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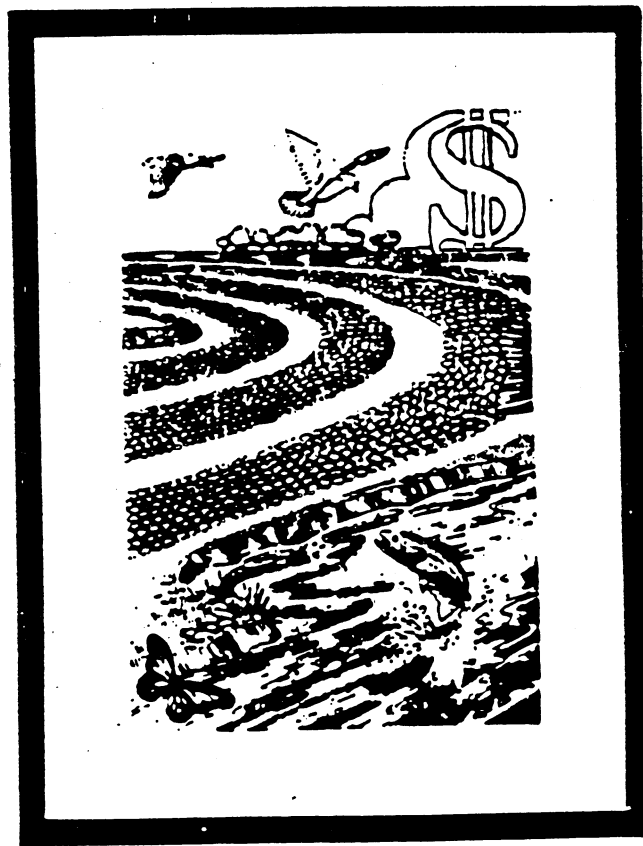
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Low-Input/Sustainable Agriculture  
Research and Education Projects  
for 1988



Sustainable agriculture

University of California  
April 1988

by

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## INTRODUCTION

In 1985, Congress passed the Food Security Act, PL-99-198, which included Subtitle C, Agriculture Productivity Research. In December 1987, \$3.9 million was appropriated for a program of research and education on low-input farming systems for FY 1988.

Congress specified expectations in the way the program was to be operated and the subject matter to be included. A total of \$851,000 was allocated to each of the four regions (Northeast, North Central, Southern, and Western), including \$15,000 start-up money to meet the costs of setting up the program in the states. In the near future (August 1988 suggested) the institutions that have agreed to disperse these monies to the participating organizations should receive \$836,000 from USDA.

The intent of Congress for the program is to promote the development and adoption of farming methods which will (1) enhance agricultural productivity, (2) maintain the productivity of the land, (3) reduce soil erosion and loss of water and plant nutrients, and (4) conserve energy and natural resources. In the language of the Appropriation legislation, the intent of Congress is made more explicit:

A growing number of farmers are now looking for reliable information on reduced input farming systems. These farmers are interested in learning how alternative farming methods can be used to reduce production costs and control soil erosion and the pollution of underground water supplies caused, in part, by heavy fertilization, pesticide use, and monocultural cropping systems.

Guidelines for operating the low-input sustainable agriculture program were developed by USDA. These guidelines were adapted to local situations in each of the regions, and many public and private organizations were invited to prepare proposals for projects to be funded by this program. During May and June, review meetings were held in each of the regions. Technical committees composed of researchers, Extension personnel, farmers, representatives of private research and education foundations, and Agricultural Research Service evaluated a total of more than 400 proposals. The projects selected for funding cover a wide range of subject matter related to low-input sustainable agriculture, as indicated in the following brief summary of the projects funded.

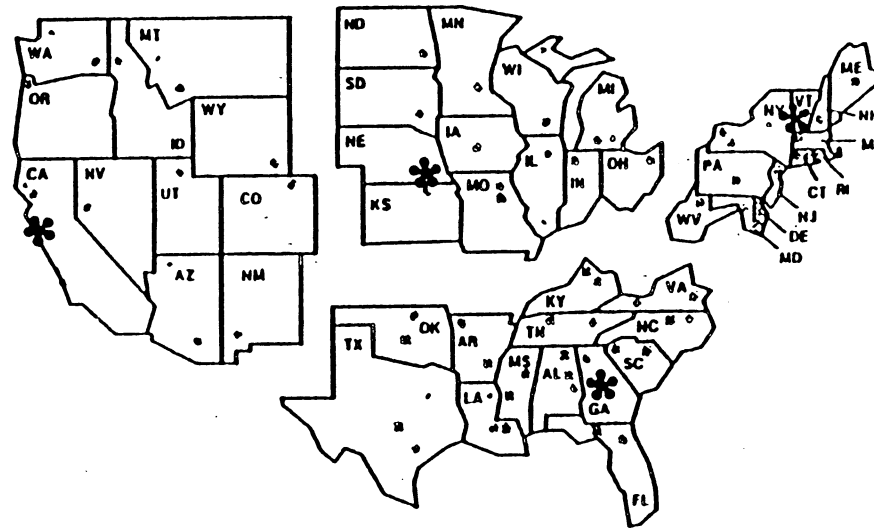


# Regions

North  
Central

Northeast

West



\* Host Institutions

Projects Funded in the Northeast Region

The Northeast Region includes Connecticut, Delaware, Maine, Maryland, Massachusetts, New Jersey, New York, Pennsylvania, Rhode Island, Vermont, and West Virginia. A total of 78 proposals were evaluated. Eleven were selected to receive funding. Two of these projects were funded for two years, for a total of \$382,000. The other nine projects received a single year of funding, including one planning grant. The federal funds allocated to projects in the Northeast Region during the current fiscal year is \$800,000. Matching support provided by the participating organization totaled \$970,000.

1. DEVELOPMENT OF A LOW INPUT APPLE PRODUCTION SYSTEM FOR THE NORTHEAST

Principal Investigators (alphabetic by state):

University of Massachusetts, Amherst, MA: D.R. Cooley, (Plant Pathology) and others in Plant and Soil Sciences, Entomology, and Agricultural Economics

Rutgers Fruit Res. and Dev. Center, Cream Ridge, NJ: D.F. Pol (Agri. Econ.) and E.F. Durner (Horticulture)

New York Agric. Exper. Station, Hudson Valley Lab., Highland, NY: D.A. Rosenberger (Plant Pathology) and others in Entomology, Dept. of Natural Resources and Cornell Cooperative Extension Service.

Cornell University, Ithaca, NY: L.S. Willett (Agri. Econ.)

Rodale Research Center, Kutztown, PA: C.D. Kauffman and other staff.

University of Vermont, Burlington, VT: L.P. Berkett (Project Coordinator) and J. F. Costante (Plant and Soil Science)

Objectives:

1. Reduce pesticide use in Northeast apple production through the development of low input apple production systems that utilize disease-resistant apple cultivars and IPM techniques.
2. Produce a compendium of information on low-input apple production using information generated in this study, published literature, and expert's observations. This information will be made available via several

methods, including talks and demonstrations, a joint publication, and a computerized database.

Project Duration: July 1, 1988 - June 30, 1991

CSRS Funding: \$200,000 for two years. Matching: \$264,553

2. IMPROVING FARM PROFITABILITY BY EFFICIENTLY USING THE PASTURE RESOURCE

Principal Investigators:

The University of Vermont: William M. Murphy (project coordinator, sheep farmer and Agronomist) plus others animal scientists, and dairy extension specialist, agricultural economist, and county extension agent)

West Virginia University: William B. Bryan (Agronomist) and others animal scientist, and agricultural economist).

State University of New York, Syracuse: Daniel L. Dindal (soil ecologist)

University of Massachusetts: Kent Fleming (farm management extension specialist)

Cooperators: John Brigham, Brent Brigham, and Austin Cleaves (dairy farmers); Brian Pillsbury (Agronomist, Soil Conservation Service); William Reid (fence dealer and builder); and Donald and Bette-Ann Lockhart, Perceptions, Inc. (Video Film Producers).

Objectives:

1. Evaluate grass/legume pasture production and quality under different frequencies and intensities of grazing of well developed, Voisin-managed pasture.
2. Determine the economic implications and the effects on farm management of incorporating well developed, Voisin-managed pastures, into dairy farm feeding programs during 5 to 7 months of the year.
3. Transfer to farmers in the Northeast existing information on proper pasture management, as well as new information developed in this project as quickly as possible, by farm walks, videos, television programs, meetings for farmers, popular press articles, and fact sheets that summarize research results.

Project Duration: June 1, 1988 - May 10, 1991

CSRS Funding: \$182,000 for two years. Matching: \$268,515

3. ROLE OF CEREAL GRAIN (RYE) COVER CROPS IN NITROGEN  
MANAGEMENT FOR THE CHESAPEAKE BAY REGION

Principal Investigators:

University of Delaware: William Ritter (agri engineer)  
University of Maryland: Russell Brinsfield (Project  
Coordinator and agronomist)  
Pennsylvania State University: Les Lanyon (agronomist)  
Rodale Institute: James Morgan (Executive Director)

Objectives:

1. Evaluate the management of cereal grain (rye) cover crops to reduce the leaching of nutrients to groundwater and to optimize nitrogen recycling on the farm.
2. Evaluate the economic impact of cereal grain (rye) cover crops on the farming system.
3. Develop on-farm research to promote the use of cereal grain (rye) cover crops as a tool for nitrogen management.

Project Duration: July 1, 1988 - July 31, 1993

CSRS Funding: \$150,000 for one year. Matching: \$111,576

4. ALTERNATIVE CROPPING SYSTEMS FOR LOW INPUT AGRICULTURE  
IN THE NORTHEAST

Principal Investigators:

Cornell University: Jane Mt. Pleasant (weed scientist) and  
Tom Scott (soil fertility).

USDA, Agricultural Research Service: Rich Zobel (root  
genetics)

Cooperators:

Cornell University: Ed Bechinski (entomology) and other  
faculty in plant pathology, agronomy, soil fertility,  
weed ecology, soil physics, and integrated pest  
management.

Rodale Research Center: Rhonda Janke (agronomy, weeds) and other staff

USDA Agricultural Research Service: Jerry Radke (stationed at Rodale Research Center)

Boyce Thompson Institute: Allan Eaglesham

Objectives:

1. Provide farmers with viable crop production practices that reduce off-farm inputs while maintaining productivity and conserving the natural resource base, through demonstration trials on research farms, and on-farm trials comparing conventional practices can with alternative low-input practices.
2. Determine the effects of alternate cropping systems under several tillage, weed control, manure, and cover crop practices on nutrient utilization, crop growth, soil erosion, pest levels and the soil-root environment.
3. Developing methods of utilizing information on nitrogen dynamics within different cropping systems to maximize the capacity of soils to supply nitrogen for crops while reducing nitrogen losses from the soil-plant system (especially leaching into groundwater).

Project Duration: June 1, 1988 - May 31, 1998.

CSRS Funding: \$60,000 one year. Matching: \$41,285

5. IMPLEMENTATION OF ELECTRONIC DECISION SUPPORT TECHNOLOGY FOR APPLE PRODUCTION

Principal Investigators and Cooperators:

The Pennsylvania State University: The Artificial Intelligence Applications Group (AIAG)-- an interdisciplinary group. Edwin G. Rajotte (Assistant Professor of Entomology, Grant Administrator) and other faculty in Agriculture Economics, Rural Sociology, Entomology, Horticulture, Plant Pathology, Agronomy, and Industrial Engineering.

University of Vermont: Lorraine Berkett (Plant and Soil Sciences) and Patricia Downer (Computer Specialist)

University of Massachusetts: The Expert System Committee and the Experimental Knowledge Systems Laboratory.

Cooperators:

Faculty members in Extension Plant Pathologist, Plant and Soil Science, Regional Farm Management Specialist, and Experimental Knowledge Lab.

Rodale Research Center: Sarah Wolfgang, project leader/  
orchard

Objectives:

1. Develop and implement decision support technology, particularly expert systems, in order to substitute high quality, integrated, interpreted information for purchased production inputs in apple production thereby decreasing input costs and detrimental environmental impacts.
2. Develop interstate, interdisciplinary and academic/private sector (grower and agribusiness) cooperation in the development and evaluation of electronic decision support technology, especially expert systems, for apple production in the Northeast.

Project Duration: June 1, 1988 - May 30, 1993

CSRS Funding: \$55,000 for one year. Matching: \$28,949

6. RESEARCH, DEMONSTRATION AND OUTREACH IN LOW-INPUT, SUSTAINABLE AGRICULTURE FOR SMALL FARMS

Principal Investigator:

The New Alchemy Institute, East Falmouth, MA: John Quinney,  
Ph.D. Executive Director

Objectives:

1. Promote low-input, well-managed, small-farm systems producing high quality vegetables, herbs, cut flowers, small fruit, and greenhouse crops
2. Plan and manage research projects in integrated pest management, cover cropping, composting and greenhouse technology for New England small farms
3. Respond to New England farmers' requests for research and information on low-input/sustainable agriculture

4. Help stimulate demand for the products of sustainable agriculture through public education and guided tours of the New Alchemy Institute's twelve acre Cape Cod site

Project Duration: June 1, 1988 - May 30, 1990

CSRS Funding: \$50,000 for one year. Matching: \$102,500

7. USE OF ELECTRONIC TECHNOLOGY TO DELIVER INFORMATION AND DIRECT RESEARCH: THE GRAPE PARADIGM

Principal Investigators:

Pennsylvania State University: M. C. Saunders (Entomology), J. W. Travis (Plant Pathology) and C. W. Haessler (Horticulture)

Cornell University: J. Nyrop and T. J. Dennehy (Entomology); R. Seem and R. Pearson (Plant Pathology)

Objectives:

1. Further develop the Grape Expert System (GRAPES), including improved horticulture, entomology, and plant pathology components.
2. Generate and deliver weather forecast data at a high spatial resolution (1km) for weather variables important to local management decisions - pest development, cultural management, timing of pesticide applications, etc., and link into GRAPES Expert System.
3. Field test, evaluate, and implement GRAPES in farm-level setting in Pennsylvania and New York, and deliver the system to grape growers in Pennsylvania and New York..

Project Duration: June 1, 1988 - May 30, 1990

CSRS Funding: \$40,000 for one year. Matching: \$43,712

8. WEED CONTROL IN REDUCED TILLAGE CROPPING SYSTEMS: USE OF OVERSEEDED COVER CROPS

Principal Investigators:

Rodale Research Center: Rhonda R. Janke (Agronomy Coordinator)

Cornell University: Peter Marks and Charles Mohler (Plant Ecology)

USDA, ARS, Weed Science Laboratory, Beltsville, MD: John R. Teasdale (Plant Physiologist)

Objectives:

1. Control both annual and perennial weeds in no-till and reduced-till cropping systems with the use of overseeded mulch crops and relay cropping practices.
2. Test the use of mulch crops and relay crops for reducing perennial weed seedling establishment as well as perennial weed invasion from vegetative propagules.
3. Test the effectiveness of mulch crops and relay cropping to curtail annual weed seedling establishment.
4. Determine whether the use of mulch crops in the reduced tillage systems without herbicides will provide adequate weed control, reasonable yields, and improved net profits for farmers.

Project Duration: June 1, 1988 - September 30, 1989

CSRS Funding: \$27,000 for one year. Matching: \$21,897

9. ACCELERATING THE ADOPTION OF LOW INPUT STRATEGIES IN FIELD CROPS

Principal Investigator: Western New York Crop Management Association Cooperative, Inc., John R. Deibel, Manager, East Aurora, NY

Cooperators: New York Field Crops Cooperative Extension Agents, Dale Dewing and Bruce Tillapaugh

Objectives:

1. Establish field-scale trials using selected low-input strategies and variations on Crop Management Association farms, with intensive scouting programs and portable scale measurement of yields.
2. Develop an economic analysis of each practice, showing costs and returns impact of the practice or approach.
3. Disseminate findings by holding field days on farms, publishing booklet, and other means.

Project Duration: June 1, 1988 - May 30, 1991



CSRS Funding: \$16,000 for one year. Matching: \$16,500

#### 10. NORTHEAST DAIRY FARM FORAGE DEMONSTRATION PROJECT

Principal Investigator:

Joan Sinclair Petzen (Agriculture Program Leader, Cornell Cooperative Extension) Ellicottville, NY

Participating Sponsors:

Cornell Cooperative Extension Associations of Allegany, Cattaraugus, Chautauqua and Wyoming Counties; Seneca Trail Resource conservation and Development; Northeast Dairy Herd Improvement Cooperative, Inc.

Cooperating Agencies

Cornell University and New York State Soil Conservation Service

Objectives:

1. Teach farmers to implement a total year-round forage management system, utilizing intensive rotational grazing technique and progressive dry hay and fermented forage harvesting and storage technology, that will allow dairy farms on sloping and low pH soils to improve their profitability by maximizing the use of forages in their feeding program while reducing the needs for tillage of highly edible soils.
2. Conduct an economic analysis of the impact of intensive rotational grazing systems on the profitability of dairy farms in regions where soil resources and climate limit the production of mechanically harvested forages.
3. Develop an accurate database and calibration equations for near infrared analysis of fresh forage samples and to develop a practical methodology for producer sampling and handling of fresh forages for analysis.

Project Duration: June 1, 1988 - October 31, 1990

CSRS Funding: \$10,000 for one year. Matching: \$43,695

11. HELPING FARMERS MAKE WISE DECISIONS ABOUT LOWERING  
INPUTS (A VIDEO PRESENTATION)

Principal Proposer: James Morgan, Executive Director, Rodale  
Institute

Cooperating Institutions: Rodale Research Center, Kutztown,  
PA

Objectives:

1. Develop the approach, scenario and draft script for a broadcast quality videotape that will assist farmers, specifically in the Northeastern Region, in understanding and considering low-input or regenerative agriculture as an option for their farms.
2. Address practical questions of interest to farmers, on topics such as the economic, conservational and environmental implications of adopting regenerative farming methods through use of research findings and experiences of farmers.
3. Assemble a professional production team, farmers experienced with low-input agriculture, researchers, extensionists and other information sources essential to the development of the video. The planning and more detailed proposal will be completed by November 1, 1988.

Project Duration: June 1, 1988 - November 1, 1990

CSRS Funding: \$10,000 planning grant for one year.  
Matching: \$4,210

Projects Funded in the North Central Region

The North Central Region includes Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, South Dakota, and Wisconsin. A total of 106 proposals were evaluated. One project was funded for two years, \$98,500. Another twenty projects were given smaller amounts (\$4,000 to \$76,500) for one year. The total CSRS funding for these 21 projects was \$778,356. Matching contributions in excess of \$700,000 (including in-kind contributions and faculty salaries, indirect costs, etc.) were provided by the participating organizations.

1. INTEGRATION OF CONSERVATION TILLAGE, ANIMAL MANURES, AND CULTURAL PEST CONTROL IN CORN

Principal Investigators at University of Minnesota: David A. Andow (Entomology), John F. Moncrief and James B. Swan (Soil Science)

Cooperating Farmer: Dale Flueger

Objectives:

1. Explore and evaluate management alternatives for low-input corn production using ridge-tillage and farm manures.
2. Investigate the potential for reducing nitrate and pesticide pollution of ground water by substituting manures for anhydrous ammonia.
3. Determine whether reasonable rates of applications of manure and different tillage practices affect survival of corn rootworms, attack by European corn borer and weed populations

CSRS Funding: \$98,500 for two years. Matching: \$132,236

2. LOW-INPUT BEEF CATTLE SYSTEMS OF PRODUCTION

Project Leaders:

University of Nebraska: Terry Klopfenstein (Animal Science)

University of Missouri: John Paterson (Animal Science)

Iowa State University: James Russell (Animal Science)

Objectives:

- 1) Develop economical, forage based, low-input-cost beef growing finishing systems.
- 2) Develop production systems that maintain beef cow reproductive efficiency with minimum use of hydrocarbon-based fuels in the form of nitrogen fertilizer or harvested feeds.
- 3) Transmit information on low in-put, economical beef production systems to cattle producers through field days, reports and a multi-state symposium.

CSRS Funding:

University of Nebraska	\$25,500
University of Missouri	\$25,500
Iowa State University	\$25,500
Total	\$76,500

Matching: in-kind contributions of faculty salaries, indirect costs, and facilities.

## 3. MIDDLE BORDER ON-FARM RESEARCH AND INFORMATION NETWORK

Principal Organizations:

Nebraska Sustainable Agriculture Society: Steve Ela

University of Nebraska, Department of Agronomy: Chuck Francis

Kansas Rural Center: David Ebbert

Land Stewardship Project, Stillwater MN: Patrick Moore, Managing Director; Audrey Arner, Siouxlans Project Director; Anita Zelenka, Sioux-lands Project Organizer

Cooperators:

The West Central Minnesota Experiment Station at Morris: Dennis Warnes, (Agronomist); South Dakota State University Research Station at Brookings; Jim Smolik (Agronomist); The Carmen Fernholz, Madison, MN (farmer in the Regenerative Agriculture Association's research and demonstration network).

Objectives:

1. Each of the citizens' organizations will organize a low-input farmers network throughout the region that:
  - a) Communicates regularly with researchers at the local land grant institutions;
  - b) identifies and publicizes local farmers who have had substantial experience with specific low-input methods and are willing to share their experiences with others;
  - c) conducts on-farm, low-input agriculture demonstrations on supervised test plots;
  - d) conducts tours and educational programs for area farmers and lenders;
  - e) publishes a bimonthly newsletter for the exchange of information about low-input farming innovations being tried in the area.
2. Assist in disseminating results of low-input agriculture research being conducted at land grant universities in the region and to encourage increased research in areas that meet the needs of local cash grain and livestock farmers.
3. Coordinate communications and relations between the citizens' organizations, local extension agents, bankers, local state and federal agencies and consumers in the major towns in the region.

CSRS Funding:

NSAS	\$19,000
KRC	25,000
LSP	31,000
Total	<u>\$75,000</u>

Matching: \$104,115

4. SUBSTITUTING LEGUMES FOR FALLOW IN US GREAT PLAINS WHEAT PRODUCTION.

Principal Investigators:

Michael Fields Agricultural Institute: W.A. Goldstein (agronomist)

North Dakota State University: J. C. Gardner (Contact person) and other faculty in agronomy and agricultural economics.

Kansas State University: J.L. Havlin (soil management)

University of Nebraska: R. N. Klein (ecol. farming extension specialist) and D. Martin (agronomy)

South Dakota State University: J.D. Smolik (agronomist)

Objectives:

1. To demonstrate and conduct on-farm research of a biennial black medic/cereal production system in the spring cereal region of the US Great Plains.
2. Conduct small plot research on several alternative legumes for water use, nitrogen-fixing, and growth characteristics which will determine their suitability as companions in a cereal/legume production system in both spring and winter wheat regions.
3. Using the most promising legumes, develop production systems in combination with wheat and possibly other locally adapted crops to substitute for fallow in ND, MN, SD, NE, and KS.

CSRS Funding: \$74,000      Matching: in kind contributions

5. AGRONOMIC AND ECONOMIC ANALYSES OF ALTERNATIVE SMALL GRAIN/ROW CROP PRODUCTION SYSTEMS FOR THE NORTHERN PLAINS

Principal Investigators at South Dakota State University:

James D. Smolik (Project Director and Agronomist) and other faculty in Agricultural Economics, Plant Pathology, Soils, and Weed Science.

Cooperating Farmers: Charles Johnson and Allan Johnson (organic farmers), Kris Johnke (conventional farmer), and Fred Kirschenman (organic farmer and President of Northern Plains Sustainable Agriculture Society, Windsor, ND)

Other Cooperators: Agricultural Research Service, USDA:  
 Robert W. Kieckhefer (Entomologist); South Dakota State  
 University: David D. Walgenbach (Integrated Pest  
 Management); Robert G. Hall (Extension  
 Agronomist); University of Nebraska: Warren W. Sahs  
 (Agronomist); North Dakota State University: John C.  
 Gardner (Research Extension Center); University of  
 Minnesota: Kent R. Crookston (Agronomist); Montana State  
 University: James R. Sims, (Plant and Soil Science)

Objectives:

1. Determine the nature and magnitude of agronomic and economic effects associated with the transition from conventional to alternative farming systems.
2. Intensify measurements and analyses of soil, physical and biological properties, and plant pests.
3. Incorporate farmer and researcher experience and knowledge on low-input farming into research and extension programs.

CSRS Funding: \$66,700      Matching: \$74,000

6. EVALUATION OF INTEGRATED LOW-INPUT, CROP-LIVESTOCK PRODUCTION SYSTEMS

Principal Investigators:

North Dakota State University, Fargo: S. Boyles (animal science) and other faculty in agricultural economics and microbiology; NDSU, Carrington: J.C. Gardner (plant science, Contact Person) and other faculty in animal science; NDSU, Hettinger: T. Faller (animal science); NDSU, Mandan: R.J. Lorenz (animal science)

Northern Plains Sustainable Agriculture Society: F. Kirschenman (farmer and President of NPSAS)

On Farm Cooperator: J. Ludwig

Objective:

Compare the production and economics of three systems: a traditional crop production enterprise, a low-input crop production enterprise, and a low-input crop production enterprise with either beef, cows, or sheep.

CSRS Funding: \$50,000      Matching: in-kind contributions

7. PERFORMANCE AND ECONOMICS OF A LOW-INPUT, FARROW-TO-FEEDER SWINE OPERATION

Principal Investigators:

University of Minnesota: C. Pijoan, DVM (veterinary medicine) and other faculty in agricultural engineering, extension, and agricultural and applied economics.

Cooperating Farmer: G. Forsmann, Howard Lake, MN

Objectives:

1. Compare the performance and health of swine raised under a low-input system with similar animals raised under a confinement system, and to make an in-depth economic analysis of these 2 systems.
2. Establish management parameters for this low-input system based on environmental and production measurements.
3. Continuing observation of the system as the animal grow older, and the study of modifications of the system to address further welfare concerns such as 8 week weaning.

CSRS Funding: \$42,100      Matching: \$39,000

8. EFFECT OF TILLAGE AND WEED CONTROL ALTERNATIVES ON CROP ROTATIONS

Principal Investigators:

Iowa State University: James Baker (agricultural engineering), Richard M. Cruse (agronomy), and Michael D. Owen (weed science extension)

Agricultural Research Service, USDA: Donald C. Erbach (agricultural engineer)

Practical Farmers of Iowa: Harlan Grau, Newall, Iowa

Objectives:

1. Determine the degree of weed control success obtained using different weed control strategies for a corn, soybean, oats/alfalfa rotation managed with three different tillage systems.



2. Determine the effect of tillage systems on crop yields and legume N production in the rotation previously listed and for small grains.
3. Evaluate the effect of nitrogen incorporation in the ridge and herbicide banding with ridge tillage and chisel plowing on surface and subsurface drainage losses of nitrate and herbicides.
4. Help develop weed control recommendations, requiring minimal use of herbicides, for multi-crop rotations which are managed with conservation tillage.

CSRS Funding: \$40,000      Matching: \$35,616

9. A RESEARCH EXTENSION AWARENESS PROGRAM FOR LOW-INPUT AGRICULTURE IN OHIO

Principal Investigators at Ohio State University:

D.J. Eckert and R. Lal, (agronomy department)

Cooperating Farmer: R. Spray (organic farmer, Mt. Vernon, Ohio)

Other Cooperators at OSU: L. Forster (agricultural economics); R. Holmes (agricultural engineering), P. Lipps (plant pathology), E. Regnier (agronomy) and B. Stinner (entomology)

Objectives:

1. Expand existing experimental plots to evaluate low-input crop production practices, effects of legume management on N-supplying power, soil test-yield calibrations, precision N management (Eckert), effects of cropping practices on soil properties (Lal and Holmes), and integrated pest management (Lipps, Regnier, and Stiner)
2. Bulletin outlining known methods for reducing inputs and costs.

CSRS Funding: \$38,000      Matching: \$40,000

10. UTILIZATION OF THE ALLELOPATHIC EFFECTS OF WINTER RYE  
GRAIN AS A METHOD OF WEED CONTROL IN SOYBEAN PRODUCTION

Principal Investigators:

Rodale Institute: Ken McNamara, Midwest On-Farm Research  
Coordinator, Lodi, WI

University of Wisconsin: Jerry Doll (agronomy extension  
scientist)

Cooperating Farmers: Gary Zicafoose, Mead, Nebraska; Dick  
Thompson, Boone, Iowa; Tim Ballweg, Mazomanie, Wisconsin,  
Bob Fogg, Leslie Michigan; Terry Holsapple, Greenup,  
Illinois; Ron Harmon, Salisbury, Missouri; and Richard  
Bennett, Napoleon, Ohio.

Objectives:

1. Examine the use of a rye, hairy vetch and oats cover  
crops as a method of weed control for soybeans in a wide  
range of soil and climatic conditions and with a range of  
management regimes, including different means of cover  
crop establishment, tillage, and methods of killing the  
rye in the spring.
2. Evaluate the effectiveness of a rye cover as a means of  
controlling soil erosion in soybean production.
3. Compare the economics of soybean production using a rye  
cover with more conventional production methods.
4. Carry out, along with the applied on-farm trails, a  
program of greenhouse and small plot studies, examining  
more basic concepts of allelopathic properties of rye and  
oats and their management in soybean production systems.

CSRS Funding: \$31,150      Matching: \$24,042

11. A STATEWIDE COLLABORATIVE SUSTAINABLE AGRICULTURE  
RESEARCH AND OUTREACH PROJECT

Principal Investigators at University of Wisconsin:

Professor Dennis Keeney (Soils) and Professor Richard Klemme  
(agricultural economics)

Institutional Participants:

The Wisconsin Rural Development Center: (G.W. Stevenson);  
The Wisconsin Department of Agriculture, Trade, and  
Consumer Protection (Kenneth C. Rineer); The College of

Agricultural and Life Science, University of Wisconsin;  
the Michael Fields Agricultural Institute

Objectives:

1. Obtain a valid, whole farm economic comparison of farms using conventional and sustainable practices to determine the areas of economic advantage.
2. To engage these multi-directional research, outreach, and policy efforts in the planning of an overall sustainable agriculture agenda for Wisconsin and related farming regions of the Upper Midwest.

CSRS Funding: \$25,000      Matching: \$29,500

12. AN ECONOMIC ANALYSIS OF PRODUCER AND INDUSTRY LEVEL  
IMPACTS OF LOW-INPUT AGRICULTURE

Principal Investigators:

Iowa State University, Ames: Michael Duffy (extension economist) and James Kleibenstein (economist)

University of Nebraska, Lincoln: Glenn Helmers and Azzeddine Azzam (agricultural economists)

Objectives:

1. Establish baseline data for economic analysis of resource use and efficiency in low-input agriculture, through survey of farmers: identify technologies presently in use; develop cost and return budgets.
2. Evaluate through systems analysis, farm-level management alternatives and production strategies for low-input crop and livestock production. Estimate income generation, labor needs and use, and risk and management responsibilities.
3. Sectoral analysis of agricultural policies which result in widespread use of low-input agriculture, with emphasis on agricultural prices and production, income, labor utilization, soil conservation, pollution, industry structure, and rural community impact.

CSRS Funding:

Iowa State University	\$12,500	<u>Matching:</u> \$31,824
University of Nebraska	12,500	
Total	\$25,000	

## 13. LOW-INPUT RIDGE TILLAGE SYSTEM FOR THE CORN BELT

Principal Investigators and Cooperators:

Ohio State University: Randall Reeder (agricultural engineering, principal investigator) and other faculty in agronomy, farm operations, information, agricultural economics, entomology, and agricultural engineering.

Agricultural Research Service, USDA: Norman Fausey

Purdue University: Samuel Parsons and Donald Griffith

Cooperating Farmers: Dale McNelly (OH), Donn Klor (IL), John Alexander (IN) and Carl Eppley (IN)

Objectives:

1. Establish a permanent low-input ridge tillage system on 175 acres of continuous corn and corn-soybean rotation at the site of the Ohio State Farm Science Review. Demonstration plots will compare ridge tillage directly to conventional and no-till systems, using commercial farm size equipment that will appeal to the majority of farmers. Reduce use of synthetically formulated pesticides and fertilizers. Control erosion without using forages in rotation.
2. Educate farmers in Ohio, the North Central Region and the world about low-input ridge tillage through programs during Farm Science Review. Included are field days at cultivation time for those considering a switch to ridge tillage and in late August for farmers already practicing ridge tillage; a national conference on low-input ridge tillage in March, 1990, and publishing findings in Extension bulletins, local newspapers, and the national farm press.

CSRS Funding: \$24,300    Matching: 70,899

14. MAKING THE CONVERSION FROM CONVENTIONAL TO SUSTAINABLE AGRICULTURE: A VIDEO TAPE SERIES FOR FARMERS

Principal Investigators: Jerald R. DeWitt (cooperative extension, Iowa State University)

Objectives:

1. Form a multi-state coordinating committee.
2. Develop 10 broadcast-quality videotapes.
3. Deliver the videotapes to farmers in the Midwest and nationally,

CSRS Funding: \$20,000    Matching: \$23,783

15. ASSESSING SOIL PHOSPHORUS AVAILABILITY IN LOW-INPUT SYSTEMS

Principal Investigators at Kansas State University: Steve J. Thien and A. Paul Schwab

Objectives:

Develop a soil test that will aid in soil management for low-input farming systems by measuring both organic and inorganic phosphorus available for plant uptake during the growing season.

CSRS Funding: \$18,949    Matching: \$19,144

16. ON-FARM EXPERIMENTATION WITH PRACTICAL LOW-COST ALTERNATIVES FOR INCLUDING LIVESTOCK IN SUSTAINABLE FARMING SYSTEMS

Principal Investigators:

Center for Rural Affairs: Larry Krcil and Ron Krupicka (Hartington NE)

Nebraska Sustainable Agriculture Society: Steve Ela

Objectives:

1. Integrate a livestock production component into NSAS's workshops, held in cooperation with county extension agents in north-east Nebraska, to conduct farmer-initiated experimentation for finding better ways to use

farm resources. Farmers, county extension agents, and project staff will develop specific practical research questions to be presented to agricultural researchers so that barriers to implementing sustainable livestock production practices can be eliminated.

2. Continue Project-initiated, on-farm research on specific livestock technologies and practices. Test the feasibility and appropriateness of using a walk-through fly trap for cattle to control horn flies on today's dairy and cow/calf farms. On-farm research with cooperating farmers on composting of livestock manure, pasture management, and the design and construction of low-cost livestock facilities.
3. Share the findings with other farmers, sustainable agriculture groups, and land grant universities through media involvement, farm tours, written materials, and presentations at workshops and conferences.

CSRS Funding: \$16,848      Matching: \$28,544

#### 17. SUSTAINABLE/LOW-INPUT AGRICULTURE: AN OVERVIEW VIDEOTAPE

##### Principal Investigators:

University of Nebraska: Charles Francis, Myra Wilhite,  
James W. King

##### Objectives:

1. Give a suitable definition of sustainable agriculture, and describe examples of sustainable farming practices.
2. Discuss sustainable agriculture issues and practices in differing regions.
3. List ways to use sustainable agricultural techniques in some specific farming systems with emphasis on the profitability and long-term ecological advantages of sustainable agriculture.
4. Edit and publish this overview in Nebraska. Duplicate and distribute to all land-grant universities in the North Central region and several other organizations.

CSRS Funding: \$16,800      Matching: \$24,187

18. LOW-INPUT AGRICULTURE AND COVER CROP WORKSHOP FOR  
EXTENSION AND RESEARCH PERSONNEL FROM NEBRASKA, IOWA,  
KANSAS AND MISSOURI

Principal Coordinators:

University of Missouri: Z. R. Helsel (agronomy)

University of Nebraska: Richard Ferguson (soil science),  
Roger Selley (economics) and Charles Francis (agronomy)

Kansas State University: David Whitney (agronomy)

Iowa State University: Regis Voss (agronomy)

Objectives:

1. The workshop will provide participants with latest information on various agronomically related subject matter relevant to low-input agriculture.
2. Participants will prepare teaching materials appropriate for use in training other scientists and extension field staff in their respective states. Subsequent training sessions and educational programs for agri-organization leaders and producers respectively should follow.
3. As a specific 2-day part of the workshop, researchers from the four states will discuss current activities in the area of cover crops and develop research plans for future efforts. A joint session will provide an overview of reported cover crop research and general known information outside the region.

CSRS Funding: \$16,500    Matching: \$8,156

19. DEVELOPMENT OF ORGANIC N AVAILABILITY FUNCTIONS FOR  
NITROGEN MANAGEMENT MODEL

Principal Investigators at University of Wisconsin: D.R. Keeney (soil science), L.G. Budy (soil science and U.W. - extension) and R.M. Klemme (agricultural economics and U.W. extension)

Objectives:

1. Develop a comprehensive nitrogen management model capable of providing predictions for maximizing crop use of available soil nitrogen, particularly N from organic sources through selection of optimal combinations of management variables. The model will also serve to min-

imize environmental problems, particularly groundwater contamination by nitrate associated with excess use of N.

2. Integrate research program with extension to facilitate development of the model for the needs of the users and the rapid transfer of the technology and will be user-tested.

CSRS Funding: \$14,009      Matching: \$20,809

20. LOW-INPUT DATABASE AND INFORMATION SYSTEM ON AGRONOMIC AND ECONOMIC CONSEQUENCES OF CONVERSION FROM CONVENTIONAL TO LOW-INPUT CROPPING SYSTEMS

Principal Investigators:

University of Nebraska, Lincoln: Charles Francis (agronomy)

Iowa State University, Ames: Richard Cruse and Stan Hennig (agronomy)

University of Missouri: Zane Helsel (agronomy)

Cooperating Farmers: Richard Mazour, Deweese, Nebraska; Richard Thompson, Boone, Iowa; Jim Long, Powhattan, Kansas

Objectives:

The objective is for representatives from the 12 North Central States to develop plans to organize and produce an interactive computerized database and information retrieval system for low-input agriculture. The system will interface, where appropriate, with private organizations, the National Agricultural Library, ATTRA, and the other three national regions.

CSRS Funding: \$5,000 planning grant      Matching: in-kind

21. SUSTAINABLE AGRICULTURE EDUCATIONAL DISPLAYS

Principal Investigators at Ohio State University: Clive Edwards (entomology) and Bill Lyon (extension entomology OSU)

Cooperators at Ohio State University: Nancy Creamer (sustainable agriculture project, entomology) and other faculty in farm science review board, agronomy, agricultural engineering, plant pathology, agricultural economics, dairy science and animal science.



Objective:

Design and construct educational displays for use first at the 1988 Farm Science Review. Also available for future events.

CSRS Funding: \$4,000      Matching: \$4,000

Projects Funded in the Southern Region

The Southern Region consists of Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, Missouri, North Carolina, Oklahoma, South Carolina, Texas, and Virginia. Some 120 project proposals were evaluated by the Southern Region's Technical Committee. Two projects were funded for two years, receiving a total of \$340,000. Six projects received between \$14,700 and 100,000 for a single year. Three planning grants of \$15,000 each were awarded. The total CSRS funding allocated to these eleven projects is \$769,700. Matching contributions by the participating organizations totaled \$1,400,000.

1. A COMPARISON OF CROPPING SYSTEMS MANAGED CONVENTIONALLY OR WITH REDUCED CHEMICAL INPUT

Principal Investigators at North Carolina State University:

Larry D. King (coordinator, soil science) and other faculty in soil science, botany, economics and business and entomology and plant pathology.

Objectives:

1. In an ongoing field experiment, maintain four cropping systems managed conventionally or managed with reduced rates of commercial fertilizer and pesticides (hereafter referred to as "low-input"). Monitor crop yield, cycling of N, P, and C in the soil-plant systems concentration of allelopathic compounds (phenolic acids) in soil; shifts in composition and number of soil arthropods and nematodes; microbial population and activity; soil infiltration capacity and recharge of plant available water; and economic viability of each cropping system.
2. Conservation tillage/natural reseeding: develop or adapt equipment to mechanically kill strips in winter green manure crop, no-till plant into kill strip, or allow green manure to mature seed and then cultivate through green manure residue to control weeds leavings as much residue as possible on the soil surface.
3. Develop response functions based on various inputs (legumes, reduced fertilizer rates, cultivation, soil properties, etc.) and apply them to actual North Carolina farms to determine the affect of reduced input levels on profitability.
4. Develop extension programs to increase awareness of extension agenda and specialists regarding the scope

and purposes of low-input agricultural systems; provide extension agents and specialists with current and applicable research information on low-input agriculture from this and other experiments.

Duration: Three years (June 1, 1988 - May 31, 1991)

CSRS Funding: \$190,000 for two years. Matching: \$287,614

## 2. LOW-INPUT REDUCED TILLAGE CROP PRODUCTION SYSTEMS FOR THE SOUTHERN UNITED STATES

### Principal Investigators:

University of Georgia: W.L. Hargrove (agronomy); J. R. Allison (agricultural economics); and D.C. Coleman (ecology)

Clemson University: J.H. Palmer (agronomy, extension)

### Objectives:

1. Develop low-input reduced tillage crop production systems, including relay interplanting, and determine their profitability.
2. Evaluate combinations of three important factors in sustainable, low-input production systems; namely, tillage, nitrogen fertilizer, and herbicides.
3. Demonstrate profitable, low-input, reduced tillage production systems on a field-scale.

Duration: Four years (June 1, 1988 - May 31, 1992)

CSRS Funding: \$150,000 for two years. Matching: \$463,176

## 3. LOW INPUT ORCHARD PEST MANAGEMENT FOR APPLES AND PEACHES

### Principal Investigators:

University of Georgia: F.F. Hendrix and D. Horton (plant pathology)

Virginia Polytechnic Institute and State University:  
Douglas G. Pfeiffer (entomology); Richard P. Marini (horticulture); Jeffrey F. Derr (plant pathology)

Objectives:

1. To develop new methods for controlling pests using reduced input and organic techniques by continuing and expanding ongoing research.
  - a) To control damage by codling moth and variegated leafroller through mating disruption achieved by pheromone permeation.
  - b) to determine current ground cover management practices, contrasting conventional and biological farmer, and effects on the mite system, tree growth and yield.
  - c) to determine toxicity of a broad range of herbicides to *Neoseilus fallacis* (Garman).
  - d) to determine optimum width of weed-free strips needed to balance demands of biological control and tree growth.
  - e) To examine several potential ground covers in order to allow adequate tree growth and support the mite biological control system.
2. To disseminate to conventional commercial and organic fruit growers, through orchard and formal meetings, current information on reduced pesticide input resulting from intensive scouting, and organic pest management systems.
3. To demonstrate to these growers, through paired plot grower orchard trials, the advantages and problems of reduced pesticide input, or organic pest management.
4. To train growers in the pest management skills and scouting techniques of low pesticide input or organic culture by wise of trained technical help.

Duration: One year

CSRS Funding: \$100,000    Matching: \$223,882

#### 4. DEVELOPMENT, IMPLEMENTATION AND EVALUATION OF LOW INPUT CROP AND LIVESTOCK SYSTEMS FOR THE MID-ATLANTIC REGION

##### Principal Investigators and Cooperators:

Virginia Polytechnic Institute and State University:

John Luna (entomology) and other faculty in departments of agronomy, horticulture, animal science, agricultural economics, and plant pathology; extension agronomist and extension plant pathologist; extension agents in Rockingham Co., Washington Co., Madison Co., and Montgomery Co.

Cooperating Farmers: Floyd Childress (beef producer, Christianburg, VA) and David Jones (dairyman, Aroda, VA)

##### Objectives:

1. Develop and evaluate crop-livestock farming systems that minimize reliance on non-renewable inputs while maintaining or improving profitability, improving long-term soil productivity, and minimizing undesirable environmental impacts.
2. Develop and implement extension educational programs to promote the adoption of low-input farming technologies, practices, and systems.
3. Link research and extension through field-days, in-service extension agent training, winter grower meetings, and development of farm level expert system for use by farmer subscribers and others.

Duration: one year

CSRS Funding: \$90,000      Matching: \$160,968

#### 5. WHOLE FARM - LOW/REDUCED FARMING SYSTEMS AND EDUCATIONAL PROGRAM

##### Investigators and Cooperators:

Prairie View A&M University: Hoover Carden (administrator, cooperative extension service)

Prairie View A&M University: Alden Reines (director, cooperative research center) and other faculty

Cooperating Farmers in Texas: Maurice Owens (Waller County), Ralph Lindsey (Cherokee County) and Perry Leutage (Milam County)

Texas Department of Agriculture: Gus Townes (Marketing  
Director, Austin, Texas)

Objectives:

1. To implement research projects addressing "low/reduced input" farm resource management practices. Projects will include crop rotation, intercropping systems, soil management practices, specialty crops (oriental vegetables, low chili apples, etc.), and reduced levels of fertilizers in combination with legumes and cover crops. And to:
2. Maintain comprehensive records to document costs from production to market and use this data to evaluate the net effects of each project, on farm profitability.
3. To implement small farm, whole farm demonstrations in various geographic areas across Texas to evaluate low/reduced input resource utilization and conservation systems including strategies and materials necessary for converting from high input to low/reduced input farming systems.
4. Make available technical assistance to aid producers and Cooperative Extension personnel in understanding, disseminating and adapting the technology from the data base generated in this project.

Duration: Five years (June 1, 1988 - May 31, 1989)

CSRS Funding: \$90,000      Matching: \$40,345

6. DEVELOPING AND EXTENDING MINIMUM INPUT STRATEGIES FOR WEED CONTROL IN AGRONOMIC AND HORTICULTURAL CROPS

Principal Investigators:

University of Arkansas Coop Extension Service, Little Rock:  
Ford L. Baldwin and John W. Boyd (extension weed scientists)

University of Arkansas, Fayetteville: Lawrence R. Oliver  
and Ronald E. Talbert (agronomy)

Objectives:

1. Develop minimum input weed control programs for multi-species weed situations in the major crops:
  - a) Develop a data base for the minimum herbicide rates required to control broadleaf and grass weeds causing

the major economic losses in the leading agronomic and horticultural crops in the South.

- b) Integrate the minimum herbicide rates with non-chemical methods of weed control.
- 2. Develop written information and computer programs to facilitate adoption of the minimum input weed control technology, and conduct extensive on-farm test demonstrations.
- 3. Develop research guidelines and in-service training package for use in the states desiring to implement similar programs.

Duration: Five years (June 1, 1988 to May 31, 1992)

CSRS Funding: \$50,000    Matching: \$110,000

#### 7. SOLARIZATION AND LIVING MULCH TO OPTIMIZE LOW-INPUT PRODUCTION SYSTEMS FOR SMALL FRUITS

##### Principal Investigators:

Texas Agri. Expt. Station - Overton: Kim Patten (fruit research) and other faculty in legume breeding, soil fertility, plant pathology, vegetable research, and horticulture extension.

Texas Agri. Expt. Station - College Station: Calvin Lyons (fruit extension specialist)

USDA Small Fruit Research Sta. - Poplarville, MS: Barbara Smith (small fruit plant pathologist)

University of Georgia: Gerard Krewer (fruit extension specialist)

##### Objectives:

- 1. Investigate the feasibility of eliminating fertilizer and herbicide input on blueberries grown in the South through the use of a combination of legumes and annual summer forage crops, such as living mulch systems.
- 2. Evaluate solarization as a replacement for fumigation, and cover crop production as a replacement for fertilization in growing strawberries.

Duration: Five years (June 1, 1988 - May 31, 1992)

CSRS Funding: \$40,000    Matching: \$41,197

8. DEVELOPMENT OF LOW INPUT AGRICULTURAL TECHNOLOGY  
DEMONSTRATIONS AT THE SUNBELT AGRICULTURAL EXPOSITION  
DEMONSTRATION FARM

Investigators at University of Georgia: William S. Farrington, Extension Specialists (coordinator of Sunbelt Agricultural Expo Rural Development Center); Charles Douglas (agronomy) and John P. Beasley (extension agronomist)

Objectives:

1. Identify research with potential for rapid application to low-input farming systems for southern farmers.
2. Screen identified research for its relevance to southeastern farming systems and evaluate the research on its ability to be readily adopted by farmers.
3. Develop demonstration methodologies for application of selected low-input research at the Sunbelt Agricultural Exposition Demonstration Farm.

Duration: One year planning proposal (June 1, 1988 - May 31, 1989)

CSRS Funding: \$14,700      Matching: \$33,900

9. DEVELOPMENT OF A FARMER/EXTENSION/RESEARCH NETWORK AND  
FARMING SYSTEMS DATA BASES FOR LOW-INPUT AGRICULTURE

Principal Investigators:

Winrock International Institute for Agricultural  
Development: F.E. Busby and Robert Havener, President

University of Arkansas: Ted D. Jones (director,  
cooperative extension service) and Gerald Musick (dean of  
the college of agriculture and director, agricultural  
experiment station); Tom W. Westing (associate dean of  
international agricultural programs)

Appropriate Technology Transfer for Rural Areas - ATTRA:  
Ann Sinclair (program manager), Memphis, TN

Small Farm and Technical Assistance Center: Corbet Lamkin  
(head)

East Arkansas Produce Marketing Association: Leroy S. Lacy  
(director)



Heifer International, Global Services: Armin Schmidt (dir. of programs)

Ozark Small Farm Viability Project: Gordon Watkins (president)

Meadowcreek Project: Jim Lukens (agricultural director)

Kerr Center for Sustainable Agriculture: James Horne (vice president)

Arkansas Land Stewardship Project: Nick Brown (director)

Rodale Institute: Janet Bachmann (AR/South Central States rep.)

Oklahoma Cooperative Extension Service and Agricultural Experiment Station: Ron Johnson (associate director)

Objectives:

1. Bring together interested organizations, agencies, and persons in the region composed of Arkansas, Oklahoma, and appropriate adjacent areas to engage in a planning process for the identification, elaboration, and development of low-input agricultural techniques and production in the region.
2. Produce a detailed plan for the cooperative achievement of the above, using a Farming Systems Research/Extension (FSR/E) approach, which emphasizes farmer involvement together with multi-disciplinary and multi-agency collaboration.
3. Produce comprehensive project proposal for multi-year funding, which will be implemented cooperatively by the planning group and/or by individual agencies or groups from the planning group.
4. Develop a mechanism for identifying, prioritizing, and funding individual component project phases that are being proposed.

Duration: One year planning proposal (June 1, 1988 to May 31, 1989)

CSRS Funding: \$15,000      Matching: \$34,858

10. PLANNING FUNDS ON THE ISSUE OF SUSTAINABLE AGRICULTURE FOR AND WITH SMALL FARMS: DEVELOPMENT OF AN 1890 LAND GRANT UNIVERSITY EXTENSION DEMONSTRATION ENDEAVOR CONCERNED WITH SUSTAINABLE AGRICULTURAL ENTERPRISES IN THREE STATES: NORTH CAROLINA, TENNESSEE, AND VIRGINIA

Principal Investigators:

North Carolina A&T State University: Daniel S. Godfrey and M. Ray McKinnie

North Carolina State University: Kevin Pound

Virginia State University: Lorenzo Lyons

Tennessee State University: Richard Winston

Objective:

The present proposal will permit the 1890 institutions in North Carolina, Tennessee, and Virginia to develop a multi-year, multidisciplinary Extension based program to involve small and part-time farmers in their respective states in sustainable agricultural endeavors.

Duration: One year planning proposal (June 1, 1988 - May 31, 1989)

CSRS Funding: \$15,000 Matching: None

11. ON FARM DEMONSTRATION OF LOW-INPUT FARMING

Principal Investigators: Carolina Farm Stewardship Association: W.W. Dow

Objective:

To plan and begin to implement a program for creating on-farm demonstrations of low-input farming systems at several locations throughout North Carolina. The on-site part of this project will be accompanied and enhanced by marketing and education components.

Duration: One year planning proposal (August 1, 1988 to July 31, 1989)

CSRS Funding: \$15,000 Matching: \$5,500

Projects Funded in the Western Region

The Western Region includes Arizona, California, Colorado, Hawaii, and Protectorates (America Samoa, Micronesia, Marinanas and Guam), Idaho, Montana, New Mexico, Nevada, Oregon, Utah, Washington and Wyoming. A total of 67 proposals were evaluated. Six projects were selected for operational funding ranging from \$7,700 to \$220,000 (see Table 4). Five of these were funded for two years. Four project proposals were given planning grants of from \$2,000 to \$15,000. The total allocation of CSRS funds for these ten projects is \$772,000. Matching contributions by participating organizations totaled \$540,000.

1. EVALUATION AND DESIGN OF LOW-INPUT VEGETABLE/SMALL GRAIN AND SMALL FRUIT SYSTEMS OF WESTERN OREGON AND WASHINGTON

Investigators:

Oregon State University: Richard P. Dick (project contact; soil science) Russel E. Ingham (nematology), Russell S. Karow (extension cereal specialist), Larry S. Lev (agricultural and resource economics), Peter Bens McEvoy (entomology), Christopher C. Mundt and Mark V. Wilson (botany and plant pathology)

Washington State University: Virginia N. Hillers (Extension Food Specialist), Curtis J. Moulton (agricultural economics extension), Carl H. Shanks (entomologist) and Jack L. Waud (extension genetics and plant pathology)

Cooperating Farmer: Dr. Gene Kahn, Cascadian Farm, Inc., Rockport, WA. (Founding member of TILTH and member of Advisory Committee to Washington Department of Agriculture Organic Certification Program.

Other Cooperating Organizations: Evergreen State College, WA; Cascadian Farms, Rockport, WA

Objectives:

1. Measure the performance and resource requirements (economic and biological) of low-input and conventional agricultural systems.
2. Develop a preliminary compendium of information for the adoption and use of existing methodologies of low-input agriculture that would be disseminated in a users' guide, newsletter, and existing production guides.

3. Design and carry out several major educational activities on low-input agriculture alternatives to provide opportunities for dialogue among producers, researchers, and extension personnel by holding symposia, workshops, and seminars.
4. Determine relevant biological processes of LIA for study from an ecological perspective which will provide the basis for a future research phase to design efficient, sustainable agricultural systems.

CSRS Funding: \$210,000 for two years.      Matching: \$274,634

2. COMPARATIVE STUDY OF ESTABLISHED LOW AND HIGH INPUT  
VEGETABLE PRODUCTION SYSTEMS IN CALIFORNIA

Investigators:

University of California at Santa Cruz: Deborah K.  
Letourneau (ecology, environmental studies, principal  
investigator)

University of California at Davis: Carol Shennan (plant  
physiologist); Ariena H.C. van Bruggen (plant  
pathologist); Laurie Drinkwater (zoologist, post-  
doctoral scholar in vegetable crops)

Dr. E. Phillip LeVeen (economist and independent consultant  
on water resource issues) Berkeley, CA.

Objectives:

1. Compare low-and high-input vegetable production systems in terms of their productivity, water use, nutrient budgets, soil physical and chemical characteristics, pest and disease incidence, and profitability.
2. Determine which factors are significant determinants of crop growth in each of the systems.

Funding: \$215,300 for two years.      Matching: \$83,176

### 3. OPTIONS FOR REDUCING PRODUCTIONS INPUTS IN THE CEREAL AND LEGUME GROWING REGIONS OF THE NORTHWEST

#### Investigators:

Washington State University: David F. Bezdicek (project contact person; soils) and Peggy Chevalier (agronomist) Pullman, WA.

Montana State Extension Service: Allen C. Bjergo (Community Development Specialist) Missoula, MT

Oregon State University: Richard W. Smiley (Superintendent, Columbia Basin Agricultural Research Center) Pendleton, OR.

University of Idaho: Edgar Michalson (Agricultural Economist) Moscow, ID.

Utah State University: V. Philip Rasmussen, Jr. (State Extension Soil and Water Conservation Specialist, Computer Specialist, Soil Science and Biometrics) Logan, Utah.

University of Wyoming: James M. Krall (Extension Agronomist) Torrington, WY.

#### Objectives:

1. The overall goal of this project will be to develop a comprehensive research and education program to help producers implement sustainable grain and legume cropping systems which will reduce both purchased inputs and impacts on the environment.
2. Develop a data base of options for reducing inputs in the cereal-legume growing regions that would serve as a basis for providing information to growers.
3. Disseminate the appropriate extension publications, presentations, audiovisuals, and software packages to aid growers and county extension personnel in adapting the information contained in the low-input farming data-bases to address specific production problems.
4. Identify constraints that limit farmer acceptance and application of low-in-put methods and define research needs to remove these constraints and enhance the productivity, profitability, and resource- use efficiency of low-input cereal/legume production systems.

CSRS Funding: \$208,000 for two years. Matching: \$100,000

## 4. NATIVE CROPS RESEARCH PROJECT

Principal Investigator: Jose Emigdeo Ballon (Agronomist, Research Director of Talavaya, Santa Cruz Station, NM (Talavaya is a private non-profit corporation which was awarded The 1985 Environmental Leadership Award by the United Nations for pioneering work in the preservation of native crops compatible with low-input growing techniques.)

Objectives:

1. Monitor and collect data regarding low-input production of legumes, grains and vegetables by Hispanic farmers, Indian Pueblos, Talavaya and other growers in Northern New Mexico.
2. Compare and evaluate low-input techniques originated by traditional agricultural societies in New Mexico with new information on low-input technology and high-input growing of similar crops.
3. Analyze the market potential of non-hybrid, low-input crops native to New Mexico.
4. Disseminate information compiled from the above projects to growers and Indian tribes around the country through a written publication, a 35-minute video production and a replicate curriculum which will be presented at Northern New Mexico Community College.

CSRS Funding: \$45,000 for two years. Matching: \$43,964

## 5. COMPILING A DATABASE OF SUSTAINABLE PRODUCERS FOR THE SOUTHERN ROCKIES REGION

Principal Investigator: Rita Robinson, Program Director, Telluride Institute, and Communications Director of Sustainable Agricultural Alliance in the Telluride Institute, Telluride, CO

Objectives:

1. Identify producers using low-input/sustainable farming practices in the Southern Rockies subregion (Colorado, Utah, northern New Mexico, and northern Arizona); develop a data base of low-input techniques that have been tested in the field, and rate their relative success in the areas of soil fertility, water conservation, weed control, energy conservation, and other management considerations.

2. Assist producers, both commercial and small-scale, interested in making the transition to low-input farming systems.
3. Facilitate ongoing information exchange between producers already practicing low-input techniques.

CSRS Funding: \$36,000 for two years.      Matching: \$23,400

6. CARE AND FEEDING OF THE SOIL: INTRODUCING LEGUMES AND OTHER GREEN MANURES INTO THE CROPPING SYSTEMS OF THE NORTHERN PLAINS, ROCKIES, AND INTERMOUNTAIN REGION

Investigator: Robert Gillespie (Vice Chair, Alternative Energy Resources Organization) Last Chance Gulch, Helena, MT

Objectives:

1. Provide producers in the Northern Rockies/Plains subregion current information on the production, uses, and marketing of green manures and cover crops (such as legumes) in dryland and irrigated systems.
2. Provide an opportunity for producers, researchers, and policymakers to identify and begin addressing current information gaps.

CSRS Funding: \$7,700 for one year.      Matching: \$12,718

7. LOW-INPUT SUSTAINABLE/ANIMAL/RANGE SYSTEMS: PLANNING GRANT TO SUPPORT PREPARATION OF A PROPOSAL TO BE SUBMITTED NEXT CYCLE

Organizer: Robert Heil, Director of Colorado Agri. Experiment Station

CSRS Funding: \$15,000      Matching: in-kind contribution of personnel salaries and indirect costs

8. DEVELOPMENT OF A CONSORTIUM NETWORK INFORMATION SYSTEM PROVING GATEWAY LINKAGE BETWEEN USERS AND MULTIPLE DATA BASES AND INFORMATION SOURCES: PLANNING GRANT TO SUPPORT PREPARATION OF A PROPOSAL TO BE SUBMITTED NEXT CYCLE

Organizer: Fred Poston, Director of Cooperative Extension at Washington State University.

CSRS Funding: \$15,000      Matching: in-kind contribution of personnel salaries and indirect costs

9. LOW-INPUT/SUSTAINABLE TARO PRODUCTION SYSTEMS FOR MICRONESIA: PLANNING GRANT TO SUPPORT PREPARATION OF A PROPOSAL TO BE SUBMITTED NEXT CYCLE

Organizers: Agnes Vargo (entomologist), American Samoa Community College; Nelson Esquerra (entomologist), College of Micronesia; Isadora Cabrera (entomologist), Northern Marianas College; Don Nafus (entomologist), University of Guam; Dwight Sato (extension agent) University of Hawaii.

CSRS Funding: \$8,000      Matching: in-kind contribution of personnel salaries and indirect costs

10. LOW-INPUT/SUSTAINABLE METHODS OF RICE PRODUCTION IN NORTHERN CALIFORNIA: PLANNING GRANT TO SUPPORT PREPARATION OF A PROPOSAL TO BE SUBMITTED NEXT CYCLE

Organizers: Lundbergs, Richvale, CA

CSRS Funding: \$2,000      Matching: in-kind contribution of personnel salaries and indirect costs