

Sustainable Agriculture

T. Bharath¹, N. Nalini¹, Harshad Singh Thakur² and G. Vijay Krishna³

¹PJTSAU, Hyderabad; ²Ph.D Scholars, Hyderabad; ³SKLTSHU³

*Corresponding Author E-mail: bharath032@gmail.com

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Introduction & Definition

Sustainable agriculture, simply defined, is an approach to agriculture that focuses on producing food in a way that does not degrade the environment and contributes to the livelihood of communities. However, this simple statement conveys a complex concept: that agriculture must balance production, environmental, and community development goals. The 1990 Farm Bill states that the term sustainable agriculture refers to “an integrated system of plant and animal production practices having a site-specific application that will over the long term:

- Satisfy human food and fiber needs.
- Enhance the environmental quality and natural resource base upon which the agricultural economy depends.
- Make the most efficient use of nonrenewable resources and on-farm resources and integrate, where appropriate, natural biological cycles and controls.
- Sustain the economic viability of farm operations.

- Enhance the quality of life for farmers and society as a whole.

Sustainable agriculture should not be an either/ or proposition, such that a farm either is or is not sustainable. Rather, sustainable agriculture encompasses many principles and practices that benefit growers, their farm, their community, and the environment. The economic, environmental, and social goals of sustainable agriculture can serve as a useful yardstick for measuring a farm’s performance and progress over time. This approach makes sustainable agriculture relevant to all farmers because it can be applied to farms of every size and type.

The Components of Sustainable Agriculture

Sustainable agriculture can be broken into three components: economic, environmental, and social. While discussed separately here, it should be noted that the goals overlap, impacting and influencing each other. For example, economic decisions will also impact the environmental and the social components.

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Economic Profitability

To be truly sustainable, a farm must be economically viable. The environmental and social benefits of sustainable production methods do not always translate into immediate economic gains. That said, sustainable agriculture practices can have a positive economic impact on a farm. For example, diversifying the farm with several crops and markets helps to reduce financial risk. Over time, improved soil and water quality, as well as other environmental benefits from sustainable practices, may raise the value of the farm. Selling products directly to local markets in the community reduces shipping and fuel costs and can potentially decrease transportation costs. While sustainably grown produce may not bring the full price premiums sometimes paid for certified organic products, growers selling directly to individuals and specialty markets can still capture added value.

Production costs can be variously affected by sustainable methods. Fertilizer and pesticide costs are generally reduced on a sustainably managed farm because, for example, legumes and crop rotations tend to be less expensive than their synthetic alternatives. Labor costs are often higher than conventional systems. The higher labor costs are most often attributed to the increased time required for monitoring and managing pests on sustainable farms. Planting material costs can be lower for growers saving their own seed or producing their own stock. However, those using organic planting material often pay more for seed or other planting material.

Machinery costs (purchase, fuel, and repairs) will vary depending on the specific type of sustainable production system. Conservation tillage systems and reduced pesticide applications can cut costs related to machinery use and fuel costs. On the other hand, certain systems, such as ridge tillage, can require specialized equipment. Fuel and machinery costs can increase as a result of moving bulky materials, such as organic matter, for soil improvement purposes. The result is that some farms that utilize

sustainable agriculture practices may be more profitable than their conventional farming counterparts, although the reverse can also be true. In addition to crop production methods, many other factors can affect the bottom line, including management, marketing skills, and experience.

The following indicators that a farm is achieving economic sustainability:

- The family savings or net worth is consistently going up.
- The family debt is consistently going down.
- The farm enterprise is consistently profitable from year to year.
- Purchase of off-farm feed and fertilizer is decreasing.
- Reliance on government payments is decreasing.

Environmental Stewardship

Environmental concerns are central to sustainable agriculture. Sustainable agriculture is frequently described as: ecologically sound practices that have little to no adverse effect on natural ecosystems. However, more than that, sustainable agriculture also seeks to have a positive impact on natural resources and wildlife. This can often mean taking measures to reverse the damage (e.g. soil erosion or draining of wetlands) that have already occurred through harmful agricultural practices. Renewable natural resources are protected, recycled, and even replaced in sustainable systems. Also inherent to sustainable agriculture environmental concerns is the stewardship of non-renewable resources, such as fossil fuels.

A key to successful sustainable production is healthy soil, with a central tenet that management practices “feed the soil and the soil feeds the crop.” Ecologically, this means that soil fertility is provided by adequate soil organic matter and biologically based inputs that feed soil organisms, which release nutrients to plants. Sustainable methods of enhancing soil fertility and improving soil health include: using nitrogen-fixing legumes, green manure, and animal manure; minimizing or eliminating tillage; and

maintaining year round soil cover. However, depending on the condition of the soil, establishing healthy soils may take several years. This approach does not preclude the use of synthetic fertilizer that can be used to supplement natural inputs. However, fertilizer decisions are based upon soil test results and are applied on an as-needed basis. Synthetic chemicals known to harm soil organisms and soil structure must be avoided in sustainable agriculture.

Other sustainable concepts include: maximizing diversity through planned crop rotations, intercropping, and companion planting; protecting water quality; composting; year round soil cover; integrating crop and animal production; soil conservation practices; and attracting beneficial wildlife. Some traditional agricultural practices, such as moldboard plowing, are in conflict with sustainability since they can result in damage to soil structure. Rather, tillage practices should be appropriately timed, using implements that minimize damage to soil structure to the greatest extent possible.

Insects, diseases, and weeds are managed, rather than controlled, in sustainable systems. The goal is not necessarily the complete elimination of a pest, but rather to manage pests and diseases to keep crop damage within acceptable economic levels. Sustainable pest management practices emphasize prevention through good production and cultural methods. Some strategies include: using crop rotations that will disrupt the pest life cycle, improving soil quality, practicing good sanitation, using optimum planting densities, timing planting and transplanting operations to avoid high pest populations, employing biological control, and growing resistant varieties. Monitoring pests through frequent crop inspections and accurate identification are essential to keeping ahead of potential problems. Integrated Pest Management techniques can be incorporated into a sustainable program. These may include scouting, targeting pesticide applications, and the use of biological pest controls. Pesticides are seen as a last resort when using IPM

methods, and are chosen for their low toxicity, specificity to the pest, and lack of persistence in the soil. Achieving a healthy, balanced ecosystem takes time. Making the transition to sustainable farming is a process that generally requires moving forward step-by-step. While there are common goals that are critical to sustainable agriculture, there is no single approach that will guarantee sustainable success on every farm. The methods for accomplishing those goals must be tailored to the individual farm.

The following indicators that a farm is achieving environmental sustainability:

- There is no bare ground.
- Clean water flows in the farm's ditches and streams.
- Wildlife is abundant.
- Fish are prolific in streams that flow through the farm.
- The farm landscape is diverse in vegetation.

Social Responsibility Social sustainability relates to the quality of life for those who work and live on the farm, as well as those in the local community. Fair treatment of workers, positive farm family relationships, personal interactions with consumers, and choosing to purchase supplies locally (rather than from a more distant market) are just some of the aspects considered in social sustainability. Community supported agriculture (CSA), farmers markets, U-pick, cooperatives, and on-farm events are just some of the ways a sustainable farm can have a positive impact on the local community. In essence, the farm supports the community and the community supports the farm.

The following indicators that a farm is achieving social sustainability:

- The farm supports other businesses and families in community.
- Dollars circulate within the local economy.
- The number of rural families is going up or holding steady.
- Young people take over their parents' farms and continue farming.