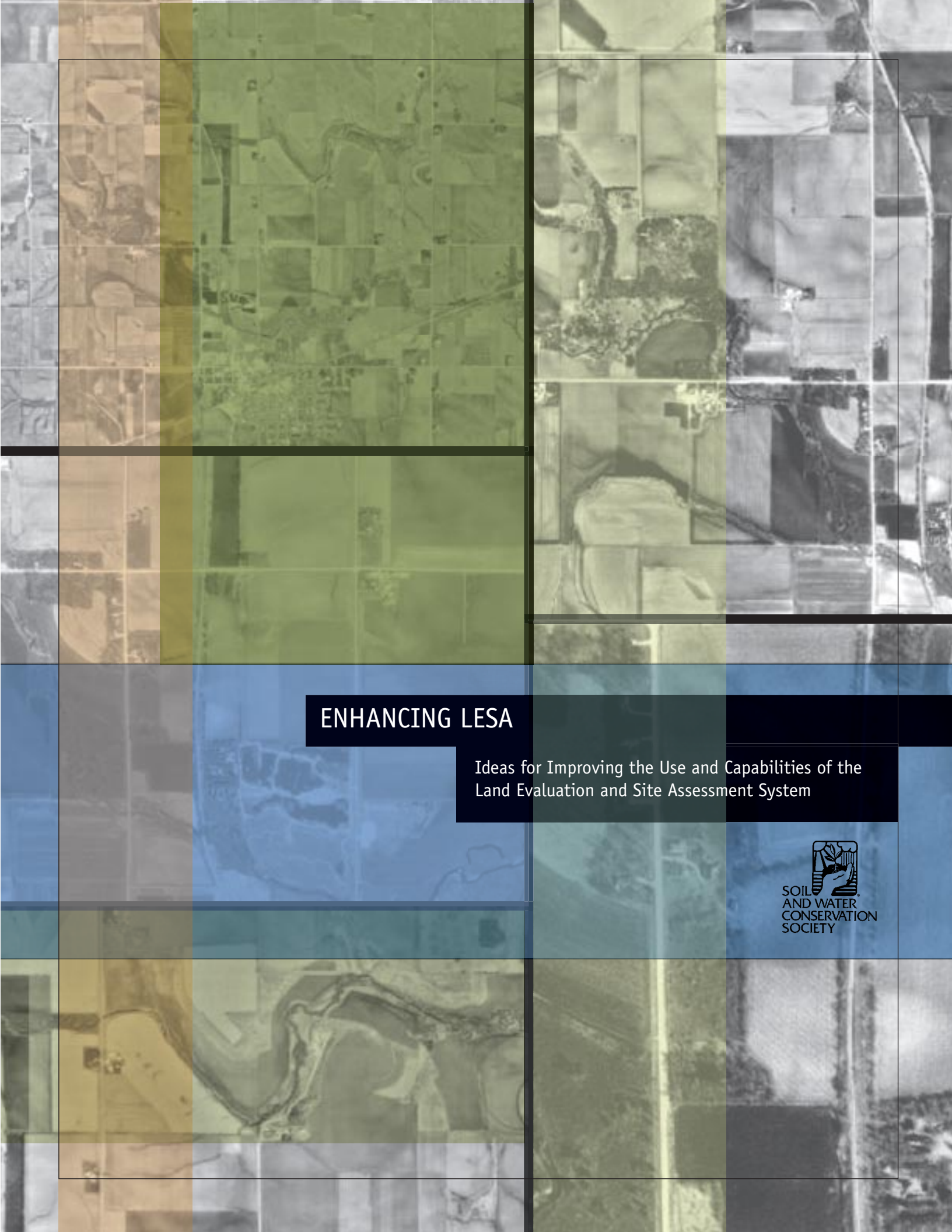

ENHANCING LESA

Ideas for Improving the Use and Capabilities of the Land Evaluation and Site Assessment System

SOIL AND WATER CONSERVATION SOCIETY

A report from the Soil and Water Conservation Society summarizing findings and recommendations from a workshop held June 3–4, 2003, at the Lied Lodge and Conference Center, Arbor Day Farm, Nebraska City, Nebraska.

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ACKNOWLEDGEMENTS

This report resulted from a workshop held June 3-4, 2003,
at the Lied Lodge and Conference Center, Arbor Day Farm, in Nebraska City, Nebraska.
The workshop was supported financially by the U.S. Department of Agriculture's Natural Resources Conservation Service under a cooperative agreement with the Soil and Water Conservation Society.

ABOUT SWCS

The Soil and Water Conservation Society (SWCS) is a nonprofit scientific and educational organization that serves as an advocate for conservation professionals and for science-based conservation policy. SWCS seeks to advance the science and art of soil, water, and related natural resource conservation to achieve sustainability. Members practice and promote an ethic that recognizes the interdependence of people and their environment.

SWCS has about 7,000 members around the world. They include researchers, administrators, planners, policymakers, teachers, students, farmers, and ranchers. Nearly every academic discipline and many different conservation institutions are represented within the membership. Member benefits include the widely respected *Journal of Soil and Water Conservation,* representation in policy and scientific circles, opportunities for leadership and networking, and discounts on books and conference registrations.

SWCS chapters throughout the United States and Canada conduct a variety of activities at local, state, and provincial levels and on university campuses. These 75 chapters represent the grassroots element of the organization. Each chapter elects its own officers, organizes conservation forums, and formulates local recommendations on land and water conservation issues.

SOIL AND WATER CONSERVATION SOCIETY

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EXECUTIVE SUMMARY

The Land Evaluation and Site Assessment (LESA) system is a framework for combining multiple factors into an integrated assessment of the importance of a particular site for continued agricultural use. Such factors as soil quality, agricultural productivity, development pressure, and measures of other public values are combined into a single score that allows units of government and nongovernmental organizations to identify and protect important agricultural land and plan growth accordingly.

An agricultural land suitability assessment tool is important because problems associated with sprawl and conversion of agriculturally significant land are becoming critical. Those problems will become more troublesome, given population growth rates and associated development pressures. Moreover, land is currently being developed at a rate that exceeds the rate of population growth. Between 1960 and 1990, population in metropolitan areas grew by 50 percent while the acreage of developed land increased by 100 percent.

Planning for continued growth will be among the most important tasks this nation faces in the coming decades. Some farm and ranch land will have to be sacrificed to accommodate increased population. The question is whether we make these critical land use decisions consciously, based on solid information about the relative values of land for agriculture, environmental quality, and development, or make them on an ad hoc basis.

Invited experts met for a day and a half to share, discuss, and debate the most promising opportunities to improve the effectiveness of LESA as an agricultural land suitability assessment tool and to identify the obstacles standing in the way of achieving those opportunities.

Workshop participants concluded that LESA is a good tool that is under used and under supported. They argued that LESA fills an important niche and that there are promising opportunities to make LESA better by empowering users and making key improvements to its technical capacity.

Workshop participants concluded that an important first step to be taken is to enhance the support available to current users and new users of LESA. Making more users aware of LESA's existence and helping them adapt LESA to their locality and priorities is just as important as enhancing the technical capabilities of the LESA system itself. A dense, web-based support network should be built to provide users with technical resources, technical assistance, examples of how to use LESA and to connect users with colleagues with whom they can share successes, failures and ideas. LESA training should be made available to users—particularly in high growth areas—and efforts taken to ensure the continued growth and development of the intellectual capital on which LESA depends.

Participants also concluded that key technical improvements in LESA would markedly improve its utility as a farmland protection, land use planning, and growth-management tool. Participants stressed, however, that LESA should not abandon its most important niche as an agricultural land suitability assessment tool. Instead, participants recommended a two-step approach to enhancing the technical capabilities of LESA:

1. Developing an enhanced generic model of LESA for agricultural land suitability assessment, for example, by adding geographic information system (GIS) capability.
2. Developing guidance and generic approaches for linking LESA to compatible applications, such as environmental benefits assessment.

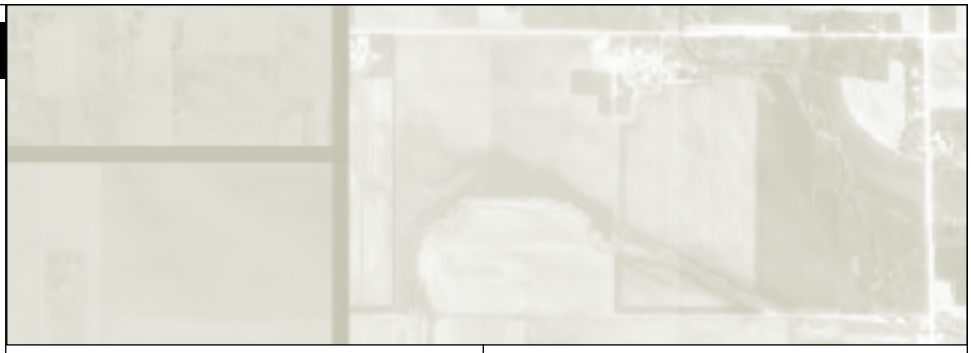
Participants suggested numerous technical improvements for LESA. The most commonly recommended ideas fell into one of three groups: (1) build an environmental benefit assessment capability into LESA, (2) enhance LESA with GIS capabilities, and (3) strengthen LESA applications for land use planning and growth management.

Workshop participants recognized that implementing their recommendation would take time. Some steps, they thought, should be taken quickly to strengthen LESA. Those steps included:

- Establishment of a web-based LESA clearinghouse and technical support network.
- The targeting of LESA training to NRCS and partner organization employees working in counties experiencing the most intense development pressure and growth-management challenges.
- Establishment of a working group to develop a framework for incorporating environmental metrics into LESA.
- Hold a LESA conference, and use the conference proceedings to produce an update of the book *A Decade with LESA*.
- Work with the American Planning Association to develop a report on "LESA and Applications for Smart Growth."

INTRODUCTION

The Soil and Water Conservation Society (SWCS), in cooperation with the U.S. Department of Agriculture's Natural Resources Conservation Service (NRCS), held a workshop in June 2003 to elicit ideas and recommendations for enhancing the use and capabilities of the Land Evaluation and Site Assessment (LESA) system, a tool used to assess agricultural land suitability. Invited experts met for a day and a half to share, discuss, and debate the most promising opportunities to improve the effectiveness of LESA and to identify the obstacles standing in the way of achieving those opportunities.



WHAT IS LESA?

The LESA system is a framework for combining multiple factors into an integrated assessment of the importance of a particular site for continued agricultural use (Pease and Coughlin, 1996). Such factors as soil quality, agricultural productivity, development pressure, and measures of other public values are combined into a single score that allows units of government and nongovernmental organizations to identify and protect important agricultural land and plan growth accordingly (see "LESA Framework" sidebar).

LESA is a marriage between two traditions in land planning in the United States (Steiner, 2003). The first and oldest tradition is the system established by NRCS to assess the suitability of a soil for supporting agronomic uses. The second tradition is the land suitability assessment approach advocated by landscape architects and planners, such as Phil Lewis, Carl Steinitz, and Ian McHarg, beginning in the 1960s (Steiner, 2003).

NRCS first tested LESA in 1981. In 1984, the U.S. Department of Agriculture (USDA) adopted a generic LESA system for use by federal agencies evaluating projects causing the conversion of agricultural land to nonagricultural uses. Hundreds of communities have since adopted and adapted LESA and LESA-like systems to help them make informed land use decisions (see Table 1, page 8).

LESA is an analytical tool designed to provide systematic and objective procedures to rate and rank sites based on their agricultural importance. A LESA system can help address many land use questions confronting decision-makers:

- What land should a city, town, or county designate in its comprehensive plan or zoning ordinance for continued, long-term agricultural use?
- How can agricultural land be ranked in two or more land classes?
- Which farm sites should be given highest priority for purchase of development rights?
- What is the significance of highway project impacts on farmland?
- Should a zoning permit be given to partition farmland or to allow a nonfarm use?
- Which site among development project alternatives has the least impact on agricultural land (Pease and Coughlin, 1996)?

LESA's primary purpose was and remains assessing the suitability of land for agricultural use. The system is a highly flexible one that can be adapted to the unique nature of agriculture in particular communities. At the same time, LESA also can be modified to assess other land resources,

LESA Framework

LESA, the Land Evaluation and Site Assessment tool, combines soil quality factors with other factors to assess the importance of a site for agricultural use. The LESA framework has two parts. Soil quality factors are grouped under the Land Evaluation (LE) side of the LESA framework. The Site Assessment (SA) side of the framework includes factors that affect the importance of a site for agricultural uses.

There are three groups of SA factors:

- **SA-1: Factors other than soil-based qualities measuring limitations on agricultural productivity or farm practices.**
- **SA-2: Factors measuring development pressure for land conversion.**
- **SA-3: Factors measuring other public values, such as historic or scenic values.**

Each LE and SA factor is assigned a factor rating and a weight. The factor ratings and weights are adjusted on the basis of how important each factor is for a given location or application of the LESA framework. The sum of the weighted factor ratings is the total LESA score. A simplified, hypothetical example of a LESA system appears in the table on the following page.

HYPOTHETICAL EXAMPLE OF COMPUTING A LESA SCORE

Factor Name	Factor Rating (0-100)	Factor Weight (Total = 1.00)	Weighted Factor Rating (Factor Rating X Factor Weight)
LAND EVALUATION (LE)			
Land capability classification	68	0.30	20.4
Soil productivity	62	0.20	12.4
LE subtotal		0.50	32.8
SITE ASSESSMENT (SA)			
SA-1 Agricultural Use			
Acreage of farm	100	0.15	15.0
Farm investment	80	0.05	4.0
Surrounding uses	60	0.10	6.0
SA-1 subtotal		0.30	25.0
SA-2 Development Pressure			
Protection by plan or zoning	90	0.06	5.4
Distance to sewer	70	0.05	3.5
SA-2 subtotal		0.11	8.9
SA-3 Other Factors			
Scenic quality	50	0.09	4.5
SA-3 subtotal		0.09	4.5
TOTAL LESA SCORE			**71.2**

In this simple example, a LESA score could range from 0 to 100. The higher the score, the more important the site for agricultural uses. Thresholds can be set to group sites by scores into two or more classes—based on their agricultural importance—to help make land use decisions.

The LESA framework is flexible. Factors can be added and factor ratings and weightings adjusted to tailor the assessment to a particular location or for use in achieving a particular objective.

Source: Pease, J.R., and R.E. Coughlin. 1996. Land Evaluation and Site Assessment: A Guidebook for Rating Agricultural Lands, *Second Edition. Soil and Water Conservation Society: Ankeny, Iowa.*

including forestland, wetlands, rangeland, and riparian zones.

The ideas and recommendations put forward by workshop participants were diverse. They ranged from very specific ideas for enhancing LESA as a technical tool to very broad statements regarding the role LESA might play in land use and growth management. This report summarizes participants' ideas and groups them under three main topics: (1) the rationale for enhancing LESA, (2) ideas for enhancing the capabilities of current and new users of LESA, and (3) ideas for enhancing the technical capabilities of LESA. A more complete listing of participants' ideas can be found in Appendix A.

WHY ENHANCE LESA?

An agricultural land suitability assessment tool is important because problems associated with sprawl and conversion of agriculturally significant land are becoming critical. And those problems will become more troublesome, given population growth rates and associated development pressures. Today, there are 288 million people in the United States. The U.S. Census Bureau projects that the nation's population in 2050 will exceed 400 million people—nearly a 40 percent increase (Daniels, 2003).

Land is currently being developed at a rate that exceeds the rate of population growth. Between 1960 and 1990, population in metropolitan areas grew by 50 percent while the acreage of developed land increased by 100 percent (U.S. Department of Agriculture Policy Advisory Committee on Farm and Forest Land Protection and Land Use, 2001, as cited by Steiner, 2003).

Planning for continued growth will be among the most important tasks this nation faces in the coming decades. Some farm and ranch land will have to be sacrificed to accommodate increased population. Current estimates of the loss of agricultural land and rangeland vary from a few hundred thousand acres annually to more than two million acres annually (U.S. Department of Agriculture Policy Advisory Committee on Farm and Forest Land Protection and Land Use, 2001, as cited by Daniels, 2003).

About 20 percent of the prime agricultural land in the United States can be considered at-risk because that land is within 50 miles of the 100 largest cities (U.S. Department of Agriculture Policy Advisory Committee on Farm and Forest Land Protection and Land Use, 2001, as cited by Steiner, 2003). Land adjacent to metropolitan areas, which now produces about 25 percent of the nation's food, is under intense and increasing pressure. In California's Central Valley, for example, 15,000 acres of farmland are developed each year. That region produces 10 percent of the value of U.S. farm output on less than 1 percent of U.S. farmland (U.S. Department of Agriculture Policy Advisory Committee on Farm and Forest Land Protection and Land Use, 2001, as cited by Steiner, 2003).

The question is whether we make these critical land use decisions consciously, based on solid information about the relative values of land for agriculture, environmental quality, and development, or make them on an ad hoc basis.

LESA is the best developed agricultural land suitability assessment tool in the United States—a tool that, particularly with selected enhancements in its technical capacity and its users' capacities, could help communities (1) manage growth, (2) plan comprehensively, (3) ensure food security, (4) achieve agricultural sustainability, and (5) direct farmland and ranchland preservation programs.

LESA is an important tool that can be used to evaluate agricultural land as part of comprehensive land use, smart growth, and community planning. LESA can serve as an effective initial phase of planning processes at the local level. The system is flexible and application-driven. It can be used as an index or as a qualitative guide to decision-making. As important, LESA facilitates participatory planning and builds social capital for growth management.

Table 1: Inventory of State and Local LESA Systems.

State	Level of LESA system implementation			Year(s) developed	Applications			Comments
	State	County	Municipal		FPP/PDR[2]	Land Use[3]	Other	
Alaska		1		1985				Developed by Kenai Peninsula County in conjunction with Homer Soil and Water Conservation District.
Arizona		1		1996			✓	Cochise County developed system to address range and water issues. Not in use.
California	✓			1997			✓	Developed to provide state agencies with an optional methodology to assess the environmental impacts of agricultural land conversions.
Colorado		3		1984 &2001	✓	✓		Adams County system developed in 1984 but not adopted. Delta and Larimer systems adopted by in 2001.
Connecticut	✓	5	4	1980s	✓			Counties used LESA for FPPA purposes. State PDR program uses a system similar to LESA but with less emphasis on soils data.
Delaware	✓			1994	✓			Used to qualify agricultural properties for state PACE program.
Florida	✓			1984 &2001	✓			1984 system used LE only. Adopted Pennsylvania system in 2001, adjusting the SA for environmentally sensitive areas to reflect different public values.
Idaho		4		1988 &2000		✓		Fremont and Butte County systems used to determine whether development is appropriate on certain agricultural lands.
Illinois		34		1984-99		✓		34 counties have developed LESA systems for land use planning and FPPA purposes.
Iowa		1		1992		✓		Muscatine County system used to determine whether development is appropriate on certain agricultural lands.
Kentucky	✓	2		1990s	✓			State PACE program uses LESA to evaluate applications for easement purchases.
Maryland	✓	1		1984	✓			State LESA updated in 2001. Howard County system used for county Agricultural Land Preservation Program.
Michigan	✓			1997	✓			State ranking system is similar to LESA and is currently being transferred to county level for application.
Montana		✓		1985	✓	✓		LESA system for the Upper Flathead Valley developed, but system never adopted. Flathead Land Trust used this system to apply for FPP funds to protect agricultural land.
Nevada		1		1995			✓	Churchill County system developed to evaluate land in the 60,000-acre Newlands Irrigation Project and resolve water rights issues.
New Hampshire	✓			1980s /1992	✓		✓	Began as 10 individual county systems, combined into statewide system in 1992. Used for open space protection and tax assessment.

Table 1: Inventory of State and Local LESA Systems.

State	Level of LESA system implementation			Year(s) developed	Applications			Comments
	State	County	Municipal		FPP/PDR[2]	Land Use[3]	Other	
New Jersey	✓	4		1983 /1992-94	✓	✓		Monmouth, Warren and Hunterdon Counties have local systems for farmland protection.
New York		4	3	1996-2000	✓	✓		County and municipal systems used for farmland protection; some land use planning applications.
North Carolina		2		1986-1989	✓			Wake County system used for county PDR program. Forsyth County system used by NRCS for FPP applications.
Ohio		6		1983-1991	✓	✓		Used for comprehensive planning and to designate important agricultural lands. Three counties have digitized their LESA systems.
Pennsylvania		50		1980s-1990s	✓			All counties have LE component. State prescribes format for SA that counties use to rank parcels for easement purchases through the state Farmland Preservation program.
Rhode Island	✓			1983	✓			Statewide LESA consists only of LE. The state PDR program has a separate SA component.
Tennessee		3		1980s		✓		Three counties developed complete LESA systems for land use planning. Not used after 1985.
Vermont		3	19	1980s-2000	✓	✓		Both forest (FLESA) and agriculture LESA systems used for land use planning and to identify agricultural and forested lands for protection.
Virginia		2		1980s		✓	✓	Clark County developed a LESA system to determine: 1) maximum lot size exceptions for zoning, and 2) admission to agricultural districts.
Wisconsin		2	22	1999-2001		✓		Two counties and 22 townships have developed their own LE scores for land use planning. Five townships have developed their own SA factors.

1 This inventory of state and local LESA systems is based on information collected in 2001 by American Farmland Trust (AFT). AFT contacted NRCS state offices and states and localities previously identified as having LESA systems.

2 Systems developed to rank agricultural parcels for the acquisition of conservation easements through the Farmland Protection Program (FPP) or through state or local purchase of development rights (PDR) programs.

3 Systems developed for local land use planning purposes.

Source: American Farmland Trust

Workshop participants concluded that we have the knowledge to advance LESA through technology and a better understanding of landscape change and ecology. They believed that substantial potential exists to advance LESA and integrate it into comprehensive approaches to growth and natural resource management. The list of applications for planning and problem-solving is long. Workshop participants cited the following opportunities:

- Inform smart-growth strategies.
- Implement community comprehensive land use plans.
- Establish and delineate appropriate agricultural zones or districts.
- Evaluate the agricultural impacts of development proposals during the environmental impact study process.
- Identify "sending areas" within a transfer-of-development-rights (TDR) program.
- Implement points-based valuation of development rights.
- Assess valuation for property tax purposes.
- Identify and establish growth boundaries.

ENHANCING LESA USERS' CAPABILTIES

Workshop participants concluded that an important first step to be taken is to enhance the support available to current users and new users of LESA. Making more users aware of LESA's existence and helping them adapt LESA to their locality and priorities is just as important as enhancing the technical capabilities of the LESA system itself. Technical enhancements to LESA will likely be as underutilized as the current version of LESA unless a better technical support network is available to current users and new users.

A 2003 survey on the use of non-agricultural and agricultural resource rating systems reinforces the views of workshop participants. That survey found a modest but increasing level of land protection efforts in the United States. More and more communities are using land-rating systems. Many of those communities are using formal LESA systems, although many communities are developing their own systems. Unfortunately, there seems to be a general lack of knowledge among communities about the existence of the LESA guidebook and the resources available to facilitate use of an agricultural land assessment system (DeMers et al., 2003).

Workshop participants concluded—with a real sense of urgency—that a support infrastructure for LESA must be built. This infrastructure should be based on a flexible network of organizations and institutions that will provide the intellectual capital, technical support, and financial assistance needed to foster innovation and facilitate full utilization of LESA.

IDEAS FOR MARKETING LESA

Workshop participants identified several options for increasing awareness of LESA among potential users and how the system could help them in their planning and management work at local levels. Those ideas included:

- Inform county planners in high growth areas about the LESA system.
- Place articles in key publications about the uses and benefits of LESA.
- Network with smart-growth and other growth management groups, as well as the American Planning Association and similar organizations.
- Integrate LESA into the USDA Land Use Committee.
- Identify and encourage local practitioners to incorporate LESA into their growth management programs.
- Integrate LESA into the "ToolKit" planning tool used by NRCS field office staff and partners.

IDEAS FOR A LESA SUPPORT NETWORK

Workshop participants stressed that LESA is a flexible framework designed to be adapted to local situations. There is no one LESA tool; there are as many LESA tools as there are users, communities, and landscapes. Such a tool requires a dense, web-based support network that provides users with technical resources, technical assistance, and examples of how to use LESA. The same network must connect users with colleagues with whom they can share successes, failures, and ideas.

The worldwide web was seen as a particularly important and appropriate means of building a LESA support network. Participants suggested:

- Create a web-based clearinghouse for LESA users.
- Develop web applications for users.
- Construct a web page with good LESA applications.
- Develop a website to help users incorporate enhanced benefit assessment capabilities.

All participants agreed that finding an appropriate institutional home(s) for the LESA support network would be critical to ensuring its sustainability. Technical support services need to be consistently available, and ongoing support for the intellectual capital needed to improve LESA is essential.

Some participants suggested that the American Farmland Trust's Farmland Information Center would be a logical home for the web-based LESA support network. Others stressed the importance of support for NRCS field staff and planners in using LESA. They noted that NRCS

provides an on-the-ground, person-to-person technical support network that could be of great help to LESA users. Still others recommended that the best role for NRCS would be to "prime the pump." Given tight budgets and multiple demands for NRCS services, it would be better to look elsewhere for the intellectual capital and comprehensive technical support network that LESA needs.

IDEAS FOR LESA TRAINING

Workshop participants agreed that training for LESA users is essential. LESA is a flexible framework, not a cookbook. Agricultural land suitability assessment is complex. Users need a thorough understanding of the influence that choice of factors, ranking criteria, and assignment of weights has on a final LESA score. Absent that understanding, making decisions based on a single LESA score could be compared to "giving a six-year-old a shotgun."

A LESA system should be designed to support a clear, explicit strategy for farmland preservation and growth management. That strategy should determine which factors are included in a LESA system and the rank and weights assigned to those factors. A LESA system must reflect the unique landscapes, agricultural economies, and values of the community it is designed to serve. Enabling users to invent their own LESA system should be the over-riding goal of LESA training programs.

Participants generated a number of specific ideas for advancing LESA training:

- Develop and distribute a short course for LESA users.
- Target training within American Farmland Trust's top 20 communities with the greatest risk of agricultural land conversion.
- Target training at Resource Conservation & Development Program coordinators in high-growth areas.
- Target training on use of LESA for ranking purchase-of-development-rights (PDR) proposals.
- Develop specific training packages for managers of PDR programs—current and under development—to help them use LESA in points-based appraisal systems.

BUILDING INTELLECTUAL CAPITAL TO SUPPORT LESA

As noted in the introduction of this report, two intellectual traditions formed the foundation for LESA—the first derived from using soil properties to rank the ability of a site to support agronomic uses and the second derived from ecology as the theoretical basis for land suitability analysis. Workshop participants recognized that both of these intellectual traditions have continued to evolve since LESA was developed. The assessment of soils has expanded beyond agronomic uses to include the ecological and environmental functions of soils within a particular landscape. Suitability analysis has grown from simple overlays of site characteristics to sophisticated analysis of the interactions of adjacent land uses and the functional consequences of landscape pattern.

The technical advances now possible for LESA derive from the evolution of these intellectual traditions and from connections made to other relevant traditions. Ensuring the continued growth and development of the intellectual capital on which LESA depends should be an important objective of any initiative to enhance LESA as a land use and growth-management tool, workshop participants agreed.

Participants suggested the following activities to build that intellectual capital:

- Hold a national or international LESA conference.
- Use the conference proceedings to update the book *A Decade with LESA,* with new stories, new uses, and new models.
- Strengthen the link between agencies and universities.

ENHANCING LESA'S TECHNICAL CAPABILITIES

Workshop participants concluded that key technical improvements in LESA would markedly improve its utility as a farmland protection, land use planning, and growth-management tool. Participants stressed, however, that LESA should not abandon its most important niche as an agricultural land suitability assessment tool. Participants worried that the simplicity and transparency of the LESA system—one of its most compelling advantages—could be lost if the system were forced to incorporate functions not directly compatible with its core function as an agricultural land suitability assessment tool.

Participants recommended a two-step approach to enhancing the technical capabilities of LESA:

- Developing an enhanced generic model of LESA for agricultural land suitability assessment, for example, by adding geographic information system (GIS) capability.
- Developing guidance and generic approaches for linking LESA to compatible applications, such as environmental benefits assessment.

Participants suggested numerous technical improvements for LESA. The most commonly recommended ideas fell into one of three groups: (1) build an environmental benefit assessment capability into LESA, (2)

enhance LESA with GIS capabilities, and (3) strengthen LESA applications for land use planning and growth management.

ENVIRONMENTAL BENEFIT ASSESSMENT IN LESA

Participants agreed that building the capacity to evaluate the relative environmental values of parcels proposed for protection because of their agricultural importance would improve farmland protection and growth-management programs. Expanding the LE portion of LESA with soil quality factors tied to key environmental functions would be one approach. The SA portion could be expanded with such factors as the extent to which a particular site is subject to a comprehensive conservation plan or the relationship of the site to environmentally sensitive land. The fact that the LESA framework has been used to assess wetlands and riparian areas, workshop participants noted, should give us confidence that environmental benefit assessment factors could be integrated effectively into the LESA framework.

Participants counseled caution, however. They noted that quantitative measures of environmental benefits are still in their infancy. Agricultural operations with the same soils and landscape position, they noted, can produce very different environmental benefits because of significant differences in annual management systems. Participants also worried that the information and data required for comprehensive natural resource and/or environmental assessment could far outstrip the information needed for agricultural land suitability assessment.

Those participants suggested that one land suitability tool could not do justice to both objectives.

Workshop participants recommended that LESA retain its niche as an agricultural land suitability assessment tool and that efforts be undertaken to build environmental metrics into LESA that are compatible with that niche. The best approach, participants concluded, was to:

- Develop a generic model or framework to help users build in environmental metrics that are appropriate and meaningful in their community.
- Build user-friendly linkages or portals from LESA to other natural resource and environmental assessment systems and tools.

Participants also noted the potential for conflict between keeping LESA simple and dealing with the complexity of environmental benefits, the importance of field-testing criteria used to assess environmental benefits, the need to take into account scale effects and the challenge of applying LESA to habitat fragmentation and water quality concerns associated with agriculture.

LESA AND GIS CAPABILITIES

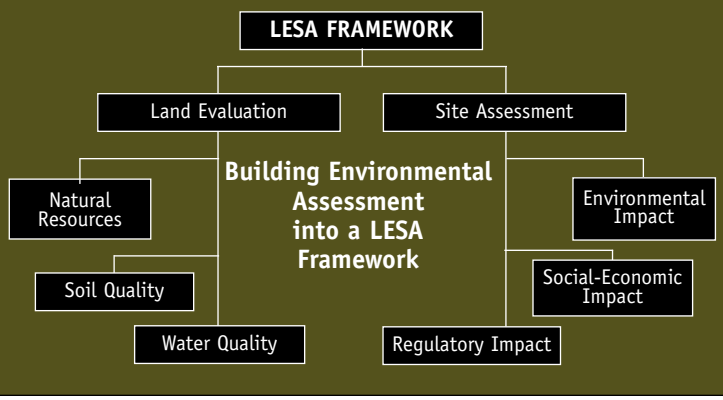
Workshop participants strongly agreed that operating LESA in a GIS environment would greatly increase the power of LESA for landscape analysis and participatory planning and decision-making. Participants pointed out that the potential for using LESA in areawide planning and in conjunction with watershed modeling applications could only be

Environmental Benefits Assessment Using LESA

Comprehensive planning is arguably the most important step in community decision-making. It provides a logical and sequential process for gathering information on what is and what might be to clarify the options available to decision-makers. LESA can contribute to that information base. It can help citizens and decision-makers recognize the consequences of alternative futures.

Building the capacity to couple LESA with outputs from environmental assessment tools would help citizens and decision makers envision alternative futures. At a watershed level, for example, a LESA framework could organize outputs from several environmental models to present a simple index of watershed integrity for decision-making. The LE component could include information about forests, wetlands, riparian corridors, and floodplains, as well as information regarding water quality, depth to groundwater, conductivity, and other key indicators of environmental performance. The SA portion could add data on landowner enrollment in conservation programs, proximity to environmentally sensitive areas, or compatibility with regulatory programs.

Using the LESA framework to organize environmental information within a Geographic Information Systems (GIS) is particularly powerful. It helps people visualize the environmental implications of future trends, the "so what" of change. A GIS environmental assessment permits rapid calculation of LESA scores based on natural resource, ecological, and environmental features and instant visualization of the result. It could be applied at almost any scale from a sub-parcel cell to a state or watershed.



Using LESA to Value Development Rights

Valuing development rights is challenging for managers of farmland preservation programs. The traditional appraisal method—completed by a certified real estate appraiser and based on comparable sales of unpreserved and preserved farmland—is time-consuming and expensive. LESA can be used to expedite the valuation process by assigning points to certain attributes of farmland, then multiplying the total points by a dollar value to determine the per acre price of an easement.

Such an approach was used in Lancaster County, Pennsylvania. The county was divided into five regions, and a points-based appraisal system was developed for each region. Farms that had been appraised using the traditional system were used to develop the points-based system. The goal was to develop a points-based system that came as close as possible to matching the easement values determined using the traditional approach.

Farm size, soil quality, and road frontage were used as measures of development potential. Proximity to public sewer and water served as measures of development pressure. The land to be appraised was assumed to be zoned for agriculture. The maximum number of points and the dollar value used to estimate easement value varied according to distance from public sewer and water. The dollar value also varied among the five regions.

The easement values derived using the points-based system were within 10 percent of the values derived using the traditional appraisal method in 11 out of 15 cases (see table below).

Easement Estimate (Per Acre)	Northern Region	Eastern Region	Western Region	Southern Region	Southwest Region
Low					
Points-based	1,998.50	1,492.00	1,166.90	1,494.60	1,223.80
Traditional	2,050.00	1,900.00	1,410.00	1,568.00	758.00
Medium					
Points-based	2,679.84	2,275.36	3,440.50	1,392.00	1,557.60
Traditional	2,851.00	2,489.00	2,000.00	1,423.00	1,595.00
High					
Points-based	4,716.60	4,762.35	3,484.00	2,142.00	2,472.00
Traditional	4,516.00	3,372.00	3,300.00	2,300.00	2,649.00

The points-based system, which was easy to understand, explain, and implement, can be adapted easily as market conditions change. The consistency, speed, and low cost of the points-based approach could increase the efficiency farmland preservation programs.

Source: Daniels, T. 2003. Strategic Uses of LESA for Farmland Protection. Paper presented at the SWCS LESA Workshop, June 4, 2003, Lied Conference Center, Arbor Day Farm, Nebraska City, Nebraska.

realized if LESA were integrated with GIS capabilities.

Participants identified possible obstacles to expanding LESA's capacity through GIS. Perhaps most important is the uncertainty over the availability of high quality soils information in a digital format, particularly in the urbanizing landscapes where LESA is most urgently needed. One participant, for example, pointedly asked: "How good is digital soils information for agricultural land in and around the 100 largest metropolitan areas in the United States?" Other participants noted that, as the geographic scale covered by LESA increases, the number of potential factors that could be included in the system increases. Users clearly will need guidance on limiting the number of factors included in a GIS-capable LESA system.

Participants suggested that incorporating GIS capabilities into LESA could be facilitated by:

- Starting a LESA "user-group" within the GIS community.
- Creating a "LESA Team GIS," comprised of staff from NRCS, the Environmental Systems Research Institute (ESRI), and other organizations, to create the basic LESA GIS model that could be adapted to local circumstances by users.

LAND-USE PLANNING AND GROWTH MANAGEMENT

Workshop participants paid by far the most attention to opportunities to enhance LESA as a part of comprehensive approaches to land use planning and growth management. Their ultimate goal was to enable LESA to contribute to comprehensive assessment of the viability and sustainability of agricultural enterprises and the environmental, economic, and esthetic benefits of farmland protection and growth-management programs.

Two enhancements would be particularly helpful, according to workshop participants:

1. Enhance LESA as a tool to set priorities and make appraisals in PDR programs by:
   a. Developing guidance and examples for using LESA as a points-based appraisal system to streamline and accelerate the process of valuing development rights.
   b. Enabling comparison of properties to be included in easement or PDR programs on a more consistent and comparable basis.
2. Build the capability to use LESA to analyze the impacts of low-density development.

Other ideas to build the capacity to use LESA as an aid to comprehensive growth management suggested by workshop participants included:

- Build capability to conduct sensitivity analysis of the factors used in a LESA system.
- Enhance assessment of locational considerations, particularly the capability to complete both parcel-specific and areawide assessments.
- Integrate a LESA-like template into the NRCS Farm and Ranch Land Protection Program.
- Incorporate landscape metrics into LESA using an adaptive management approach.
- Develop a defensible rule and consistent guidance for adding weight to individual factors or the final LESA score that reflect critical priorities and specific, defined objectives.
- Strengthen LESA for use in areawide planning.
- Include rural amenities in land evaluation and site assessment—create a separate score for rural amenities.
- Develop an "agricultural compatibility index."

NEXT STEPS

When workshop participants convened for the last time during the closing session of the workshop, they expressed a sense of urgency regarding LESA. They felt strongly that LESA is a good tool that is under used and under supported. They argued forcefully that LESA fills an important niche and that there are promising opportunities to make LESA better by empowering users and making key improvement to its technical capacity. LESA should be used more, better supported, and improved because the need for sound land use planning and growth management is great and growing.

Workshop participants' ideas and recommendations for enhancing the use and capabilities of LESA have been detailed above. Participants, however, thought the following specific steps should be taken quickly:

- Establishment of a web-based LESA clearinghouse and technical support network.
- The targeting of LESA training to NRCS and partner organization employees working in counties experiencing the most intense development pressure and growth-management challenges.
- Establishment of a working group to develop a framework for incorporating environmental metrics into LESA.
- Hold a LESA conference, and use the conference proceedings to produce an update of the book *A Decade with LESA*.
- Work with the American Planning Association to develop a report on "LESA and Applications for Smart Growth." ■

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APPENDIX A:

Summary of Ideas from Workshop Breakout Sessions

During the LESA workshop, participants broke up into work groups to generate ideas and recommendations for enhancing the capabilities of LESA and LESA users. Their ideas and recommendation were captured on flipcharts. In this appendix, those ideas and recommendations are grouped into clusters reflecting the crosscutting issues that emerged through discussion and debate at the workshop. Except for the clustering, the ideas appear as they did on the flipcharts.

WHY ENHANCE LESA?

- Existing and emerging metropolitan counties are at a critical juncture in their development—they will face serious problems if they don't plan their growth.
- Homeland security—food security—are national land use issues that require evaluation.
- LESA should be an initial phase of all planning processes at the local level—foundation for planning at grassroots.
- Planning issues/development suitability—LESA can work in both rural and metropolitan areas. Residents' concerns may vary, but LESA suitability model works for both.
- LESA helps guide expenditures of public funds—ensures accountability.
- Expand LESA to help set priorities for USDA conservation and other programs.
- LESA facilitates participatory planning—builds social capital for growth management.
- LESA is very flexible tool—is application driven—can be used for either index or qualitative decision.

Potential and/or current applications of LESA to planning and problem solving:

- Use LESA to implement the comprehensive plan as it pertains to the timing, sequence and rate of development. Incorporate LESA/Ag LESA into smart growth strategies.
- Use LESA to establish and delineate appropriate agricultural zones or districts.
- Use LESA to evaluate agricultural impacts during environmental impact study process.
- Use LESA to identify "sending areas" with a transfer of development rights program.
- Use LESA as a property tax assessment tool.
- Identify "areas of greater concern" for protection—cut across local boundaries.
- Use as tool to identify and establish growth boundaries.
- Application in watershed management and participatory planning.

IDEAS FOR ENHANCING LESA USERS' CAPACITY

Market LESA

- Market the need to develop LESA systems to county planners in high growth areas.
- Articles in press about use and benefits of LESA.
- Network with SmartGrowth groups, American Planning Association, and other growth management groups.
- Integrate with USDA Land Use Committee.
- Identify and encourage local practitioners.
- Integrate the process of LESA evaluation and planning at the grassroots level.
- NRCS staff is largely unaware of LESA and its capabilities. LESA could be incorporated into ToolKit and used in conservation programs as part of their ranking and eligibility criteria.

Institutionalize Support Network for LESA

- A long-term agricultural liability and farmland protection infrastructure—and institutional arrangements to support that infrastructure—are needed.
- Support for NRCS field staff and planners in using LESA is critical.
- Institutionalize with FIC.
- Develop web applications for users.
- Construct a web page with good LESA applications.
- Develop website to help users incorporate enhanced benefit assessment capabilities.
- Create a web-based clearinghouse for LESA users.
- Technical support services need to be consistently available.
- Foster and facilitate grassroots access to LESA and technical assistance.
- Role for NRCS should be to "prime the pump"—have to look elsewhere for intellectual capital and comprehensive technical support network.
- Digital soils information in critical areas for agricultural suitability analysis is essential—how good is soils information in 100 largest metropolitan areas?
- Correlation at appropriate scales in soils information for use in LESA systems.
- Assessment of impacts of low-density development.
  Evaluate the significance of mitigation for urbanization.

Training for LESA Users

- Different landscapes require different LESA criteria and scoring systems.
- Develop and distribute short-course for LESA users. Target training within American Farmland Trust's top 20 areas.
- Target training at RC&D coordinators in high growth areas.
- Target training on using LESA for ranking PDR proposals and using LESA in a point-based appraisal

systems at current PDR administrators and in locations where a PDR program is under consideration.
- Real estate training for NRCS employees.

Intellectual Capital to Support LESA

- Update *Decade of LESA*—new stories, new uses, and new models.
- Foster and grow the intellectual capital that supports LESA. Strengthen the link between agencies and universities—students are the next generation of employees.

IDEAS FOR ENHANCING LESA's TECHNICAL CAPACITY

- Develop a generic, normative LESA model for agricultural land suitability analysis—then show additional applications.
- LESA system should be designed to support a clear, explicit strategy for farmland preservation and growth management.

Build Environmental Benefit Assessment Capability into LESA.

- Measures of environmental benefits are not well developed. There is a gap between the benefits the public and policymakers want and the benefits we can measure.
- Conflict between keeping LESA simple and dealing with the complexity of environmental benefits.
- Important to field test criteria used to assess environmental benefits.
- Develop framework criteria for environmental benefits within SA-3 and include that guidance in the LESA guidebook.
- Take into account scale effects—watershed, state, regional, national scales—develop national guidelines, then adapt at larger scales.
- How to apply LESA to habitat fragmentation and water quality concerns associated with agriculture.

Enhance LESA with Geographic Information System Capabilities

- GIS would increase the power of LESA for landscape analysis and participatory planning/decision-making.
- LESA has potential for area-wide planning and watershed modeling applications.
- Users will need guidance on limiting the number of factors included in a LESA system.
- As scale increases the number of potential factors increases. Start a LESA "user-group" within the GIS community.
- Create "LESA Team GIS"—SWCS/NRCS/ESRI—to create basic LESA GIS model.

Strengthen LESA Applications for Land Use Planning and Growth Management

- Develop guidance and examples for using LESA as a point-based appraisal system to support PDR programs.
- Enhance assessment of locational considerations—parcel specific versus area-wide analysis.
- Integrate LESA-like template into the NRCS Farm and Ranch Land Protection Program.
- Enable LESA to evaluate multiple benefits from farmland protection and growth management.
- Incorporate landscape metrics using an adaptive management approach.
- Thresholds to simplify LESA use.
- Develop a defensible rule or index to add weight to the final LESA score to reflect critical priorities and specific, defined objectives.
- Strengthen LESA for use at area-wide planning scale, use in market valuation of development rights.
- Develop a specific guidebook and guidelines for use of LESA in purchase of development rights and transfer of development rights applications.
- What is the appropriate way to account for size of the tract in a LESA system?
- Fully utilize unique soils feature of important farmland.
- Consider market value per unit of land—ratio of market value of a farm as a whole relative to a particular unit of land.
- Build capacity to use LESA as an appraisal tool.
- Build capacity in LESA to assess the viability/sustainability of agricultural enterprises, environmental benefits, economic benefits, and esthetics.
- Include rural amenities in land evaluation and site assessment—create a separate score for rural amenities.
- Develop an "agricultural compatibility index."
- Can LESA play a role in evaluating alternative cropping systems?
- Develop LESA for use in purchase of development rights programs—set priorities and price—use in federal, state, local, and private programs.

APPENDIX B:
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