland flats;
- **GRUNDY**: 2 to 7 percent slope, on upland slopes, fine texture.

LOCATION: 45249 170th Ave., Chariton, IA 50049 • Lucas County
PHONE: (641) 766-6465
SIZE: 1,968 acres
OWNER: Iowa State University

SOILS: What was once a plain has eroded to a series of irregular upland flats, flanked by gentle to steep slopes. The upland flats constitute about 20 percent of the land. Predominant soils are:

- **HAIG**: level to sloping, very fine texture, poor drainage, occurs primarily on upland flats;
- **GRUNDY**: 2 to 7 percent slope, on upland slopes, fine texture.
Muscatine Island Research and Demonstration Farm

LOCATION: P. O. Box 40, 111 North St., Fruitland, IA 52749 • Muscatine County
PHONE: (563) 262-8787
SIZE: 126 acres
OWNER: Muscatine Island Research Farm Association
SOILS: Predominant soil is Fruitland coarse sand with less than 5 percent slope, is well-drained and has an organic matter content of less than 3 percent.

History
The research farm was founded in 1935 on 63 acres leased from the Rock Island Railroad. In 1983, the association purchased 40 acres of this original tract and an additional 66 acres were added in 2002. In 2013, an adjacent 20 acres were acquired.

Research and Demonstration

Variety testing. Scientists conduct trials of advanced breeding lines and the newest cultivars of fruits, vegetables and ornamental crops.

Agronomic crops. Agronomic crops. Scientists are conducting soybean cyst nematode and Sudden Death Syndrome in soybeans testing with plans to expand this work.

Cultural methods. Scientists evaluate production strategies and methods for sustainability and environmental stewardship. Research areas include: efficient fertilizer use to protect groundwater and develop guidelines for plant tissue nutrient tests; using plastic mulches and row covers; irrigation management (both drip and overhead); earliness techniques for high-value vegetable; and organic crop production.

Pest control. Researchers evaluate new products and methods of controlling diseases, insects and weeds. Integrated pest management practices are explored to address food safety and environmental concerns. Weather data collection and insect-trapping provide information for scheduling spray applications for certain pests, such as corn earworm, corn borer and melon leaf blights.

The farm serves as an extension education hub for commercial growers. Field days or individual visits to the research farm provide clients with an opportunity to interact with Iowa State production specialists and observe recommendations being used in the field. Home demonstration gardens provide information to the public for home landscaping and gardens.

Above top: A group visits the research farm. ISU Research Farms host about 20,000 visitors annually for field days, tours and learning experiences. Above bottom: Plantings and gardens at the research farm provide living classrooms for area growers. Right: Harvesting muskmelons at the farm. Muscatine is known for muskmelons. The sandy soil is conducive to melon culture.
**History**

The Wallace Foundation was formed in 1990 to enhance agricultural research and education for southwest Iowa. A donation of a 160-acre farm in Adair County by Wayne and Margaret Neely in 1994 established the Neely-Kinyon Research Farm. The farm is managed as a satellite of the Armstrong Research Farm.

**Research and Demonstration**

The farm researches and demonstrates alternative agricultural approaches that are environmentally sound and have a positive impact on the community.

**Crops.** A 17-acre block of 40 quarter-acre plots is dedicated to research. Plant, soil, pest, grain quality and economic performance of organic and conventional systems are studied. Sorghum is grown for information related to biomass production. Cover crops also are studied.

**Soils.** The topography of the area makes soil erosion, cropping rotation and tillage research important. Prairie strips are used to control water and nutrient movement in the fields. There is ongoing monitoring of soil quality for the crops research.

**Facilities**

In addition to the plots, the farm has a machinery storage building. An erosion control structure waterway and tile drainage was completed recently.
Research and Demonstration Farms

Partnership (Association Owned)

University Owned
**Principal Soil Association Areas**

**MONONA-IDA:** Very deep well-drained loess. Sloping ridges with steep side slopes. Numerous drainage ways common.

**KENYON-CLYDE-FLOYD:** Loam soils over glacial till. Level to gently rolling with long slopes and low relief. Lowlands drain poorly.

**SHARPSBURG-SHELBY:** Loess ridges over glacial till. Mostly rolling to hilly with broad ridge tops.

**GALVA-PRIMGHAR-MOODY:** Loess-derived soils that are well-drained. Gentle long slopes.

**TAMA-MUSCATINE-DOWNS:** Nearly level to steep slopes with soils that formed in loess.

**GRUNDY-HAIG:** Finely textured, loess-derived soils with high clay content. Drainage is poor. Upland flats with gentle to steep side slopes.

**FRUITLAND SAND:** Alluvial soils occur on flood plains. Well-drained nearly level with low organic and low moisture-holding capacity.

**CLARION-NICOLLET-WEBSTER:** Nearly level glacial till plain with numerous wet depressions. Much of the area is tile drained.

**MARSHALL:** Loess with exposures of glacial till. Gently to strongly sloping well-drained soils.

**OTLEY-TAINTOR-MAHASKA:** Soils are fine loess or till. Land is flat to sloping. Somewhat poorly drained.

**DOWNS-FAYETTE:** Area characterized by deep valleys, rock outcroppings and high bluffs.

**LUTON-ONAWA:** Nearly level flood plain. Variable alluvial soils from clay to sand.

**Definitions**

**LOESS:** Material deposited by wind.

**GLACIAL TILL:** Material deposited by glaciers.

**ALLUVIAL:** Material deposited by streams.
Northeast Research and Demonstration Farm

LOCATION: 3321 290th St., Nashua, IA 50658 • Floyd County
PHONE: (641) 435-4864
SIZE: 260 acres
OWNER: Northeast Iowa Agricultural Experimental Association
SOILS: The land is nearly level to undulating with low swells rising gradually between intervening lowlands that drain poorly. Numerous soil types have formed in loamy material overlying glacial till. Predominant soils are:
KENYON: 1 to 2 percent slope, moderately well-drained, occurs on ridges and swells;
FLOYD: 1 to 3 percent slope, somewhat poorly drained, occurs on lower slopes;
CLYDE: 0 to 2 percent slope, poorly drained, located in drainage ways.

History
The association established the farm in 1976. In 2009, the Borlaug Learning Center building opened. It houses ISU Extension and Outreach and farm staff. (see page 22).

Research and Demonstration
Crops. Experiments focus mainly on corn and soybean production, such as planting dates, row spacing, plant populations and long-term tillage. Agronomists and plant breeders conduct breeding programs and variety evaluations on small grains, corn, soybeans and forages. Weed, insect and disease control strategies are studied and evaluated annually.

Horticultural crops. Horticulturists conduct garden produce evaluations for yield potential and pest control. They use a demonstration garden to display new horticultural varieties and cultural practices that can be adopted by home gardeners.

Soils. Researchers study soil fertility and soil management systems. Agronomists study nutrient requirements of area crops and crop rotations, and evaluate fertilizer and lime rates and placement to observe crop yield response.

Water quality. Researchers from ISU and the USDA’s National Laboratory for Agriculture and the Environment carry out extensive water-quality testing based on timing, rate and placement of fertilizer, pesticide and animal manure applications. Field drainage tile lines and groundwater wells from 40 one-acre plots are monitored and sampled to determine the extent of chemical, nutrient and pesticide leaching. The farm is a regional site for USDA groundwater research.

Facilities
In 2009, the Borlaug Learning Center opened with meeting rooms, offices and a small-business incubator (see page 22). Other facilities include a heated shop, grain storage and a hoop barn for machinery storage.

The tiled plots are fitted with individual computerized groundwater sampling equipment for surface and subsurface water quality monitoring. Irrigation simulates rainfall intensity and timing for research studies looking at runoff and leaching of pesticides and fertilizer.

Above left: Several farms have demonstration home gardens and host popular field days for gardeners. Above: Harvesting research plots with a special harvester. The research involves studying the interaction of fungicide use and aphid infestation in soybeans.
Northern Research and Demonstration Farm

LOCATION: 310 S. Main St., Kanawha, IA 50447 • Hancock County
PHONE:  (641) 762-3247
SIZE:  173 acres
OWNER: North Central Iowa Research Association
SOILS: Terrain is gently sloping, broken by a rectangular gridwork of roads and fields. Much of the land is drained by tile systems and open ditches because the land has poor natural drainage. Predominant soils are:
  CLARION: 2 to 5 percent slope, very well drained, occurs on upland slopes;
  NICOLLET: 1 to 3 percent slope, poorly drained, occurs between uplands and low areas;
  WEBSTER: 0 to 3 percent slope, poorly drained, occurs on low-lying uplands.

History
The North Iowa Experimental Association, the oldest in Iowa, was formed in 1930 and purchased 93 acres. The Clarion-Webster Experimental Association was formed in 1952 and purchased 80 acres. In 1995, the associations merged.

Research and Demonstration
Crops. The farm is a site for small grain variety tests, corn and specialty soybean breeding, studies of nitrogen fertilization rates and timing on corn and breeding soybeans with resistance to soybean cyst nematode. Researchers conduct extensive tests on corn and soybean weed management. Evaluation of cover crops and strip tillage also is underway.

Soils. Researchers study soil fertility and management systems. Agronomists study nutrient requirements of area crops and apply nitrogen, phosphorus, potassium and lime to observe crop yield response.

Above: Modern, GPS-equipped machinery is planting in a strip tillage setting. Left: The research farms are sites of butterfly habitat and milkweed identification plots.
Northwest Research and Demonstration Farm

LOCATION: 6320 500th St., Sutherland, IA 51058 • O’Brien County
PHONE: (712) 446-2526
SIZE: 272 acres
OWNER: Northwest Iowa Experimental Association

SOILS: Terrain is nearly level to gently rolling and is well-drained. The soils are loess derived. Predominant soils are:
- **GALVA**: 2 to 5 percent slope, well-drained, occurs on uplands and gentle slopes;
- **PRIMGHAR**: 1 to 3 percent slope, moderately well to moderately poorly drained, occurs on broad ridges.

**History**
The association purchased two tracts, 37 acres in Lyon County and 75 acres in O’Brien County, in 1954. In 1989 and 1990, the organization purchased additional land, 60 acres in Lyon County and 152 acres in O’Brien County. The original tracts have been sold. Development has continued with the purchase in 2001 of 120 acres adjacent to the O’Brien County farm. The Lyon County site is no longer used for plot research.

**Research and Demonstration**
**Crops.** Scientists study fertilizer requirements of corn and soybeans in different crop rotations and corn yields under various planting and fertilization rates and moisture conditions.

**Tillage.** Researchers compare ridge-till, no-till and conventional tillage methods to determine the effects on crop yield, pest control and soil compaction. Plots are used to study the effects of tillage and manure application on runoff water quality.

**Soils.** Researchers assess soil fertility and management systems. Agronomists evaluate nutrient requirements of area crops and apply nitrogen, phosphorus, potassium and lime to observe crop yield response. Ag engineers study water quality using an intensively instrumented set of plots and drain tiles.

**On-Farm Research**
The farm is the hub of an on-farm research program that conducts research projects in local farmers’ fields.

*Left: The farm has research plots for measuring runoff water from land with various crops, tillages and manure applications. The collection tubes and sumps are shown. Below: A fertilizer applicator, specially built for precision rates, is used to study nitrogen management. Below left: Sophisticated instruments measure and sample tile water for water quality research.*
Southeast Research and Demonstration Farm

LOCATION: 3115 Louisa-Washington Rd., Crawfordsville, IA 52621 • Washington County
PHONE: (319) 658-2353
SIZE: 273 acres
OWNER: Southeast Iowa Agricultural Research Association
SOILS: Land is flat to slightly sloping. Predominant soils are:
TAINTOR: 0 to 2 percent slope, poorly drained, occurs on broad upland flats;
MAHASKA: 1 to 3 percent slope, somewhat poorly drained, on ridges and uplands.
OTLEY: 2 to 18 percent slope, very deep, moderately well-drained, occurs on side slopes.

History
The association purchased the main farm in 1987. An adjacent tract was acquired in 2002.

Research and Demonstration
Crops. Researchers study corn, soybeans and small grains. Other research focuses on tillage methods, pest management, fertilizer and manure management and alternative cropping systems.
Soils. Researchers study soil fertility and management systems, including nutrient requirements of area crops and applications of nitrogen, phosphorus, potassium and lime to observe crop yield response. Researchers also evaluate the effectiveness of tile drainage systems.
Other studies. The Iowa Nut Growers Association has established a demonstration site on the farm and the USDA Natural Resources Conservation Service is evaluating native grasses at the site.

Above: Planting research plots involves specialized machinery. Right: The farms use modern equipment fitted with special devices for measuring yield.
Western Research and Demonstration Farm

LOCATION: 36515 Highway E34, Castana, IA 51010 • Monona County
PHONE: (712) 885-2802
SIZE: 280 acres
OWNER: Western Iowa Experimental Farm Association

SOILS: Gently sloping ridges and steep side slopes that gradually change to well-defined valleys characterize this region. Sloping soils are very erosive and require terracing, contouring and other conservation practices. Predominant soils are:

IDA: 6 to 30 percent slope, well-drained, occurs on narrow divides and steep side slopes;
MONONA: 5 to 14 percent slope, well-drained, occurs on ridges and steep side slopes.

History
The association purchased the farm in 1946. In 2002, 40 acres was given to the farm.

Research and Demonstration
Swine. Research focuses on alternative pig production. The ISU Hoop Research Complex is located at the farm. Studies on animal density, pork quality, alternative feeds and wean-to-finish approaches are conducted with finishing pigs. Researchers include scientists from animal science and extension.

Forage. Performance of young cattle is evaluated using various rotational grazing systems. Cover crops are studied for their potential as a grazed forage and their impact on crop yields, soil quality and nutrient management properties. Native plants in the Loess hills also are being researched. The farm staff helps with research projects in area farmers’ fields.

Facilities
Extensive pastures support grazing and forage studies. Deep-bedded hoop structures are used in the alternative swine production project. The Hoop Research Complex consists of three full-sized hoop barns equipped with six pens for 64 pigs each and three small research hoops with six pens with 6 to 10 pigs each.

Above: Beef cattle are used in a variety of grazing trials. Left: Alternative swine production techniques are studied in deep-bedded hoop barns.
BioCentury Research Farm

**Location:** Agricultural Engineering and Agronomy Research Farm, 1327 U Ave., Boone, IA 50036 • Boone County • Across from the Ag Engineering and Agronomy Research Farm

**Phone:** (515) 296-6300

**Owners:** Iowa State University—565 acres • Committee of Agricultural Development—656 acres • 1,100 acres make up the Agricultural Engineering and Agronomy Research Farm and are available to BioCentury Research Farm (BCRF) researchers.

**Soils:** Terrain is gently sloping, broken by a rectangular gridwork of roads and fields. Much of the land is drained by tile and ditches because the land has poor natural drainage. Predominant soils are:

- **Clarion:** 2 to 5 percent slope, very well-drained, occurs on upland slopes;
- **Nicollet:** 1 to 3 percent slope, poorly drained, occurs between uplands and low areas;
- **Webster:** 0 to 3 percent slope, poorly drained, occurs on low-lying uplands.

**History**

The BioCentury Research Farm (BCRF) is the first-in-the-nation research and demonstration farm devoted to biomass production and processing. Since opening in 2009, the BCRF has promoted and supported advanced research in the areas of biomass production, harvest, storage, transport, preparation, processing and analysis.

**Research and Demonstration**

The BCRF is located at and works closely with the Ag Engineering/Agronomy Research Farm. Examples of research and demonstration projects at the BCRF include:

- **Biomass production.** Alternative biomass crop species including miscanthus, sorghum and switchgrass are being evaluated. Different biomass cropping systems are being explored, including development of perennial cover crops and management strategies for corn biomass production systems.

- **Biomass harvest, storage, and transport.** Single pass biomass harvesting technologies that separate and gather corn stover and corn grain are being evaluated. Work on biomass densification and corn stover storage techniques continues.

- **Biomass preparation and processing.** Grinding and sizing corn stover and woody biomass is underway. Further testing of pyrolytic processes and high-temperature gas filtration continues. Additional facilities include a thermal gasification system and small-scale fermentation vessels.

- **Outreach.** Many tours of the farm host thousands of visitors. ISU classes also use the facilities.

**Facilities**

The BCRF offers opportunities for medium pilot-scale research in biomass feedstock production, harvest, transport, storage, preparation, biorefinery processing and laboratory testing. BCRF facilities include biomass production, dry biomass feedstock storage, biomass feedstock preparation, biomass chemical pretreatment, wet and dry fractionation, fast pyrolysis and thermal gasification, fermentation and distillation, cold storage, business incubator and office space.

**Above:** Researchers are studying the conversion of biomass to fuels. **Left:** Harvesting corn residue and grain at the same time.
Central Iowa Research and Demonstration Farms

LOCATION: Story and Boone counties
SIZE: Approximately 8,200 acres
OWNERS: Iowa State University • City of Ames • Committee For Agricultural Development, a nonprofit corporation organized in 1943, that works to increase and distribute seed of crop varieties developed by researchers at experiment stations in the North Central Region and the USDA. • ISU Foundation, a nonprofit, tax-exempt Iowa corporation, that is the official fund-raising organization for ISU. It manages donated assets for the benefit of ISU in accordance with donor wishes.

SOILS: Terrain is gently sloping, broken by a rectangular gridwork of roads and fields. Much of the land is drained by tile and ditches because the land has poor natural drainage. Some predominant soils are Clarion, Niccollet and Webster.

Background
Agricultural land owned by ISU and its affiliates provides room for future growth of research programs and the university’s infrastructure.

In addition to research, the agricultural land also is used for demonstrations, feed production for livestock and as areas to spread manure. Affiliate ownership of a large portion of this land keeps it on the local tax rolls and provides greater flexibility in buying and selling property.

Teaching, Research and Demonstration
The Experiment Station manages and assigns its farmland to faculty and project leaders based on their research needs.

The projects encompass a variety of disciplines, including: agronomy, animal science, agricultural and biosystems engineering, horticulture, forestry, ecology, entomology and plant pathology. In addition researchers at the USDA’s National Laboratory for Agriculture and the Environment and the North Central Regional Plant Introduction Station use land for research.

Animal science department: This department uses a number of farm sites for teaching and research.

• The Animal Science Teaching Complex includes several farm sites located south of Ames and is used for laboratory classes, applied research and demonstrations of production systems with beef, sheep, swine and horses.
• The Beef Nutrition Research Farm, located north of Ames, provides continuing research on management and nutritional needs of ruminants, especially beef cattle.
• The Dairy Science Farm, located south of campus, opened in 2007. The farm is used for dairy breeding, nutrition and related research. Dairy cattle from this herd are used in classes.
• The Lauren Christian Swine Research Center at the Bilsland Farm, located near Madrid, is used to study the importance of genetic variation in economic traits of swine.
• The Swine Nutrition Research Farm, located west of Ames, was completed in 1993. It is used to study nutrition and management techniques to improve feed utilization, lean tissue gain, animal well-being and meat quality of pigs.
• The Poultry Science Farm is a complex located south of Ames and is used to study nutrition and genetics of turkeys and chickens.
• The Zumwalt Station Farm is located southwest of Ames and is the site of research related to odor characterization, dietary manipulation and effects of environment on animals.

For more information on animal science research conducted at sites in central Iowa, call (515) 294-2160.

Other facilities:
• The 50-acre Hinds Irrigation Plots, located on a flat, well-drained area north of Ames, is the primary irrigated farm available to ISU researchers.
• The Animal Resource Station is a 160-acre farm located south of Ames. This unit is under the administrative direction of the Vice President for Research and supports university programs by housing a variety of animal species. For more information, call (515) 294-8507.
• The Ag 450 Farm has been managed by students since 1943, serving as a laboratory for students enrolled in Agricultural Education and Studies 450,
Farm Management and Operation. The farm includes 266 acres of ISU-owned land, additional rented property and a swine operation. For more information, call (515) 294-6924.

- The North Central Regional Plant Introduction Station, a joint USDA-ISU facility located south of Ames, uses 120 acres of ISU-owned land for preservation, evaluation and distribution efforts. A variety of crops is grown.

- The facility maintains a germplasm collection of about 1,000 species and 40,000 accessions (different samples of plant material). For more information, call (515) 294-3255.

- The Committee for Agricultural Development (CAD) owns a number of farms in Story and Boone counties. These farms are used for seed production, research plots and large-scale research projects. CAD is an affiliate of the ISU College of Agriculture and Life Sciences.

- The ISU Compost Facility was constructed in 2008 for composting organic waste materials (10,000 tons annually). The organic wastes processed include manure and bedding from ISU farms, primarily the dairy farm, campus yard waste, campus greenhouse materials, ISU Dining food waste and biomass research organic wastes.
Learning Centers

Borlaug Learning Center
LOCATION: Northeast Research Farm, 3327 290th St., Nashua, IA 50658 • Floyd County
PHONE: (641) 435-4864
OWNER: Iowa State University

Wallace Learning Center
LOCATION: Armstrong Memorial Research Farm, 53020 Hitchcock Ave., Lewis, IA 51544 • Pottawattamie County
PHONE: (712) 769-2650
OWNER: Wallace Foundation for Rural Research and Development

Borlaug Learning Center
The Borlaug Learning Center, opened in 2009, houses ISU Extension and Outreach and farm staff and is located at the Northeast Research and Demonstration Farm.

The center is named for Norman E. Borlaug, agricultural scientist and Nobel Peace Prize recipient, who was born near Cresco in Howard County. Borlaug, who is called the father of the Green Revolution, was a leader in developing higher yield crops and also founded the World Food Prize. The center displays highlights of Borlaug’s achievements and his successful effort to provide food security and promote world peace. The building provides office space and meeting rooms for staff and public use and incorporates a number of energy-saving features.

Wallace Learning Center
The Wallace Learning Center, completed in 1997, houses ISU Extension and Outreach and research farm staff and is located at the Armstrong Research and Demonstration Farm. The Wallace Foundation was formed in 1990 to enhance agricultural research and education for southwest Iowa. The center and the Wallace Foundation, which owns the farm and the center, are named for Henry A. Wallace, former U.S. vice president and secretary of agriculture and commerce, who was born on a farm near Orient in Adair County. Wallace was a member of a leading Iowa agricultural family, who started the Wallaces Farmer magazine. He also was a scientist, developer of hybrid seed corn and founder of the Pioneer Hi-Bred International, Inc.
For more information, contact:

IOWA STATE UNIVERSITY
Research and Demonstration Farms
103 Curtiss Hall
513 Farm House Lane
Ames, Iowa 50011
(515) 294-5045

www.ag.iastate.edu/farms

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