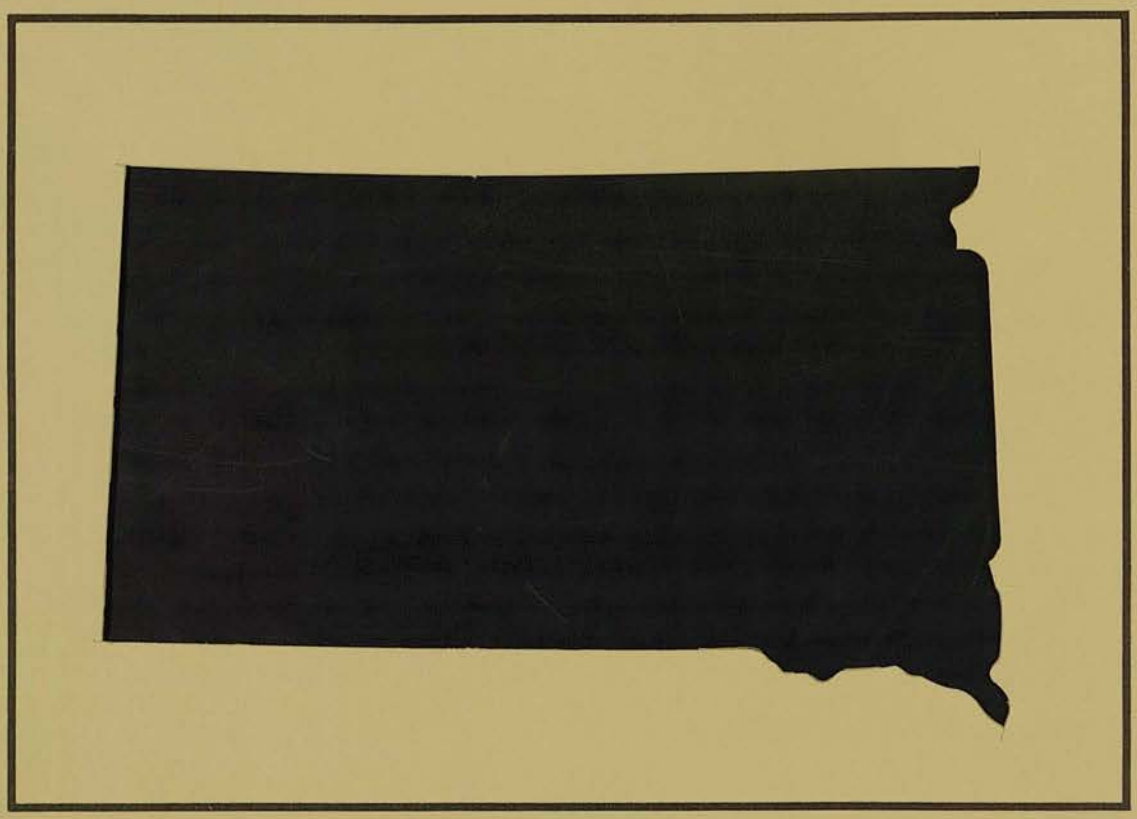

ECONOMICS DEPARTMENT

South Dakota State University
Brookings, South Dakota

CROP PRODUCTION MANAGEMENT IN SOUTH DAKOTA: LISA FARMERS COMPARED TO FARMERS IN GENERAL

by

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PREFACE

The authors appreciate the most willing, cordial, and insightful contributions of the various panels of sustainable and conventional farmers and others who reacted in February-March 1991 to a draft listing of contrasts in crop production management practices being followed by LISA farmers compared to farmers in general in South Dakota. The care and patience that they showed in responding to our questions has added much to the quality of this paper.

The authors also thank Donald Peterson, colleague in Agricultural Economics, and James Smolik, colleague in Plant Science, for their comments on an earlier version of this report. We thank the Northwest Area Foundation for financial support of this research.

DCT, DLB, JDC, AND TLD
September 1991

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CROP PRODUCTION MANAGEMENT IN SOUTH DAKOTA: LISA FARMERS COMPARED TO FARMERS IN GENERAL[1]

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INTRODUCTION

One component of SDSU's current research on sustainable agriculture involves comparative analysis of the prospective effects of various agricultural policies on low input, sustainable agriculture (LISA) farmers compared to farmers generally in South Dakota.[2] Illustrative reports of findings from this policy research are Dobbs et al. (1990) and Becker and Dobbs (1990). Dobbs and Cole (1991) also report prospective rural economy implications of farms converting from conventional to sustainable agriculture practices.

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[1]The research reported in this paper was supported by the South Dakota Agricultural Experiment Station and by Grant No. 88-56 from the Northwest Area Foundation (St. Paul, MN).

[2]In the interviews reported in this paper, LISA's definition was that from the U.S. Department of Agriculture: "Low-input sustainable agriculture (LISA) is a new USDA program for farming and farm research. It aims to help farmers use production resources--including equipment, labor, and chemicals--more efficiently. Under LISA, farmers may still use some synthetic chemicals, substituting on-farm resources, skilled management, and scientific know-how for others. LISA helps keep farmers profitable by improving management skills and reducing the need for chemicals and other purchased inputs. It helps sustain natural resources by reducing soil erosion and groundwater pollution and by protecting wildlife. And it links farmers, scientists, and lawmakers in a new partnership for safe, profitable farming."

In the interviews reported in this paper, we talked with farmers as if they were either "LISA farmers" or "farmers in general." The latter term is roughly equivalent with the term "conventional farmers" that is used rather commonly in the literature. "Farmers in general" and "conventional farmers" are, therefore, used interchangeably in this paper.

An early step in the above analysis involved the development of budgets for individual crop enterprises and principal crop rotations for selected LISA and conventional farming systems in South Dakota. The LISA budgets were developed with information provided through personal interviews of 12 practicing LISA farmers in five regions of the state (Becker et al. 1990).

One budget was developed for a similar, but conventional farming system in each of the five agroclimatic regions where the 12 LISA farms were clustered: South Central = SC, East Central = EC, Northeast = NE, Northwest = NW, and Southwest = SW (Figure 1). These budgets were developed for an actual conventional farm in one region (EC) and a "typical" synthetic conventional farm in each of the other four regions (Cole and Dobbs 1990). The latter budgets were based on data from various secondary sources and insights from "key informants" (e.g., Area Cooperative Extension Specialists, County Extension Agents, Soil Conservation Service personnel, local agricultural chemical suppliers) in each study region.

This paper summarizes (1) five main contrasts in crop production management between LISA and conventional farmers in South Dakota[3] and (2) reactions of panels of LISA farmers, conventional farmers, and other key informants to the existence of and explanations for apparent contrasts, between LISA farmers and farmers in general, in their respective crop production practices.

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[3]As noted below, the fifth postulated contrast was not considered as valid by most panelists. For the sake of completeness in reporting, however, we include discussion of this contrast in the paper.

STUDY PROCEDURES

The first step in the research reported in this paper was to identify the major apparent contrasts in crop rotations[4] and tillage and other cultural practices between the LISA and conventional farming systems in each of the five selected agroclimatic regions in the state. A questionnaire was developed for each region in which the apparent contrasts were described. Provisions were made in the questionnaires for determining (1) whether respondents agreed or disagreed with each stated contrasting crop management practice and (2) what respondents viewed as the primary constraints to more farmers adopting LISA practices. An illustrative questionnaire for the Northeast Region is provided in Annex B.[5]

The most common approach for obtaining information in each region was to invite separate panels of (1) three to six sustainable farmers and (2) three to six conventional farmers and other "key informants"[6] to meet in a central location in each

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[4]See Annex A for a listing of the respective regions' crop rotations.

[5]Also covered in the questionnaires were questions on (a) features of Federal farm policy that influence the adoption of LISA management practices and (b) possible initiatives, beyond those of individual farmers and in the Federal farm policy arena, that might be undertaken to alleviate constraints to the more widespread adoption of LISA production practices.

[6]The term "key informant," as used in this paper, is a social science research term. It is used to denote people who are especially knowledgeable in a particular subject area. The perhaps more popular connotation of "key informant" which implies someone who possesses "secretive, inside information" does not apply in this paper.

region with either David Becker or John Cole for an informal group administration of the region's questionnaire. In most cases, the "conventional panels" included one or more County Extension, Soil Conservation Service (SCS), and Agriculture Stabilization and Conservation Service (ASCS) personnel. Because of the rather remote location of some respondents in the west, interviews with as few as one or two respondents at a time were conducted. The interviews were undertaken during February-March 1991.

The responses to similar questions in the various regions were summarized by region and type of farmer panel. The formatting and wording of the various questions in the five regional questionnaires were then modified to enable a more general characterization of what appear to be five main contrasting features of crop production management between LISA farmers and farmers in general in South Dakota.

Following the statement of each contrasting feature in this paper is a reflection of the views of the panel groups, by region and by LISA-compared-to-conventional panelists. These views represent the perceptions of LISA informants about themselves and conventional farmers and, similarly, the perceptions of conventional informants about themselves and LISA farmers. The views are not always consistent with one another. Some views are rather anecdotal. None are purported by the authors to necessarily represent "objective truth."

CONTRASTS IN CROP PRODUCTION MANAGEMENT PRACTICES

1. The crop mixes on LISA farms differ from those on farms generally in South Dakota in the following ways:

a. In the SW, NW, NE, and SC, more non-program crops tend to be raised on LISA farms, e.g., millet (SW, NE), buckwheat (SW), forage sudan (NW), rye (NE, SC), flax (NE), sunflowers (NE).

Southwest

Both LISA panelists agree. One says in Mellette County this is not much of an issue, however, since moisture limits crops that can be grown. The other says conventional farmers don't grow non-program crops because such crops may not fit their rotations and because they may not have adequate facilities for storage, necessary equipment for raising, experience with, and capability to market non-program crops.

Conventional panelists disagree. The statement used to be true, but moisture limitations keep everyone from growing most non-program crops, such as buckwheat, that require more moisture than wheat. An exception seems to be millet, which "everyone" rediscovered during the drought of 1988.

Northwest

LISA panelists agree. They believe conventional farmers may feel that moisture is inadequate to allow for non-program crops and that alternative crops are not profitable enough.

Conventional panelists disagree, saying that moisture limits the crops that anyone can grow. Conventional farmers believe that wheat can stand drought better than other crops. They also believe that markets for non-program crops are inadequate and that non-program crops leave too little residue on top of the soil to meet ASCS standards. One key informant, however, agrees with the statement, saying that millet, clover, and alfalfa can be used as livestock feeds by sustainable farmers. He believes conventional farmers lack information on appropriate non-program crops.

Northeast

LISA panelists agree, indicating that rye is a good crop for cleaning up weeds. Rye is vital in a rotation. There are organic markets for non-program crops. Conventional farmers may not have adequate storage facilities for non-program crops. Further, one LISA panelist believes that harvesting non-program crops late in the year may conflict with the preferred "post-working season" vacation times of some conventional farmers.

Conventional panelists disagree, saying that the recent drought has brought to all farmers increasing interest in crop rotations in Brown County. Sunflowers, also because of the farm program, and millet are generally coming back to Brown County. Edible beans are also becoming more popular. Crops like millet, rye, and flax don't usually require herbicides. Alfalfa is less popular, due to less livestock and limited moisture (sudan is taking its place to some extent). Factors constraining conventional farmers from moving toward non-program crops are limited markets and relatively low prices for those crops. Rye is not very popular.

South Central

LISA panelists agree, indicating that rye is a good crop for building organic matter. Conventional farmers may not raise rye because the market price of rye grain tends to not be profitable and conventional farmers may not have enough livestock to use the rye as hay.

Conventional panelists agree, saying that rye is not a profitable crop.

b. In the NE, corn is less likely on LISA farms.

LISA panelists say the statement may not be accurate. Most farmers are reluctant to reduce corn acreages and thereby lose corn base acres.

Conventional panelists say that no livestock may be the reason for no corn on sustainable farms. If you have livestock, you have to produce corn to feed them. Also, farmers do not want to lose their corn base through cutting back on their corn acreage.

c. In the EC, more small grains and alfalfa are grown by LISA farmers.

LISA panelists agree, saying that conventional farmers may believe small grains to not be sufficiently profitable, particularly with current provisions of the farm program, and well-suited for recent weather conditions in Lake County. Furthermore, some LISA panelists believe that (i) conventional farmers tend to give low priority to crop rotations and (ii) they have less livestock now than formerly. The latter implies less need for alfalfa for feed. Conventional farmers may not have the time to put up hay which often coincides with cultivating.

Conventional panelists agree, saying that fewer small grains are grown because small grains are not profitable--particularly in relation to soybeans, for which production costs are about comparable. Alfalfa is not common because of high costs of alfalfa establishment, limited livestock to consume the alfalfa, and added labor and machinery requirements for producing alfalfa.

d. In the EC, alfalfa stands are broken up sooner after establishment on LISA farms.

LISA panelists agree, saying that they harvest alfalfa only 1 year so as to obtain a maximum of nitrogen fixation and weed control benefits and a minimum of moisture loss from alfalfa. Farmers in general leave their alfalfa down for several years because of concerns over the high establishment costs of and general difficulties in establishing alfalfa.

Conventional panelists list establishment costs/difficulties and larger livestock herds as their main reasons for leaving alfalfa down for several years.

2. Compared to S.D. farmers in general, LISA farmers substitute crop rotations, green manures, and livestock manures for purchased synthetic chemical fertilizers. West of the Missouri River, however, neither LISA nor conventional farmers have used much synthetic chemical fertilizer in recent years.

LISA panelists agree. Conventional farmers throughout the state are believed to be rather afraid of the unknown, especially that they may lose yields and profits if they reduce or totally exclude the use of chemical fertilizer. Some LISA farmers say that farmers in general are led to believe that they will receive several dollars return per dollar of fertilizer expenditure. Farmers in general tend to believe that you have to add external nutrients or your soil will "run out of fertility." Farmers in general need to learn the possibilities of using crop rotations and other approaches to maintain soil fertility. LISA farmers say that farmers have to accept the fact that some natural fertilizers require more time than synthetic fertilizers to become available to plants.

Conventional panelists in the west indicate it has been so dry in recent years that almost no one uses fertilizer anyway; some are concerned that, if fertilizer is used under drought conditions, the vegetative growth thereby promoted makes plants less tolerant of the drought. Conventional panelists from throughout the state indicate that most farmers are applying less fertilizer now than formerly. They stress their use of soil testing and applying only as much fertilizer as is needed. They are concerned that further reductions in chemical fertilizer use will reduce yields and

profits. Most farmers carefully time fertilizer and pesticide applications. Some believe it is cheaper to obtain nutrients from synthetic than natural sources. Some say they believe nutrients removed by crops have to be replaced by external nutrients. Recycling nutrients is not enough; net losses of P and K are inevitable unless the P and K are replaced from external sources. There aren't enough livestock (livestock numbers have gone down over time) to produce the needed amount of manure to cover all land. Further, it is much more difficult to monitor nutrient application rates from livestock manure than from synthetic fertilizer. Some farmers are concerned that the application of manure can result in tied up nitrogen.

3. Compared to S.D. farmers in general, LISA farmers substitute mechanical tillage and other cultural practices[7] for chemical methods of weed control. As for synthetic chemical herbicides, however, relatively few chemicals have been used recently by most farmers west of the Missouri River. Illustrative common methods of mechanical tillage are dragging (all regions), cultivating (all regions), rotary hoeing (NE, EC, SC), and hand weeding (NE, EC, SC).

Southwest

LISA panelists agree. One LISA farmer says that conventional farmers may be concerned about injuring roots of row crops through mechanical tillage (cultivator blight), the high costs of owning and operating necessary tillage equipment, and having too little time for mechanical tillage--if they have livestock. The other farmer says that conventional farmers are concerned about being able to find the extra time to undertake tillage when it needs to be done and possible moisture losses and added costs associated with mechanical tillage. TV and elevator advertising of chemical weed control (but not mechanical or biological weed control) also impacts the general mind-set of conventional farmers.

Conventional panelists disagree, saying that all farmers are doing it the same. If farmers are good stewards of the soil, they will not use excessive tillage or chemicals. ASCS requires set-aside acres to have 30% residue cover; additional tillage would destroy that cover, dry out the soil, and take more time than chemical weed control.

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[7]Illustrative other methods of weed control include crop rotations, altered planting dates, widened row-widths to allow cultivating or narrowed row-widths to shade out weeds, and increased seeding rates.

Northwest

LISA panelists disagree, saying that if LISA farming practices are done properly, tillage operations will decrease. Conventional farmers may believe that some weeds can't be controlled by tillage (e.g., creeping jenny) and that they don't have the amount or flexibility of time to properly do mechanical tillage.

Conventional panelists disagree, but (i) "economics," i.e., the cost of tillage versus cost of chemicals, and (ii) moisture play a big role in the amount of chemicals used. They believe chemical control to be cheaper and faster than tillage control. "Herbicides are used to meet ASCS guidelines." Weather is a big factor, e.g., if it is windy, farmers may chose to till rather than spray. One conventional panelist agrees with the statement in the questionnaire. He cites heavy emphasis on chemical control (not on tillage or crop rotations) in SDSU extension weed control recommendations.

Northeast

LISA panelists agree, indicating that most conventional farmers don't like to see weeds in the field. They also feel it is cheaper to spray than make several trips with mechanical tillage equipment.

Conventional panelists generally agree. They believe that more tillage may not be profitable because extra tillage dries out the ground. Conventional farmers carefully monitor herbicide applications and sometimes custom hire the work done so as to not have to handle the chemicals.

East Central and South Central

LISA panelists agree. They believe that some conventional farmers think it is hard to find people to do hand weeding. Farmers in general tend to fear added drying out of soil from more tillage, but they fail to take into account that improved soil tilth resulting from sustainable practices mitigates the impact of this potential problem. Many conventional farmers are concerned with fuel costs for mechanical tillage. With larger operations, there isn't adequate time to use mechanical tillage. LISA farmers believe that chemical control is easier (e.g., herbicide application is relatively rapid, there exists a range of herbicides to control particular weeds) and the timing is less critical than with mechanical tillage (e.g., rotary hoeing has to be done at "exactly" the right time; a different herbicide may be selected, depending on the stage of weed growth). Larger farmers would have more difficulty finding the extra time/labor required for mechanical tillage; chemical control is easier and advertised to be safe. Some conventional farmers may not have the necessary equipment, e.g., rotary hoes.

Conventional panelists agree, indicating that they believe those who do not use chemicals are unrealistic. Some conventional farmers stress that they apply only limited amounts of herbicides, through banding of herbicides, and that they undertake tillage for weed control. Conventional farmers are concerned with added time/labor and the cost of buying, repairing, and operating equipment for doing mechanical tillage. Too much tillage results in added soil moisture depletion, soil erosion, and water runoff. "We have pride in the appearance of our fields; we don't like to see weeds." Also, chemicals are convenient, require little time to apply, and are safer today than they used to be.

4. Summer fallow/set-aside land management practices for LISA farmers differ from those for farmers generally in S.D. as follows:

a. In the SW and NW, LISA farmers use sweet clover (SW, NW) or forage sudan (NW) as a green manure compared to farmers generally using black fallow.

LISA panelists in the SW agree, saying that constraints to moving away from black fallow are concerns over the green manure crop using up soil moisture, being difficult and costly (may not have the right equipment) to establish, requiring time and management to establish, and being a more costly way to obtain nitrogen than if the nitrogen were bought directly as fertilizer. Black fallowing has a long tradition.

LISA panelists in the NW agree, saying that constraints to moving away from black fallow are concerns over the green manure crop using up soil moisture, not decaying adequately (will plug up drill next year), and taking more time than simply black fallowing.

Conventional panelists in the SW agree with the statement, but are skeptical about the wisdom of anyone getting away from black fallow. Their reasons are similar to those for the NW conventional farmers indicated below. One conventional panelist believes that LISA farmers do not place sweet clover on summer fallow/set-aside land because that would use up too much scarce moisture.

Conventional panelists in the NW agree, saying that constraints to moving away from black fallow are concerns over the green manure crop using up soil moisture, a damaging effect to the green manure crop of carry-over chemicals from the prior year, and possible damage to the green manure crop on fallow land from spray-drift from neighboring wheat strips.

b. In the NE, LISA farmers use sweet clover as a green manure compared to farmers in general using strips of flax or continuous black fallow.

LISA panelists generally agree. Constraints to more farmers using sweet clover as a green manure are possible added costs and a requirement for greater management.

Conventional panelists say that Brown County has less black fallow now than before. They say that the new farm program may bring in more sweet clover and alfalfa to rotations. A current constraint to more farmers using sweet clover as a green manure are greater costs for solid cover than for strip cover.

c. In the EC, LISA farmers use sweet clover as a green manure on set-aside land, rather than millet (harvested for hay after the allowed date for harvesting set-aside acres) as reported for some conventional farmers.

LISA panelists agree with the first part of the statement, but say that fallow/disced set-aside or small grain on set-aside--in expectation that farmers may be allowed to hay the small grain for cattle feed if there is a drought declaration by U.S.D.A.--are more common than millet for hay. Set-aside land tends to be below-average in quality and may not grow anything well. Some conventional farmers view sweet clover as a weed.

Conventional panelists agree with the first part of the statement, but say that fallow/disced set-aside is more common than millet for hay. They say that one cannot afford to grow nitrogen; it's cheaper to buy it. They also say it is hard to get a good stand of sweet clover or alfalfa on set-aside, because set-aside land tends to be below-average in quality. They are also concerned with the difficulty of trying to kill sweet clover the next year. The percent set-aside for corn is so small in 1991 that farmers may not think the extra effort of planting a green manure crop is worthwhile.

d. In the SC, LISA farmers use sweet clover as a green manure on set-aside rather than forage sorghum for a green manure as reported for farmers in general.

LISA panelists agree with first part of the statement, but they say farmers in general will harvest the sorghum for silage or let cattle graze it rather than use it as a green manure. Constraints to more farmers using sweet clover as a green manure are perceived heavy moisture use by sweet clover, the need for small grains to establish the sweet clover in rotations, the need to plan ahead for ground to be placed under set-aside (through seeding the prior year), and a damaging effect to sweet clover of carry-over chemicals from the prior year.

Conventional panelists indicate that sorghum is cut for silage or used for feed, presumably after the consecutive 5-month period when haying or grazing is not permitted, rather than used as green manure. They indicate set-aside acres are generally used by farmers to produce inexpensive feed such as sorghum and millet. Sweet clover is believed to dry out the ground too much.

5. Compared to S.D. farmers in general, LISA farmers may undertake less post-harvest tillage and use "lighter" farm machinery and equipment (e.g., moldboard and chisel plows on conventional farms versus tandem discs and noble blades on LISA farms).

Some LISA panelists agree that LISA farmers undertake less post-harvest tillage, but others disagree. Some LISA farmers agree that LISA farmers use "lighter" equipment while others disagree. Those who agree that LISA farmers use lighter equipment cite a greater prominence of noble blades on LISA farms.

Conventional panelists disagree, saying that post-harvest tillage is seldom undertaken by anyone and that machinery inventories do not differ much between LISA farmers and farmers in general.

CONCLUSIONS

SDSU's survey research on sustainable agriculture in South Dakota since 1988 shows rather definite broad contrasts between LISA farmers and farmers generally in regard to the farmers' overall crop mixes and their fertility, weed control, and fallow/set-aside management practices. Differences between the two categories of farmers are less extreme in the west, however, particularly in recent drought years when relatively few synthetic farm chemicals have tended to be used by anyone there. Contrasts in LISA versus general cropping practices in the west revolve more around fallow/set-aside land management than around farm chemical management.

The perceptions of some farmers concerning the specific nature of farming practices being followed and the reasons for the practices being followed are different from those of other farmers. This is true to some extent within the "communities" of LISA and conventional farmers. Contrasting perceptions are greater, however, between the communities of LISA and conventional farmers. To some extent each "group" feels somewhat misunderstood by the other.

Particular focal points of misunderstanding revolve around a rather common perception of some LISA farmers and the public in general that "conventional" farmers are "irresponsibly pouring chemicals onto their land" and otherwise failing to show concern for preserving nature's farming resources for generations to come. Some LISA farmers, however, believe such a characterization to be unfair. They see very considerable differences among individual conventional farmers in human values and farming practices. Some conventional farmers may not farm very differently from them, although motivations for their practices may differ some from their own.

Many conventional farmers believe that economic conditions during the 1980s have forced all farmers to become better managers and that they are increasingly reflecting long-term concerns in the management of the natural resources on their farms. Some conventional farmers, however, find it hard to believe that certain LISA farming practices could be economically viable in the competitive agricultural environment of the 1990s. They are concerned, for example, about possible (1) yield reductions, (2)

difficulties in maintaining adequate fertility and pest controls, (3) damaging soil moisture depletion from green manure crops and mechanical tillage, and (4) difficulties in being able to provide necessary labor if they were to follow LISA practices. Some also believe farmers are better advised to develop managerial expertise in relatively few enterprises, rather than to have more diversified operations--especially if the diversification involves both crops and livestock.

Issues such as these are inherently complex. Simple-fix answers do not exist. Additional research to untangle the complexities needs to be undertaken. In all of this, a major challenge is for farmers, researchers, groups with differing interests in the future of agriculture, and the general public to remain open-minded and to be in dialogue with each other.

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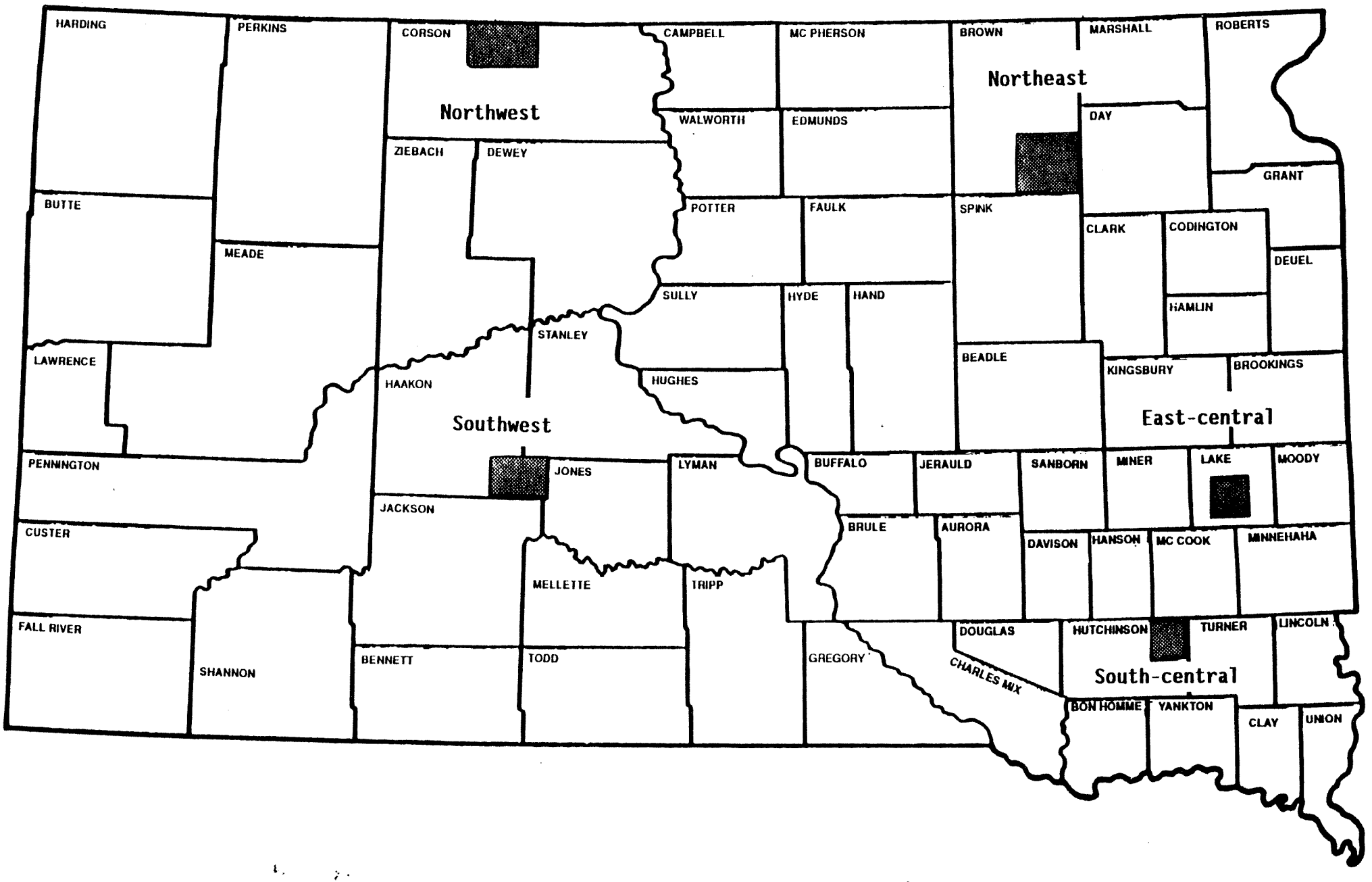
Figure 1. Locations of the five regional LISA and general farming systems investigated.



ANNEX A

CROP ROTATIONS: LISA FARMS AND FARMS IN GENERAL, BY REGION

The "LISA" rotations referred to in this annex (Rot T, Rot U, etc.) are found in Becker et al. (1990). Cultural practices for each LISA rotation are described in that publication. Cultural practices for the rotations of "farmers generally" are described in Cole and Dobbs (1990).

Crops grown by various farmers in Southwest Region

Farmers Generally	Farmers using LISA Practices	
Haakon Co.	Rot T.	Rot U.
W. Wheat	W. Wheat	W. Wheat
G. Sorghum		
F. Sorghum		
Oats (Gr)		Oats (Gr)
Oats (Hay)		
S. Fallow	S. Fallow	S. Fallow
Alfalfa (4 years)	Alfalfa (4 years)	Alfalfa (5 years)
	Millet	Millet
	Buckwheat	
		Set Aside (Est Alf)

Crops grown by various farmers in Northwest Region

Crops Grown by Various Farmers

Farmers Generally	Farmer using LISA Practices
Corson Co.	Rot V.
S. Wheat	S. Wheat
Corn (Grain)	Corn (Grain)
Corn (Forage)	Corn (Forage)
Barley	
S. Fallow	S. Fallow (Sw. Clover)
	S. Fallow (Forage-Sudan)
	Oats

Crops grown by various farmers in Northeast Region

Farmers Generally	Farmers Using LISA Practices				
Brown Co.	Rot S.	Rot. Q	Rot R.	Rot O.	Rot P.
S. Wheat	S. Wheat	W. Wheat	S. Wheat	S. Wheat	S. Wheat
Soybeans	Soybeans	Soybeans	Soybeans	Soybeans	Soybeans
	Millet	Millet	Millet	Millet	
		Sunflowers	Sunflowers		
Flax strips S. Fallow	S. Fallow	S. Fallow	Sw Clover-S. Fallow	S. Fallow	Sw Clover-S. Fallow
	Flax		Flax		
		Rye	Rye		Rye
	Oats			Oats	Oats
Alfalfa (4 years)	Alfalfa (4 years)			Alfalfa (3 years)	Alfalfa
Barley					
Corn				Corn	Corn

Crops grown by various farmers in East Central Region

Farmers Generally	Farmers Using LISA Practices						
Lake Co.	Rot H.	Rot. K.	Rot L.	Rot I.	Rot J.	Rot M.	Rot N.
Corn	Corn	Corn	Corn	Corn	Corn	Corn	Corn
			Corn(silage)				
Soybeans	Soybeans	Soybeans	Soybeans	Soybeans	Soybeans	Soybeans	
Set Aside (Millet)	Set Aside	Set Aside (S. Clover)	Set Aside (S. Clover)		Set Aside (S. Clover)		
	Oats		Oats	Oats	Oats	Oats (R. Clover)	Oats
	S. Wheat	S. Wheat			S. Wheat		
						Red Clover	
		Barley					
		Flax	Flax				
			Rye				Rye
	Alfalfa (1 Year)	Alfalfa (3 Year)	Alfalfa (5 Year)	Alfalfa (1 Year)	Alfalfa (3-5 Year)	Alfalfa (2-3 Year)	Alfalfa (3-4 Year)

Crops grown by various farmers in South Central Region

Farmers Generally	Farmers Using LISA Practices						
Hutchinson Co.	Rotation D	Rotation A	Rotation G	Rotation B	Rotation C	Rotation E	Rotation F
Corn		Corn		Corn	Corn	Corn	Corn
Soybeans	Soybeans	Soybeans	Soybeans	Soybeans	Soybeans		
Oats		Oats			Oats	Oats	Oats
Alfalfa (3-4 yrs)		Alfalfa (4-5 yrs)	Alfalfa (3 yrs)	Alfalfa (3-5 yrs)	Alfalfa (3-5 yrs)	Alfalfa (5-8 yrs)	Alfalfa (3 yrs)
Green Manure (Forage Sorg)	Green Manure (sp wht/swt cl)			Green Manure (swt clover)			Green Manure (swt clover) (forage sudan)
	Spring Wheat		Spring Wheat				Spring Wheat
		Rye	Rye		Rye		Rye
				Winter Wheat			
					Grain Sorghum		
							Millet

ANNEX B

ILLUSTRATIVE QUESTIONNAIRE, NORTHEAST REGION

Date _____

1991 INDIVIDUAL / GROUP INTERVIEWS:
NORTHEAST AREA, S. DAK.

Part I. Description of L.I.S.A. - from the United States Department of Agriculture's (USDA) brochure on Low-Input Sustainable Agriculture:

"Low-Input Sustainable Agriculture (LISA) is a new USDA program for farming and farm research. It aims to help farmers use production resources - including equipment, labor and chemicals - more efficiently. Under LISA, farmers may still use some synthetic chemicals, substituting on-farm resources, skilled management and scientific know-how for others. LISA helps keep farmers profitable by improving management skills and reducing the need for chemicals and other purchased inputs. It helps sustain natural resources by reducing soil erosion and groundwater pollution and by protecting wildlife. And it links farmers, scientists and lawmakers in a new partnership for safe, profitable farming."

Some examples of LISA farming practices include but are not limited to the following:

- integrated crop-livestock systems;
- substituting legumes for fallow;
- rye for weed control;
- and small-grain/row crop rotations.

For discussion we would like to use two categories of farmers:

(1) "LISA" farmers; and
(2) farmers "generally".

Part II. Our Perception of the Main Differences Between LISA Farmers and Farmers in General in the Northeast Area

We are interested in your reactions to the accuracy of the following perceived differences as well as any ideas you may have about "Other Differences".

1. Corn is less likely to be included in the rotations of LISA farmers in the northeast area. (See attached sheet listing crops grown by various farmers.)

2. LISA farmers tend to use additional tillage to control weeds (e.g., drag, rotary hoeing, or hand weeding) compared to chemical methods of weed control used by farmers in general.

3. Non-program crops (e.g., millet, rye, flax, and sunflowers) are included in the crops grown by some of the LISA farmers but not as much by other farmers in general.

4. Summer fallow/set aside may be managed using sweet clover as a green manure by LISA farmers compared to planting strips of flax on black fallow to prevent soil erosion as reported by farmers in general.

5. Post-harvest tillage is usually not done on soybean ground by LISA farmers. Post-harvest tillage on other cropland is done with "lighter" equipment (e.g., tandem disc, noble blade, etc.) by LISA farmers, compared to moldboard and chisel plowing done by farmers in general.

6. Chemical fertilizer is less likely to be used by LISA farmers compared to farmers in general.

7. Other differences (e.g., livestock)?

Part III. Practicality, Economic Feasibility, Why's and Why Not's, and Additional Possible Incentives for LISA Practices

A. We are interested in your reactions to the attached table dealing with the possible problems with sustainable agriculture. In particular, which problems appear to you to generally be most important in constraining farmers from following LISA practices?

B. For each of the listed LISA practices, what are the reasons that keep more farmers from following them?

1. Excluding corn from the rotation.

2. Using additional tillage (e.g., drag, rotary hoeing, hand weeding, etc.) in place of herbicides for weed control.

3. Including more non-program crops in the rotation (e.g., rye, millet, flax, sunflowers, etc.).

4. Alternate methods of summer fallow/set aside management (e.g., including a legume such as sweet clover on summer fallow).

5. Eliminating post-harvest tillage on soybeans and using "lighter" equipment (e.g., tandem disc, noble blade, etc.) when performing post-harvest tillage on other cropland.

6. Reducing or excluding the use of chemical fertilizer.

7. Other (e.g., livestock)?

C. To what extent does Federal farm policy discourage the adoption of LISA practices? Do aspects of the 1990 Federal farm bill lessen those constraints at all? Could or should more be done with Federal farm policy to further lessen those constraints?

D. Are there other things that could be done -- which are beyond the possible initiatives of individual farmers -- which might facilitate more general use of LISA practices (e.g., research, marketing, or other things)?

Continuing problems with sustainable agriculture, survey respondent farmers (adapted from Table 32 in SDSU Econ Res Rpt 89-1, Sustainable Agriculture in South Dakota, by Donald C. Taylor, Thomas L. Dobbs, and James D. Smolik).

Possible problem with sustainable agriculture[a]	Degree of importance[b] Continuing problem Mean	Median	Range
Difficult to find organic market outlets	2.83	3	0-5
Lack of up-to-date and accurate information on sustainable agriculture	2.45	2	0-5
Receive personal ridicule from neighbors	2.21	2	0-5
Increased weed problems	2.07	2	0-5
Crops experience nitrogen shortages	1.97	2	0-5
Organic fertilizer and soil amendments are costly	1.93	2	0-5
Tough to cope with management requirements	1.86	2	0-5
Difficult to find adequate organic waste products (manure, compost, industrial)	1.79	2	0-5
Forces me to reduce my base acreage in the Federal farm program	1.55	0	0-5
Creditors are reluctant to grant loans	1.21	0	0-5
Forces me to have less farmland in high valued crops	1.10	0	0-5
Lack of pest resistant varieties	0.97	0	0-4
Forces me to be a livestock farmer	0.59	0	0-5
Increased insect problems	0.52	0	0-2
Increased disease problems	0.41	0	0-2

[a]Each of four respondents indicated one additional problem with sustainable agriculture: having to cope with the pollution of the land rented from others (5 rating), moisture in dry years--green manuring (5), pollution from neighbors (2), and increased labor requirements (2).

[b]Each respondent rated the relative severity of each possible problem with sustainable agriculture on a scale of 0 to 5, where 0 meant not at all important and 5 meant very important. The degree of importance of various problems is reflected by the mean, median, and range values for the problem-ratings by the individual survey respondents.