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ABSTRACT

The key objectives of this project were to promote adoption of farming practices that are environmentally and economically sound by strengthening the education networks of the Sustainable Farming Ass'n through on-farm research, demonstrations, field days, and workshops. The other key objective was to develop a cooperative network and conduct complementary on-farm and SW Experiment Station research to advance the development and use of sustainable farming practices. Also to increase effectiveness of Sustainable Farming Association through creation of new Chapters and larger membership.

One-hundred and fifteen workshops, field days, pasture walks and annual meetings featuring many aspects of farming practices that are environmentally and economically sound were put on by SFA chapters and the State SFA during the two years of this project. These programs were delivered to over 6,000 people across Minnesota. Additional audiences were created for many of these events by media coverage. For instance Jennifer Buckley, of the Northeast Chapter, and Tim King State Program Manager, were featured in television and radio interviews in the Duluth media in 1996 and a July 1997 feature in AURI's Ag Innovation News will feature SFA farmers.

Two new chapters of the Sustainable Farming Ass'n were formed during this two year grant period and the ground work was established for two more. Overall membership increased from 800 to 1,000 families. The two chapters are the Coteau Ridge in Southwestern Minnesota and the Princeton Area chapter.

One chapter, the Coteau Ridge, was developed in co-operation with the the University of Minnesota's Southwest Experimental Station in Lamberton. That chapter and officials from the Experiment Station and the Minnesota Department of Agriculture co-sponsored an on-farm demonstration regarding run off from pastures into waterways during the summer of 1996. A similar field day is planned for August of 1997.

Independent research, conducted by Dr. Jerry DeWitt, indicates that SFA members benefit in membership in the SFA by improved relationships with major institutions such as Extension and the Department of Agriculture. When they become members, according to DeWitt's research, they are likely to adapt more environmentally friendly agricultural practices.

Dissemination of the SFA's educational efforts takes place via the 'Cornerpost', the organizations newsletter which is distributed to 1,400 people three times per year. During the two year term of this project the newsletter was doubled in size.

Development of a cooperative network of farmers and researchers has proven to be a challenging process. The traditional approach to research used by many scientists treats members of communities and organizations as passive subjects who contribute little to the research process and receive results disseminated by agricultural experts. During the process of this project, a different, more holistic approach to agricultural research evolved. The approach is called Participatory Action Research (PAR) and it contrasts sharply with traditional methods. In PAR,

members of the group of interest are actively engaged as important, essential partners engaged in the quest for knowledge that will help guide their future actions. We initiated 12 conversations with farmers in southwest Minnesota on topics concerning their soil management history and observations. The goal was to jointly gain a more holistic understanding of the complexity of agricultural issues and current methods of scientific inquiry, and for initiating joint research activities in the area of soil quality. The results of these activities are presented in the attached report entitled 'Participatory Action Research: Redefining
the Relationship Between Scientist, Farmer, and the Land'. These results will be presented at the upcoming American Society of Agronomy meetings in Anaheim, CA this fall, and will be published in a Master of Science thesis at the University of Minnesota, as well as in a technical journal.

One area that we had hoped to develop was the formation of a Sustainable Farming Association chapter that works more closely with the Southwest Experiment Station in Lamberton. The farmers that have been involved with our project and our project results may stimulate successful future development of a new
SFA chapter.

III. Final Work program summary. 6/97

*22 workshops and field days and chapter annual meetings were held by the 12 chapters with an approximate attendance of 850 people.

Some examples of the workshops and field days include:

1) A non-chemical flame weeding demonstration at the Jean Pederson farm in Wright County.

2) A presentation on low input beef and poultry processing by private processors and MN Dept. of Ag. officials in Yellow Medicine County.

3) A pasture walk in Morrison County to study plant diversity.

4) A pastured poultry and hogs field day in Filmore County

*A statewide annual meeting, featuring speakers on bio-diversity, women's role in sustsainable agriculture, and on farm research techniques was held in Rochester in February. This meeting also featured a training session for rural leaders from Iowa, Wisconsin, and Minnesota. Total attendance was 120.

*A joint AURI/SFA conference on marketing and on farm processing was held in late January in Wadena county. Total attendance, due to bad weather, was 40. AURI wants to do another one.

*SFA initiated a series of university researcher pot luck discussions that were located in Wright County. Two have been held and a third is planned for July. SFA has, as a result, been invited to join together with some broad minded weed resaerchers from the U of M in a further attempt to creative a collaborative research agenda. One planning session has been held and a second scheduled for the SFA retreat in July.

*SFA is currently engaged in organizing an urban agriculture chapter and a chapter in the Bemidji area.

*SFA has received funding from AURI to conduct pesticide reduction 8 field days and workshops.

*The Cannon River & Central chapters are working, along with the state Program Manager, with St Cloud State, St John's, St Ben's, and the Earl Brown Center at the University of Minnesota to provide locally grown food to those campuses.

Date of Report: July 1, 1997.

LCMR Final Work Program Update Report

I. Project Title and Project Number: Cooperatives to Promote Sustainable Agricultural Practices and Research.

Program Manager: Tim King
Agency Affiliation: Sustainable Farming Association of Minnesota
Mail Address: RR 2 Box 178A, Long Prairie, MN 56347
Phone: (320) 732-6203
email: timking@maroon.tc.umn.edu
Fax:

A. Legal Citation: ML 95, Chp. 220, Sec. 1995, Subd. 5(s).
Total biennial LCMR appropriation: $ 100,000.00
Balance: $ $0

Appropriation Language: This appropriation is from the future resources fund to the commissioner of agriculture for an agreement with the sustainable farming association of Minnesota to promote sustainable farming practices by strengthening farmer-based demonstration and education networks of the sustainable farming association and by forming a pilot cooperative of on-farm and southwest experiment station research. This appropriation must be matched by at least $15,000 of nonstate money.

B. Status of Match Requirement: secured
Match Required: $15,000.00
Amount Committed to Date: $15,000.00
Match Spent to Date: $15,000.00

II. Project Summary: Promote adoption of farming practices that are environmentally and economically sound through on-farm research, demonstrations, field days, and workshops. Develop cooperative network and conduct complementary on-farm and SW Experiment Station research to advance the development and use of sustainable farming practices. Increase effectiveness of Sustainable Farming Association through creation of new Chapters and larger membership.

IV. Statement of Objectives:

Objective A: Promote adoption of farming practices that are environmentally and economically sound through on-farm research, demonstrations, field days, and workshops.

Objective B: Develop cooperative network and conduct complementary on-farm and SW Experiment Station research to advance the development and use of sustainable farming practices.

Objective C: Increase effectiveness of Sustainable Farming Association through creation of new Chapters and larger membership.

Timeline for Completion of Objectives:

	7/95	1/96	6/96	1/97	6/97
Objective A:	xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx				
Objective B:		xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx			
Objective C:	xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx				

V. Objectives/Outcome:

A. Title of Objective/Outcome:
Promote adoption of sustainable farming practices

A.1 Activity: On-farm research and demonstrations including workshops, field days, and special events.

A.1.a. Context within the project: Field days, workshops, farm demonstrations, and on-farm research will increase knowledge and linkages among farmers, scientists, consultants, and ag. related organizations to promote sustainable farming practices.

A.1.b. Methods: We will work with existing SFA chapters, new chapters and others to identify innovative farmers and farming practices that promote agricultural sustainability. Six SFA chapters and anticipated formation of two new chapters (see objective C) will serve as base for contacts and organization for workshops, field days, and special events.

Workshops (20/year) will be conducted during winter months and will cover sustainable agriculture topics prioritized by chapter membership during annual chapter meeting. Field days (20/year) will occur during summer months and involve farm tours and southwest experiment station tours with subjects identified and prioritized by chapter membership. Special events (3/year) will involve speakers or activities of state-wide importance identified by chapter membership at the annual state SFA meeting.

On-farm research will be conducted on at least six farms. Proposals for on-farm research will be developed by chapter membership and prioritized at annual State SFA meetings to decide what research will be conducted.

A.1.c. Materials:
Materials for field days, workshops, and special events will include printed and some audio-visual materials.

A.1.d. Budget

Total Biennial LCMR Budget: $50,000.00
LCMR Balance: $18,200
MATCH: $15,000.00
MATCH BALANCE: $0

A.1.e. Timeline:

	7/95	1/96	6/96	1/97	6/97
Product#1 Field Days		xxxx	xxxxxxxxx		
Product#2 Workshops		xxxxxx		xxxxxx	
Product#3 Special Events		xxxx	xxxx	xxxx	
Product#4 On-farm Research		xxx		xxxxxxxxxxxxx	

A.1.f. Workprogram Update:A.1.f.
*22 workshops and field days and chapter annual meetings were held by the 12 chapters with an approximate attendance of 850 people.
Some examples of the workshops and field days include:
1) A non-chemical flame weeding demonstration at the Jean Pederson farm in Wright County.
2) A presentation on low input beef and poultry processing by private processors and MN Dept. of Ag. officials in Yellow Medicine County.
3) A pasture walk in Morrison County to study plant diversity.
4) A pastured poultry and hogs field day in Filmore County
Two pot luck dinners were held between University researchers and farmers. Both were well attended.

V. Objectives/Outcome:

B. Title of Objective/Outcome:
Develop cooperative network to conduct complementary on-farm and Experiment Station research to identify research needs and assess sustainable farming practices.

B.1 Activity: Formation of cooperative network between working farms, Southwest Experiment Station, Land Stewardship Project, Minnesota Institute of Sustainable Agriculture, Department of Agriculture and other interested groups to couple on-farm and University research. Research will develop and evaluate ecological indicators of farm sustainability.

B.1.a. Context within the project: Formation of cooperative research network will aid in defining research needs and coupling on- farm and experiment station research. Research conducted will identify and evaluate ecological indicators of farm sustainability

B.1.b. Methods: Cooperative research network will be developed by SFA chapters in cooperation with the southwest experiment station and other interested groups. Meetings with chapter members will identify interested parties and help develop research priorities. Evaluation of environmental indicators of sustainable farms will include sustainable farming system research plots at the southwest experiment station 'Koch Farm' and complementary farms (at least six) in the southwest region that will be identified. Ecological monitoring will consist primarily of terrestrial properties (soil biological, chemical, and physical properties, vegetation,

landscape attributes). We will determine indicators that are robust across a range of soil and climatic conditions. Details about indicator monitoring can be found in Table 1. Sampling, data analyses, and interpretation will be conducted by a graduate student (Univ. of Minn. Soils Department), Assistant Scientist (Southwest Experiment Station), and Assistant Professor of Soil Science (Southwest Experiment Station).

In the analyses of indicator data we will attempt to document the spatial and temporal variability of measured properties; determine indicators that are useful for evaluating sustainable farms and threshold values or acceptable ranges of values that indicate desirable levels of soil quality; determine the resiliency of selected indicators as effected by management factors.

TABLE 1. PARAMETERS TO BE MONITORED	**Reference**
SOIL QUALITY	
Soil biological characteristics	
Microbial biomass, N, respiration,	Jenkinson and Powlson, 1976
Decomposition rates (cotton strips)	Robertson (KBFS)
Earthworms	
Soil physical characteristics	
Bulk density	Doran (1993)
Penetration Resistance	Doran (1993)
Infiltration	Doran (1993)
Aggregate stability	Karlen and Colvin (1992)
Texture	Hydrometer method
Soil chemical characteristics	
C/N ratio, OM, P, N, K, Ca, Mg	U of M Laboratory

B.1.c. Materials:

Materials include analytical supplies (chemicals), collection devices, materials to record data, computer time, paper, and other office supplies.

B.1.d. Budget

Total Biennial LCMR Budget: $40,000.00
LCMR Balance: $0
MATCH: 0.00
MATCH BALANCE: 0.00

B.1.e. Timeline:

	7/95	**1/96**	**6/96**	**1/97**	**6/97**
Product#1	xxxxxxxxxxxxxxxxxxxxxxxxxxxx				
Formation of cooperative research network					
Product#2		xxx	xxx	xxx	xxx
Indicator sampling					

Product#3 xxxx xxx xxx xxxxxxxxx
Data analyses and interpretation

Product#4 xxxxx xxx xxx xxxxx
Preliminary or final reports

B.1.f. Workprogram Update: Farmers who were interested in how farming practices were affecting soil quality were engaged in research involving their farm (six farms), a native prairie site (Schaefer prairie), and complementary experiments at the Southwest Experiment Station (3 studies). Soil samples from these sites were analyzed to develop soil indices and threshold values for evaluating sustainable farming practices. Useful
soil indicators and threshold values of long-term soil sustainability
were identified as topsoil depth, depth to carbonates, depth to mottling, and organic matter. Soil indicators and threshold values useful as an early warning signal of non-sustainable farming practices were also developed and include soil structural characteristics, water-stable macro-aggregation, bulk density, soil consistence, nutrient status, pH, and microbial activity. These results are in the attached report entitled 'development of soil indices of sustainability'. These results have been presented to farmers at the Southwerst Experiment Station field days, and will be published in a Master of Science thesis at the University of Minnesota, as well as in a technical journal.

C. Title of Objective/Outcome:
New SFA Chapter development and increased statewide membership

C.1 Activity: New chapters of SFA will be formed and membership increased to reach more farmers and interested people throughout Minnesota.

C.1.a. Context within the project: Currently, Minnesota has six chapters of SFA. Important agricultural areas with no chapter are southwest and northwest Minnesota. These areas have been targeted for new chapter development.

C.1.b. Methods: Farmers and other interested people or agencies will be identified to form new SFA chapters in southwest and northwest Minnesota. Annual SFA chapter and state-wide meetings will be planned and conducted to help carry out objectives A, B, and C.

C.1.c. Materials:
Materials will include office supplies for dissemination of information and for conducting meetings.

C.1.d. Budget

Total Biennial LCMR Budget: $10,000.00
LCMR Balance: $0.
MATCH: $0.00
MATCH BALANCE: $0.00

C.1.e. Timeline:

7/95 1/96 6/96 1/97 6/97

Product#1 xxxxxxxxxxxxxxxxxxxxxxx
New chapter formation

Product#2 xxx xxx
Annual Chapter meeting

Product#3 xxx xxx
Annual SFA State meeting

C.1.f.Workprogram Update: A state annual meeting was held in Rochestor is planned for February 22. Numerous chapter annual meetings were held in January and February. Efforts are currently under way to form an additional chapter in southwest Minnesota, the Twin Cities, and Bemidji. Primary focus, however, has been on strengthening the existing chapter and state organization.

VI. Evaluation:

Objective A will be evaluated by reaching goals set for number of workshops (20/year), field days (20/year), special events (3/year), and on-farm research sites (6 farms with complementary Southwest Experiment Station research). Each event will include an evaluation form completed by the attendants that will provide information on the success of the event and how it might be improved. The number of people in attendance will also be used to evaluate the success of the event. The purpose of the various events will be to provide real world examples of sustainable practices and will lead to more rapid adoption and development of sustainable farming systems. The on-farm research in coordination with Experiment Station research is a pilot study to explore the coupling of complementary research. Success will be evaluated by the successful completion of on-farm studies on six farms. Successful on-farm research will provide answers to critical production problems, identified by cooperative network, facing sustainable agriculture.

Objective B will be evaluated by the successful formation of a cooperative research network among farmers, the Southwest Experiment Station and other interested groups or agencies. The successful formation of a cooperative research network could provide a new paradigm for agricultural research at Experiment Stations that couples on-farm with University research and addresses research questions at a more holistic systems level. Quantitative indicators of farm sustainability are necessary to evaluate the impacts of farm practices and their potential sustainability. Success will be evaluated by the development of useful indicators of farm sustainability as outlined in Objective B.

Objective C will be evaluated by the successful formation of two new SFA Chapters and increased overall state-wide membership and participation in SFA sponsored events.

VII. Context within field:

Sustainable agriculture is a system that enhances environmental quality and resource base on which agriculture depends, provides for basic human food and fiber needs, is economically viable, and improves the quality of life for farmers and society as a whole. The development of sustainable farming systems will require the efforts of diverse groups including scientists, farmers, consultants, and farm related agencies and businesses. Chapters of SFA in cooperation with LSP have been successful in promoting sustainable farming systems. Events sponsored by SFA have increased during the last four years and have been well attended: 28 programs attended by 1100 people in 1990, 37 programs attended by 1900 people in 1993. In order for agriculture to become more sustainable, these efforts must be expanded to include a wider audience and greater participation of farmers, researchers, and other interested people. Currently, however, there is little infrastructure to facilitate cooperative efforts among these groups. This situation has led to restricted information exchange, limited complementary research, an erosion of research diversity, and created barriers to innovation development and adoption. Our objectives are to enhance the interaction of farmers, scientists, and other interested groups; couple on-farm and University research; and develop management alternatives that promote natural processes, integrate recent scientific advances with resource conserving practices, improve farm efficiencies, enhance environmental quality, and maintain profitability.

The development of indicators of sustainable practices is a natural extension of research (Huggins, Allan, and Alms) evaluating significant differences of soil biological, chemical and physical properties in CRP as compared to other land uses funded through the Northwest Area Foundation. This research has identified soil properties that are very sensitive to management practices and may be useful as indicators of farm sustainability. Interpretation and use of soil quality as a tool for assessing impacts of differing land uses is still underway.

VIII. Budget context:

a. No monies will be directly spent by the co-program managers for this project prior to June 30, 1995. However, efforts of the co-program managers prior to this date will include searches for personnel (graduate student, and program director) and discussions at SFA Chapter meetings and the state meeting regarding potential research, workshops, field days, and new chapters, as outlined in the projects objectives.

b. During the 2-year period beginning July 1, 1995, monies will be spent by the Univ. of Minn. Southwest Experiment Station to support the salary of Assistant Professor David Huggins during the time he is working on the project (5%). Cooperation with other people and groups involved with the project are on a voluntary basis. No monies will be spent by SFA for activities in this project.

IX. Dissemination:
Data from research collected in Objectives A and B will be presented at Experiment Station field days and at SFA sponsored field days and workshops. The data may also be presented at regional and national meetings of the American Society of Agronomy. Data will be documented in field and laboratory notebooks where applicable, within LCMR progress reports, and within scientific journals where appropriate..

X. Time:
Although our objectives are framed within a two year context, efforts to develop and promote sustainable agricultural systems are expected to continue beyond the time-frame of this proposal. The value of this effort will increase with time and the funding request is perceived as the first of a three biennial project.

XI. Cooperation:
Program Co-manager: Ralph Lentz, Current SFA Chairperson, 5% time, help coordinate project, key resource and contact person representing SFA, will be involved primarily with objectives A and C.
Program Co-manager: David Huggins, Assistant Professor at Southwest Experiment Station, 5% time, coordination of activities in objective B and on-farm research in objective A, Data interpretation, reporting.
Cooperators: Land Stewardship Project, 5% (George Boody and Audrey Arner), help with voluntary advisement for objectives A, B, and C (providing matching funds of $15,000).
Minnesota Institute of Sustainable Agriculture,, (Carmen Fernholz and Don Wyse), 5%, provide voluntary advisement to fulfill objectives A, B, and C.
Southwest Experiment Station, Lee Klossner, Assistant Scientist, 10%, Assist in objective B sample collection and data analysis.

XII. Reporting Requirements:
Semiannual six-month workprogram update reports will be submitted no later than January 1, 1996, July 1, 1996, January 1, 1997, and a final six-month workprogram update and final report by June 30, 1997.

XIII. REQUIRED ATTACHMENT:

1. Qualifications:
2. Project Staffing Summary: