

## World Trade Organization and its Impact on Indian Agriculture Sector

**Vijay Kumar**

Research Fellow,  
Rajeev Gandhi National Fellow,  
Dept. of Applied Economics,  
University of Lucknow

**Abstract:** Agriculture is very important element in Indian economy as it provides 54.6 per cent employment to the workforce according to census 2011 and also accounted 13.7 per cent to the GDP in 2013 collectively agriculture and allied sector. Food and Agriculture organization of United Nations (FAO) data of 2010 for world agriculture statistics shows India as a largest producer of vegetables, fresh fruits, spices, fresh meats, Jute, millets, castor oil seed etc. and also the second or third largest producer of dry fruits, roots and tuber crops, eggs, pulses, farmed fish, sugarcane, coconut, cotton and coffee etc. In the following research study secondary data have been used which is collected from ministry of Agriculture through various annual reports, publications, books etc. and for the analysis some statistical tools used such as percentage growth, standard deviation, etc.

**Keywords:** Agriculture, Food Production, % Growth, WTO, Economic growth etc.

### Introduction

Indian agriculture shows various fluctuations in case of growth in agriculture GDP. It declined from 5 per cent in 2011. 12 to 1.4 per cent in 2012 - 3 but provisional estimated value for the year 2013 - 14 shows 4.7 per cent growth rate in agriculture GDP. Agriculture share in total GDP also declined, it was 14.7 % in 2010 - 11, which decreased in next year 2011 - 12 up to 14.4 % but in 2012 - 13 it achieved negative growth up to 13.9 % and the provisional estimated value for 2013 - 14 it was 13.9 %. In case of Number of Cultivator it is declined in India in recent years, according to

census 2001, the number of cultivator was around 127.3 million but Census data 2011 shows a decline up to 118.7 million which is showing the shifting of employment from farm to non-farm employment.

In India, Agriculture is primarily a subject to state government and state government is mainly responsible for increasing its production and solve out the problem or obstacle so that agriculture sector can growth better and the central government helps state government through various its schemes, plans and policies.

**Table: Indian Agriculture Performance in recent years**

		( per cent value)				
Sl. No.	Item	2009-10	2010-11	2011-12	2012-13	2013-14
1.	Growth in agri GDP	0.8	8.6	5	1.4	4.7*
	Share in total GDP	14.6	14.6	14.4	13.9	13.9*
	Of which, Agriculture	12.3	12.4	12.3	11.8	NA
2.	Share in total GCF	7.3	6.3	7.0	7.1	NA
	Of which, Agriculture	6.7	5.8	6.5	6.5	
3.	GCF as % of agri GDP	20.1	18.5	20.8	21.2	NA
	Of which, Private sector	16.7	15.7	18.0	18.1	
4.	Agri export (incl marine products) as % of total exports	8.2	8.0	10.1	11.8	11.9 (P)

**Source:** Central Statistics Office (CSO) and Directorate General of Commercial Intelligence and Statistics (DGCI&S).

**Notes:** \*Quarterly Estimates of GDP as of 30 May 2014; NA - Not Available; GCF-gross capital formation; P-provisional.

**Growth Rates of Principle Crops** - Some of the major changes occur in the field of Area, Production and Yield during last few decades such as -

**Rice** - Following Data shows that Area of Rice (% per annum) has been decreased from 0.41 % in 1980 to 0.00 % in 2014. Production of Rice decreased from 3.62 % per annum in 1980-81 to 1.82 % per annum in 2000-01 to 2013-

14 and Yield of Rice also decreased from 13.9 per cent in 1980-90 to 1.82 per cent in 2000-14.

**Wheat** - Data shows that Area of Wheat (% per annum) has a tremendous growth rate in the from 0.46 % per annum in 1980-90 to 1.35 % in 2000-2014. But Production of Wheat decreased from 3.57 % per annum in 1980-81 to 1989-90 to 2.65 % per annum in 2000-01 to 2013-14 and Yield of Wheat also decreased from 3.10% in 1980-90 to 1.29 % in 2000-14.

**Coarse cereals**-Area of Coarse Cereals got a positive growth (0.2%) which was negative earlier in 1980-90, Production level increased from 0.40 % in 1980-90 to 2.96 % per annum in 2000 – 14. Yield has achieved a growth level from 1.62 % in 1980 – 90, 1.82 % in 1990 – 2000 and 2.70 per cent in 2000-14.

**Pulses** – The growth rate of Area in case of pulses has achieved positive growth rate from the negative growth rate which was -0.09 % in 180-90 and 1059 % per annum in 2000-14. Production has increased from 1052 % per annum in 1980 to 3.72 % in 2014.

**Sugarcane** - The growth rate of Sugarcane Area was 1.44 % per annum during 1980 – 90 which was later in negative -0.07 % per annum during 1990 to 2000 but in the 2000 to 2014 it achieved a positive growth rate of 1.34 per cent per annum but Production of sugarcane has been decreased from

2.70 % per annum during 1980 – 90 later which was almost same 2.73 % per annum during 1990 to 2000 but during 2000 to 2014 it is still negative with 2.10 per annum.

**Nine Oilseeds** - Data shows that Area of Oilseeds has a negative growth rate in the from 1.51 % per annum in 1980-90 to 0.86 % in 1990 – 2000 and later on in during the year of 2000 – 2014 it was achieved positive growth rate which was 2035 % per annum. But Production of Wheat decreased from 5.20 % per annum in 1980-81 to 1.15 % in 1989-90 but it was 4.71 % per annum in 2000-01 to 2013-14 and Yield of Oilseeds also decreased from 2.43 % in 1980-90 to 2.31 per cent in 2000-14.

**Cotton** -Growth rate of Cotton Area achieved a positive growth rate after 1980.It was -1.25 % per annum during 1980 – 90 which was later in positive 2.71 % per annum during 1990 to 2000 and during the year of 2000 to 2014 it achieved a tremendous positive growth rate of 3.22 per cent per annum. Production of sugarcane was almost same in the decades of 80's and 90's 2.80 % per annum during 1980 – 90 and 2.71 % in 1990 – 2000 but during the year of 2000 – 2014 it achieved a high growth rate up to 13.53 % per annum, Yield of Cotton decreased from 4.10 % in 1980-90 to -0.41 % in 1990 – 2000 but later on it also achieved high growth rate of 9.99 % per annum during the year of 2000 – 2014.

**Table: Aggregate Growth Rates of Principle crops (Area, Production, and Yield) during 1980-81 to 1989-90, 1990-91 to 1999-2000**

*A - Growth rate of area, P – Growth rate of production, Y – Growth rate of Yield (% per annum)*

Crop	(Base: TE 1981-82=100)			(Base: TE 1993-94=100)			(Base: TE 1993-94=100)		
	1980-81 to 1989-90			1990-91 to 1999-2000			2000-01 to 2013-14		
	A	P	Y	A	P	Y	A	P	Y
Rice	0.41	3.62	3.19	0.68	2.02	1.34	0.00	1.82	1.82
Wheat	0.46	3.57	3.10	1.72	3.57	1.84	1.35	2.65	1.29
Coarse Cereals	-1.34	0.40	1.62	-2.12	-0.02	1.82	0.25	2.96	2.70
Pulses	-0.09	1.52	1.61	-0.60	0.59	0.93	1.59	3.72	2.10
Sugarcane	1.44	2.70	1.24	-0.07	2.73	1.05	1.34	2.10	0.75
Nine Oilseeds	1.51	5.20	2.43	0.86	1.63	1.15	2.35	4.71	2.31
Cotton	-1.25	2.80	4.10	2.71	2.29	-0.41	3.22	13.53	9.99

*Source: Department of Agriculture and Cooperation.*

**Note:** TE – Triennium Ending, Nine Oilseeds includes, Soya bean, sesamum, groundnut, Niger seed, safflower, rapeseed and mustard, sunflower, linseed, castor seed as per 2<sup>nd</sup> AE (Advance Estimation) (Base: TE 1981-82=100), and for 2000-01 to 2013-14 (Base: TE 1993-94=100)

**World Trade Organization** - World Trade Organization (WTO) is an International organization for the Trade opening at global level; a platform for the member countries for the negotiation of Trade agreements; a forum to settle all the trade disputes with rule and regulation; an international body to maintain a system regarding rule and regulation of International Trade etc. Thus WTO is an International body of Trade regulation at global level. The working of WTO is based on the negotiation decision which has been taken in its

ministerial conferences. At International level every country have to face trade barriers which may be of any type. WTO works to remove these trade barriers for free smooth of International trade but sometime it also maintain such tariff barriers to protect consumer or to prevent of various spreadable disease which can be harmful for other member countries. Negotiations are the backbone of working of WTO because negotiation signed by any member country is the acceptance by those countries that they will follow all the rule and

regulations which is mentioned in negotiation. Negotiation is the legal acceptance for smooth flow of International Trade. It is a type of contract at which its member countries are ready for their international issues regarding trade and developments. This negotiation helps all the exporters, importers, producers of goods and services for the smooth flow of their business.

### Literature of Review

**Bhagwati and Srinivasan (1975)** - Bhagwati and Srinivasan also tried to understand the India's foreign trade regime with special focuses on government policy for domestic support and objectives, so that they can assess the efficiency and growth of India's foreign trade during 1951-70. They give following conclusion in his study (i) *Government is focusing more on import substitution policy* (ii) *Government is not focusing on export promotion* (iii) *Due to more emphasis on import substitution policy, export performance is going down.* Thus according to his study, apart from import substitution government should focuses on export sector through various export promotion policy so that the amount of fiscal deficit can be decrease and export can get its maximum level.

**Dhindsa (1981)** – Dhindsa in his study, analyzed the trend of some major commodities which are traditional in nature and exported from a long time from India such as Jute, Cotton, tea etc. He examined that why there is a slowdown in these commodity export specially in those country which are importing it from a long time period and he gave some conclusion for this slow down like (i) Increasing in the profitability ratio of domestic sales, (ii) Government tax policy so that heavy tax on these major export commodity, (iii) Low level of production & productivity of such commodities (iv) Higher level of cost of production etc. So that all were these major factor which ultimately gives stiff competition to these commodities in international market from there substitute products.

**Kathuria (1996)** - Various other study shows that the government policy for import substitution was the main factor the decrease in export and thus various schemes for the export promotion has been adopted by the government to increase the share of India's export at world level and thus through this step domestic market also protected and the export of traditional goods increased.

**Greenaway et al., (1999)** – His study also describe the relationship between trade and economic growth of the country also focuses on the importance of trade. According to him, Trade is an engine for better economic growth.

**Mukhpadhay (2001)** – He analyze the impact of Uruguay round of WTO on India and concluded that for India it is not beneficial. India only gain little bit from Uruguay round of WTO.

**Nanda and Raikhy (2003)** –They studied the labor and environmental law and agreement made by World Trade Organization for the export of Agriculture, Textile, Readymade garments export. They also analyze the pattern and trend of India's textile and agriculture export and concluded that European country is the main source for the export of India.

Although developed country have various norms and standard for export these product but still India do not have any change to refuse it and India have to maintain the standard of World Trade Organization.

**Chakraborty and Singh (2006)** –They took agricultural subsidy as a main factor for the increase and decrease of agriculture trade. They concluded that subsidy on agriculture is favorable for developed country but for developing country it works as a hurdle for free trade of agricultural product so they are not favorable negotiation. According to him negotiations

should be in such a way which can be beneficial for developing country also.

**M. Ramesh, M. Chandrayya and M. Sankara (2009)** – According to their point of view, WTO has a direct and indirect relationship with various sectors of Indian economics. Indian agriculture sector affected so much from the WTO. WTO also have its impact on Indian former because they are directly associated with agriculture and their livelihood depends on

agriculture sector so they affected so much by government policy to subsidies agriculture and also from the policy of WTO. There is also a very big challenge for the Indian government to protect these former on agriculture sector from the side effects of WTO and also a big task to

improve its competitiveness for the international market because after economic reform and adoption of LPG India is getting a tough competition from foreign companies therefore government is trying to make more favorable policy such as market policy, agriculture policy to make former more capable for the production. There are various institutions which provide financial help, training to the former for better agriculture growth.

**Research Objective:** This research objective for the following research study are mentioned

below :

1. To analyse the Food production in India.
2. To analyse the Minimum and Maximum Level of agriculture production growth in India.
3. To analyse the percentage growth of food production both in Pre and Post WTO regime in India.

4. To analyse whether WTO made positive or negative impact on Indian Agriculture Sector.

#### Research Methodology

Data used in this research is of statistical in nature and have been collected from the secondary sources such as various reports and article from the Ministry of Agriculture and Reserve Bank of India website. Time period used is of 33 years from 1980 to 2013 and this time period is divided in two time period i.e. Pre WTO and Post WTO, Period I (Pre WTO) which is of 15 year from 1980 to 1995 and Period II (Post WTO) which is of 18 years from 1995-2013. In the following research some basic statistics tool such as standard deviation and mean growth rate in percentage have been used and researcher also tried to find out minimum and maximum level of agriculture production in both pre and post WTO time period.

#### Analysis of the Data

##### Production of Food Grain and Major Non-Food Grain Crops in Whole India

##### Production of Rice in Whole India

From Table- 1.1, it may be observed that for Pre-WTO 15 years, the minimum, maximum and range of Production of Rice (in thousand tonnes) in Whole India is 47115.80, 81814.00 and 34698.20 respectively. Further mean and standard deviation of Production of Rice (in thousand tonnes) in Whole India is 65445.6000 and 10697.94215 respectively. And mean growth rate of Production of Rice (in thousand tonnes) in Whole India for Pre-WTO 15 years is 3.576752 %.

From Table-1.1, it may be observed that for Post-WTO 18 years, the minimum, maximum and range of Production of Rice (in thousand tonnes) in Whole India is 71820.20, 104398.70 and 32578.50 respectively. Further mean and standard deviation of Production of Rice (in thousand tonnes) in Whole India is 89645.8389 and 8797.21286 respectively. And mean growth rate of Production of Rice (in thousand tonnes) in Whole India for Post-WTO 18 years is 2.290684 %.

**Table-1.1; Production of Rice in Whole India**

Production of Rice (in thousand tonnes) in Whole India							
Period	No. of Years	Minimum	Maximum	Range	Mean	Standard Deviation	Mean Growth Rate in %
1980-81 to 1994-95	15	47115.80	81814.00	34698.20	65445.6000	10697.94215	3.576752
1995-96 to 2012-13	18	71820.20	104398.70	32578.50	89645.8389	8797.21286	2.290684

#### Production of Wheat in Whole India

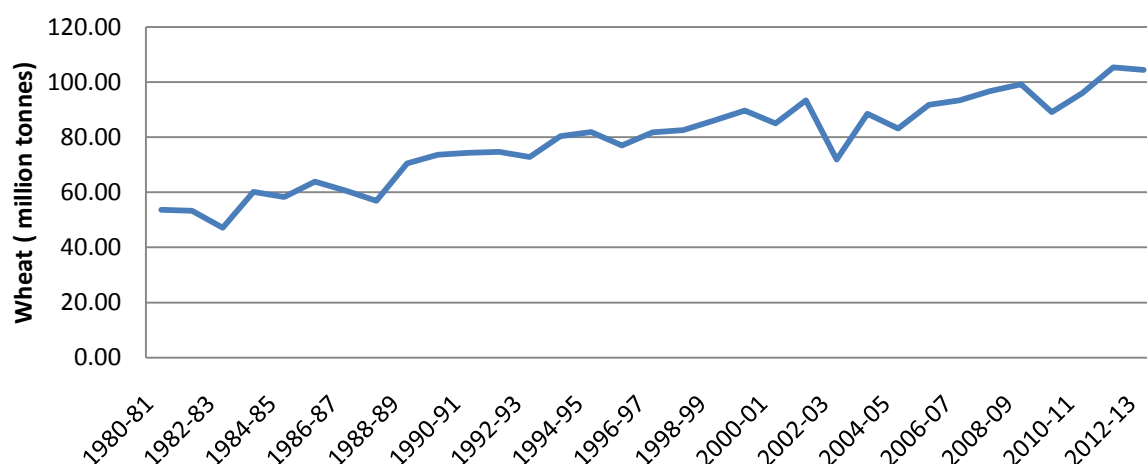
From Table-1.2, it may be observed that for Pre-WTO 15 years, the minimum, maximum and range of Production of Wheat (in thousand tonnes) in Whole India is 36312.60, 65767.40 and 29454.80 respectively. Further mean and standard deviation of Production of Wheat (in thousand tonnes) in Whole India is 49416.6000 and 8349.25347 respectively. And mean growth rate of Production of Wheat (in thousand tonnes) in Whole India for Pre-WTO 15 years is 4.562571 %.

From Table-1.2, it may be observed that for Post-WTO 18 years, the minimum, maximum and range of Production of Wheat (in thousand tonnes) in Whole India is 62097.40, 93903.60 and 31806.20 respectively. Further mean and standard deviation of Production of Wheat (in thousand tonnes) in Whole India is 75161.3944 and 8976.97850 respectively. And mean growth rate of Production of Wheat (in thousand tonnes) in Whole India for Post-WTO 18 years is 2.57128 %.

**Table-1.2; Production of Wheat in Whole India**

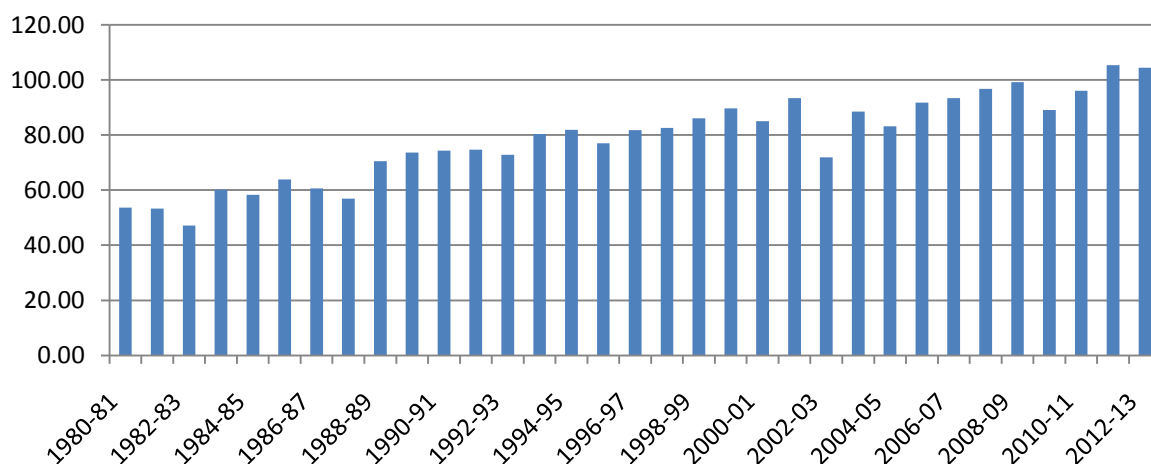
Production of Wheat (in thousand tonnes) in Whole India							
Period	No. of Years	Minimum	Maximum	Range	Mean	Standard Deviation	Mean Growth Rate in %
1980-81 to 1994-95	15	36312.60	65767.40	29454.80	49416.6000	8349.25347	4.562571
1995-96 to 2012-13	18	62097.40	93903.60	31806.20	75161.3944	8976.97850	2.57128

**Table: Production of Wheat in India, 1980-2013**



Source: Ministry of Agriculture, Government of India.

**Wheat in Million tonnes**



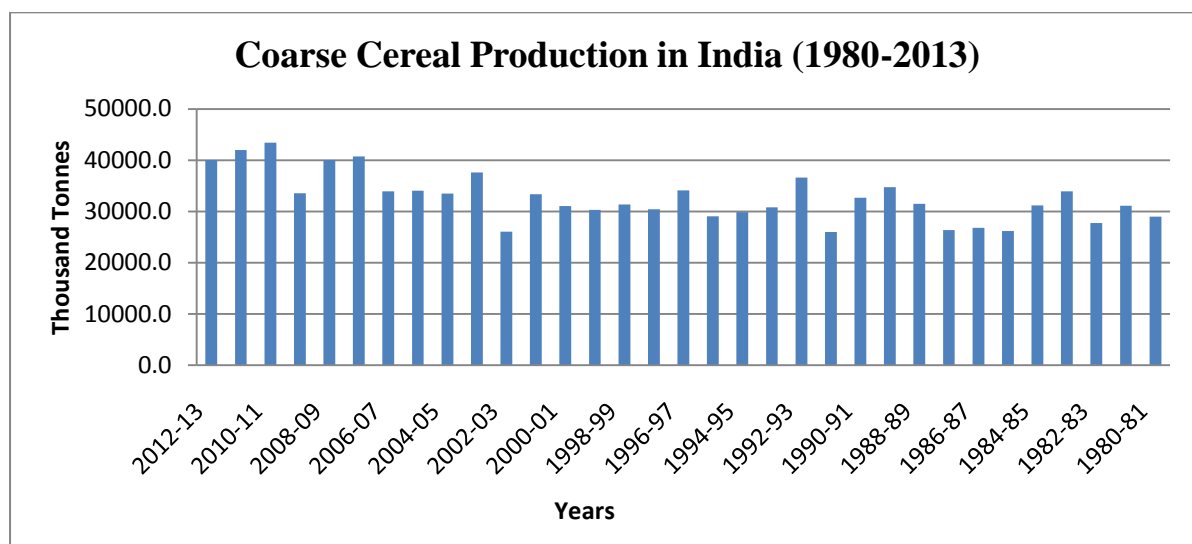
**Production of Coarse Cereals in Whole India**

From Table-1.3, it may be observed that for Pre-WTO 15 years, the minimum, maximum and range of Production of Coarse Cereals (in thousand tonnes) in Whole India is 25991.40, 36590.90 and 10599.50 respectively. Further mean and standard deviation of Production of Coarse Cereals (in thousand tonnes) in Whole India is 30302.1667 and 3299.99952 respectively. And mean growth rate of Production of Coarse Cereals (in thousand tonnes) in Whole India for Pre-WTO 15 years is 1.468748 %.

From Table-1.3, it may be observed that for Post-WTO 18 years, the minimum, maximum and range of Production of Coarse Cereals (in thousand tonnes) in Whole India is 26065.40, 43397.10 and 17331.70 respectively. Further mean and standard deviation of Production of Coarse Cereals (in thousand tonnes) in Whole India is 34699.3389 and 4886.54628 respectively. And mean growth rate of Production of Coarse Cereals (in thousand tonnes) in Whole India for Post-WTO 18 years is 3.103252 %.

**Table-1.3; Production of Coarse Cereals in Whole India**

Production of Coarse Cereals (in thousand tonnes) in Whole India							
Period	No. of Years	Minimum	Maximum	Range	Mean	Standard Deviation	Mean Growth Rate in %
1980-81 to 1994-95	15	25991.40	36590.90	10599.50	30302.1667	3299.99952	1.468748
1995-96 to 2012-13	18	26065.40	43397.10	17331.70	34699.3389	4886.54628	3.103252



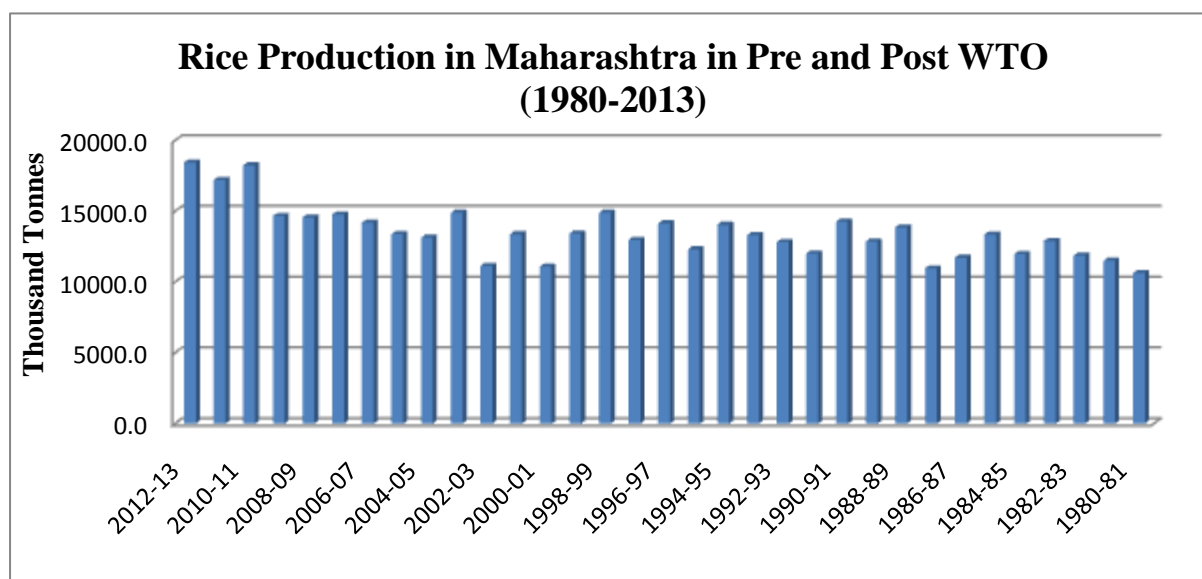
**Production of Pulses in Whole India**

From Table-1.4, it may be observed that for Pre-WTO 15 years, the minimum, maximum and range of Production of Pulses (in thousand tonnes) in Whole India is 10626.80, 14265.30 and 3638.50 respectively. Further mean and standard deviation of Production of Pulses (in thousand tonnes) in Whole India is 12534.7800 and 1117.39987 respectively. And mean growth rate of Production of Pulses (in thousand tonnes) in Whole India for Pre-WTO 15 years is 2.580974 %.

From Table-1.4, it may be observed that for Post-WTO 18 years, the minimum, maximum and range of Production of Pulses (in thousand tonnes) in Whole India is 11075.40, 18446.00 and 7370.60 respectively. Further mean and standard deviation of Production of Pulses (in thousand tonnes) in Whole India is 14267.9556 and 2063.71049 respectively. And mean growth rate of Production of Pulses (in thousand tonnes) in Whole India for Post-WTO 18 years is 3.373154 %.

**Table-1.4; Production of Pulses in Whole India**

Production of Pulses (in thousand tonnes) in Whole India							
Period	No. of Years	Minimum	Maximum	Range	Mean	Standard Deviation	Mean Growth Rate in %
1980-81 to 1994-95	15	10626.80	14265.30	3638.50	12534.7800	1117.39987	2.580974
1995-96 to 2012-13	18	11075.40	18446.00	7370.60	14267.9556	2063.71049	3.373154



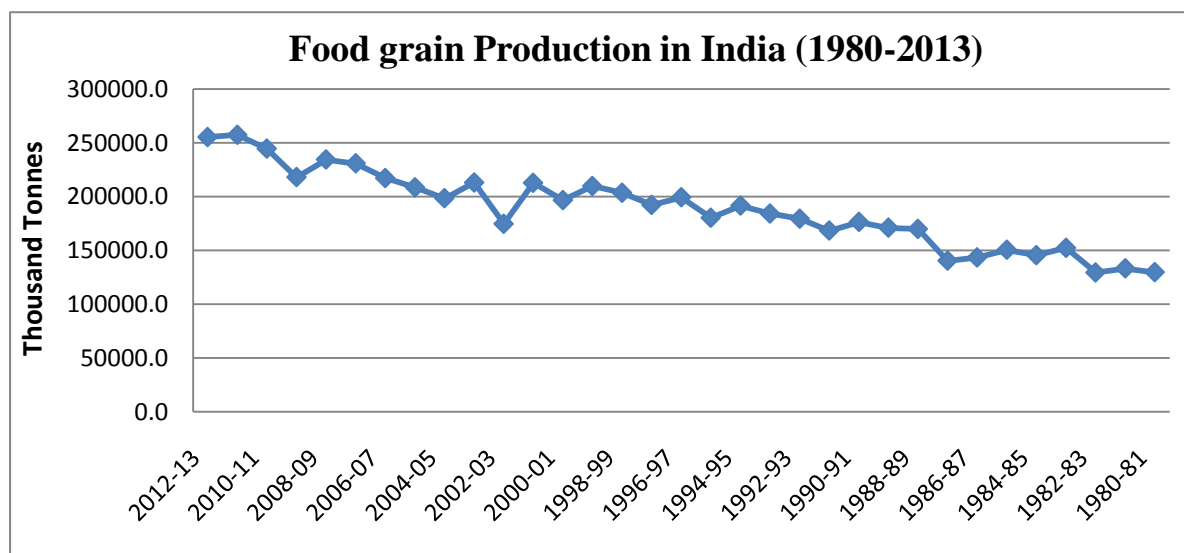
### Production of Food Grains in Whole India

From Table-1.5, it may be observed that for Pre-WTO 15 years, the minimum, maximum and range of Production of Food Grains (in thousand tonnes) in Whole India is 129518.70, 191495.20 and 61976.50 respectively. Further mean and standard deviation of Production of Food Grains (in thousand tonnes) in Whole India is 157699.1867 and 20747.51767 respectively. And mean growth rate of Production of Food Grains (in thousand tonnes) in Whole India for Pre-WTO 15 years is 3.088957 %.

From Table-1.5, it may be observed that for Post-WTO 18 years, the minimum, maximum and range of Production of Food Grains (in thousand tonnes) in Whole India is 174771.40, 257441.90 and 82670.50 respectively. Further mean and standard deviation of Production of Food Grains (in thousand tonnes) in Whole India is 213774.5167 and 23396.34289 respectively. And mean growth rate of Production of Food Grains (in thousand tonnes) in Whole India for Post-WTO 18 years is 2.453982 %.

**Table-1.5; Production of Food Grains in Whole India**

Production of Food Grains (in thousand tonnes) in Whole India							
Period	No. of Years	Minimum	Maximum	Range	Mean	Standard Deviation	Mean Growth Rate in %
1980-81 to 1994-95	15	129518.70	191495.20	61976.50	157699.1867	20747.51767	3.088957
1995-96 to 2012-13	18	174771.40	257441.90	82670.50	213774.5167	23396.34289	2.453982



### Production of Oilseeds in Whole India

From Table-1.6, it may be observed that for Pre-WTO 15 years, the minimum, maximum and range of Production of Oilseeds (in thousand tonnes) in Whole India is 9372.10, 21495.50 and 12123.40 respectively. Further mean and standard deviation of Production of Oilseeds (in thousand tonnes) in Whole India is 15129.7600 and 4298.06120 respectively. And mean growth rate of Production of Oilseeds (in thousand tonnes) in Whole India for Pre-WTO 15 years is 7.224513 %.

From Table-1.6, it may be observed that for Post-WTO 18 years, the minimum, maximum and range of Production of Oilseeds (in thousand tonnes) in Whole India is 14838.40, 32479.00 and 17640.60 respectively. Further mean and standard deviation of Production of Oilseeds (in thousand tonnes) in Whole India is 24714.8167 and 4610.64614 respectively. And mean growth rate of Production of Oilseeds (in thousand tonnes) in Whole India for Post-WTO 18 years is 4.129882 %.

**Table-1.6; Production of Oilseeds in Whole India**

Production of Oilseeds (in thousand tonnes) in Whole India							
Period	No. of Years	Minimum	Maximum	Range	Mean	Standard Deviation	Mean Growth Rate in %
1980-81 to 1994-95	15	9372.10	21495.50	12123.40	15129.7600	4298.06120	7.224513
1995-96 to 2012-13	18	14838.40	32479.00	17640.60	24714.8167	4610.64614	4.129882

**Production of Cotton in Whole India**

From Table-1.7, it may be observed that for Pre-WTO 15 years, the minimum, maximum and range of Production of Cotton (in thousand tonnes) in Whole India is 6382.00, 11887.60 and 5505.60 respectively. Further mean and standard deviation of Production of Cotton (in thousand tonnes) in Whole India is 8872.5333 and 1885.86395 respectively. And mean growth rate of Production of Cotton (in thousand tonnes) in Whole India for Pre-WTO 15 years is 5.349393 %.

From Table-1.7, it may be observed that for Post-WTO 18 years, the minimum, maximum and range of Production of Cotton (in thousand tonnes) in Whole India is 8623.70, 35200.00 and 26576.30 respectively. Further mean and standard deviation of Production of Cotton (in thousand tonnes) in Whole India is 18642.8833 and 8807.10655 respectively. And mean growth rate of Production of Cotton (in thousand tonnes) in Whole India for Post-WTO 18 years is 7.67831 %.

**Table-1.7; Production of Cotton in Whole India**

Production of Cotton (in thousand tonnes) in Whole India							
Period	No. of Years	Minimum	Maximum	Range	Mean	Standard Deviation	Mean Growth Rate in %
1980-81 to 1994-95	15	6382.00	11887.60	5505.60	8872.5333	1885.86395	5.349393
1995-96 to 2012-13	18	8623.70	35200.00	26576.30	18642.8833	8807.10655	7.67831

**Production of Sugarcane in Whole India**

From Table-1.8, it may be observed that for Pre-WTO 15 years, the minimum, maximum and range of Production of Sugarcane (in thousand tonnes) in Whole India is 154248.00, 275539.90 and 121291.90 respectively. Further mean and standard deviation of Production of Sugarcane (in thousand tonnes) in Whole India is 205657.3200 and 35013.37766 respectively. And mean growth rate of Production of Sugarcane (in thousand tonnes) in Whole India for Pre-WTO 15 years is 4.583706 %.

From Table-1.8, it may be observed that for Post-WTO 18 years, the minimum, maximum and range of Production of Sugarcane (in thousand tonnes) in Whole India is 233861.80, 357667.10 and 123805.30 respectively. Further mean and standard deviation of Production of Sugarcane (in thousand tonnes) in Whole India is 298831.2667 and 36445.08947 respectively. And mean growth rate of Production of Sugarcane (in thousand tonnes) in Whole India for Post-WTO 18 years is 1.700748 %.

**Table-1.8; Production of Sugarcane in Whole India**

Production of Sugarcane (in thousand tonnes) in Whole India							
Period	No. of Years	Minimum	Maximum	Range	Mean	Standard Deviation	Mean Growth Rate in %
1980-81 to 1994-95	15	154248.00	275539.90	121291.90	205657.3200	35013.37766	4.583706
1995-96 to 2012-13	18	233861.80	357667.10	123805.30	298831.2667	36445.08947	1.700748

**Production of Raw Jute & Mesta in Whole India**

From Table-1.9, it may be observed that for Pre-WTO 15 years, the minimum, maximum and range of Production of Raw Jute & Mesta (in thousand tonnes) in Whole India is 6777.90, 12646.50 and 5868.60 respectively. Further mean and standard deviation of Production of Raw Jute & Mesta (in thousand tonnes) in Whole India is 8601.1933 and 1402.77766 respectively. And mean growth rate of Production of Raw Jute & Mesta (in thousand tonnes) in Whole India for Pre-WTO 15 years is 2.821642 %.

From Table-1.9, it may be observed that for Post-WTO 18 years, the minimum, maximum and range of Production of Raw Jute & Mesta (in thousand tonnes) in Whole India is 8807.10, 11817.40 and 3010.30 respectively. Further mean and standard deviation of Production of Raw Jute & Mesta (in thousand tonnes) in Whole India is 10848.1667 and 731.23431 respectively. And mean growth rate of Production of Raw Jute & Mesta (in thousand tonnes) in Whole India for Post-WTO 18 years is 1.887903 %.

**Table-1.9; Production of Raw Jute & Mesta in Whole India**

Production of Raw Jute & Mesta (in thousand tonnes) in Whole India							
Period	No. of Years	Minimum	Maximum	Range	Mean	Standard Deviation	Mean Growth Rate in %
1980-81 to 1994-95	15	6777.90	12646.50	5868.60	8601.1933	1402.77766	2.821642
1995-96 to 2012-13	18	8807.10	11817.40	3010.30	10848.1667	731.23431	1.887903



### Finding and Conclusion

From Table-1.1, it may be observed that for Production of Rice (in thousand tonnes) in Whole India from Pre-WTO to Post-WTO range has been decreased by 2120, which is undesirable; mean has been increased by 24200.24, which is desirable; standard deviation has been decreased by 1900.729, which is desirable; and mean growth rate has been decreased by 1.28607, which is undesirable for the economy. Further from Pre-WTO to Post-WTO increase in mean and decrease in mean growth rate is a strongly undesirable condition for the economy.

From Table-1.2, it may be observed that for Production of Wheat (in thousand tonnes) in Whole India from Pre-WTO to Post-WTO range has been increased by 2351, which is desirable; mean has been increased by 25744.79, which is desirable; standard deviation has been increased by 627.725, which is undesirable; and mean growth rate has been decreased by 1.99129, which is undesirable for the economy. Further from Pre-WTO to Post-WTO increase in mean and decrease in mean growth rate is a strongly undesirable condition for the economy.

From Table-1.3, it may be observed that for Production of Coarse Cereals (in thousand tonnes) in Whole India from Pre-WTO to Post-WTO range has been increased by 6732, which is desirable; mean has been increased by 4397.172, which is desirable; standard deviation has been increased by 1586.547, which is undesirable; and mean growth rate has been increased by 1.6345, which is desirable for the economy. Further from Pre-WTO to Post-WTO increase in mean and increase in mean growth rate is a strongly desirable condition for the economy.

From Table-1.4, it may be observed that for Production of Pulses (in thousand tonnes) in Whole India from Pre-WTO to Post-WTO range has been increased by 3732, which is desirable; mean has been increased by 1733.176, which is desirable; standard deviation has been increased by 946.3106, which is undesirable; and mean growth rate has been increased by 0.79218, which is desirable for the economy. Further from Pre-WTO to Post-WTO increase in mean and increase in mean growth rate is a strongly desirable condition for the economy.

From Table-1.5, it may be observed that for Production of Food Grains (in thousand tonnes) in Whole India from Pre-WTO to Post-WTO range has been increased by 20694, which is desirable; mean has been increased by 56075.33, which is desirable; standard deviation has been increased by

2648.825, which is undesirable; and mean growth rate has been decreased by 0.63498, which is undesirable for the economy. Further from Pre-WTO to Post-WTO increase in mean and decrease in mean growth rate is a strongly undesirable condition for the economy.

From Table-1.6, it may be observed that for Production of Oilseeds (in thousand tonnes) in Whole India from Pre-WTO to Post-WTO range has been increased by 5517, which is desirable; mean has been increased by 9585.057, which is desirable; standard deviation has been increased by 312.5849, which is undesirable; and mean growth rate has been decreased by 3.09463, which is undesirable for the economy. Further from Pre-WTO to Post-WTO increase in mean and decrease in mean growth rate is a strongly undesirable condition for the economy.

From Table-1.7, it may be observed that for Production of Cotton (in thousand tonnes) in Whole India from Pre-WTO to Post-WTO range has been increased by 21071, which is desirable; mean has been increased by 9770.35, which is desirable; standard deviation has been increased by 6921.243, which is undesirable; and mean growth rate has been increased by 2.32892, which is desirable for the economy. Further from Pre-WTO to Post-WTO increase in mean and increase in mean growth rate is a strongly desirable condition for the economy.

From Table-1.8, it may be observed that for Production of Sugarcane (in thousand tonnes) in Whole India from Pre-WTO to Post-WTO range has been increased by 2513, which is desirable; mean has been increased by 93173.95, which is desirable; standard deviation has been increased by 1431.712, which is undesirable; and mean growth rate has been decreased by 2.88296, which is undesirable for the economy. Further from Pre-WTO to Post-WTO increase in mean and decrease in mean growth rate is a strongly undesirable condition for the economy.

From Table-1.9, it may be observed that for Production of Raw Jute & Mesta (in thousand tonnes) in Whole India from Pre-WTO to Post-WTO range has been decreased by 2858, which is undesirable; mean has been increased by 2246.973, which is desirable; standard deviation has been decreased by 671.5434, which is desirable; and mean growth rate has been decreased by 0.93374, which is undesirable for the economy. Further from Pre-WTO to Post-WTO increase in mean and decrease in mean growth rate is a strongly desirable / undesirable condition for the economy.

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