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## SUSTAINABLE AGRICULTURE DEVELOPMENT IN INDIA

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**Abstract:**

*The Indian government's policies have always emphasized food grain self-sufficiency, which has not necessarily coincided with agricultural sustainability. The growth of agricultural production and productivity, which had risen significantly during 1970s and 1980s, declined during 1990s.*

**KEY WORDS:**

Sustainable , Agriculture , Development , Soil , Mixed Farming , Multiple Cropping.

**INTRODUCTION:**

These slowdowns have worsened since 2000; both overall agricultural production and food grains production have shown negative growth rates in 2000-01 to 2002-03 periods .Decline in the growth rates of agricultural production and productivity is a serious issue considering the questions of food security, livelihood, and environment. As such, a critical examination of the approaches for sustainable agricultural development is necessary.

**OBJECTIVES –**

**Objectives of this Research Paper is as follows**

1. To study of meaning of sustainable Development.
2. To observe the need of sustainable agriculture.
3. To Find out the way of sustainable development about Agriculture.

**METHODOLOGY –**

This Research paper is based on secondary data like Reference book, Reports-economic survey and websites.

**DEFINITION OF SUSTAINABLE DEVELOPMENT**

The concept of sustainable development formed the basis of the United Nations Conference on Environment and Development held in Rio de Janeiro in 1992. The summit marked the first international attempt to draw up action plans and strategies for moving towards a more sustainable pattern of development. It was attended by over 100 Heads of State and representatives from 178 national governments. The Summit was also attended by representatives from a range of other organisations representing civil society. Sustainable development was the solution to the problems of environmental

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degradation discussed by the Brundtland Commission In 1987, the United Nations Released the Brundtland Report, Which included what is now one of the most widely recognised definition:

"Sustainable development is development that meets the needs of the present, without compromising the ability of future generations to meet their own needs."

The concept of 'need', in particular the essential needs of the world poor, to which overriding priority should be given.

The idea of limitations imposed by the state technology and social organization on the environment's ability to meet present and future needs.

### **OBJECTIVES OF SUSTAINABLE DEVELOPMENT**

Make best use of the resources available

Minimize use of non-renewable resources

Protect the health and safety of farm workers, local communities and society

Protect and enhance the environment and natural resources

Protect the economic viability of farming operations

Provide sufficient financial reward to the farmer to enable continued production and contribute to the well-being of the community

Produce sufficient high-quality and safe food

Build on available technology, knowledge and skills in ways that suit local conditions and capacity.

### **SUSTAINABLE AGRICULTURE IN INDIA**

Sustainable Agriculture can be simply defined as environmentally friendly methods of farming that allow the production of crops or livestock without damage to the farm as an ecosystem. A part from this, it also prevents the adverse effect on soil, water supplies, biodiversity, or other surrounding natural resources. The concept of sustainable agriculture is an intergenerational one in which we pass on a conserved or improved natural resource base instead of one which has been depleted or polluted.

Since the dawn of civilizations agriculture is one sector that impacts and in turn is impacted the most by environment. Hence sustainability of the human race and this world depends a lot on the environmental friendliness of our agriculture.

India is facing a food crisis thanks to the systematic destruction of farmlands and food production systems over the last five decades through uncontrolled use of chemical fertilisers, pesticides, monocropping and other intensive agricultural practices. Instead of looking at the real problem the government is favouring false solutions like genetically engineered (GE) food crops.

Ecological farming is the answer to the problems being faced by agriculture in our country today. It will also keep agriculture sustainable. This form of agriculture conserves our soil and water resources, protects our climate, enhances agro-diversity, ensures biodiversity, meets the demand for food and safeguards livelihoods. In short, it ensures that the environment thrives, the farm is productive, the farmer makes a net profit and society has enough nutritious food.

India has a long history of agriculture. Over centuries, farmers in this country devised practices to keep our farms sustainable. Practices like mixed cropping, crop rotation, using organic manure and pest management kept our agriculture sustainable. But things changed for the worse with the onslaught of a chemical intensive model of agriculture, imposed through the so called Green Revolution in 1965.

It was therefore not surprising when the International Assessment of Agricultural Science and Technology for Development [IAASTD], an initiative of the United Nations and World Bank, concluded that small-scale farmers and agro-ecological methods are the way forward if the current food crisis is to be solved. This initiative involved a three year review of all the agricultural technologies in the past 50 years by around 400 scientists across the world.

The IAASTD said that to meet the needs of local communities, indigenous and local knowledge need to be declared as important as formal science. This is a significant departure from the destructive chemical-dependent, one-size-fits-all model of industrial agriculture. The report also acknowledges that genetically engineered crops are highly controversial and will not play a substantial role in addressing the key problems of climate change, biodiversity loss, hunger and poverty

### **NEED FOR SUSTAINABLE AGRICULTURE**

We can compare three broad types of farming: traditional production systems, conventional

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modern agriculture (such as Green Revolution technologies), and sustainable agriculture. We can compare them across three dimensions: ecological, economic and social.

### ECOLOGICAL SUSTAINABILITY

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 major advantages over both traditional and conventional practices:

**Soil fertility:** A continuous fall in soil fertility is a major problem in many parts of India. Sustainable agriculture improves fertility and soil structure and prevents erosion, so would be an answer to this problem.

**Water:** Irrigation is the biggest consumer of fresh water, and fertilizer and pesticides contaminate both surface- and groundwater. Sustainable agriculture increases the organic matter content of the topsoil, so raising its ability to retain and store water that falls as rain.

**Biodiversity:** Sustainable agricultural 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 fields.

**Pollution:** Pesticides are hazardous to human health as well as to the local ecology. Incorrect handling, storage and use of pesticides lead to health and pollution problems. Sustainable agriculture reduces or eliminates the use of hazardous chemicals; instead it controls pests with a variety of biological and agronomic measures and the use of natural substances.

**Landscape:** Agriculture and forestry clothe the rural landscape. Inappropriate use causes erosion, landslides and flooding, clogs irrigation channels, and reduces the ability of the land to support the local population. Impoverished rural people flock into the cities in search of jobs, forming unsightly, insanitary slums that further destroy the landscape. Rehabilitating ecologically damaged areas needs huge investments that few countries can afford. Sustainable agriculture avoids these problems by improving productivity, conserving the soil, avoiding the expansion of farming into unsuitable areas, and preserving rural jobs.

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

**Economic sustainability:** Agriculture cannot be sustainable unless it is economically viable over the long term. Conventional agriculture poses greater long-term economic risks than “sustainable” alternatives.

**Export vs. local orientation:** Governments tend to view export-oriented production systems as more important than those that supply domestic demands. This is misguided. Focusing on exports alone involves hidden costs: in transport, in assuring local food security, etc. Policies should treat domestic demand and in particular food security (either by farmers producing food for themselves, or by selling produce for cash they can use to buy food) as equally important to the visible trade balance.

**Debt:** The Green Revolution raised India's grain output significantly, but a vast number of small-scale farmers ran into a debt trap: they took out loans to raise their production, and then found they could not pay the money back. About 40,000 were so desperate that they committed suicide.

**Risk:** Concentrating on specific commodities seems to promise high economic returns. But market production implies certain risks: markets change quickly, and international agricultural prices are dropping. Cheap foreign food may sweep into the national market, leaving Indian farmers without a market. As a World Trade Organization signatory, the Indian government is under pressure to deregulate and open its economy to the world market so cannot protect its farmers behind tariff walls.

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**Niche markets:** Organic agriculture is one of the strongest ways to farm in an environmentally sustainable way. The demand for certified organic products is increasing quickly, opening opportunities to expand sales of such products and to explore niche markets.

**Employment:** Farming is the main source of employment for rural people. Trends towards specialization and mechanization may increase narrowly measured “efficiency”, but they reduce employment on the land. The welfare costs of unemployment must be taken into account when designing national agricultural support programmes. Sustainable agriculture, with its emphasis on small-scale, labour-intensive activities, helps overcome these problems.

### WAYS OF SUSTAINABLE AGRICULTURE

**Mixed Farming** – Sustaining agricultural productivity depends on quality and availability of natural resources like soil and water. Agricultural growth can be sustained by promoting conservation and sustainable use of these scarce natural resources through appropriate location specific measures. Indian agriculture remains predominantly rain fed covering about 60% of the country's net sown area and accounts for 40% of the total food production. Thus, conservation of natural resources in conjunction with development of rain fed agriculture holds the key to meet burgeoning demands for food grain in the country. Towards this end, National Mission for Sustainable Agriculture (NMSA) has been formulated for enhancing agricultural productivity especially in rain fed areas focusing on integrated farming, water use efficiency, soil health management and synergizing resource conservation. NMSA derives its mandate from Sustainable Agriculture Mission which is one of the eight Missions outlined under National Action Plan on Climate Change (NAPCC).

**Mixed Farming-** Many farmers in tropical 7 temperate countries survive by managing a mix of different crops or animals. The best known form of mixing occurs probably where crop residues

Are used to feed the animal and excreta from animals are used as nutrients for the crop. Other forms of mixing takes place where grazing under fruit tree keeps the grass short or where manure from pigs is used to feed the fish.

Mixed farming exists in many forms depending on external and internal factors .External factors are: Weather patterns, Market Price, Political Stability And technological Development. Internal

Factors relate to Local soil characteristics, composition of family and farmers Ingenuity .Mixed farming provides farmers with a) an opportunity to diversify risk from single-crop production (b) to use labour more efficiently :(c)To have a source of cash for purchasing farm inputs;(d) to add value to crop or crop by product;(e) combining crops and live stocks.

**(e) Multiple cropping** – The process of growing two or more crops in the same piece of land, during the same season is called Multiple cropping .It can be right called a form of polyculture. It can be – (a) Double Cropping (the practice where the second crop is planted after the first has been harvested);(b)Relay Cropping (the practice where a second crop is started along with the first one, before it is harvested).

### CROP ROTATION

The process of growing two or more dissimilar or un related drop in the same piece of land in different seasons is known as Crop Rotation. This process could be adopted as it comes with a series of benefits like – (a) avoid the build-up of pests that often occurs when one species is continuously replenishment of nitrogen through the crop rotation is the replenishment of nitrogen through the use of green manure in sequence with cereals and other crops; (c) crop rotation can also improve soil structure and fertility by alternating deep-rooted and shallow – rooted plants;(d)It is a component of polyculture.

### Present position of Sustainable Agriculture in India-

**National Mission for Sustainable Agriculture:** The total fund requirement assessed for the Mission for the Twelfth Plan Period is ` 1,08,000crore and proposals for ` 13,034 crore have so Far been approved. Given the availability of funds, 15 deliverables are proposed for implementation under the Mission. Some of the important deliverables and targets are given as below

| Mission deliverables | Mission activities | Target for 2013-14    | Target for 2013-17 | Achievement 2013-14 | Achievement 2013-17 |
|----------------------|--------------------|-----------------------|--------------------|---------------------|---------------------|
|                      |                    | percentage in 2013-14 |                    |                     |                     |

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|  |              |       |       |    |  |
|--|--------------|-------|-------|----|--|
| Horticulture                                     | Horticulture | area  |       |    |  |
| Expansion (lakh ha)                              | 11           | 1.2   | 1.04  | 86 |  |
| Seed processing (lakh qtl)                       | 102          | 3.64  | 182   |    |  |
| Agriculture supply chain management (lakh mt.)   | 230          | 45    | 42.93 | 95 |  |
| Livestock & fisheries (fingerling production) mt | 22035037818  | 37132 | 99    |    |  |

### Sustainable Agriculture – Possible Actions in India

Improvement of existing production systems (e.g. altered crop rotations, introduction of green manuring, use of plant species adapted to specific locations)  
Improved protection of natural resources (e.g. erosion protection)  
Increase in efficiency of existing resources (e.g. irrigation, use of technology, basic and advanced training)  
Introduction of regenerative branches of business (e.g. horticulture or aquaculture)  
Introduction of a new production element in existing enterprises (such as fruit trees to stabilize terraced fields, fish-farming in rice fields)  
Optimization of post-harvest systems (e.g. storage)  
Increase the value of agricultural products through further processing (e.g. production of yoghurt from milk)  
Improvement of channels of distribution (e.g. market access, transport)  
Access to loans and other financial services  
Covering risk (e.g. through land law, support of producer groups)

### CONCLUSION

The trajectory of Indian agriculture and its associated environmental problems has brought about recognition that future agricultural growth and productivity will have to occur simultaneously with environmental sustainability. The environmental challenges, especially in terms of land degradation and groundwater depletion, water logging and excessive use of chemical inputs are posing problems for the future of Indian agriculture. To address the problems, policies have laid emphasis on promoting sustainable agriculture including organic farming. Differential approaches and policy instruments, however, will be required to address these problems. The shift from input-intensive to sustainable, particularly organic farming is a difficult task as it involves a number of policy measures dealing with a variety of issues ranging from the transfer of information and technology to the development of markets. Another difficult task, and perhaps more difficult, relates to marginal and small farmers – which comprise a substantial part of Indian agriculture. Although these marginal and small farmers have been considered organic by 'default', severe resource constraints make a shift to the modern sense of organic farming prohibitive

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