

## TRENDS IN CONSUMPTION OF PESTICIDES IN INDIA AND TELANGANA

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### ABSTRACT

The green revolution was made possible only through the supply of agri inputs viz., seeds, fertilizers and pesticides provided by the industry. In order to meet the food grain requirement for the increasing population, there must be intensive agriculture with judicious use of inputs like fertilizers, pesticides, seeds, irrigation etc. Because of high yielding varieties the pest attack has increased and to get the proper yield the usage of pesticide also increased. The present study was conducted based on secondary data. The results revealed that Compound annual growth rate of pesticide consumption in India was 1.9 with level of significance at 1 per cent whereas Compound Annual Growth Rate of pesticide consumption in Telangana was 2.9 with level of significance at 1 per cent.

**KEYWORDS:** Green Revolution, Pesticides, Inputs, Increased, Agriculture

### INTRODUCTION

Indian economy is largely agrarian in nature, which is contributing about one fifth of the total GDP. The occupation of nearly 58 per cent of the population is agriculture. In the modern world, inter dependence of agriculture and industry is a well-known fact. The green revolution was made possible only through the supply of agri inputs viz., seeds, fertilizers and pesticides provided by the industry. Agriculture development in the 21<sup>st</sup> century faces some unprecedented challenges with a steady growth in the world population. The population in India is expected to reach 1329 million in 2020 (Indiastat.com, 2014). In order to meet the food grain requirement for the increasing population, there must be intensive agriculture with judicious use of inputs like fertilizers, pesticides, seeds, irrigation etc. The pesticide usage in India has increased from green revolution period in India. Because of high yielding varieties the pest attack has increased and to get the proper yield the usage of pesticide also increased. Even though the usage is more in India we are still at very low level of usage in comparison to many countries.

The Indian crop protection industry is estimated to be USD 4.25 billion in FY14 and is expected to grow at a CAGR of 12% to reach USD 7.5 billion by FY19. Exports currently constitute almost 50% of Indian crop protection industry and are expected to grow at a CAGR of 16% to reach USD 4.2 billion by FY19, resulting in 60% share in Indian crop protection industry. Domestic market on the other hand would grow at 8% CAGR, as it is predominantly monsoon dependent, to reach USD 3.3 billion by FY19. Globally, India is fourth largest producer of crop protection chemicals, after United States, Japan and China. The crop protection companies in India can be categorized into three types Multi-National, Indian including public sector companies and small sector units. The demand for pesticide use reported that most of farmers declared that they asked for information or instructions related to pesticide use and pest prevention from retailers (72.5 per cent) and over half of them (52.5 per cent) sold their pesticide empty packages (Khai, 2014). 95.3 per cent of farmers used chemical pesticides in their vegetable crops (Sharma *et al.*, 2014).

## METHODOLOGY

The data relating to usage of pesticides information was collected from Agriculture Commissioner ate office, Hyderabad, journals, websites and other relevant reports.

### Compound Annual Growth Rate

A trend analysis has been employed to analyze the data for India, Telangana. Compound growth rates were estimated to study the trends in growth of pesticide consumption in India, Telangana. The data has been collected for a period of ten years *i.e.*, from 2001-02 to 2014-2015.

The compound growth rates were calculated as follows:

$$Y = ab^t$$

$$\log y = \log a + t \times \log b$$

Where,

t = base period in number of years (1, 2, 3....n)

y = number of tractors

$$b = (1 + r)$$

r = compound growth rate

a = constant

In log form b was calculated by using the formula,

$$\log b = \frac{\sum t \times \log y - (\sum t \times \sum \log \frac{y}{n})}{\frac{\sum t^2 - (\sum t)^2}{n}}$$

Where,

n = number of years

The per cent of compound growth rate is,

$$[(\text{Anti log of } b) - 1] \times 100$$

The standard error of growth rate (SEr) was estimated by using the following formula.

$$SEr = \frac{\log b}{\log e} \sqrt{\frac{\frac{\sum (\log y)^2 - (\sum \log y)^2}{n} - (\log y)^2 \sum T^2}{(n-2) \sum T^2}}$$

Where,

$$T = t - t$$

The student 't' test was used to test the significance of growth rates.

$$T = \frac{r}{SE(r)}$$

## RESULTS AND DISCUSSIONS

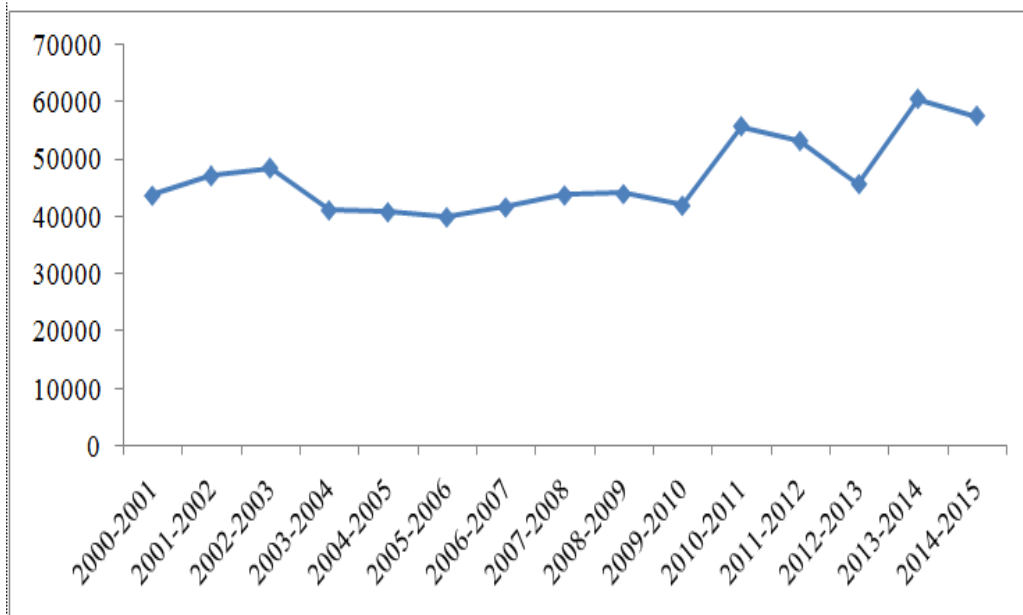
### Trend in Pesticide Consumption in India

The pesticide consumption in India in 2000-01 was 43584 metric tonnes. In 2001-02 the consumption increased to 47020 metric tonnes *i.e.*, 7.88 per cent increase over the previous year. In 2002-03 consumption has increased to 48350 metric tonnes *i.e.*, 2.82 per cent increase over 2001-02. There was a decrease in the pesticide consumption in India from 2004 to 2006. The per cent decreases were 15.1, 0.84 and 2.21 respectively and the consumption of pesticides were 41020, 40672 and 39773 metric tonnes respectively. In 2006-07 the consumption had increased by 4.37 per cent and it was 41515 metric tonnes, this increase continued up to 2009, in 2007-08 the consumption was 43630 metric tonnes and per cent increase was 5.09 and in 2008-09 the consumption was 43860 metric tonnes and per cent increase was 0.52. With 4.6 per cent decrease the pesticide consumption of India in 2009-10 was 41822 metric tonnes. There was huge increase in the pesticide consumption in 2010-11 with 32.8 per cent increase and the consumption was 55540 metric tonnes. In 2012 and 2013 the pesticide consumption decreased by 5.5 per cent and 13 per cent respectively and pesticide consumption in these years was 52479 metric tonnes and 45619 metric tonnes respectively. There was a very huge increase in the pesticide consumption in India in 2013-14; pesticide consumption was 60282 metric tonnes. The per cent change over previous year was 32.1 per cent. In 2014-15 pesticide consumption decreased by 4.8 per cent and consumption was 57353 metric tonnes.

**Table 1: Pesticide Consumption in India (2000-2015)**

Sl. No	Year	Pesticide Consumption (Metric Tonnes)	Per Cent Change Over Previous Year
1	2000-01	43584	
2	2001-02	47020	7.88
3	2002-03	48350	2.82
4	2003-04	41020	-15.1
5	2004-05	40672	-0.84
6	2005-06	39773	-2.21
7	2006-07	41515	4.37
8	2007-08	43630	5.09
9	2008-09	43860	0.52
10	2009-10	41822	-4.6
11	2010-11	55540	32.8
12	2011-12	52479	-5.51
13	2012-13	45619	-13.0
14	2013-14	60282	32.14
15	2014-15	57353	-4.85

(Source: Ministry of Agriculture, Government of India, 2015)



(Source: Ministry of Agriculture, Government of India, 2015)

**Figure 1: Pesticide Consumption in India (2000-2015)**

Compound annual growth rate of pesticide consumption in India was 1.9 with level of significance at 1 per cent. That implies positive trend in pesticide consumption in India and that was significant. Percentage change in 2015 over 2001 was 24 per cent.

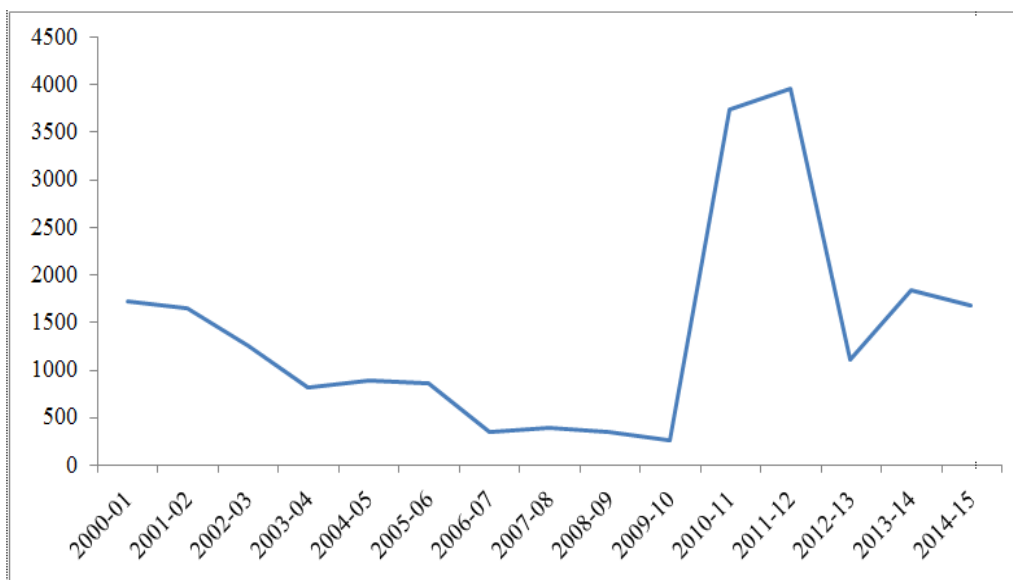
### **Pesticide Consumption in Telangana**

Pesticide consumption of Telangana in 2000-01 was 1715 metric tonnes. In 2001-2002 it has decreased to 1650 metric tonnes and per cent decrease when compared to previous year was 3.7 per cent. This decrease continued up to 2003-04. In 2002-03 the consumption was 1257 metric tonnes and per cent decrease was 23.81 per cent. In 2003-04 the pesticide consumption was 818 metric tonnes and per cent decrease was 34.9. In 2004-05 consumption has increased to 880 metric tonnes and per cent change was 7.57 per cent. Again in 2005-06 and 2006-07 decrease has been noticed in pesticide consumption and it was 863 metric tonnes and 344 metric tonnes respectively. The per cent change in the pesticide consumption was 1.9 per cent and 60.1 per cent respectively. In 2007-08 consumption increased to 385 metric tonnes and per cent change also increased to 11.9 when compared to previous year. In 2008-09 and 2009-10 again the consumption of pesticide decreased to 354 metric tonnes and 260 metric tonnes respectively and per cent change was 8 per cent and 26.5 per cent respectively. In 2010-11 and 2011-12 pesticide consumption is very high increase in Telangana can be noticed. In 2010-11 the consumption was 3724 metric tonnes and per cent increase from previous year was 1332.3. 2011-12 pesticide consumption was 3947 metric tonnes and per cent change from previous year was 5.9 per cent. In 2012-13 pesticide consumption of Telangana decreased to 1107 metric tonnes and per cent change from previous year was 71.9. 2013-14 pesticide consumption was 1828 metric tonnes and per cent increased from previous year was 65.1 increases. 1674 metric tonnes was the pesticide consumption of Telangana in 2014-15 and there was a decrease in percentage compare to previous year by 8.4 per cent.

**Table 2: Pesticide Consumption in Telangana (2000-2015)**

Sl. No	Year	Pesticide Consumption (Metric Tonnes)	Per Cent Change Over Previous Year
1	2000-01	1715	
2	2001-02	1650	-3.79
3	2002-03	1257	-23.8
4	2003-04	818	-34.9
5	2004-05	880	7.57
6	2005-06	863	-1.9
7	2006-07	344	-60.1
8	2007-08	385	11.9
9	2008-09	354	-8.05
10	2009-10	260	-26.5
11	2010-11	3724	1332.3
12	2011-12	3947	5.98
13	2012-13	1107	-71.9
14	2013-14	1828	65.1
15	2014-15	1674	-8.4

(Source: Ministry of Agriculture, Government of India, 2015)



(Source: Ministry of Agriculture, Government of India, 2015)

**Figure 2: Pesticide Consumption in Telangana (2000-2015)**

Compound Annual Growth Rate of pesticide consumption in Telangana was 2.9 with level of significance at 1 per cent. That implies positive trend in pesticide consumption in Telangana and that was significant. Percentage change in 2015 over 2001 was 18 per cent.

**CONCLUSIONS**

From the study it was conclude that the Compound annual growth rate of pesticide consumption in India was 1.9 with level of significance at 1 per cent. That implies positive trend in pesticide consumption in India and that was significant. Percentage change in 2015 over 2001 was 24 per cent. Compound Annual Growth Rate of pesticide consumption in Telangana was 2.9 with level of significance at 1 per cent. That implies positive trend in pesticide consumption in Telangana and that was significant. Percentage change in 2015 over 2001 was 18 per cent.

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