



---

## SUSTAINABILITY OF AGRICULTURE: SOME ISSUES

Meena\*

---

**Abstract:** *In India tremendous agriculture development has been witnessed after the advent of green revolution programme in 1966. These reforms have significantly contributed in enhancing the food grains production and achieving food self sufficiency but the production system is under threat due to declining food productivity and degradation of natural base of agriculture i.e. land and water etc. The present paper attempts to make reflection on the concern of sustainability of agriculture. In addition it elucidates the problems generated by the use of chemical fertilizer and pesticides. The results suggest that there is remarkable increase in food grains production and yield per hectare. But the question is raised, whether this agriculture growth sustainable or not.*

**Keywords:** *Chemical Fertilizers, Green Revolution, Pesticides, Productivity, HYV seeds and Sustainability.*

---

\*Research Scholar, Department of Economics, MD University, Rohtak [Haryana]



## **INTRODUCTION**

In the context of food sufficiency- agricultural sustainability seeks to maximize food production within constraints of profitability. In the developing countries, however, agronomic sustainability is of immediate concern and is looked at as the ability of agricultural land to maintain acceptable levels of production over a long period of time, without degrading the environment. However, the statement was given by Sh. Jawaharlal Nehru (Late Prime Minister of India) that “Everything else can wait, but not agriculture” and this is even true today. On the beginning of new millennium, the challenge before us is to sustain food security and have some surplus for exports to take advantage of the wind of globalization, keeping in view of environmental conservation and conservation of natural resources.(Malhotra, 2003)

During 1960s, there was felt a great need of a strategy that could help the country to become self-sufficient in food grains production. Therefore, the Government adopted the agricultural strategy, “Green Revolution” in mid sixties. It was a package programme since it depended crucially on regular and adequate irrigation, fertilizers, and high yielding varieties of seeds, pesticides and insecticides.

Green revolution gave rise to the use of chemical fertilizers and pesticides. The use of fertilizer was not properly followed. So imbalanced fertilizer use has affected adversely not only the growth of agricultural production, but also damaged the physical and chemical structure of soil. In 1980's the benefit of Green Revolution was seen eroding, with the problem of stagnation, declining yields, water logging, soil salinity, land degradation, contamination and over exploitation of ground water resources. Excessive use of chemical inputs has contaminated surface water and ground water, causing environmental and health hazards.

There was quick rise in food grain production after introduction of Green Revolution. Farmers took it as a miracle and started using fertilizers as an indispensable input for raising agricultural production. But the farmers were more concerned with their private gain and costs, while completely ignoring the social cost of over utilization of land and ground water resources. So the requirement is to go for a new revolution, natural and eco- friendly one, which would be more lucrative in long run. Therefore, the need of sustainable agriculture has been felt.



‘Sustainability’ refers to the capacity to remain productive while maintaining the resource base.

According to Gips 1986, “Agriculture is sustainable if it is ecologically sound, economically viable, socially just, humane and adaptable.”

According to Food and Agriculture Organization (FAO), “Sustainable agriculture is that form of farming which produces sufficient food to meet the needs of the present generation without eroding, the ecological assets and the productivity of the life supporting system of future generations. Sustainable development (in agriculture, forestry and fisheries) conserves land, water, plant and genetic resources and is environmentally non-degrading, technically appropriate, economically viable and socially acceptable” (FAO, 1989).

However, Government of India has also started focusing on the issue of sustainable agriculture since First Five Year Plan. The Government has taken very steps in this regard from time to time. Soil and Water Conservation Programmes were initiated during the First Plan period and they have been progressively intensified over the successive Plan periods. During the First and Second Plan periods, soil conservation works mainly constituted of contour bunding and some afforestation of denuded areas. During the Third and Fourth Plan, a centrally sponsored scheme of soil conservation in catchments of 21 river valley projects was undertaken. From the Fifth Plan onwards, soil and water conservation programmes were taken using a watershed approach. Other measures include the setting up of the All India Soil and Land Use Survey Organization and State Land Use Boards to take an overall view of the land use and conservation problems. The Seventh Plan besides continuing the previous initiatives, laid emphasis on reclamation of alkali soils, control of shifting cultivation and maintenance of the works already completed. Realizing the necessity of community involvement, the Eighth Plan encouraged the participation of people and voluntary organizations in soil conservation measures. The Eighth Plan also stressed the requirement of Integrated Pest Management (IPM) for controlling pests by using less chemical pesticides to reduce environmental pollution.

India’s National Agricultural Policy (NAP) has stressed the importance of management and conservation of resources by stating that, ‘the policy will seek to promote technically sound, economically viable, environmentally non-degrading, and socially acceptable use of country’s natural resources – land, water and genetic endowment to promote sustainable



development of agriculture'. The Central and state governments have also initiated several measures to promote sustainable agricultural development. The NAP stated that improving the quality of land and soil, rational utilization and conservation of water, and sensitizing the farming community to environmental concerns would receive high priority. (GOI, 2000)

The Tenth Five Year Plan (2002-2007) has put emphasis on natural resource management through rainwater harvesting, groundwater recharging measures and controlling groundwater exploitation, watershed development, treatment of waterlogged areas. With regard to application of agricultural inputs like fertilizer and pesticides, the Plan stated that factors such as imbalanced use of nitrogenous (N), phosphatic (P) and potassic (K), increased deficiency of micronutrients and decreased soil organic carbon would be addressed through a holistic agro-environmental approach stressing Integrated Plant Nutrient and Pest Management. Further, the Tenth Plan document recognizes organic farming as a 'thrust area' in the sustainable use and management of resources in agriculture (GOI, 2002).

The Prime Minister Council on Climate Change has approved National Mission for Sustainable Agriculture (NMSA) in September, 2010. The NMSA under the aegis of National Action Plan on Climate Change seeks to address issues related to sustainable agriculture. The NMSA focused on to enhance food security and protection of resources such as land , water, biodiversity and genetic resources by developing strategies to make Indian agriculture more resilient to climate change. The main strategies are: Modifying crop management practices, improving water management, adopting new farm practices such as resource-conserving technologies, crop diversification, improving pest management, making available timely weather-based advisories, crop insurance and harnessing the indigenous technical knowledge of farmers.

Based on the recommendation of the Task Force on Balanced Use of Fertilizer, the new Centrally Sponsored Scheme, National Project on Management of Soil Health and Fertility was formulated in 2008. (Prasad, 2009)

But all the efforts made by State and Central Governments could not add much for sustainability of agriculture.

The effect of green revolution was reflected in cropping system as well as in the food grains production and yield per hectare. Now we discuss the trends in consumption pattern of



chemical fertilizer along with the total food grains production and yield per hectare over the years. This has been shown by the table:

**Table 1**

Years	Consumption of Fertilisers (N+P+K) (lakh tones)	Yield per Hectare (Total Foodgrains) (kg./hectare)	Total Food-grains Production (in million tonnes)
1965-66	7.85	629	72.35
1968-69	17.61	781	94.01
1970-71	21.77	872	108.4
1971-72	26.57	858	105.17
1974-75	25.73	824	99.83
1977-78	42.86	991	126.41
1980-81	55.16	1023	129.59
1983-84	77.10	1162	152.37
1986-87	86.45	1128	143.42
1989-90	115.68	1349	171.04
1990-91	125.46	1380	176.4
1992-93	121.55	1457	179.48
1995-96	138.76	1491	180.42
1998-99	167.98	1627	203.61
2000-01	197.02	1626	196.8
2003-04	167.99	1727	213.19
2004-05	183.98	1652	198.36
2005-06	203.40	1715	208.6
2006-07	216.51	1756	217.3
2007-08	225.70	1860	230.78
2008-09	249.09	1909	234.47
2009-10	264.86	1798	218.1
2010-11	281.22	1930	244.8
2011-12	277.39	2059	259.32

**Source: Ministry of Agriculture, Government of India and Economic Survey of India.**

The table reflects that there is a remarkable increase in the total food grains production and yield per hectare (total food grains). This was the motive behind the implementation of Green Revolution which was need of the time. And it fulfilled the purpose of increasing food grains production successfully. But the question arise that can we enjoy the same fruit of modern technology in future or for a long time. As the dependence on pesticides, insecticides and chemical fertilizer has made the farmers slaves of the intensive agriculture system. Now question of great concern is that “Whether today’s agriculture is modern and scientific or not.”



Today's agriculture is modern and scientific only from the point of industrialists who manufacture pesticides, insecticides and chemical fertilizers.

The so-called 'Modern Scientific' agriculture is neither modern nor scientific. It is senseless exploitation of farmers, consumers and the nature as a whole in Indian context (Venktesha, 2003). Now we discuss the problems which have been created by this modern technique.

## **AGRONOMIC AND ENVIRONMENTAL PROBLEMS**

The advance and scientific technology has created so many agronomic and environment problems:-

- **Poisoning our Food**

An important problem with the use of pesticides in agriculture is poisoning our food grains, fruits and vegetables. At the world level, pesticide residue contained in food above the tolerance level is 1.2%, where as it is 25% in India. Indians' daily intake of pesticide residues in food is among the highest in the world. Although the Government has banned the use of DDT and BHC, these two pesticides constitute more than 40% of total pesticides used in the country. The chemicals used in modern agriculture are polluting our lakes, rivers, underground water and the whole environment (ibid). So, the agriculture land is losing its fertility. Nearly 70% of all pesticides consumed by Indian farmers belong to banned or severely restricted categories in the developed countries. (qtd. in Marothia, 1997)

- **Salinity and Water Logging**

The twin problem of water logging and salinity pose a serious threat to sustainability of agriculture in command areas. Our cultivated area is affected by water logging due to rising groundwater levels. This trend is caused by excessive irrigation from canal water and under utilization of groundwater. Water logging leads to salinity of ground water and soils, causing permanent degradation of land and sharp productivity declines. Water logging, generally, cuts the normal circulation of air, which is essential to the growth of plants and reduces the yields of the crops.(Yedla & Sowjanya, 2007)

- **Soil Erosion**

The permanent loss of soil productivity due to erosion is the worst on a global scale. Accelerated erosion occurs almost every where agriculture is practiced and is irreversible in nature. A large part of the rain fed areas in the country acutely suffers from soil erosion. The main reason for soil erosion is poor land cover and the continuous extension of cultivation



to marginal land in terms of shallow layers of top soils and low organic matters. Several agro-climatic regions under dry land areas are experiencing pronounced rain water run-off that causes soil erosion (Marothia, 1997).

- **Decline in Water Table**

Subsidized canal irrigation and subsidized electricity for tube wells, remuneration output price support, availability of yielding varieties (HYVS) seeds and higher returns encourage the farmers to opt for water intensive crops. Thus ground water has been increasingly more exploited over the period. Due to the increase in well irrigation, there has been a fall in water tables in many areas, especially in the irrigated belt of the indo-gangetic plain and in the arid and semi-arid areas. (ibid)

- **Water Pollution**

Most fresh water used on continuous basis adds 2-3 tonnes of salt per hectare per year, thus it is natural for ground water quality to deteriorate. Human interventions in terms of industrial effluents in irrigation water of deteriorate both ground and surface water. Heavy metal pollution in irrigation also has the additional threat of entering the food chain.

- **Deforestation and Loss of Biodiversity**

Increasing trends and change in land use pattern have resulted in loss in biodiversity. Especially, practices like shifting cultivation essentially involve destruction of forest and it results in tremendous loss of biodiversity. Most of the wild fauna are now being threatened to extinction due to forest depletion and hunting. There is loss of flora and fauna in the environment due to agricultural practice.

## **SUGGESTIONS**

It is true that most of the farmers in our countryside basically practiced traditional farming which is more near to natural farming. It reflects that they have not been influenced directly by the revolution. On the other hand, they are not using the modern technology properly. Therefore traditional farming should be up dated and modernized according to the need of the hour. Some more suggestions can be helpful in this direction, as given below:

- Institutional arrangement play a much greater role in the adaptation of resources conservation technologies where collective action are required for sustainable development of agricultural and others natural resources oriented programs.



- Water saving Devices: - With the scarcity of water for irrigation and others purposes, drip land sprinkler irrigation methods were introduced which became popular in some water use efficiency. The use of such methods should be encouraged.
- Consumer and farmers should be properly educated about the pesticides residue in food grains, vegetables and fruits.
- Public opinion is to be created for forcing eco-friendly symbol on all agricultural goods sold.
- Peoples should buy preferably those goods which are grown in natural farming.
- Research and extension programs are to be organized on sustainable farming.
- Safer pesticides like *Neem* derivatives have to be encouraged. Inter crop, a successful biological pest control method is to be popularized.
- Adjustment/Change e.g. diversification, crop rotations in crop plan must be facilitated in order to achieve a balanced crop-mix to make progress towards profitable and environmentally sustainable production system.

## CONCLUSION

In the present paper we have discussed about “Green Revolution”. Although, this package programmed proved to be fruitful in getting the situation of self-sufficiency in food grains but the use of chemical fertilizer and pesticides have increased tremendously. Later it was noticed that the excessive use of these nutrients is making our environmental assets degrading and poisoning our food. Now the question arise that an agriculture practice, which is degrading our environment, damaging social and natural resources, poisoning our food grains, vegetables & fruits. Can we call it modern and scientific?

## REFERENCES

1. Chand, Ramesh and Pratap S. Brithal (1997), “Pesticide use in Indian Agriculture in Relation to Growth in Area and Production and Technological Change,” *Indian Journal of Agriculture Economics*, Vol. 52, No. 3, July-Sept., pp 488-498
2. Chand, Ramesh and T Haque (1997), “Sustainability of Rice-wheat Crop system in Indo-Gangetic Region,” *Economic and Political Weekly*, Vol. 32, No. 1-13, pp A 26-A 30



3. Government of India (2000), *National Agriculture Policy-2000*, Ministry of agriculture, New Delhi.
4. Government of India (2002), *Tenth Five Year Plan 2002-2007*, Volume-II, Planning Commission, New Delhi
5. Joshi, R.K.(1997), "Rapporteur's Report: Technology and Environmental Management in Agriculture", *Indian Journal of Agricultural Economics*, Vol. 52, No. 3, July-Sept., pp. 673-681
6. Malhotra, Sandeepa (2003), " Agronomic Strategies for Eco- Friendly Sustainable Agricultural Development", in Y. K. Alagh (ed.), *Globalisation and Agricultural Crisis in India*, Deep & Deep Publication, New Delhi
7. Marothia, Danish K.(1997), "Agriculture Technology and Environmental Quality: An Institutional Perspective," *Indian Journal of Agriculture Economics*, Vol. 52, No. 3, July-Sept., pp 472-487
8. Prasad, Chandrashekhar (2009), *Agriculture and Rural Development in India since 1947*, New Century Publication, New Delhi
9. Reddy, V Ratna (1995), "Environmental and Sustainable Agricultural Development, conflicts and contradiction", *Economic and Political Weekly*, March 25, pp A21- A26
10. Venkatesha, H.R. (2003), " Nature-Based Sustainable Farming Versus Consumerist-Oriented Intensive Agriculture" in Y. K. Alagh (ed.), *Globalisation and Agricultural Crisis in India*, Deep & Deep Publication, New Delhi
11. Yadav, D.B. and K.N. Rai(2001), "Perspective and Prospects of Sustainable Agriculture in Haryana", *Indian Journal of Agricultural Economics*, Vol.56, No.1, Jan.- March pp.100-115
12. Yedla, Sudhakar and Sowjanya Peddi (2007), " Agriculture and Environment" in Shovan Ray (ed.), *Handbook of Agriculture in India*, Oxford University Press, New Delhi