

Impact of Fertilizers on the Environmental Sustainability Development and Agriculture**Jyoti Jangra¹ & Hamit Lakra²**

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ABSTRACT

The study is the modest attempt to explain the impact of chemical fertilizers on the natural resource like soil, water, resources. By using secondary data from 1950 to 2012 collected from reserve bank of India. The study shows that as the use of fertilizer increased per hectare yield and the productivity also increased. But on other hand the fertility of soil decreased and the underground water also contaminated simultaneously which never contributes to the sustainable development of the country. Then the study suggested the measures to reduce the degradation of the environment which can be adopted by the govt. for policy making in the direction of sustainable development and also suggests to initiate the organic farming to reduce the use of chemical fertilizers.

KEYWORDS: Sustainable development, environment, chemical fertilizers, organic farming.

Introduction: The organizing principle of human life on a finite planet is sustainable development which reflects the desirable future state for human societies in which living conditions and resource-use meet human needs without distributing the sustainability of natural system so that future generation may also meet their basic needs. The United Nations World Commission on Environment and Development released the report “Our Common Future” in 1987 which commonly named “Brundtland Report” on the name of the chairperson and the prime minister of Norway Gro Harlem Brundtland. The most widely recognized definition of the report is sustainable development is development that meets the needs of the present without compromising the ability of future generation to meet their own needs. There are the emerging sustainable developing challenges which are:-

1. Large scale environmental degradation: The human activities have risen over the time which has resulted as abundant pressure on the local and global resources.
2. Air pollution: Due to the developmental activities of the world countries, air pollution has increased as unhealthy levels. That is why, the capacity of biosphere to absorb the carbon dioxide because of the reliance on the fossil fuels for energy. In the last 50 years the over consumption of fertilizers and consumption of fossil fuels has reduced the fertility of soil.
3. Scarcity of fresh water: There are problems of the availability of the fresh water to the coming generation.
4. Degradation of soil: Nearly 23 percent of all cropland, pasture, forests and woodland have been degraded since 1950's.
5. Destruction of forest: Due to the increasing population, deforestation has increased for the housing purposes.
6. Disappearing biodiversity: Due to the deforestation, several species have disappeared.

Environmental sustainability:

Environmental sustainability is “the ability to maintain things or qualities that are valued in the physical environment where physical environment includes the natural and biological environment”³

The concept of environmental sustainability includes the actions to reduce the use of physical resources, adoption of the recycle approach, use of the renewable resources, reduce

³ Sutton, Philip (2004), a paper presented on the topic “A Perspective on Environmental Sustainability?” p.g no. 1.

the use of toxic materials in the production process and the protection of the natural habitats and the environment. There are the major problems increasing which are harmful for the environment. The problems which compel the human being to take steps for the environmental sustainability are:

- Destruction of the natural habitats' living environment.
- Discharge of the harmful chemicals and other materials into the environment.
- Emission of the green house gases is becoming the major cause of climate change i.e. melting of Himalayan glacier.

These elements have the need to conserve for the coming generation through which the sustainable development can be achieved.⁴ An attempt has been made through the present study to understand the impact of the use of fertilizers on the environment and sustainable development in Indian economy from 1950 to 2012, i.e. before and after the eruption of green revolution. The study is based on the secondary data collected from the Reserve Bank of India, Economic Surveys. The objective of the study is to analyze the impact of chemical fertilizer on the agriculture production and on the environment.

Chemical fertilizer and environment

India has only 2.5 % of the total geographical area of the world but about 17% of the world population. That is why there is considerable pressure on the land for food production. India's population increased from 361 million in 1951 to 1270 million in 2013 which is about three fold increase over 50 years. According to FAO (2003), there are approximately 21% people undernourished in India of the world estimation. The fertility of land during the period of 1950's and before was low which was not comparably satiable to fulfill the need of food grain for the increasing population so there was a need to modify the technique of agriculture through the artificial supplement to the soil like fertilizers and to replace the traditional agriculture with modernized agricultural techniques.

Fertilizer was considered and important tool to stimulate the process of increase in productivity of food grains.

Firstly, fertilizers can be defined as "fertilizers are any organic or inorganic material of natural or synthetic origin that is added to soil to supply one or more plant nutrients essential

⁴ Arora, Guljit K. et. Al (ed.) (2005), "Sustainable Development, Globalisation and Global Governance- Developing Countries Perspective" Sustainable Development-An Interdisciplinary Perspective, p.g-25, Research and Publication House.

to the growth of plants.⁵ To increase the productivity it was the best tool for the agriculture sector. In the year of independence, in 1947, the Macaulay institute of soil research, Scotland was invited to give suggestion to the government of India (GOI) in this context. There were several meeting about the use of fertilizers in India with the other development country like U.K, U.S.A etc. but the impact of the use of the fertilizers was felt by the Indian agriculture with the introduction of high yielding varieties seeds of wheat, rice and other food grains and non-food grain crops during 1966-68, the era of ‘green revolution’.

Table-1**Production of Food grains and Consumption of Fertilizers (Million Tonne)**

| Year | Food grain Production | | | Fertilizers Consumption |
|---------|-----------------------|--------|-------|-------------------------|
| | Wheat | Rice | Total | |
| 1950-51 | 6.46 | 20.58 | 50.8 | 0.06 |
| 1960-61 | 11.0 | 34.58 | 82.0 | 0.2 |
| 1965-66 | 10.40 | 30.59 | 72.3 | 0.8 |
| 1966-67 | 11.39 | 30.44 | 74.2 | 1.1 |
| 1967-68 | 16.54 | 37.61 | 95.0 | 1.5 |
| 1970-71 | 23.83 | 42.22 | 108.4 | 2.2 |
| 1980-81 | 36.31 | 53.63 | 129.6 | 5.3 |
| 1990-91 | 55.14 | 74.29 | 176.4 | 12.5 |
| 1995-96 | 62.10 | 76.98 | 180.4 | 13.9 |
| 2000-01 | 72.77 | 84.98 | 196.8 | 16.7 |
| 2005-06 | 69.35 | 917.9 | 208.6 | 20.3 |
| 2007-08 | 78.57 | 96.69 | 230.8 | 22.5 |
| 2011-12 | 94.88 | 105.30 | 255.3 | 27.5 |

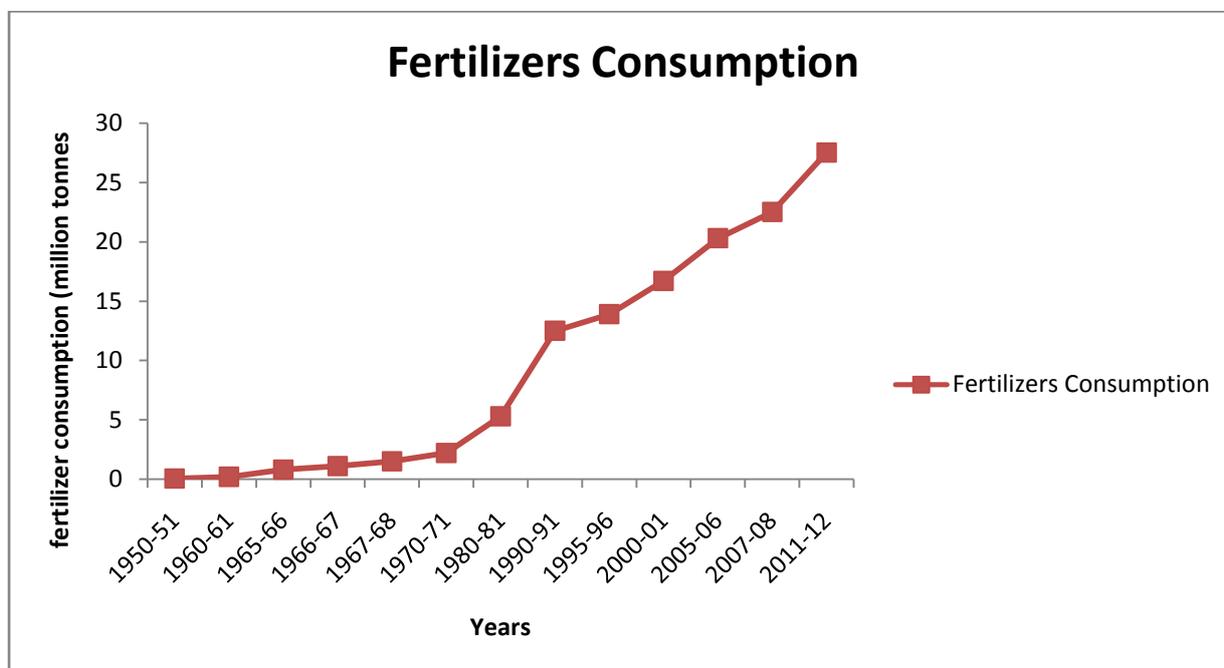
Source: Reserve Bank of India & Economic Survey 2010-11.

Fertilizer consumption almost doubled from 0.8 million ton to 1.5 million tons from 1965-66 to 1967-68 with a tremendous increase in wheat production from 72.3 million ton to 95

⁵ “Glossary of Soil Science Term” Soil science society of America, Retrieved May 10,2011.

million tons. Figure-1 shows the accelerated growth of the consumption of the chemical fertilizers.

Figure-1



Source: Reserve Bank of India & Economic Survey of 2010-11

As can be analysis from the table -1, there is a five –fold increase in food grain production i.e 50.8 million tons to 255.3 million tone.

As the consumption of chemical fertilizer increased after the agriculture production also increase of floodable and non-food grains and non food grains or the cash crops also which contributed much in growth of the Indian economy by contributing a better share in country GDP. But every coin has its two aspects one is positive and other is negative. The positive aspect of the use of fertilizers was the increase in production of food grains and solves the problem of increasing population. But on the other hand, there are several negative impacts of fertilizers on the environment elements like decrease in soil fertility and ground water contamination etc. The popular chemical fertilizers urea produce ammonia emanation which becomes the reason of acid rain, contamination of ground water and the depletion of ozone layer due to release of nitrous oxide by densification process.

“India consumes roughly 22 million tone of NPK nutrients of which N comprises 60% of the total. The average fertilizer consumption in between 105 to 110 kg per hectare although states like Panjab, Haryana and Andhra Pradesh consumes more than 200 kg of nutrients per

hectare. High subsidy on urea is leading to unbalanced use of N, P, K which can be seen through the example of Punjab where the ratio is 20:6:1 and in Haryana 30:9:2 in 2005-06 while the recommended ratio between N,P,K is 4:2:1, which indicates a huge inefficiency in the use of fertilizers.⁶

Suggestions

There is a need to draw attention to the dimension of soil erosion and the need for water-shed management along with a number of social, economic, environmental and institutional indicators (Ritu Khanna, 2005). The degradation of environment has happened due to the use of chemical fertilizers which spoil the soil, water and forest resources to protect the social and cultural values related with the environment (Rajesh k. Jalota et. Al. 2005). To prevent the degradation of environment organic farming is a better technique which can be better cure for the environmental degradation.

Organic farming is a form of agriculture that is relies on the natural techniques to increase the productivity of land, such as crop rotation, green manure, compost and biological pest control. In the organic farming fertilizers and pesticides are used which include herbicide, insecticide and fungicide and considered as natural such as bone meal from animal and pyrethrum from flowers.

The govt. should make such policies for the use of fertilizers in an appropriate ratio which can never harm the fertility of soil.

Conclusion

Fertilizer consumption has increased about 323 times in India during the period from 1950 to 2012, The fertilizers use in the Indian agriculture has low efficiency. The use of fertilizer N not only spoils the ground water but also have profound deleterious effects on the environment by the emission of harmful gases. It is concluded in the study that the chemical fertilizers should be replaced with the natural techniques like organic farming, organic manures which can play a key role of the conservation of the environment.

⁶ The Economic Times, 21 August, 2007.

References

- Arora, Guljit K. ET. Al. ed. (2005), “Sustainable Development, Globalisation and Global governance-Developing Countries Perspective” *Sustainable Development-An Interdisciplinary Perspective*, pg-25, Research & Publishing House.
- Brar,M.S. & N.Kumar (2006), “Effect of Soil & Faliar Applied Potassium & Nitrogen on Yield of Potato in Alluvial Soil of Punjab, India, *Indian Journal of Agriculture & Science*,76, pg-740-743.
- En. Wikipedia.org/wiki/organic_farming.
- “Glossary of Soil Science Term”*Soil Science Society of America*, Retrieved May10, 2011.
- Ghosh, R.N. et.al (1999), “Prospects for the Indian Economy: The 1990s and Beyond” *Sustainable Development Human Resource, Gender &Development*.
- Jaga,P. K. & Yogesh Patel(2012), “An Overview of Fertilizers Consumption in India: Determinants & Vision for 2020-A Review” *International Journal of Scientific Engineering &Technology*, Vol. 1, Issue.6, pg-285-291.
- Prasad,Rajendra (2009), “Efficient Fertilizers Use: The Key to Food Security & Better Environment” *Journal of Tropical Agriculture*, Vol. 47(1-2).
- *The Economic Times*, 21 August, 2007.
- www.sustainablebabysteps.com.
- www.rbi.org.in.