DEPARTMENT OF AGRONOMY

Sustainable Agriculture in Kansas

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This bulletin will provide an introduction to sustainable agriculture in Kansas, clarify the use of the term "sustainable," and dispel myths.

The Controversy

The controversy over the use of the word "sustainable" began in the 1960s, when the phrase "alternative agriculture" was often used synonymously with sustainable; "alternative" meaning other than conventional. This set up an us versus them situation, which has largely been defused in the 1990s. Both sides have come to the table, and have agreed on some common definitions and approaches. In reality, agricultural practices fall on a continuum, with very few examples of farms at either extreme of the spectrum. All producers want production agriculture to continue to be profitable and to conserve the natural resource base.

Principles and Practices

To some people, the term "sustainable agriculture" conjures up images of a farming style common 50 or 100 years ago. To others it is a political hot button, implying more government restrictions on farming practices. To many it is a catchall phrase, meaning "everything is sustainable." In fact, sustainable agriculture is hard to define, but it does have a specific meaning. Any one practice, alone, cannot be defined as sustainable or not sustainable. The context, or the system within which the practice is used is important.

"Official" Definitions

Several definitions of sustainable agriculture have been proposed, but the first US institution to adopt a definition was the American Society of Agronomy. Their definition, published in 1989, states:

"A sustainable agriculture is one that, over the long term, enhances environmental quality and the resource base on which agriculture depends; provides for basic human food and fiber needs; is economically viable; and enhances the quality of life for farmers and society as a whole."

The following year, the U.S. Congress defined sustainable agriculture in the 1990 farm bill. Under that law:

The term sustainable agriculture means an integrated system of plant and animal production practices having a site-specific application that will, over the long term:

A) satisfy human food and fiber needs;
B) enhance environmental quality and the natural resource base upon which the agricultural economy depends;
C) make the most efficient use of nonrenewable resources and on-farm resources and integrate, where appropriate, natural biological cycles and controls;
D) sustain the economic viability of farm operations; and
E) enhance the quality of life for farmers and society as a whole.

The U.S. government's definition has five parts, emphasizing productivity, environmental quality, efficient use of nonrenewable resources, economic viability, and quality of life. To meet this definition, a farm that emphasizes environmental quality but sacrifices economic viability would fall short.

The reverse also would be true. A farm that was very productive, but used large quantities of a nonrenewable resource, such as fossil fuel, or a nonrechargeable aquifer to achieve and maintain that productivity, would not be considered sustainable in the long term.

Following are three other ways to look at sustainability that build on, but also simplify, the farm bill definition.

Sustainable Agriculture for the Long Term (More Than 10,000 years)

Agriculture in Kansas changed drastically within the last 150 years with the introduction of the moldboard plow. Native Americans have raised and harvested crops in the Great Plains region for more than 1,000 years. Some, but not all, of their methods provide examples of sustainable agriculture, hunting, and wild-plant use.

In Europe, some farms can trace their agricultural histories back for more than 2,000 years. European fields have received manures, legume cover crops, and other soil amendments to keep them productive. In the last 50 to 100 years modern fertilizers have been used to replenish the nutrients in the soil, but cannot replace top soil and the tilth factor associated with a high-organic-matter content. Experiments at the Rothamstead Experiment Station in England, going back 150 years, have shown this.

The oldest agricultural civilizations in China, the Middle East and Africa are estimated to have existed for more than 10,000 years. In these areas, many examples of sustainable land use practices can be seen. There are historical references to civilizations that declined due to unsustainable practices. Humans have been farming for about 10,000 years, while in Kansas our experience with current methods only goes back about 150 years.

Since the beginning of farming in Kansas, soil organic matter levels have declined from approximately 5 percent in the native prairie to the 1 to 2 percent range on many cropped fields, reflecting top soil loss, the effects of tillage, and the lack of soil improving practices. The "long term" question could be used as a test for sustainability:

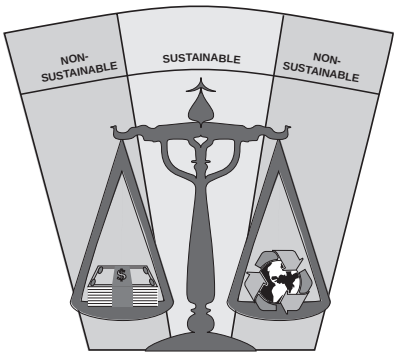
"If I keep farming in the future the way I farm now, will this farm be here, and be productive, 10 years from now? 100 years? 10,000 years from now?"

Sustainable Agriculture as a Direction, While Staying in Balance

To some, the two most difficult parts of the farm bill definition are "profitability" and "maintain environmental quality." To combine these two seems almost impossible, or contradictory, as exemplified by the statement, "I can't afford to farm sustainably."

In fact, the two can work together, both in the short term, and in the long term. A graphical representation of sustainable agriculture may be pictured as a balance. When conditions are too focused on one area of importance, the farm could be considered "unsustainable," but moving to a balance between an emphasis on environmental stewardship and economic viability represents the direction a farm needs to go to be sustainable.

This movement, or direction, could be another way to define or think about sustainability and to evaluate a farm. "Am I moving in the right direction? Am I in balance, or am I too far off in one direction or another, sacrificing economic viability, or environmental quality?"



Short-term profitability and environmental quality go together when certain practices are used, such as reducing herbicide use. As long as weeds are controlled effectively using other methods, such as crop rotation, cover crops, or competitive crop varieties, there are cost savings on purchased inputs. Net profit will rise if the alternative control methods cost less than the herbicide. Environmental advantages are that less herbicide is put into the environment, so potential runoff and leaching risks are reduced.

Farm diversification is important when developing a sustainable system. This diversification can help avoid the risks of price fluctuation, pests, and the weather. This diversification can happen on a farm level or on a community-wide level.

Long-term profitability also is enhanced with sustainable agriculture, since the natural resource base, the soil and water, is conserved and the resource quality is enhanced. Off-site costs to society, such as water purification, also are reduced.

Sustainable Agriculture = Multiple Goals

Interviews with Kansas farmers who identify themselves as practitioners of sustainable agriculture revealed that many of them had multiple goals for their farm. In fact, they mentioned many of the factors in the five-part farm bill definition, including quality of life. Quality of life for them meant having more time with their family, making a meaningful contribution to their community, and having time to focus on personal goals.

For sustainable agriculture to be a reality, farm goals need to be articulated and need to have several dimensions to achieve the balance that would be called sustainable agriculture.

Other Terms Defined

The terms "organic" and "sustainable" are often confused. Organic means that particular farming practices have been followed, and certified by a third party inspector. This certification follows the product into the marketplace to indicate to consumers that the crop has been grown in a specific way. Livestock also may be certified.

Organic guidelines have been written in an attempt to be as sustainable as possible, plus to assure the consumer the least amount of pesticide residue possible on the food product. Organic guidelines specify that crop-rotation and soil-building practices must be used, that pest control must rely primarily on cultural, mechanical, and biological control, and that pesticides used as a last resort are derived from plants and are short-lived in the environment. Soil amendments should be from renewable resources as much as possible, and use only nonrefined, mined products, when manure, composts, or other sources of nutrients are not available. Farmers who follow these practices but do not go through the certification procedure are in principle organic, but may not use this label in the marketplace. Currently this process is conducted by member-based organizations, with oversight by the United States Department of Agriculture (USDA).

The term "low input" has also been used along with sustainable, and the first USDA funding for sustainable agriculture research in the 1985 farm bill used the acronym LISA, for Low Input Sustainable Agriculture. The implication was not that farmers should starve their crops, let the weeds choke them out, and let the bugs clean up what is left. The term "low input" refers to lower purchased off-farm inputs (fertilizers and pesticides usually), while on-farm inputs (manures, cover crops, and management) are increased. A more accurate term would be "different input" rather than low-input.

In Europe, the term "biological" is often used to refer to sustainable farming practices. In other arenas, the term "ecological" is used, not to refer to the environmental aspect of the farming practice, as much as the interrelatedness of the parts of the agro-ecosystem. The term "integrated" is used both in the United States and in Europe generally to refer to a system of "integrated pest management," which can exemplify some aspects of sustainable agriculture, but may or may not fit the other parts of the five-part definition.

Myths about Sustainable Agriculture

1) *Isn't this what my Grandparents did?*

Sustainable agriculture is not rejecting current appropriate technology nor is it going back to old technology. In some ways, sustainable agriculture seeks to combine some of the wisdom of past practices, like crop rotation and green manure crops, with careful use of current technology, including equipment that leaves residue on the surface, modern, pest-resistant crop varieties, and the vast array of information technologies now available.

2) *You can't make money in sustainable agriculture.*

Studies from several states, including Kansas, have reported that sustainable agriculture is as profitable as examples on the conventional end of the continuum (Diebel, et. al.). These studies utilized case studies and economic models to reach their conclusions. Barriers to adoption of sustainable practices, such as crop rotation, have often been factors such as the simplicity of growing only a few crops, and the base acerage requirement in the farm bills prior to 1996. The new farm bill has removed one aspect of this barrier, but additional crops and practices require learning different methods, equipment and marketing methods. Other additional cost-saving practices may include nonchemical pest control, and using manures and legumes as primary sources of soil fertility.

3) *Sustainable agriculture increases soil erosion because of increased use of tillage.*

Sustainable agricultural practitioners can meet conservation compliance guidelines, but they emphasize certain soil conservation methods over others. For example, continuous no-till does not work well for sustainable agricultural farmers, due to the reliance on herbicide inputs in such a system. On the other hand, a tillage-rotation system, where no-till may be alternated with reduced-till and conventional-till practices is feasible.

Sustainable agriculture systems utilize cover crops during winter months and rotation with perennial crops (grasses, alfalfa) to hold the soil, and improve water infiltration rates. The increased infiltration rates reduce runoff. In some cases, this effect carries over when the field is put back into an annual crop. Row crops may be cultivated for weed control, but rapid canopy closure and overseeding with fall cover crops help reduce erosion during the rest of the cropping season.

Examples of Sustainable Agriculture

Farm visits can be extremely valuable to a person trying to become familiar with this new terminology. Sustainable agricultural field days, tours, and neighbor-to-neighbor farm visits can be valuable learning tools. More than 30 Kansas farm families were willing to share their experiences during a series of tours in 1996. On these farm visits examples of diverse, pest controlling crop rotations, crop-livestock integration, and careful manure management were illustrated. Soil improving crops like alfalfa, hairy vetch, and Austrian winter pea, were used. Value added marketing strategies including organic certification and new crops like spelt, blue corn, and soybeans for tofu were part of the whole-farm plan for profitability.

Quality of life was mentioned at nearly every farm, and economic information was shared freely. It was the opinion of these farmers that they were no worse off than their neighbors economically, and had some advantages through diversification, such as lower risk and tapping into new markets. Marketing skills and an overall high level of management are required to realize these advantages.

Summary–Where to Go from Here

All of the definitions of sustainable agriculture lead to similar conclusions. One of the keys to sustainable agriculture is careful whole-farm planning, using a systems perspective and including all of the dimensions described in the farm bill definition. The plan needs to include the human dimension, and be based on the farm operator's goals and definition of quality of life. The plan must be environmentally sound, and profitable.

Soil improvement is key, since this is the resource that forms the base of the future of the farm. Finally, the end user, the consumer, should not be forgotten in the farm plan. Taking advantage of direct marketing niches (including community supported agriculture), local markets, value added opportunities, as well as export markets helps to link the farm with the community within which it is a part.

For More Information:

The following booklets are available at your County K-State Research and Extension Office, and also available from the USDA National Agricultural Library (NAL), Washington, D.C. Ph. 301-504-6425

USDA National Directory of Sustainable Agriculture Expertise. Most recent edition is 1995, available as book or searchable data base.

Sustainable Agriculture: Definitions and Terms. USDA/NAL SRB 94-05

Tracing the evolution of Organic/Sustainable Agriculture - A Selected and Annotated Bibliography. 1988 USDA/NAL (No. 72).

Sustainable Agriculture in Print: Current Books. USDA/NAL (1992 SRB 92-15, 1993 SRB 93-04, 1994 SRB 94-06, 1995 SRB 95-02)

Sustainable Agriculture in Print: Current Periodicals. 1995 USDA/NAL (SRB 95-08)

Video cassettes in the NAL Collection Pertaining to Alternative Farming Systems. 1995 USDA/NAL (SRB 95-93) (Note: these cassettes can be borrowed on interlibrary loan free of charge).

Food, Agriculture, Conservation, and Trade Act of 1990, Public Law 101-624, Title XVI, Subtitle A, Section 1603.

An Economical Analysis of Conventional and Alternative Cropping Systems for Northeast Kansas, Diebel et. al., Report of Progress 687, Agricultural Experiment Station, Kansas State University

For more information on sustainable agriculture call Rhonda Janke, Extension Specialist, 785-532-5776, or contact the local K-State Research and Extension office.

Publications from Kansas State University are available on the World Wide Web at *http://www.oznet.ksu.edu*

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