

## Sustainable Agriculture: A Review

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### SUMMARY

There are students try to search the matter of sustainable agriculture and ultimately organic farming, this article written to satisfy the various entrance examinations for M.Sc. and Ph.D. students in a systemic manner. This article also discusses the potential for sustainable agriculture to contribute towards sustainable development with a particular focus on renew the natural resources. Agricultural Sector, world over, has experienced an outstanding growth since the mid-twentieth century. The growth, driven by Green Revolution technology, has made a significant dent on aggregate supply of food grains, ensuring food security to the growing population. The existing condition of agriculture and trend of varied indicator shows way forward for Indian agriculture which has become very serious. The new agenda in Indian agriculture should have a aim that explicitly focuses on enhancing agricultural systems and addresses rural development in an integrated manner. The challenge is very tough but feasible.

### INTRODUCTION

The first rule of sustainability is to align with natural forces or at least not try to defy them. Sustainable agriculture contains three main goals- environmental health, economic profitability, and social and economic equity. A spread of philosophies, policies and practices have contributed to those goals. People in many different-different capacities, from farmers to consumers, have shared this vision and contributed therewith. Despite the range of individuals and perspectives, the subsequent themes commonly weave through definitions of sustainable agriculture. Sustainable agriculture has emerged as an alternate agricultural system that addresses many of the constraints faced by resource-poor farmers and at an equivalent time ensures environmental sustainability. Sustainable agricultural development seeks not only to preserve and maintain natural resources, but also to develop them, as future generations would have far more demand quantity-wise and quality-wise for agricultural and food products. Such goals should ensure a balance with the event of livelihoods enjoyed by the individuals concerned. Livelihood shouldn't be restricted to an indicator of sufficient income levels but should also include public health concerns and education standards.

**Remark:** Intergovernmental panel on climate change ( IPCC ) - 1988

### Sustainable Agriculture: Definitions

**According to Food and Agriculture Organization (FAO) :-**

"The management and conservation of the natural resource base, and the orientation of technological and institutional change in such a manner as to ensure the attainment and continued satisfaction of human needs for present and future generations. Such development... conserves land, water, plant and animal genetic resources, is environmentally non-degrading, technically appropriate, economically viable and socially acceptable."

**According American Society of Agronomy:-**

(American Society of Agronomy, 1989. "Decision reached on sustainable agriculture" Agronomy News. January, pg-15, Wisconsin and Madison). "A sustainable agriculture is one that, over the long term, enhances environmental quality and the resource base on which agriculture depends; provides for basic human food and fiber needs; is economically viable; and enhances the quality of life for farmers and society as a whole."

**Remark:** The word "Sustain" from the Latin word - Sustinere: ( Sus- From below and Tenere- To hold )

**Remark:** National Mission for Sustainable Agriculture - 2010

### Why Sustainable Agriculture?

To satisfy demand for low cost food agriculture has developed production methods. While this may produce cheap, palatable food in bulk, it's at the expense of environmental health and nutritional worth. Intensive agriculture results in nutrient depletion, erosion and nutrient escape that pollutes rivers and seas. Also, hillsides

bare of trees with soil compacted by livestock contribute to flooding at the time of extreme rainfall. Recent winter floods in northern England demonstrated this. Intensive production of crops also results in soil compaction meaning more water runs off land faster – another think about flooding. Globally, many everyday food products contribute to the destruction of rain forests, causing pollution and contributing to heating for instance, vegetable oil is found in vegetable oils utilized in many cakes and sweets. Its production can in some cases be liable for the destruction of rain forests especially in Indonesia and Malaysia. Wherever large tracts of land are wont to produce single crops the range of ecosystems is broken. With some pest predators and beneficial insects near more pesticides are needed. Nutrient levels in soil fall, meaning more manufactured fertilizers are applied – which successively pollute watercourses and increase emissions of greenhouse gases. Once we buy our food we must recognise that sustainable farming is best for the local and global environment and our health and seek certified products.

**Remark :** Anderson (1998) used the phrase ‘ Growing the soil to grow crops ’

**Remark :** Masanobu fakuoka gives in 1940 - “ Fakuoka Farming ”, “ Do Nothing Farming ”, “ Natural Farming ”

### An overview of sustainable agricultural practices and system in India

India’s total net sown area is about 141 million ha, and about half of it (68.4 million ha) is net irrigated.

**Table- 1, Systems adopted in India**

S. No.	Systems	Area under the system (million ha)	Scale of adoption (number of farmers in millions)	Geographical spread (number of states)
1.	Agroforestry	25	5>	All
2.	Precision farming	9.2	3	24
3.	Integrated pest management	5	~5	22
4.	System of rice intensification	3	> 3	25
5.	Natural farming	0.7	0.8	3-4
6.	Biodynamic agriculture	0.1	0.1	~ 10
7.	Permaculture	0.05 >	0.01	3-4

**Source:-** Sustainable Agriculture in India 2021: What We Know and How to Scale Up

**Table- 2, Practices adopted in India**

S. No.	Practices	Area under the practices (million ha)	Scale of adoption (number of farmers in millions)	Geographical spread (number of states)
1.	Crop rotation	30	~15	All
2.	Mulching	~20	5>	17
3.	Vermicomposting	3.5	1.5	All
4.	Contour farming	~2	3>	19
5.	Cover crops	1.9	1.5	All
6.	Intercropping	1.0	0.8	All
7.	Floating farming	0	0	1

**Source:-** Sustainable Agriculture in India 2021: What We Know and How to Scale Up

### Barriers to adoption and scaling up of Sustainable Agriculture

#### 1. Lack of knowledge and hand-holding :-

The most prominent challenge farmers face in their adoption is the lack of knowledge and training on these practices adapted to their climatic zones and their available resources.

**2. Lack of safety nets and incentives**

Lack of a safety-net in the starting years makes many farmers hesitant to adopt sustainable agriculture at scale.

**3. Lack of markets for sustainable agriculture products**

The lack of well-functioning markets for both sustainable agricultural inputs and final products is another constraint highlighted across most practices.

**4. Lack of Land-holding**

Approximately 85% of farmers in India come under marginal and small farmers, they do not have the risk ability to convert their farm as an organic to low initial production.

**Remark:** Organic Foods Product Act, 1990.

**Importance of sustainable Agriculture**

The main advantage of sustainable agriculture are ecological balance, low cost of cultivation, clean environment and nutritious food without pesticide residues. Sustainable agriculture frequently encompasses a good range of production practices, including conventional and organic. A regionally integrated system of plant and animal production practices are designed to supply long-term results such as:

- Production of sufficient human food, feed, fiber, and fuel to satisfy the requirements of a sharply enhancing population.
- Keeping of the environment and dissemination of the natural resources supply.
- Sustainment of the economic viability and maintenance of agriculture systems.
- Increase profitable farm income.
- Promote environmental stewardship.
- Enlarge attributes of life for farm families and communities.

**Most Probable Questions from Sustainable Agriculture and Organic Farming**

- Highest certified area under organic farming:- Madhya Pradesh > Maharashtra.
- 100% organic state of India :- 1st state Sikkim , 2nd state Uttarakhand.
- India's first 100% organic union territory :- Lakshadweep
- Organic farming is being practiced in around 187 countries (2019) of the world.
- Global organic area is 72.3 mha (2019).
- Organic area in India is around 2.5 mha including forests.
- The term organic farming was coined by Lord Northbourne in his book entitled 'Look to the Land'.
- The country with most organic agriculture land are Australia (35.7 mha) > Argentina (3.7 million hectares) and Spain (2.4 million hectares).
- National centre for organic farming at Ghaziabad UP.
- India exports 31 organic products.
- Largest organic food market in Asia accounts in Japan.
- "Feed the soil not the plant" slogan for the ecological or eco farming.
- Biodynamic agriculture was given by Rudolf Steiner, 1924.
- International Federation of Organic Agriculture Movements ,IFOAM ( Umbrella organization ) - 1972 ( Bonn Germany).
- The sustainable agriculture movement started in 1981.
- Organic Farming movement began in the year 1930s.
- National Programme for Organic Production - October 2002.
- National Project on Organic Farming by ICAR - 2004.
- National Organic Programme - April, 2000.

- The credit for coining the term Sustainable Agriculture go to Eva Balfour in 1970.
- The logo of “ India Organic ” was released on 26th July, 2002 to support the NPOP.
- Denmark is on its way to becoming the world's 1st 100% organic country.
- U.N.O. has declared 2017 at International Year for Tourism for Sustainable Development.
- India's first Organic Farming University is going to be set up in Gujarat.
- Currently, 1.5% of the world's agriculture land is organic.
- ✓ currently, 1.5 percent of the world's agricultural land is organic. The highest organic shares of the total agricultural land, by region, are in Oceania (9.6 percent) and Europe (3.3 percent; European Union 8.1 percent).
- Switzerland, having the Highest Per capita consumption of organic products.
- 20th Organic world congress, will be takes place from 6-10 september,2021 at Rennes, France.
- International Society for Organic Agriculture Research is situated at: Germany.
- Permanent crops account for seven percent of the organic agricultural land.
- Full form of ECOCERT situated in France (1991) is Ecological certification.
- India produced around certified organic products: 2.75 million MT (2019-20).

## CONCLUSION

The conditions for development of sustainable agriculture are getting more and more favorable. New occasions are opening the eyes of farmers, development workers, researchers and policy creator's. Now the time is to ascertain the potential and importance of those practices not just for their economic interest but also because the basis for further intensification and ecological sustainability.

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