

Trends and Growth of Indian Agricultural Production: After LPG Method

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Abstract: The main intention of this paper is to analyze the trend and growth pattern of agricultural production in the Indian economy after the LPG method from 1990-91 to 2018-19 by using a simple statistical model. This study has been observed an increasing trend of Total Food Production (TFP), particularly wheat production (2.15%) is very high as compared with other food production during the period of time, whereas, the rice production (1.56%) is notably low in respect of Compound growth rate and annual growth rate analysis. Finally, this study has been found that poor performance in overall Indian agricultural production, and therefore, this paper suggests that it is very clear, if the government concentrates on the agricultural production process with proper policy measures then possibly will get better performance in agricultural production.

Keywords: Agricultural production, Compound growth, LPG, Total food production

1. INTRODUCTION

Agriculture remains the most important sector of every economy; of course, it provides more employment opportunities to rural people and as a reducing factor with poverty. India also has been characterizing and is unquestionably the largest livelihood provider in India. Most of the industries also depend upon the sector for their raw materials. Steady investments in technology development, irrigation infrastructure, emphasis on modern agricultural practices, and provision of agricultural credit and subsidies are the major factors that contributed to agriculture growth.

Indian agriculture has undergone rapid transformation in the past two decades. The policy of LPG has opened up new avenues for agricultural modernization. This has not only led to commercialization and diversification but also triggered various technological and institutional innovations owing to investments from corporate entities (IBEF, 2014).

1.1. Indian Agriculture after Independence

In the years since its independence, India has made immense progress towards food security. Indian population has tripled, and food-grain production more than quadrupled. There has been a substantial increase in available food grain per capita. Before the mid-1960s India relied on imports and food aid to meet domestic requirements. However, two years of severe drought in 1965 and 1966 convinced India to reform its agricultural policy and that it could not rely on foreign aid and imports for food security. India adopted significant policy reforms focused on the goal of food grain self-sufficiency. This was accompanied by India's Green Revolution. It began with the decision to adopt superior yielding, disease-resistant wheat varieties in combination with better farming knowledge to improve productivity. The state of Punjab led India's green revolution and earned the distinction of being the country's breadbasket. The initial increase in production was centered on the irrigated areas of the states of Punjab, Haryana, and western Uttar Pradesh. With the farmers and the government officials focusing on-farm productivity and knowledge transfer, India's total food grain production soared. A hectare of Indian wheat farm that produced an average of 0.8 tonnes in 1948 produced 4.7 tonnes of wheat in 1975 from the same land. Such rapid growth in farm productivity enabled India to become self-sufficient by the 1970s. It also empowered the smallholder farmers to seek further means to increase food staples produced per hectare. By 2000, Indian farms were adopting wheat varieties capable of yielding 6 tonnes of wheat per hectare.

With agricultural policy success in wheat, India's Green Revolution technology spread to rice. However, since irrigation infrastructure was very poor, Indian farmers innovated with tube-wells, to harvest groundwater. When gains from the new technology reached their limits in the states of initial adoption, the technology spread in the 1970s and 1980s to the states of eastern India: Bihar, Odisha and West Bengal. The lasting benefits of the improved seeds and new technology extended principally to the irrigated areas which account for about one-third of the harvested crop area. In the 1980s, Indian agriculture policy shifted to "evolution of a production pattern in line with the demand pattern" leading to a shift in emphasis to other agricultural commodities like oilseed, fruit, and vegetables. Farmers began adopting improved methods and technologies in dairying, fisheries, and livestock, and meeting the diversified food needs of a growing population. As with rice, the lasting benefits of improved seeds and improved farming technologies now largely depends on whether India develops infrastructure such as irrigation network, flood control systems, reliable electricity production

capacity, all-season rural and urban highways, cold storage to prevent spoilage, modern retail, and competitive buyers of produce from Indian farmers. This is increasingly the focus of Indian agriculture policy. India ranks 74 out of 113 major countries in terms of the food security index. India's agricultural economy is undergoing structural changes. Between 1970 and 2011, the GDP share of agriculture has fallen from 43% to 16%. This isn't because of the reduced importance of agriculture or a consequence of agricultural policy. This is largely because of the rapid economic growth in services, industrial output, and non-agricultural sectors in India between 2000 and 2010. Albeit, this paper is made an attempt to just evaluate the recent trends in Indian agricultural production during 1990-91 to 2018-19. Moreover, the paper will not be analyzed the reason behind if there is diminish and increase in the growth of agricultural production.

The paper is organized into four sections. The first section reveals that an introduction to agricultural development in Tamilnadu. The second section describes the sources of data used for the study, the third section result and discussions of growth Trends of agricultural production in India. The fourth section presents concluding remarks.

2. DATA BASE AND METHODOLOGY

The data used for the analysis were accumulated from RBI and Ministry of Agriculture & Farmers Welfare, Government of India. Time-series data from 1990-91 to 2018-19, regarding the production and yield of major crops (rice, wheat, pulse) were collected from the above-mentioned source. In order to find trend growth in Indian agricultural production (Rice, Wheat, and

Pulses) we use Annual Growth Rate (AGR) = $\frac{Y_t - Y_{t-1}}{Y_{t-1}} * 100$, Where, Y_t =

current year value, Y_{t-1} = previous year value and Linear model; $\ln Y = \beta_0 + \beta_1 X + e$, Where Y = Dependent variable (Rice, Wheat, Pulses Yield and production); X = trend over specific period; β_1 = coefficient of trend; \ln = Natural logarithm; and e = Error term. To find out the Compound (over a period of time) rate of growth, the following formula was applied; $CGR = \text{Antilog}(1 - \beta) * 100$.

3. RESULT AND DISCUSSIONS

3.1. Trends in Agricultural Production

The trends in the growth rate of total production clearly indicate that the total food grain production witnessed a tremendous spurt the after green

revolution period (mid 60's to 1990). It may be noted, however, that the area expansion having slowed down considerably, the output growth during this period was achieved through tremendous improvement in the yield growth (Table.3.2). This period explains that the policy package for this period was substantial and consisted of: a) introduction of high-yielding varieties of wheat and rice by strengthening agricultural research and extension services, b) measures to increase the supply of agricultural inputs such as chemical fertilizers and pesticides, c) expansion of major and minor irrigation facilities, d) announcement of minimum support prices for major crops, government procurement of cereals for building buffer stocks and to meet public distribution needs, and e) the provision of agricultural credit on a priority basis.

The period since the early 1990s (the economic reforms were initiated in 1991) is much worse compared to any other period since independence and this comparison is quite desolate when compared to the preceding decade, i.e. 1980s. In the eighties, the rate of growth of agricultural output (all crops) was 3.19 percent; this figure was halved to 1.58 percent, in the subsequent period. The rate of growth of food grains production, decelerated to 1.2 percent during the reform period (1990-91 to 2018-19), lower than the annual rate of growth of population, averaging 1.9 percent (Table 3.1 & 3.2). Since 1991, the Government initiated the process of economic reforms, which involved deregulation, reduced government participation in economic activities, and liberalization. Though much of the reforms were not initiated to directly affect the agriculture sector, this sector was affected indirectly by the devaluation of the exchange rate, liberalization of external trade, and dis-protection to industry.

Rice is one of the most important staple food crops of India for more than 2/3rd of its population. The slogan "Rice is life" can be considered appropriate for our country as this crop plays a vital role in our national food security and is a means of livelihood for millions of rural households. Rice is one of the world's largest cereal crops providing the caloric need for millions of people. India produces 99.15 million tonnes of rice, while China is the first in rice production in the world. However, at the current rate of population growth, rice production has to enhance to about 120 million tons by 2020. Achieving this target is a major challenge as this increase has to be attained simultaneously with shrinking available land and water resources, scarce and costly labor, and other inputs combined with deteriorating environment and climate change. Notwithstanding, it can be observed in its production and yield trends from the table: 3.1 & 3.2. After implementing LPG, the growth of food production especially rice it has been grown negatively from 1992-93 (AGR-2.44) to 2015-16

(AGR-1.01), after that its performance is being positive. Moreover, in terms of yield rate of rice production also it has been very low from 1990-91 to 2018-19 as compared to other food production (it can be also seen in figures 3.1 & 3.2).

Wheat is the main cereal crop in India. The total area under the crop is about 29.8 million hectares in the country. The production of wheat in the country has increased significantly from 75.81 million tonnes in 2006-07 to an all-time record high of 94.88 million tonnes in 2011-12. The productivity of wheat which was 2602 kg/hectare in 2004-05 has increased to 3140 kg/hectare in 2011-12. A major increase in the productivity of wheat has been observed in the states of Haryana, Punjab, and Uttar Pradesh. Higher area coverage is reported from Madhya Pradesh in recent years. Indian wheat is largely a soft/medium-hard, medium protein, white bread wheat, somewhat similar to U.S. hard white wheat. Wheat grown in central and western India is typically hard, with high protein and high gluten content. India also produces around 1.0-1.2 million tons of durum wheat, mostly in the state of Madhya Pradesh. Most Indian durum is not marketed separately due to segregation problems in the market yards. However, some quantities are purchased by the private trade at a price premium; mainly for the processing of higher value/branded products.

As compared with the rest of the food crops, its growth performance is better. The volume production is from 1990-91(551.4 LT) to 2018-19 (1021.9 LT). In terms of Compound growth rate is 2.15 percent; it is very high among food crops.

Pulses are rich in proteins and found to be the main source of protein for vegetative people of India. It is the second important constituent of the Indian diet after cereals. Therefore, pulses are important for the Indian economy. Thus, the production and yield rate describes pulses which can be shown in table (3.1 & 3.2). As compared with AGR and CGR in food production and yield rate performance is considerably high among other food crops after LPG.

The present study observed the production performances of food crops in India during LPG from 1990-91 to 2018-19 from the analysis of annual growth rate and compound growth rate. The overall food production in India is very low in terms of agricultural production and yield of food grains. It was in 1990-91(1436.9 LT) and 2018-19 is 1722.8 LT in aggregate food production, whereas, the Yield of food grains was (4599 Hect) and 2018-19 is 6972 Hect. The compound growth rate of agricultural production and yield rate of food production is 1.81 and 1.44 percent respectively from 1990-91 to 2018-19.

4. CONCLUSION

The present paper revealed that the performance of agricultural production in India after LPG. The compound growth rate, as well as trend analysis, indicated that the production of food grains (including rice, wheat, and pulses) was decreased. On the other hand, the trend analysis indicated that the production of wheat during the study period was increased as compared with other products over the time period. Finally, this paper has been found that poor performance in Indian agricultural production, and therefore, this paper suggests that it is very clear, if the government concentrates on the agricultural production process with proper policy measures then possibly will get better performance in agricultural production.

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APPENDIX

Table 3.1: Agricultural Production

Year	(Lakh tonnes)							
	Rice	AGR (%)	Wheat	AGR (%)	Pulses	AGR (%)	TFP	AGR (%)
1990-91	742.9	0.98	551.4	10.61	142.6	10.89	1436.9	5.44
1991-92	746.8	0.52	556.9	1.00	120.2	-15.71	1423.9	-0.90
1992-93	728.6	-2.44	572.1	2.73	128.2	6.66	1428.9	0.35
1993-94	803	10.21	598.4	4.60	133	3.74	1534.4	7.38
1994-95	818.1	1.88	657.7	9.91	140.4	5.56	1616.2	5.33
1995-96	769.8	-5.90	621	-5.58	123.1	-12.32	1513.9	-6.33
1996-97	817.3	6.17	693.5	11.67	142.4	15.68	1653.2	9.20
1997-98	825.4	0.99	663.5	-4.33	138.3	-2.88	1627.2	-1.57
1998-99	860.8	4.29	712.9	7.45	149.1	7.81	1722.8	5.88
1999-00	896.8	4.18	763.7	7.13	134.1	-10.06	1794.6	4.17
2000-01	849.8	-5.24	696.8	-8.76	110.7	-17.45	1657.3	-7.65
2001-02	933.4	9.84	727.7	4.43	133.7	20.78	1794.8	8.30
2002-03	718.2	-23.06	657.6	-9.63	111.3	-16.75	1487.1	-17.14
2003-04	885.3	23.27	721.6	9.73	149.1	33.96	1756	18.08
2004-05	831.3	-6.10	686.4	-4.88	131.3	-11.94	1649	-6.09
2005-06	917.9	10.42	693.5	1.03	133.8	1.90	1745.2	5.83
2006-07	933.6	1.71	758.1	9.32	142	6.13	1833.7	5.07
2007-08	966.9	3.57	785.7	3.64	147.6	3.94	1900.2	3.63
2008-09	991.8	2.58	806.8	2.69	145.7	-1.29	1944.3	2.32
2009-10	890.9	-10.17	808	0.15	146.6	0.62	1845.5	-5.08
2010-11	959.8	7.73	868.7	7.51	182.4	24.42	2010.9	8.96
2011-12	1053	9.71	948.8	9.22	170.9	-6.30	2172.7	8.05
2012-13	1052.4	-0.06	935.1	-1.44	183.4	7.31	2170.9	-0.08
2013-14	1066.5	1.34	958.5	2.50	192.5	4.96	2217.5	2.15
2014-15	1054.8	-1.10	865.3	-9.72	171.5	-10.91	2091.6	-5.68
2015-16	1044.1	-1.01	922.9	6.66	163.5	-4.66	2130.5	1.86
2016-17	1097	5.07	985.1	6.74	231.3	41.47	2313.4	8.58
2017-18	1127.6	2.79	998.7	1.38	254.2	9.90	2380.5	2.90
2018-19	1164.2	3.25	1021.9	2.32	234	-7.95	2420.1	1.66
CGR	1.56		2.15		1.72		1.81	

Source: Ministry of Agriculture & Farmers Welfare, Government of India & Author's calculation

Table 3.2: Yield Rate of Foodgrains

Year	(Kg/Hectare)							
	Rice	AGR (%)	Wheat	AGR (%)	Pulses	AGR (%)	TFP	AGR (%)
1990-91	1740	-0.29	2281	7.54	578	5.28	4599	4.17
1991-92	1751	0.63	2394	4.95	533	-7.79	4678	1.72
1992-93	1744	-0.40	2327	-2.80	573	7.50	4644	-0.73
1993-94	1888	8.26	2380	2.28	598	4.36	4866	4.78
1994-95	1911	1.22	2559	7.52	610	2.01	5080	4.40
1995-96	1797	-5.97	2483	-2.97	552	-9.51	4832	-4.88
1996-97	1882	4.73	2679	7.89	635	15.04	5196	7.53
1997-98	1900	0.96	2485	-7.24	567	-10.71	4952	-4.70
1998-99	1921	1.11	2590	4.23	634	11.82	5145	3.90
1999-00	1986	3.38	2778	7.26	635	0.16	5399	4.94
2000-01	1901	-4.28	2708	-2.52	544	-14.33	5153	-4.56
2001-02	2079	9.36	2762	1.99	607	11.58	5448	5.72
2002-03	1744	-16.11	2610	-5.50	543	-10.54	4897	-10.11
2003-04	2077	19.09	2713	3.95	635	16.94	5425	10.78
2004-05	1984	-4.48	2602	-4.09	577	-9.13	5163	-4.83
2005-06	2102	5.95	2619	0.65	598	3.64	5319	3.02
2006-07	2131	1.38	2708	3.40	612	2.34	5451	2.48
2007-08	2202	3.33	2802	3.47	625	2.12	5629	3.27
2008-09	2178	-1.09	2907	3.75	659	5.44	5744	2.04
2009-10	2125	-2.43	2839	-2.34	630	-4.40	5594	-2.61
2010-11	2239	5.36	2988	5.25	691	9.68	5918	5.79
2011-12	2393	6.88	3177	6.33	699	1.16	6269	5.93
2012-13	2461	2.84	3117	-1.89	789	12.88	6367	1.56
2013-14	2424	-1.50	3075	-1.35	764	-3.17	6263	-1.63
2014-15	2390	-1.40	2872	-6.60	744	-2.62	6006	-4.10
2015-16	2400	0.42	3034	5.64	656	-11.83	6090	1.40
2016-17	2494	3.92	3200	5.47	786	19.82	6480	6.40
2017-18	2576	3.29	3368	5.25	853	8.52	6797	4.89
2018-19	2659	3.22	3507	4.13	806	-5.51	6972	2.57
CGR	1.47		1.49		1.15		1.44	

Source: Ministry of Agriculture & Farmers Welfare, Government of India & Author's calculation

Figure: 3.1: Growth Pattern of Agricultural Production

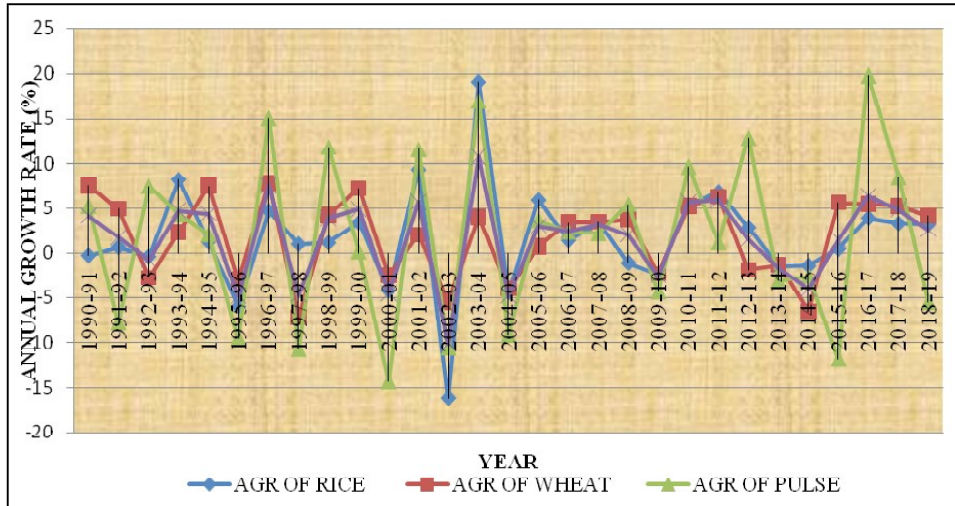


Figure 3.2: Annual Growth of Yield Rate (%): Foodgrains

