

# Agriculture Sustainability in Maharashtra

(With the reference to the agriculture productivity and use of chemical fertilizers and pesticides.)

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## Abstract:

This research paper has found that relationship between use of chemical fertilizer, pesticide and productivity of agriculture. This paper has analysed the use of chemical fertilizer between region wise and year wise in Maharashtra and evaluation impact on agriculture sustainability.

After the analysis of statistical data, this research paper finds out that farmers are increasing more chemical fertilizers year by year. They use more chemical when falling rainfall and less use a chemical when increase rainfall. But the trend of using chemical fertiliser and pesticide are continuously increasing. So conclude that problem created for agriculture sustainable development From 2010 to 2016, the trend of using pesticide is increasing for farming. In 2012, 8.31 Lakh MT consumption of pesticide was increased 12.2 Lakh MT in 2016-17. But oilseed production decreased from 2010-11 to 2016-17. Therefore create problems of sustainable agriculture development due to increase harmful pesticides for agriculture farming.

The use of toxic pesticides in India has lately been in news in connection with death of farmers and agriculture workers Yavatmal region of Maharashtra. The Centre for Science and Environment (CSE), a non-profit based in New Delhi, has been campaigning for stricter regulation of pesticides and ban on the most toxic pesticides classified as 'Class I' (based on acute toxicity of the active ingredient) by the World Health Organisation. This order bans seven of the 18 Class I pesticides allowed in India, many of which are heavily used.

## Keywords:

Sustainable Agriculture Development, Pesticide, Chemical Fertilizers

## Introduction:

India has 328.7 million hectares of geographical area out of which about 58 per cent is cultivable land. Agriculture is the mainstay of Indian economy because of its high share in employment and livelihood creation notwithstanding its reduced contribution to the nation's GDP. The share of agriculture in the gross domestic product has registered a steady decline from 56.5 percent in 1950-51 to 15 percent in 2013-14. Yet this sector continues to support more than half a billion people providing employment to 55 percent of the workforce. It also contributes 11 percent total export of the country.

The food grain production has reached to 273 million tonnes in 2016 from 50.82 million tonnes in 1950-51. Supply of good grain through agriculture sector for increasingly population of India. It is also an important source of raw material and demand for many industrial products, particularly fertilizers, pesticides, agricultural implements and a variety of consumer goods. Notwithstanding Indian farmer use modern harmful fertilizer, pesticides for farming. The use of chemicals is increasing day by day. Due to excessive use of chemicals, there is a lot of production in the present time but in future the soil fertility will be reducing. Therefore, we should now focus on the sustainable development of agriculture. It is important to study obstacles in the path of sustainable development.

## Objectives of the Research Work:

- 1) To study the impact of agriculture conditions on Sustainable Agriculture Development in Maharashtra.
- 2) To analyse the impact on agriculture productivity to use Chemical Fertilizers in Maharashtra.

- 3) To study the relationships between the use of harmful chemical fertiliser, pesticide and productivity of agriculture.

### **Hypothesis:**

- 1) Problems for sustainable agriculture development due to the use of harmful chemical fertilisers and pesticides for the production of agriculture

### **Research Methodology:**

The present research work is based on secondary data. The data is collected from different websites, published by the Department of Agriculture in Government of Maharashtra, research journals. In order to achieve the objectives of the study, secondary data is collected from the Basic Statistical return of Agriculture Department of Maharashtra Government. The collected data is analysed with the help of various tools and techniques to fulfil the research objectives.

### **Meaning of Sustainable Agriculture Development:**

(Oxford, 1987)

“Sustainable development is development that meets the needs of present without compromising the ability of future generations to meet their own needs”

(Gautam, July 2011)

Sustainable development does not end with the sustainability of just the environmental and resource system but also requires the sustainability of economic and social system.

Like all developmental activities, agricultural practices also affect the environment. Agriculture not only significantly affects the environment, but is also impacted directly by changes in the environment (Tilman et al, 2002)

Apart from the fact that farming activities involve obvious environmental problems, the agricultural sector is the dominant sector in the developing economies. Today the main problem in agriculture pertains to sustainability of resources, and indiscriminate use of chemical fertilisers and pesticides. These problems have led to increasing awareness for moving away from the input-intensive agriculture perused during the green revolution phase, to sustainable farming in different parts of the world.

Sustainable development in agriculture refers a without harming the natural resource base for a future generation, obtaining optimal agriculture production level. In agricultural economics, we use this term also for maintaining the level of Income, Employment, Food and Nutrition for Sustainable agriculture development.

### **Data Analysis:**

A number of factors impact on the agriculture sustainability but the paper focuses on the factors which is powerfully impact on sustainable Agriculture development, such as harmful pesticide and chemical fertilizers etc. below table shows the use of varies fertilizer from 2001-02 to 2016-17.

## Fertilizer Consumption

Year wise /Grade wise fertilizer consumption (Fig. in lakh MT)

Year	Urea	DAP	MOP	NPK	SSP	Others	Total
2001-02	16.48	4.17	2.27	8.70	5.30	0.53	37.45
2002-03	15.62	4.25	2.18	8.79	5.21	0.42	36.47
2003-04	14.02	3.51	1.41	7.91	5.14	0.43	32.42
2004-05	15.41	5.47	2.21	8.71	5.11	0.55	37.46
2005-06	17.34	5.23	2.64	10.62	6.17	0.63	42.63
2006-07	19.85	6.54	2.81	11.72	6.65	0.66	48.23
2007-08	21.31	6.24	3.27	12.09	4.37	0.63	47.91
2008-09	8.52	22.58	4.90	10.13	5.06	0.45	51.64
2009-10	22.89	14.57	6.68	11.06	4.96	0.77	60.93
2010-11	25.38	13.27	6.58	17.22	6.90	0.90	70.25
2011-12	24.81	10.31	3.86	17.00	9.11	0.75	65.84
2012-13	23.32	7.79	3.17	13.18	6.48	0.71	54.65
2013-14	26.15	5.21	3.37	16.03	7.14	0.50	58.40
2014-15	25.72	5.83	4.52	15.16	8.27	0.63	60.13
2015-16	23.00	6.55	3.03	17.57	8.97	0.51	59.63
2016-17	25.45	6.14	3.69	16.70	8.68	0.54	61.20

Table No. 1

Sources:

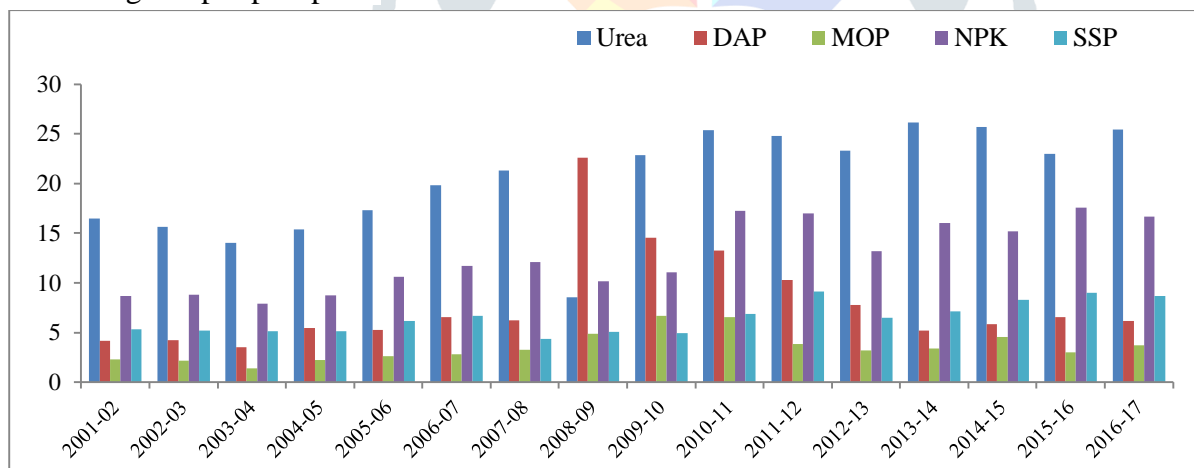
- 1) Department of Agriculture, Government of Maharashtra, Inputs, Fertilizers, General Information of Fertilizers: 2010 to 2010

DAP - Diammonium phosphate

MOP - Muriate of Potash

NPK - Nitrogen (N), Phosphorus (P), and Potassium (K)

SSP - single super phosphate



Graph No. 1

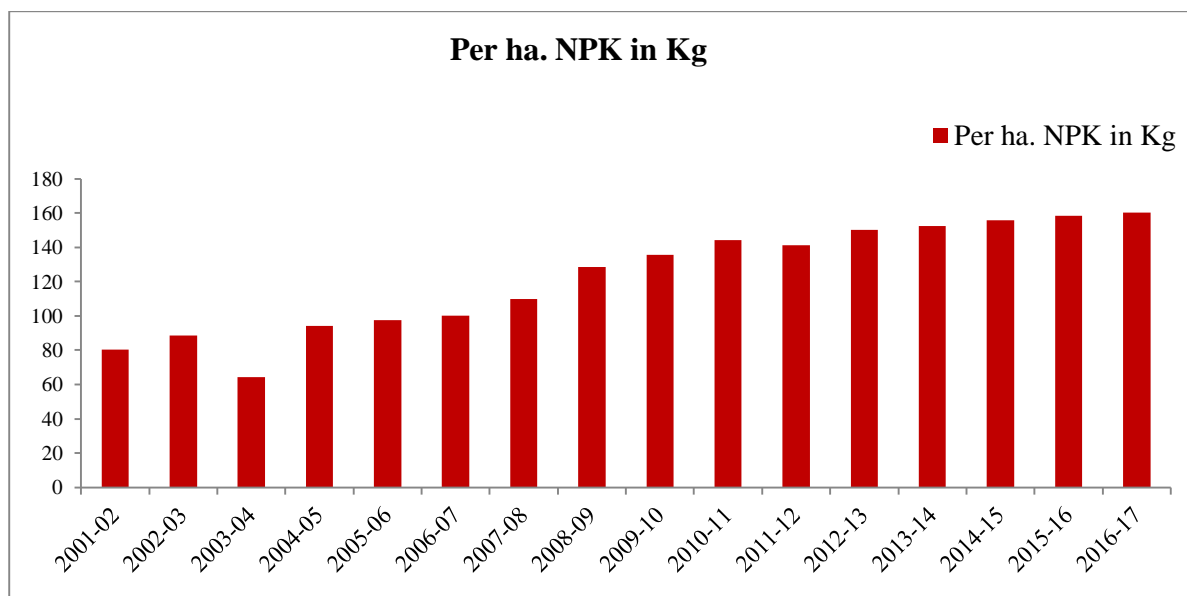
The Consumption of fertilisers has been growing rapidly from a mere 37.45 lakh MT in 2001-02 to 61.20 lakh MT in 2016-17. High rate of use Urea and DPA, Urea is necessary fertilizer for farming, its provide nitrogen, but farmer use more urea than soil requirement.

Trend of per Kg fertilizer consumption (Kg/ha) N P K Kg/ha.

Years	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17
Per ha. NPK in Kg	80.4	88.4	64.3	94.2	97.5	100.2	109.7	128.6	135.8	144.1	141.3	150.1	152.4	155.90	158.50	160.10

Table No. 2

Source: Economic Survey, 2016-17, Agricultural Statistics at a Glance



Graph No. 2

The following conclusions emerge from the fertilizer consumption pattern, over the last 15-16 years.

Consumption of fertilizers in India per hectare in 1950-51 was negligible but increased to 160 kgs in 2016-17. Absence of assured supply of water which is a primary condition for the application of chemical fertilizers is lacking over large parts of the country and this acts as a hindrance to their more rapid consumption in India.

The fertiliser strategy since the ninth plan is oriented towards increasing use of organic manure, both farmyard manure and urban and rural compost. On a rough estimate, over one-third of cow dung is not collected and one third is used as fuel by the villagers, and the amount actually collected and used is about 340 million tonnes. At present, cattle urine which has valuable manorial properties is completely wasted. If cattle urine can be mixed with cow dung, the available manure will be about 400 million tonnes. The provision of alternative fuels to the rural population will help to increase the availability of farmyard manure. Besides, the increasing use of gober gas plants will help in making organic manures available to the cultivator.

There is great scope for the manufacture of compost from urban waste, from forest litter and other waste materials and also for the use of green manures. All these will help in reducing our dependence on chemical fertilisers. In fact, there is growing awareness among farmers of the importance of organic farming.

## Pesticide Consumption

Use of Chemical, use of pesticide and agriculture Production  
from 2010-11 to 2016-17

Year	Use of Pesticide (Lakh.MT)	Total Oilseeds Quintal/ha.	Total Cereals Quintal/ha.	Total Pulses Quintal/ha.	Total Food Grams Quintal/ha.
2010-11	8.31	13.94	13.71	7.67	11.83
2011-12	8.92	12.21	13.78	7.01	11.76
2012-13	10.56	13.98	11.93	7.10	10.44
2013-14	10.96	11.63	14.21	8.05	12.30
2014-15	11.23	5.41	11.50	4.93	9.54
2015-16	11.66	5.16	8.99	4.04	7.43
2016-17	12.20	11.60	14.89	10.52	13.41

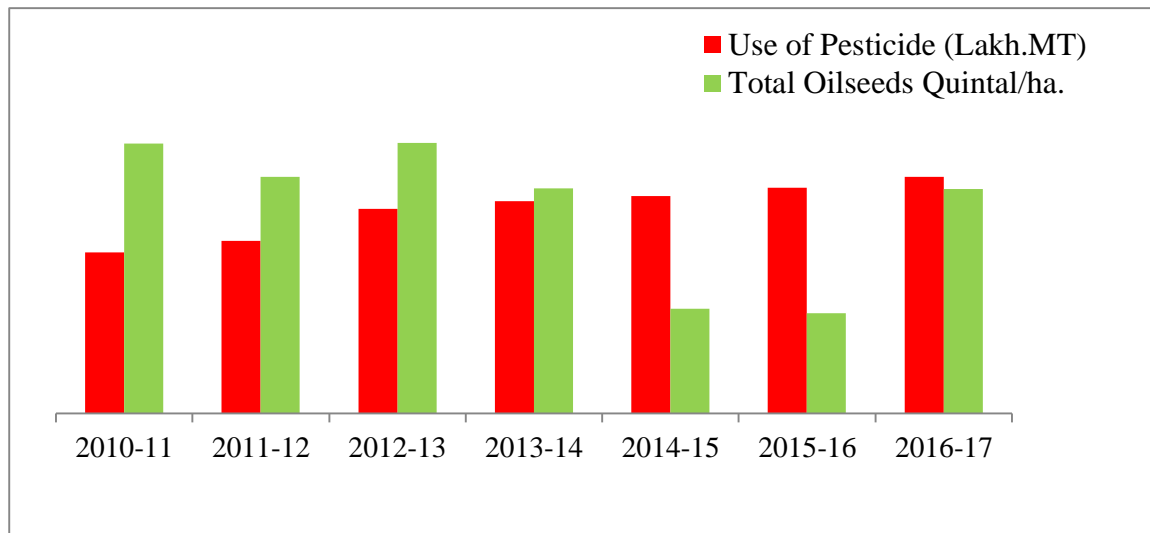
Table No. 3

Sources:

- 1) Department of Agriculture, Government of Maharashtra, Inputs, Fertilizers, General Information of Fertilizers: 2010 to 2010
- 2) Department of Agriculture, Government of Maharashtra, Statistics, Crop Statistics (APY), State Level : 2010 to 2010

Above given data shows the use of Chemical fertilisers, the use of pesticide and agriculture Production etc. We can explain the relationship between Use of Chemical, use of pesticide, and agricultural production, with the help of the below-given column.

**Use of Pesticide (lakh.MT) and Total Oilseeds Production (Quintal/ha.)  
form 2010-11 to 2016-17**



Column Chart: 3

With the help of the table, no.-3 create column graph no.-3. The graphical presentation shows the relationship between the use of pesticide and oilseed cultivation in Maharashtra. 2010-11 the total oilseeds production is 13.94 quintal per hector, and use of pesticide is 8.31 lakh MT. next year oilseeds production is 12.21 quintal per hector and use of pesticide is increase is 8.31 to 8.92 lakh MT. Use of Pesticide increasing from 8.31 to 12.2 lakh MT since 2010-11 to 2016-17.

From 2010 to 2016, the trend of using pesticide is increasing for farming in 2012, 8.31 Lakh MT consumption of pesticide was increased 12.2 Lakh MT in 2016-17. But oilseed production decreased from 2010-11 to 2016-17. Therefore we conclude create problems of sustainable agriculture development due to increase harmful pesticides for agriculture farming. There are no relationship between use of pesticide and agriculture production. Farmer use organic grain for home and they sold toxic grain to Indian market.

### Conclusion:

- 1) Farmers are increasing more chemical fertilizers year by year. They use more chemical when falling rainfall and less use a chemical when increase rainfall. So conclude that problem created for agriculture sustainable development.
- 2) From 2010 to 2016, the trend of using pesticide is increasing for farming. In 2012, 8.31 Lakh MT consumption of pesticide was increased 12.2 Lakh MT in 2016-17. But oilseed production decreased from 2010-11 to 2016-17. Therefore we conclude create problems of sustainable agriculture development due to increasing harmful pesticides for agriculture farming.



The AnupamVerma Committee submitted its recommendations, the Ministry of Agriculture and Farmers' Welfare has finally issued the Pesticides (Prohibition) Order, 2018, banning 18 pesticides. Of these 18, 12 pesticides have been banned from immediate effect (from August 9, 2018) and ban on another six will be implemented from December 31, 2020. The ban applies to registration, import, manufacture, formulation, transport, sale and use of all these pesticides.

The use of toxic pesticides in India has lately been in news in connection with death of farmers and agriculture workers Yavatmal region of Maharashtra. The Centre for Science and Environment (CSE), a non-profit based in New Delhi, has been campaigning for stricter regulation of pesticides and ban on the most toxic pesticides classified as 'Class I' (based on acute toxicity of the active ingredient) by the World Health Organisation. This order bans seven of the 18 Class I pesticides allowed in India, many of which are heavily used. However, there is scope for improvement, the list leaves out two heavily used Class I pesticides: Monocrotophos and Carbofuran.

Monocrotophos is one of the pesticides connected with the death of farmers in Maharashtra in 2017. The situation is grave since 5,000-7,000 people die every year of poisoning due to accidental intake of pesticides in India and Class I pesticides form about one-third of the pesticides consumed in India. As per the International Code of Conduct on Pesticide Management, jointly released by FAO and WHO, "pesticides whose handling and application require the use of personal protective equipment that is uncomfortable, expensive or not readily available should be avoided, especially in the case of small-scale users and farm workers in hot climates". It is impossible to ensure use of personal protective equipment by small-scale farmers and farm workers in India. On this basis itself, Class I pesticides should have been banned in India long ago.

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**Wadgave Venkat Janardhan** has received his M.A. and M.Phil. Degree in the subject Economics from Abasaheb Garware College, Pune. He has qualified SET & NET Examination in Economics. He is doing his Ph.D. Under SRTM University Nanded since 2016. He has been published 14 research papers at International, National & State level conferences. Currently he is working as Assistant Professor in Economics at G.H. Rasoni College of Arts, Commerce and Science College Wagholi, Pune. He has 8 years teaching experience.

