*General Article*_____ *Chapter – 3*

SUSTAINABLE AGRICULTURE: CONTEMPORARY INDUSTRIALIZED AGRICULTURE VERSUS TRADITIONAL AGRICULTURE

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Abstract

In order to achieve sustainability of agricultural yields and production, this paper offers an overview of key ideas in sustainable agriculture. There are explanations for why contemporary industrialized agriculture may not produce as sustainably as traditional agriculture in terms of yields. Both the likelihood that organic agriculture will be more sustainable than non-organic agriculture and its potential effects on wild biodiversity are considered. Because some environmentalists consider the preservation of wild biodiversity to be a crucial component of sustainable development, the effect of agricultural development on wild biodiversity is evaluated.However, there is a disagreement over policy between conservationist organizations. While some people reject such production techniques as being detrimental to the preservation of wild biodiversity, others support intensive agriculture (including silviculture). There are explanations for why current industrialized farming methods are used so extensively (and still are), despite the fact that they don't seem to be sustainable. Market structures could have a tendency to confine producers to unsustainable production practices.

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Introduction

Nowadays, agriculture is the primary source of food for people, which is essential for their survival. This may explain why so much recent emphasis has been given to the subject of whether agriculture, particularly modern agriculture, can continue its current levels of productivity and those expected for the near future. Additionally, there are worries that the detrimental environmental spillovers from agriculture, especially modern or industrialized agriculture, will lead to economic growth that won't last in the larger discussion about the prerequisites for sustainable development (cf. Robertson and Swinton, 2005). Agricultural development has altered and is continuing to alter the world's genetic resources in ways that many find disagreeable (such as the extinction of precious species) and in a way that could eventually jeopardize the sustainability of agricultural output.There have long been doubts regarding agriculture's capacity to meet the requirements of human populations in a sustainable manner. For instance, T. R. Malthus (1798) stated that agriculture will be constrained in its ability to feed an ever-increasing population due to the law of diminishing marginal production. Later authors, including David Ricardo (1817), asserted that the Malthusian dilemma would not be a pressing concern with technical or scientific advancement and adequate capital investment in agriculture. Engels fiercely rejected the Malthusian viewpoint in 1959, asserting that "nothing is impossible to science."According to some, the use of contemporary industrialized technologies that have resulted in significant agricultural development is causing environmental changes (and, in some cases, social changes) that may eventually undermine that expansion and lower that level of agricultural productivity (Conway, 1998; Altieri, 2000, 2004).

Concept of Sustainable Agriculture

Concepts must be taken into account since they determine the direction of scientific inquiry. We must think about the following issues in regard to sustainable agriculture: What is sustainable agriculture? Can one accomplish it? If so, how is it accomplished? Is it wanted?

There are a number of sustainable agriculture theories in the literature, the majority of which Christen has reviewed (1996). Following his review, Christen (1996) asserts that sustainable agriculture should possess the following qualities:

(1) ensure intergenerational equity.

(2) protect the resource base of agriculture and obviate negative environmental externalities.

(3) protect biological diversity.

(4) ensure the economic viability of agriculture, enhance job opportunities in farming, and preserve local rural communities.

(5) produce enough high-quality food for society; and (6) contribute to the conservation of natural resources.

It should be understood right away that sustainable yields are only one important aspect of how well agricultural systems work. Many other factors can be taken into consideration when comparing systems, such as the amount of yields or returns and the effects of the agricultural system's income distribution (cf. Conway, 1998, p.174).

Sustainability of Modern Industrialised Agriculture Versus Traditional Agriculture:-

Traditional agricultural methods are likely to be more sustainable than contemporary industrialized agricultural systems, according to Conway (1985, 1987) and Altieri (1995). Agricultural systems are still developing, and both contemporary and "traditional" systems can be diverse. As a result, even though the aforementioned remark appears to be generally true, it needs some clarification, as Pretty, for instance, has noted (1998).For instance, early agricultural practices such as slash-and-burn or shifting agriculture (as well as these practices can be somewhat sustainable when rotation cycles are sufficiently curtailed) can no longer be sustained as yields decrease (Ramakrishnan, 1992).

Most of the characteristics Altieri (2004) and others link with traditional agrosystems are typically absent from modern industrialized agrosystems. They are characterized by the use of a small number of species on the farm (often just one farmed species), the use of crop varieties not developed locally to suit local conditions (for example, varieties developed by companies, often multinational ones, specializing in plant breeding), the presence of monoculture, and relatively open cycles leading to significant imports of materials to farms as well as significant exports of materials from them in the form of products and wastes.

Overall, traditional agricultural systems are very different from the majority of modern industrialized agricultural systems. Traditional agroecosystems typically exhibit a number of characteristics that support yield maintenance. These include using local crops of wild plants and animals that are well adapted to the environment, maintaining closed material cycles, and minimizing waste due to effective recycling practices. They also include pest control through natural levels of external inputs and pest control through natural biological interdependencies, as well as high structural diversity in space (intercropping) and time (crop rotations).

Modern agriculture has sustainability challenges due to the openness of most industrialized, modern agricultural systems and the more closed cycles of most traditional agricultural systems. The following are potential barriers to maintaining yields from modern agriculture:

- Due to limited, exhaustible, and non-renewable global stock levels, it is possible that many external inputs—including fossil fuels and various types of fertilizer—will not be available in the future.
- Reduced soil fertility caused by long-term use of chemical fertilizers, including increasing soil acidity, poverty of soil structure caused by repeated cultivation, and absence of organic matter returning to the soil to give humus (Ewel et al., 1991). In addition, frequent cultivation and a lack of intercropping may promote soil erosion, which eventually causes yields to decline due to a reduction in soil depth.
- Problems with sustainability may arise from the widespread use of chemical pesticides and herbicides in modern agriculture. For instance, pesticide resistance usually evolves over time in pests. Additionally, some pesticides and weedkillers have harmful effects on the soil's flora and fauna, which might reduce farm productivity.

- Externalities or spillovers that are detrimental to the environment frequently result from modern agriculture. This is as a result of its open-cycle nature as well as the cultivation and husbandry methods used. It can drastically interrupt hydrological cycles, contaminate common water sources, and salt or flood soils across large areas. Additionally, agriculturalists' haphazard usage of shared water bodies can endanger the continuation of their production. This may occur, for example, if farmers utilize subterranean aquifers' water more quickly than they can replenish them at first.

Sustainability of Inorganic versus Organic Agriculture:-

- The general consensus is that food produced by non-organic agriculture practices is less healthy than stuff grown organically.
- Organic farming is said to be much more sustainable than agroecosystems that heavily rely on chemicals like pesticides and synthetic fertilizers.
- Organic farming is thought to be less harmful to wildlife and more environmentally friendly than modern farming.

Even said, not all organic agroecosystems are exact replicas of conventional farming systems. For instance, organic farming may rely heavily on imported organic material and fossil fuels for energy. Farm output may be very specialized, and there may be a major loss in agricultural biodiversity. If proper precautions are not taken, the use of some organic materials, such as the use of human excreta as fertilizer, can pose health hazards. Although the degree of change may be less than with industrialized contemporary agriculture, wildlife may be harmed by habitat alteration.

Some organic farming practices, like the grazing of cattle and sheep in some parts of Australia, require substantial land use. However, these land-uses have been linked to the extinction of wild species and substantial ecosystem alterations (Tisdell, 2002, p.91). Despite the fact that organic farming is probably better for wildlife conservation than non-organic farming (for instance, because it doesn't use chemical pesticides), this does not imply that it is better for biodiversity in the wild. According to Swanson (1994, 1995), organic agriculture typically includes significant land conversion or, in other words, significant alterations to the natural ecosystem. This has a significant role in the decline of wild biodiversity.

Conclusion

Large urban populations may now be supported at comparatively high levels of life thanks to modern industrialized farming systems that have generated significant farm surpluses. However, given their high level of reliance on outside inputs, open cycles, degradation of their natural resource base, and erosion of genetic assets, questions have been raised regarding how well these modern systems can retain their productivity over the long term. However, it appears unlikely that conventional agroecosystems will return anytime soon. It is challenging to imagine how they could cope with the level of global urbanization that now exists and is increasing, especially in emerging nations. In order to boost modern agriculture's sustainability, there is a justification for more government involvement. For instance, there is a basis for public measures that ensure farmers take externalities into account, such as taxes on unfavorable

agricultural externalities or subsidies on favorable agricultural externalities (cf. Robertson and Swinton, 2005). However, as the discussion above should make obvious, lack of agricultural sustainability is not primarily caused by failure to incorporate environmental spillovers.This is due to the fact that its advantages are primarily internal to farms and that it is difficult or impossible to establish and enforce property rights in the research outcomes. Researchers in a market economy have little financial motivation to conduct this type of study because selling products based on its findings will only yield modest profits.

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