

THE EVOLVING CONCEPT OF SUSTAINABLE AGRICULTURE

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Abstract:

Over the years, the definition of sustainability in development literature has varied widely and broadened in scope. The concept arose in response to economic growth models that characterized development approaches over the last half century. It was eventually recognized that such models did not adequately address social inequalities and led to environmental degradation. The concept gained wider use after the World Commission on Environment and Development published "Our common future" (Brundtland 1987). The economic, social, political and ecological dimensions of the rural environment are complex and have multiple implications, starting with theoretical and practical reasons. The process of urbanization that takes place at world-wide level has become one of the global problems of mankind, because of the disparities created between the countryside and the city, which are materialized in the cultural, economical and social aspects that are synthesized in the terms of urban and rural civilizations, which define the different realities of the geographical space. Because the concept of sustainable agriculture is still evolving, this paper reviews the ideas, practices and policies that make the basis of sustainable agriculture concept, in order to suggest to others practical steps that may be appropriate for them in moving toward sustainable agriculture.

Key words: sustainable development, sustainable agriculture, strategies, rural development

JEL classification: R, R4, Q18

1. Introduction

For many people the basic idea of sustainable development focuses greatly on depletion of resources. Others include in sustainability the conservation of nature or other environmental and ecological aspects. And still others include the aspects of quality of human life, the human wellbeing. In a general concept we can say that sustainability comprises the following elements:

- *depletion of resources* in order not to leave next generations empty-handed;
- *environmental and ecological aspects* in order to enable present and next generations to live in a clean and healthy environment, in harmony with nature;
- *quality of life* in order to ensure human wellbeing for present and next generations (Pascu Emilia, 2011); sustainability without quality of life makes no sense and quality of life without sustainability has no perspective.

It is for this reason that IUCN, UNEP and WWF, already over fifteen years ago, defined sustainable development as "improving the quality of life of humans while living within the carrying capacity of supporting ecosystems". And even a couple of years earlier the WCED, the United Nations World Commission on Environment and Development, published the well-known and worldwide respected definition of the Brundtland Commission.

Agriculture has changed dramatically, especially since the end of World War II. Food and fiber productivity soared due to new technologies, mechanization, increased chemical use, specialization and government policies that favored maximizing production.

Although these changes have had many positive effects and reduced many risks in farming, there have also been significant costs. Prominent among these are topsoil depletion, groundwater contamination, the decline of family farms, continued neglect of the living and working conditions for farm laborers, increasing costs of production, and the disintegration of economic and social conditions in rural communities.

By the year 2025, 83 per cent of the expected global population of 8.5 billion will be living in developing countries. Yet the capacity of available resources and technologies to satisfy the demands of this growing population for food and other agricultural commodities remains uncertain. Agriculture has to meet this challenge, mainly by increasing production on land already in use and by avoiding further encroachment on land that is only marginally suitable for cultivation.

A growing movement has emerged during the past two decades to question the role of the agricultural establishment in promoting practices that contribute to these social problems. Today this movement for sustainable agriculture is garnering increasing support and acceptance within mainstream agriculture. Not only does sustainable agriculture address many environmental and social concerns, but it offers innovative and economically viable opportunities for growers, laborers, consumers, policymakers and many others in the entire food system.

Major adjustments are needed in agricultural, environmental and macroeconomic policy (Milea Oana Maria, 2012), at both national and international levels, in developed as well as developing countries, to create the conditions for sustainable agriculture and rural development (SARD). The major objective of SARD is to increase food production in a sustainable way and enhance food security.

This will involve education initiatives, utilization of economic incentives and the development of appropriate and new technologies, thus ensuring stable supplies of nutritionally adequate food, access to those supplies by vulnerable groups, and production for markets; employment and income generation to alleviate poverty; and natural resource management and environmental protection. However, conserving and rehabilitating the natural resources on lower potential lands in order to maintain sustainable man/land ratios is also necessary.

2. The concept of sustainable agriculture

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.

Agriculture is a complex issue, with multiple openings and interaction with all sectors of economic and social development. Implications of modern agriculture, with a reasonable yield, are crucial to reduce integration costs and maximize positive effects (Bălăceanu Cristina, Apostol Diana, 2012).

Sustainable agriculture integrates three main objectives:

- environmental health;
- economic profitability;
- social and economic equity.

Sustainability rests on the principle that we must meet the needs of the present without compromising the ability of future generations to meet their own needs.

Therefore, stewardship of both natural and human resources is of prime importance. Stewardship of human resources includes consideration of social responsibilities such as working and living conditions of laborers, the needs of rural communities, and consumer health and safety both in the present and the future.

Stewardship of land and natural resources involves maintaining or enhancing this vital resource base for the long term.

A systems perspective is essential to understanding sustainability. The system is envisioned in its broadest sense, from the individual farm, to the local ecosystem, and to communities affected by this farming system both locally and globally. An emphasis on the system allows a larger and more thorough view of the consequences of farming practices on both human communities and the environment. A systems approach gives us the tools to explore the interconnections between farming and other aspects of our environment.

For farmers, the transition to sustainable agriculture normally requires a series of small, realistic steps. Family economics and personal goals influence how fast or how far participants can go in the transition. It is important to realize that each small decision can make a difference and contribute to advancing the entire system further on the "sustainable agriculture continuum." The key to moving forward is the will to take the next step and we can say that making the transition to sustainable agriculture is a real process.

Finally, it is important to point out that reaching toward the goal of sustainable agriculture is the responsibility of all participants in the system, including farmers, laborers, policymakers, researchers, retailers, and consumers.

3. Preservation of natural resources

When the production of food and fiber degrades the natural resource base, the ability of future generations to produce and flourish decreases. The decline of ancient civilizations in Mesopotamia, the Mediterranean region, Pre-Columbian southwest U.S. and Central America is believed to have been strongly influenced by natural resource degradation from non-sustainable farming and forestry practices. Water is the principal resource that has helped agriculture and society to prosper, and it has been a major limiting factor when mismanaged.

The most important issues related to water quality involve salinization and contamination of ground and surface waters by pesticides, nitrates and selenium. Salinity has become a problem wherever water of even relatively low salt content is used on shallow soils in arid regions and/or where the water table is near the root zone of crops.

Another way in which agriculture affects water resources is through the destruction of riparian habitats within watersheds. The conversion of wild habitat to agricultural land reduces fish and wildlife through erosion and sedimentation, the effects of pesticides, removal of riparian plants, and the diversion of water. The plant diversity in and around both riparian and agricultural areas should be maintained in order to support a diversity of wildlife. This diversity will enhance natural ecosystems and could aid in agricultural pest management.

Modern agriculture is heavily dependent on non-renewable energy sources, especially petroleum. The continued use of these energy sources cannot be sustained indefinitely, yet to abruptly abandon our reliance on them would be economically catastrophic.

Many agricultural activities affect air quality and these include smoke from agricultural burning; dust from tillage, traffic and harvest; pesticide drift from spraying; and nitrous oxide emissions from the use of nitrogen fertilizer. Options to improve air quality include incorporating crop residue into the soil, using appropriate levels of tillage, and planting wind breaks, cover crops or strips of native perennial grasses to reduce dust.

Soil erosion continues to be a serious threat to our continued ability to produce adequate food. Numerous practices have been developed to keep soil in place, which

include reducing or eliminating tillage, managing irrigation to reduce runoff, and keeping the soil covered with plants or mulch.

4. Sustainable production practices

Sustainable production practices involve a variety of approaches. Specific strategies must take into account topography, soil characteristics, climate, pests, local availability of inputs and the individual grower's goals. Several general principles can be applied to help growers select appropriate management practices:

- *Selection of species and varieties, which are well suited to the site and to conditions on the farm.* Preventive strategies, adopted early, can reduce inputs and help establish a sustainable production system. When possible, pest-resistant crops should be selected which are tolerant of existing soil or site conditions.
- *Diversification of crops (including livestock) and cultural practices to enhance the biological and economic stability of the farm.* Diversified farms are usually more economically and ecologically resilient. While monoculture farming has advantages in terms of efficiency and ease of management, the loss of the crop in any one year could put a farm out of business and/or seriously disrupt the stability of a community dependent on that crop. By growing a variety of crops, farmers spread economic risk and are less susceptible to the radical price fluctuations associated with changes in supply and demand.
- *Management of the soil to enhance and protect soil quality.* A common philosophy among sustainable agriculture practitioners is that a "healthy" soil is a key component of sustainability; that is, a healthy soil will produce healthy crop plants that have optimum vigor and are less susceptible to pests. While many crops have key pests that attack even the healthiest of plants, proper soil, water and nutrient management can help prevent some pest problems brought on by crop stress or nutrient imbalance. Furthermore, crop management systems that impair soil quality often result in greater inputs of water, nutrients, pesticides, and/or energy for tillage to maintain yields.
- *Efficient and humane use of inputs.* Many inputs and practices used by conventional farmers are also used in sustainable agriculture. Sustainable farmers, however, maximize reliance on natural, renewable, and on-farm inputs. Equally important are the environmental, social, and economic impacts of a particular strategy. Converting to sustainable practices does not mean simple input substitution. Frequently, it substitutes enhanced management and scientific knowledge for conventional inputs, especially chemical inputs that harm the environment on farms and in rural communities. The goal is to develop efficient, biological systems which do not need high levels of material inputs.
- *Consideration of farmers' goals and lifestyle choices.* Management decisions should reflect not only environmental and broad social considerations, but also individual goals and lifestyle choices. For example, adoption of some technologies or practices that promise profitability may also require such intensive management that one's lifestyle actually deteriorates. Management decisions that promote sustainability nourish the environment, the community and the individual.

5. Strategies for sustainable agriculture

In addition to strategies for preserving natural resources and changing production practices, sustainable agriculture requires a commitment to changing public policies, economic institutions, and social values. Strategies for change must take into account the complex, reciprocal and ever-changing relationship between agricultural production and the broader society.

The "food system" extends far beyond the farm and involves the interaction of individuals and institutions with contrasting and often competing goals including farmers, researchers, input suppliers, farm workers, unions, farm advisors, processors, retailers, consumers, and policymakers. Relationships among these actors shift over time as new technologies spawn economic, social and political changes.

A wide diversity of strategies and approaches are necessary to create a more sustainable food system. These will range from specific and concentrated efforts to alter specific policies or practices, to the longer-term tasks of reforming key institutions, rethinking economic priorities, and challenging widely held social values.

New policies are needed to simultaneously promote environmental health, economic profitability, and social and economic equity. For example, commodity and price support programs could be restructured to allow farmers to realize the full benefits of the productivity gains made possible through alternative practices. Tax and credit policies could be modified to encourage a diverse and decentralized system of family farms rather than corporate concentration and absentee ownership.

Consumers can play a critical role in creating a sustainable food system. Through their purchases, they send strong messages to producers, retailers and others in the system about what they think is important. Food cost and nutritional quality have always influenced consumer choices. The challenge now is to find strategies that broaden consumer perspectives, so that environmental quality, resource use, and social equity issues are also considered in shopping decisions. At the same time, new policies and institutions must be created to enable producers using sustainable practices to market their goods to a wider public.

6. Conclusions

Agriculture is faced worldwide with an accelerating transformation. Advances in science and technology, shifting consumption patterns, continuing population growth, trade globalization, frictions in subsidy regimes, and the impacts of local and global environmental change converge and lead to new and serious risks to agricultural production systems and producers.

In light of these changes, sustainability of the agri-food system and farming as a multi-functional enterprise is of increasing importance. Successful short and long-term adaptation to endogenous and exogenous biotic and abiotic, social and economic forces requires access to information and indicators on the current situation and possible future trends in the ecological, social and economic domain of sustainability.

Sustainable development is a challenge to contemporary society. It aims to continuously improve the quality of life and wellbeing, now and for future generations. In the current global crisis, which manifests itself in financial terms, food and climate change, is even more necessary to develop a strategy for future development.

Sustainable agriculture presents an opportunity to rethink the importance of family farms and rural communities. Economic development policies are needed that encourage more diversified agricultural production on family farms as a foundation for healthy economies in rural communities.

In combination with other strategies, sustainable agriculture practices and policies can help foster community institutions that meet employment, educational, health, cultural and spiritual needs.

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