

Sustainability of Indian Agriculture

Abstract

Over the history of human settlements on the Planet earth, agriculture has transformed in tune with the growing population and its challenging needs. The transformation has been quite remarkable since the end of world War II.

Food and fibre productivity spared up due to adotion of new technologies viz, HYV, from mechanization, increased fertilizer & Pesticide use, specialized practices, water resource development & improved irrigation practices and Government Policies that favored maximizing production countries, especially India.

It led to the attainment of self-sufficiency in food grain production. This has been described by Donald plunkett (1993), scientific adviser to the CGIAR, as the greatest agricultural transformation in the history of humankind, and most of it has taken place during our lifetime.

A major problem was that these benefits have been poorly distributed' Many people have missed out and hunger still persists in many parts of the world

Estimates by the FAO and WHO (1992) and the Hunger Project 1991) suggest that around I billion people in the world have diets that are 'too poor to abstain the energy required for healthy growth of children and minimal activity of adults'.

Keywords: Sustainbie Agriculture, Transformation, WHO, Hunger Etc.

Introduction

We can compare there broad types of farming: traditional production systems, conventional modern agriculture (such as Green Revolution technologies), and sustainable aagriculture. We can compare them across three dimensions: ecological, economic and social.

Many traditional and most conventional farm practices are not ecologically sustainable: they overuse natural resources, reducing soil fertility, causing soil erosion, and contributing to global climatic change. Sustainable agriculture has several advantages over both traditional and conventional practices.

Sustainable agriculture practices frequently involve mixed cropping, so increasing the diversity of crops produced and raising the diversity of insects and other animals and plants in and around field.

Agriculture and forestry clothe the rural landscape. Inappropriate use causes crossing, landslides and flooding, clogs irrigation channels, and reduces he ability of the land to support the local population. Impoverished rural people flock into cities search of jobs, forming unsightly, insanitary slums that further destroy the landscape.

The way agriculture is practiced contributes significantly to global climatic changes. Conventional agriculture contributes to the production of greenhouse gases in various way: by reducing the amount of carbon stored in the soil and in vegetation, through the production of methane in irrigated field, and through energy intensive activities such as the production of artificial fertilizer. Adopting sustainable agriculture would reduce these impacts significantly.

Amis of the Study

1. Governments tend to view export oriented production systems as more important then those that supply domestic demands.
2. This is misguided Focusing on exports along involves hidden costs: in tra.nsport, in assuring local food security, etc.
3. Policies should treat domestic demand and in particular food security as equally important to the visible trade balance.

Review of Literature

1. Farming is the mainsource of employment for rural people. (dr. R.k. Gurjar and B. C. Jat Economic Geography)
2. Trends towards specialization and mechanization may increase narrowly measured "efficiency". But they reduce employment on the land.(Prof.kashinath singh and Judish singh , Economic Geography)



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3. The welfare costs of unemployment must be taken into account when designing national agricultural support programmes. (Prof. R.C. Chandna, book, population Geography.)
4. Sustainable agriculture, with its emphasis on small- scale, labour-intensive activities, helps overcome these problems. (Prof. Savindra singh book Disaster Management).

Inclusiveness

Development cannot be sustainable unless it reduces poverty for the broad masses of people in India. The government must find ways to enable the rural poor to benefit from agriculture development.

Political Unrest

Gaps between the "have" and "have -nots" feed a feeling of social injustice among those who feel neglected and excluded from development opportunities, as well as from better-off sympathizers. The result is a climate favorable to political opposition and even violence.

Local Acceptance

Many new technologies fail because they are based on practices or as- summations from outside. Sustainable agriculture practices usually are based on local social customs, traditions, norms and taboos, so local people are more likely to accept them and adapt them to their own needs.

Indigenous Knowledge

Sustainable agriculture practices often rely on traditional knowhow and local innovation. Local people have a wealth of knowledge about their environment, crops and livestock. They keep locally adapted breeds and crop varieties. They have social structures that manage and conserve common resources, help people in needs, and maintain the social fabric. Rather than ignoring or replacing this knowledge, sustainable agriculture development seeks to build on it and enrich it with appropriate information from outside.

Cannot Adopt the Whole Package If one element is missing, the seed delivery system fails or the fertilizer arrives late, or there is insufficient irrigation water, then yields may not be much better than those for traditional varieties. Even if farmers want to use external resources, very often delivery systems are unable to supply them on time.

Where production has been improved through these modern technologies, all too often there have been adverse environmental and social impacts in both the advanced and developing countries including India. These include the following.

Adverse Effects of Modern High-Input Agriculture

1. Overuse of natural resources, causing depletion of groundwater, and loss of forests, wild habitats, and of their capacity to absorb water, causing waterlogging and increased salinity.
2. Contamination of the atmosphere by ammonia, nitrous oxide, methane and the products of burning, which play a role in ozone depletion, global warming and atmospheric pollution;
3. Contamination of food and fodder by residues of pesticides, nitrates and antibiotics.
4. Contamination of water by pesticides, nitrates, soil and livestock water causing harm to wildlife,

disruption of ecosystems and possible health problems in drinking water.

5. Build up of resistance to pesticides in pests and diseases including herbicide resistance in weeds.
6. Damage of farm and natural resources by pesticides, causing harm to farm workers and public, disruption of ecosystems and harm to wildlife.
7. Erosion of genetic diversity – the tendency agriculture to standardize and specialize by focusing on modern varieties, causing the displacement of traditional varieties and breeds:
8. New health hazards for workers in the agrochemical and food-processing industries.

Added to the above adverse effects, the increasing human as well as cattle population is imposing intense pressure on available natural resources. Accordingly, a challenge has emerged that required a new vision, holistic approaches for ecosystem management and renewed partnership between science and society.

In December 1983, the UN General Assembly established the World Commission on Environment and Development. In 1987, on 27th of April, at the queen Elizabeth Hall in London, the Prime Minister of Norway, Mrs. Brundtland, who is also the Chairman of the World Commission of Environment and development.

Released the publication of "Our Common Future" by the World Commission on Environment and Development (WCED) and said: "Securing our common future will require new energy and openness, fresh insights, and an ability to look beyond the narrow bounds of national frontiers and separate Scientific disciplines.

The young are better at such vision than we, who are too often constrained by the traditions of former, more fragmented World. We must tap their energy, their openness their ability to see the interdependence of issues..." She suggests that we must adopt a new paradigm based on a completely new value system. " Our generation has too often been willing to use the resources of the future to meet our own short-term goals.

It is a debt we can never repay. If we fail to change our ways, these young men and women will suffer more than we, and they and their children will be their fundamental right to a healthy productive, life-enhancing environment." Her speech made it clear that we are consuming resources, which must be transferred to the next generation. We must recognize that, because resources are limited. We need a sustainable ways of life.

Almost at the same time the realization of prime importance of staple food production for achieving food security for future generations has brought the concept of "Sustainable agriculture" to the forefront and began to take shape in the following three points.

1. The interrelatedness of all the farming systems including the farmer and the family.
2. The importance of many biological balances in the systems.

3. The need to maximize desired biological relationships in the system.

Definition of Sustainable Agriculture

Sustainable Agriculture refers to a range of strategies for addressing many problems that effect agriculture. Such problems include loss of soil productivity from excessive soil erosion and associated plant nutrient losses, surface and ground water pollution from pesticides, fertilizers and sediments, impending shortages of non-renewable resources, and low farm income from depressed commodity prices and high production costs. Furthermore, "Sustainable" implies a time dimension and the capacity of a farming system to endure indefinitely.

(TAC-CGIAR, 1988)

A sustainable Agriculture is a system of agriculture that is committed to maintain and preserve the agriculture base of soil, water, and atmosphere ensuring future generations the capacity to feed themselves with an adequate supply of safe and wholesome food.

(Gracet, 1990)

A Sustainable Agriculture system is one that can indefinitely meet demands for food and fibre at socially acceptable, economic and environment cost.

A broad and commonly accepted definition of sustainable Agriculture is as follows-

Sustainable Agriculture refers to an agriculture production and distribution system that:

1. Achieves the integration of natural biological cycles and controls
2. Protects and renews soil fertility and the natural resource base
3. Reduces the use to nonrenewable resources and purchased (external or off-farm) production inputs.
4. Optimizes the management and use of on-farm inputs.

5. Provides on adequate and dependable farm income.
6. Promotes opportunity in family farming and farm communities, and
7. Minimizes adverse impacts on health, safety, wildlife, water quality and the environment.

Current Concept of Sustainable Agriculture

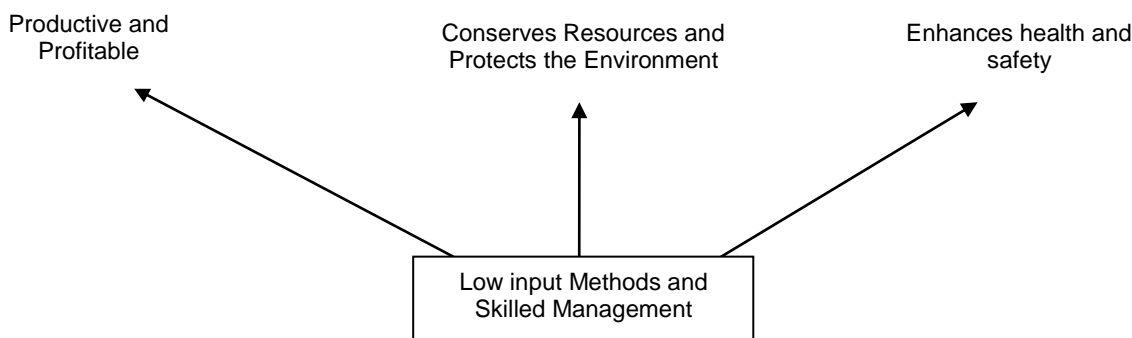
A Current concept of sustainable Agriculture in the United states showing the ends and the means of achieving them through low-input methods and skilled management is shown.

The ultimate goal or the ends of sustainable agriculture is to develop farming systems that the environment, and enhance health and safety, and to do so over the long term.

The means of achieving this is low input methods and skilled management, which seek to optimize the management and use of internal production inputs (i.e., on-farm resources) in was that provide acceptable levels of sustainable crop yields and livestock production and result in economically profitable returns. This approach emphasizes such cultural and management practices as crop rotations, recycling of animal manures, and conservation tillage to control soil erosion and nutrient losses and to maintain or enhance soil productivity.

Low-input farming systems seek to minimize the use of external production inputs (i.e. off-farm resources), such as purchased fertilizers and pesticides, wherever and whenever feasible and practicable: to lower production costs: to avoid pollution of surface and groundwater: to reduce pesticide residues in food: reduce a farmer's overall risk;; and to increase both short term and long-term farm profitability.

Another reason for the focus on low-input farming systems is that most high-input systems, sooner or later, would probably fail because they are not either economically or environmentally sustainable over the long –term.



Elements of Sustainability

There are many ways to improve the sustainability of a given farming system, and these vary from region to region, However, there are some common sets of practices among farmers trying to take a more sustainable approach, in part through greater use of no-farm or local resources each contributing in some way to long-term profitability, environmental stewardship and rural quality of life.

Soil Conservation

Many soil conservation methods, including contour cultivates contour bunding, graded bunding, vegetative barriers, strip cropping cover cropping, reduced tillage etc help prevent loss of soil due to wind and water erosion.

Crop Diversity

Growing a greater variety of crops on a farm can help reduce risks from extremes in weather, market conditions or crop pests. Increased diversity

crops and other plants, such as trees and shrubs, also can contribute to soil conservation, wildlife habitat and increased populations of beneficial insects.

Nutrient Management

Proper management of nitrogen and other plant nutrients can improve the soil and protect environment. Increased use of farm nutrient sources such as manure and leguminous over crops., also reduces purchased fertilizer costs.

Integrated Pest Management (IPM)

IPM is a sustainable approach to managing pests by combining biological, cultural, physical and chemical tools in way that minimizes economic, health and environmental risks.

Cover Crops

Growing plant such as sun hemp, horse gram, pillipesare in the off season after harvesting a grain or vegetable crop can provide several benefits, including weed suppression, erosion control and improved soil nutrients and soil quality.

Rotational Grazing

New management- intensive grazing systems take animals out barn into the pasture to provide high- quality forage and reduced feed cost.

Water Quality & Water Conservation

Water conservation and protection have important part of Agricultural stewardship Many practices have been develop conserve Viz., deep ploughing, mulching, micro irrigation techniques etc., protect quality of drinking and surface water.

Agro Forestry

Trees and other woody perennials are often underutilized on.....covers a ranges of practices Viz., ogi-silviculture, silive-pastoral, agri-silvi-pagri horticulture, horti/shlivipastoral, alley cropping, tree farming, lay farm that help conserve, soil and water.

Marketing

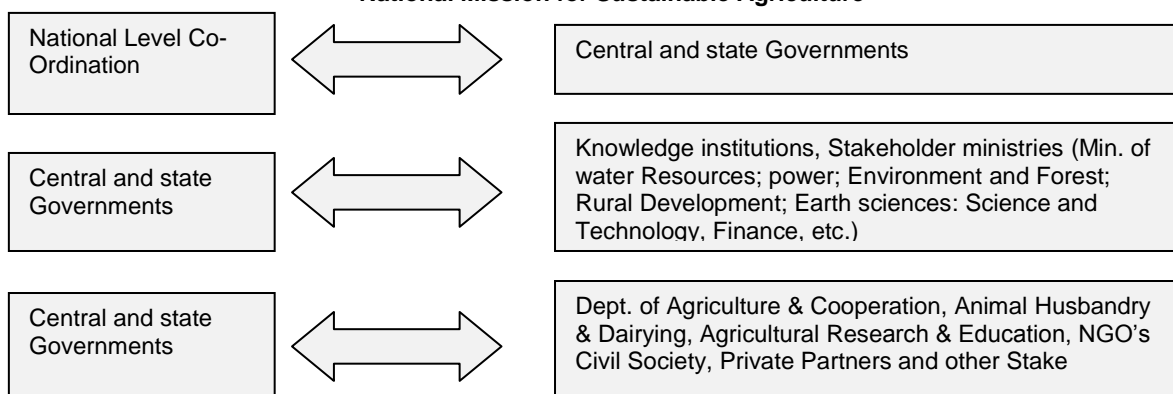
Farmers across the country are finding that improved marketing way to enhance profitability direct marketing direct marketing of agricultural product from farmers to consumers is becoming much more common, including, through Rythu bazaar rod side stands.

Status of Sustainable Agriculture in India

The survival and well being of the nation depends on sustainable development. It is a proves of social and economic betterment that satisfy needs and values of interest groups without foreclosing options. Suitable Development of India demean access to state of are 'clean' technologies and have as strategic role in increasing the capabilities of the country both the environment as well as to provide thrust towards conservation and sustainable agriculture. Current research programmes towards sustainable agriculture are as follows:

1. Resistant crop varieties to soil, climatic and biotic stresses
2. Multiple cropping system for irrigated areas and tree based farming system rainfall area.
3. Intergrated nutrient management
 - a. Combined use of organic and inorganic sources of nutrients
 - b. Use of green manures (Sesbania, Crotalaria etc)
 - c. Inclusion of pulse crops in crop sequence
 - d. Use of bio fertilizers
4. Integrated pest management
 - a. Microbial control
 - b. Use of botanicals
 - c. Use of Predators
5. Soil and water conservation
 - a. Watershed management
 - b. Use of organice as mulch and manure

National Mission for Sustainable Agriculture



Major factors affecting the ecological balance and sustainability of agricultural resources are- Land/Soil Related Problems

1. Soil degradation
2. Deforestation
3. Accelerated soil erosion
4. Siltation of reserves
5. Wind erosion

Irrigation Related Problems

1. Rise in groundwater table & water logging
2. Soil salinization & alkalization
3. Over-exploitation of groundwater

Indiscriminate use of agro-chemicals

1. Fertilizer pollution
2. Pesticide Pollution

Environmental Pollution

1. Greenhouse effect
2. Depletion emissions
3. Methane emission
4. Eutrophication

Erosion of genetic biodiversity

Land /Soil Related Problems

Soil Degradation

Soil degradation refers to decline in the productive capacity of land due to decline in soil quality caused through processed induced mainly by human activities. It is a global problem. The Global Assessment of the status of Human-induced soil Degradation (GLASOD) was the first worldwide comparative analysis focusing specifically on soil degradation.

Worldwide around 1.96 Billion ha are affected by human induced soil degradation, mainly caused by water and wind erosion (1994 and 548 million ha respectively). Chemical degradation accounted for 240 million ha, mainly nutrient decline (136 million ha) and salinization (77 million ha), physical degradation occurred on 83 mainly as a result to compaction, sealing and crusting.

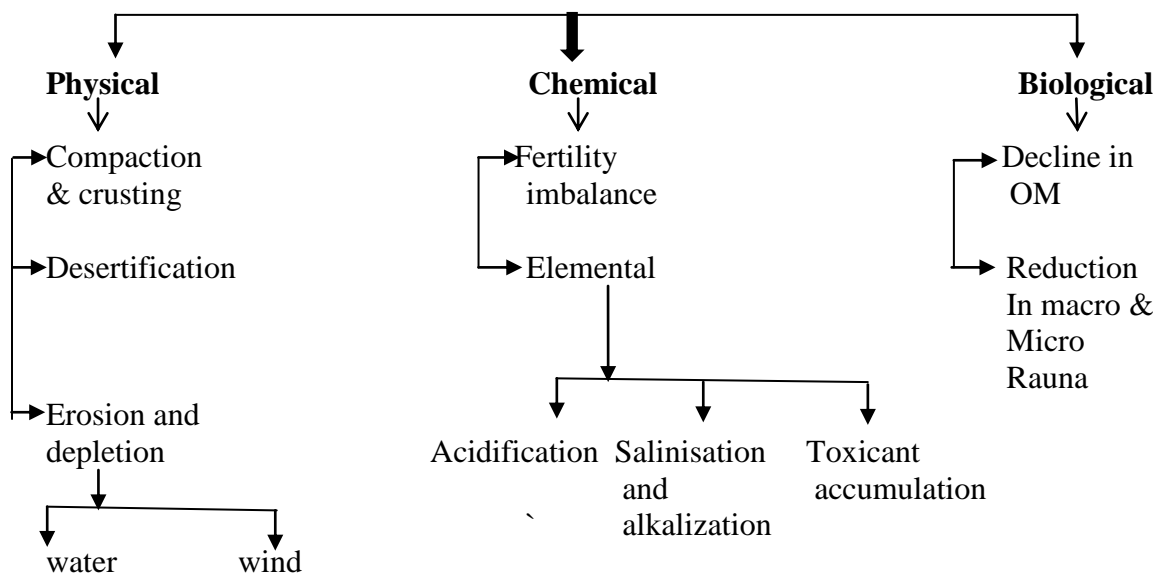
It is also a very important problem in India, which shares only 2.4% of the worlds' and resource

and supports more than 18% of the world's human population and 15% of livestock population.

Estimates of soil degradation are varied depending upon the criteria used. Processes leading to soil degradation are generally triggered by excessive pressure on land to meet the competing demands of growing population for food, fodder, fiber and fuel.

1. Deforestation of fragile lands.
2. Over cutting and grazing of vegetation
3. Extension of cultivation on to lands of low capability/potential
4. Improper crop rotations
5. Unbalanced fertilizer use
6. Non-adoption of soil conservation practices
7. Inadequacies in planning and management of irrigation resources
8. Overdraft of groundwater in excess of capacity of recharge.

Soil Degradation



Conclusion

Sustainable Agriculture refers to excellent function and variety of quality. The prominent vegetative barriers, weather, nutrient, cover crops and including weed suppression. The mission of sustainable agriculture to natural, human, physical socio-Economic resources, main tend fully problems.

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