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Trends in Area, Production and **Productivity of Non-Food Grains in India**

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Abstract

This study, based on the performance of the commercial crops in Indian agriculture by analyzing the trends in area, production and productivity for the period 1980-81 to 2012-13. It has been observed that growth rates in the area under the production of groundnut and soya bean showing a declining trend and in total oilseeds, coffee, sugarcane, tea, jute and mesta showing a fluctuating trend. But the growth in the area under the production of cotton showing an increasing trend. The overall growth in the area of groundnut and raw jute & mesta registered negative. The growth rate of groundnut production and the productivity of cotton registered highest. The average area under the production of oilseeds and average production and productivity of sugarcane was highest. On the other hand, percentage change in the production and area of soya bean and productivity of cotton was highest.

Keywords: Agriculture, Area, Production, Productivity, Trend.

Introduction:

is the crucial sector of the Agriculture Indian economy because this sector is a main source of income, employment and export earnings. Indian agriculture has made considerable progress in the production of Food Grains, especially of Wheat and Rice during the last three decades. The performance has not been good in respect of oil seeds, fibers, Pulses etc. Commercial crops play a significant role not only in the domestic sector but in the external trade. These crops also contribute significantly to the growth of the Indian economy by meeting the domestic requirements of oils, fiber and sugar as well earning foreign as exchange through exports or import substitution. Their significance has further grown recently due to liberalization and globalization of Indian economy since 1991 (Parmar, 2012). But the commercial agriculture sector in India faces many challenges in the present era of globalization. 'Price instability' is one of the most serious one, which has long run effects in this sector (Maizels, 1992) FAO. 2002). In fact commercial agriculture of the country has become the



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highly domestic market oriented (**Kumar**, **2013**).

Objectives:

1. To study the trend and growth of area, production and Productivity of Non-Food grain/commercial crops in India.

2. To analyze the production and productivity status of Non-Food grains/commercial crops in India.

Sources of Data:

The present analysis was based on secondary source data relating to the production and productivity of major commercial crops. The data was obtained from the secondary sources such as RBI Data Base.

Methodology:

For the purpose of the analysis, the entire study period is split into three sub periods, including Period I: 1980-81 to 1989-90; Period II: 1990-91 to 1999-00; Period-III: 2000-01 to 2012-13 and the Overall Period: 1980-81 to 2012-13 and accordingly Compound growth rates, Means, Standard Deviations and Coefficient of Deviations of area, production and productivity of selected commercial crops in the three periods were estimated to examine the fluctuations.

RESULTS AND EXPLANATIONS:

1.1.1 Compound Growth Rate of production: The table 1.1 clearly shows that the production of major commercial crops in the

decades last three has been characterised by fluctuations with low growth. Performance during the Period-II was very poor with Groundnut production decreased from 3.76 per cent in Period-I to -1.24 per cent during the Period-II and a further -0.01 per cent during the Period-III. Groundnut production during three periods declined due to decrease in area under production. Area Groundnut under Groundnut production is decreased from 1.64 per cent per annum in Period-I to -2.30 per cent during the Period-II and -1.68 percent during the Period-III. The Groundnut crop recorded а significant decline in area and production during the Period-II and III were mainly due to the replacement of the gradual groundnut crop by Cotton, and sunflower. The droughts and insufficient monsoon rains also affected the production and productivity of Groundnut (Reddy et.al. 2014). In the production of Rapeseed & Mustard, during 1980s the growth rate in the production has decreased from 7.29 per cent per annum during Period-I to 0.78 per cent per annum during the Period-II and further it increased to 4.35 per cent during the Period-III. As a result, the growth rate of productivity also decreased from





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5.25 percent during Period-I to 0.05 per cent during the Period-II and further increased to 2.18 per cent per annum during the Period-III. The slow growth rate in the production and productivity during the Period-II is due to decrease in the average area under cultivation of this crop 1.95 per cent per annum from during Period-I to 0.72 per cent per annum during the Period-II there is an increase and in production and productivity in the Period-II is due to increase in the area during the same period.

Table 1.1

Compound growth rate in Area, Production and Productivity of commercial crops(In Percent)

| Crop | Period-I | | | Period-II | | | | Period- | | Overall | | |
|------------|----------|------------|--------------|-----------|------------|--------------|-------|------------|--------------|---------|------------|-------------|
| | Area | Production | Productivity | Area | Production | Productivity | Area | Production | Productivity | Area | Production | Productivit |
| | | | | | | | | | | | | У |
| Groundnut | 1.64 | 3.76 | 2.08 | -2.30 | -1.24 | 1.08 | -1.68 | -0.01 | 1.84 | -1.07 | 0.05 | 1.12 |
| Rapeseed | 1.95 | 7.29 | 5.25 | 0.72 | 0.78 | 0.05 | 2.20 | 4.35 | 2.18 | 1.48 | 3.63 | 2.11 |
| & Mustard | | | | | | | | | | | | |
| Soya bean | 17.11 | 18.06 | 0.62 | 10.24 | 13.06 | 2.56 | 5.12 | 8.88 | 3.04 | 9.37 | 11.40 | 1.84 |
| Total | 2.44 | 5.45 | 2.95 | 0.17 | 2.25 | 2.07 | 1.58 | 4.70 | 2.60 | 1.23 | 3.30 | 2.03 |
| Oilseeds | | | | | | | | | | | | |
| Coffee | 1.66 | 2.10 | 0.37 | 4.29 | 5.73 | 1.59 | 2.57 | 0.53 | -2.11 | 2.68 | 3.13 | 0.79 |
| Cotton | -1.26 | 2.80 | 4.10 | 2.71 | 2.30 | -0.41 | 3.41 | 12.80 | 11.22 | 1.21 | 4.64 | 3.39 |
| Raw Jute & | -2.83 | 0.14 | 3.10 | 0.71 | 1.79 | 1.12 | -1.47 | 0.15 | 1.48 | -0.73 | 1.27 | 2.00 |
| Mesta | | | | | | | | | | | | |
| Sugar cane | 1.46 | 2.71 | 1.23 | 1.67 | 2.74 | 1.05 | 1.53 | 2.06 | 0.15 | 1.69 | 2.25 | 0.52 |
| Теа | 0.94 | 2.69 | 1.67 | 1.44 | 1.94 | 0.40 | 1.41 | 2.27 | 0.25 | 1.53 | 2.01 | 0.50 |

Source: Computed on the basis of data available at RBI data base.

1.1.2 **Compound Growth Rate** of **Productivity**: It is clear from the above table that the compound growth rate of of non-food productivity grains showing fluctuating trend. а increased mainly in the Productivity 1980s due to the effect of technological innovation In the 1990s, (the post-reform period), the Productivity increases for commercial crops, for example, oilseeds and Sugarcane, were not up to the level. expected For oilseeds, liberal policies affected the domestic import growth of the area and productivity. During 1990-2000, the pace of growth in area, production and productivity of all the oilseeds fell down mainly due to decrease in oil prices relative to other crops and liberalization of edible oil in 1996- 97. imports The government support mechanism price has favoured Wheat and Rice continuously

crops and not the oilseed crops, which has led to lower oilseed cultivation (**Reddy et.al. 2014**). The period wise analysis further indicates that growth rate was negative in the productivity of Coffee during the Period-III and Cotton during the Period-II. For Cotton it was high & in the Period-III and for Rapeseed Mustard Period-I was also favourable point from a productivity of view. Average area under Tea production increased from 0.94 per cent per annum in Period-I to 1.44 per cent per annum during the Period-II and further 1.41 per cent in the Period-III. But with the increase in area production as well as productivity per annum decreased. Some of the researchers attempted to analyse the factors responsible for variations in Cotton productivity. Sharma (1997) attributed the increase in Cotton productivity to the improved Cotton

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varieties, irrigation, fertilizers and pest management. Carpio and Ramirej (2002) and Narayana et al. (1991) found that Productivity in India to be affected by time and fertilizer prices. Wood et al. (2004) showed that irrigation is reducing Productivity effective in variability in Cotton. As the production average productivity increases, also increases from 0.41 percent in Period-II to 11.22 per cent per annum during the Period-III. In case of raw jute & Mesta and Sugarcane growth rate in production per annum decreased during the Period-III which is due to decrease in the average area under cultivation during the Period-III as a result average productivity of Sugarcane decreased during the Period-II and Period-III. The overall compound growth rate in the production of soya bean was highest (11.40 per cent) during the study period followed by Cotton (4.64 per cent), Rapeseed & percent), Total Oilseeds & Mustard (3.63 (3.30 per cent),Coffee (3.13 per cent), Sugarcane (2.25 per cent), Tea (2.01 per cent), Raw Jute & Mesta (1.27 per cent) and Groundnut (0.05 per cent).

1.1.3 Compound Growth Rate of Area: The overall compound growth rate in the area of Groundnut and Raw Jute & Mesta is negative. But, the area under the production of soya bean grows at a high rate of 9.37 per cent per annum, which is followed by Coffee (2.68 per cent), Sugarcane (1.69 per cent), Tea (1.53 per cent), Rapeseed & Mustard (1.48 percent), Total Oilseeds (1.23 per cent) and Cotton, (1.21 per cent). Further, the growth rate of the area under the production of soya bean shows a declining trend during the study periods.

2.1.1 Average Production of different commercial crops: Average production of Commercial crops has been different depicted in table no.1.2. A perusal of table observed sharp increase in the average production of Total Oilseeds, Sugarcane, Tea, Coffee, Cotton and raw jute & Mesta during the study period. There found an increasing trend in the production of average all the commercial crops except Groundnut. The overall average production of sugarcane is 256.58 million tonnes, Coffee 222.08 million kg, Cotton 14.20 million bales, raw jute & Mesta 9.82 bales, Groundnut 6.96 million million tonnes, soya bean 5.32 million tonnes and rapeseed & mustard it is nearly about 5.17 million tonnes. In case of soya bean, its production plays a crucial role in increasing the average production of Total Oilseeds which was mainly due to increase in the average area during the period.

Table 1.2

Average of Area, Production and Productivity of different Commercial Crops

| | 1 | | | 1 | | | 1 | | | 1 | | | |
|------------|----------|------------|--------------|-------|------------|--------------|------------|------------|--------------|---------|------------|-------------|--|
| Crop | Period-I | | | | Period- | ·II | Period-III | | | Overall | | | |
| | Area | Production | Productivity | Area | Production | Productivity | Area | Production | Productivity | Area | Production | Productivit | |
| | | | | | | | | | | | | У | |
| Groundnut | 7.43 | 6.57 | 875.50 | 7.78 | 7.69 | 990.40 | 6.01 | 6.7 | 1085.70 | 6.98 | 6.96 | 1002.58 | |
| Rapeseed | 4.23 | 2.98 | 698.10 | 6.35 | 5.58 | 881.00 | 5.97 | 6.53 | 1050.30 | 5.56 | 5.17 | 904.61 | |
| & Mustard | | | | | | | | | | | | | |
| Soya bean | 1.23 | 0.90 | 723.20 | 4.74 | 4.83 | 1000.40 | 8.29 | 9.09 | 1006.40 | 5.08 | 5.32 | 945.03 | |
| Total | 19.44 | 12.68 | 646.76 | 25.64 | 21.34 | 831.90 | 25.60 | 25.49 | 935.90 | 23.74 | 20.35 | 836.61 | |
| Oilseeds | | | | | | | | | | | | | |
| Coffee | 0.21 | 147.09 | 702.90 | 0.25 | 212.46 | 840.60 | 0.37 | 287.17 | 835.90 | 0.29 | 222.08 | 798.39 | |
| Cotton | 7.48 | 7.95 | 180.60 | 8.29 | 11.53 | 236.80 | 9.53 | 21.06 | 324.00 | 8.54 | 14.20 | 269.64 | |
| Raw Jute & | 1.10 | 8.34 | 1370.60 | 1.01 | 9.69 | 1730.70 | 0.95 | 11.06 | 2059.50 | 1.01 | 9.82 | 1771.36 | |
| Mesta | | | | | | | | | | | | | |
| Sugar cane | 3.13 | 185.66 | 59324.80 | 3.89 | 265.45 | 68123.60 | 4.53 | 304.32 | 65913.40 | 3.91 | 256.58 | 64832.15 | |
| Теа | 0.40 | 625.24 | 1557.00 | 0.44 | 775.45 | 1776.80 | 0.55 | 953.97 | 1694.20 | 0.47 | 800.30 | 1690.88 | |

Note: 1. Coffee and Tea data measured in million kg.



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2. Cotton data measured in million bales of 170 kg. each.

3. Raw Jute & Mesta data measured in million bales of 180 kg. each.

4. Oilseeds and sugarcane data measured in million tonnes.

5. Productivity measured in kg/hectare and area in Million hectares

Source: Computed on the basis of data available at RBI data base.

2.1.2 Average Productivity of different Commercial crops: All non-food grain crops are indicating an increasing trend in the average yield per hectare. But in case of sugarcane, tea and coffee, there observed a declining trend in productivity during the period-III. In the overall yield per hectare sugarcane observed a maximum productivity (64832.15kg/h), followed by raw jute & Mesta, tea, groundnut, soya bean, rapeseed & mustard, coffee, and cotton, respectively. In all the three periods, maximum productivity per hectare registered in sugarcane production and the least increase in the productivity of cotton.

2.1.3 Average Area Under different Commercial Crops: Average area under different commercial is shown in the above table. The overall average area under the cultivation of cotton was maximum (8.54mh) and the under the cultivation of coffee was minimum (0.29mh). The overall average area under total oilseeds was nearly 23.74 million hectares, but it was 19.44 million hectares in period-I, 25.64 million hectares in period-II and 25.60 million hectares in the period-III. In case of Soya bean, coffee, cotton, sugarcane and tea, these crops are showing an increasing trend in the average area under cultivation during the study period. But in case of groundnut, rapeseed & mustard and raw jute & Mesta, the average area under these crops declined in the period-III. Decrease in the area under Jute production is mainly due to population pressure which shrinks arable land under the cultivation of jute production and the primary emphasis will be on food crops (Central Research Institute for Jute and Allied Fibers, 2013). According to Samuel, (2011) the area under cotton across the world has been stagnant for the last five decades, however production has been increasing due to rise in yield. Among the cotton growing countries, India has the under largest area cotton production followed by China, United States and Pakistan.

3.1.1 Variability in Production: Table 1.3 reveals that maximum variability in nonfood grains was observed in the production of sugarcane followed by oilseeds, raw jute & Mesta, cotton and so on. But variability in the production of oilseeds, cotton and raw jute and Mesta was declined in period-II. In period-III there is 86.57 million kg of changes observed in the production of tea, which was much more than previous periods. The area, production and yield of jute fiber have been subjected to various fluctuations due to varying climatic conditions, lack of adequate availability of certified and HYV seeds, lack of awareness of HYV seeds developed, low incidence of mechanized farming, poor farm realization, increase in preference for alternate crops, shortage of farm labour and limited demand



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for jute products and price fluctuations of Inc raw jute (Ministry of Textile, Govt. of

India).

Table 1.3

| CROPS | PERIOD-I | | PERIOD-II | | PERIOD-III | | OVERALL | |
|--------------------|----------|-------|-----------|-------|------------|-------|---------|-------|
| | | | | | | | | |
| | SD | CV | SD | CV | SD | CV | SD | CV |
| | | | | | | | | |
| GROUNDNUT | 1.41 | 21.43 | 1.00 | 12.97 | 1.48 | 22.02 | 1.41 | 20.29 |
| RAPESEED & MUSTARD | 0.73 | 24.42 | 0.55 | 9.93 | 1.37 | 21.04 | 1.80 | 34.76 |
| | | | | | | | | |
| SOYABEAN | 0.45 | 50.05 | 1.64 | 33.86 | 2.92 | 32.06 | 3.98 | 74.77 |
| | | | | | - | | | |
| TOTAL OILSEEDS | 2.66 | 20.95 | 1.96 | 9.18 | 4.94 | 19.37 | 6.44 | 31.64 |
| | | | | | | | | |
| COFFEE | 37.21 | 25.30 | 39.10 | 18.40 | 18.12 | 6.31 | 66.43 | 15.59 |
| | | | | | | | | |
| COTTON | 1.44 | 18.07 | 1.31 | 11.32 | 8.94 | 42.42 | 8.07 | 22.65 |
| | | | | | | | | |
| RAW JUTE & MESTA | 1.53 | 18.34 | 0.96 | 9.85 | 0.47 | 4.24 | 1.53 | 19.04 |
| | | | | | | | | |
| SUGARCANE | 19.01 | 10.24 | 24.06 | 9.06 | 40.53 | 13.32 | 58.12 | 29.91 |
| | | | | | | | | |
| TEA | 51.17 | 8.18 | 48.45 | 6.25 | 86.57 | 9.07 | 152.41 | 56.83 |
| | | | | | | | | |
| | | | | | | | | |

Standard Deviation and Coefficient of Variation of Production

S.D = Standard Deviation (Million Tonnes/kg/bales)

C.V. = Coefficient of Variation (In Percent)

Note: 1. Coffee and Tea data measured in million kg.

2. Cotton data measured in million bales of 170 kg. each.

3. Raw Jute and Mesta data measured in million bales of 180 kg. each.

Variability in terms of percentage was registered maximum in the soya bean production during period-I. Percentage change in the production of coffee observed about 25.30 percent, followed by rapeseed and mustard, groundnut, raw jute and Mesta, cotton and so on. During the period-II there

3.1.2 Variability in Productivity: There is a sharp change in the yield per hectare of groundnut production during the study

was 33.86 per cent change in the production of soybean. In period-III there was again a maximum percentage change in the production of soybean. The overall percentage change in soybean was 74.77 percent, followed by tea, rapeseed & mustard, sugarcane, cotton and so on.

period. The overall variability was 188.06 kg/hectares, i.e. 18.76 per cent. Rapeseed & mustard shows 113.28 kg/hectare variability



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in period-I i.e. 16.23 per cent to 95.03 kg/h i.e. 10.79 per cent in period-II and further 97.68 kg/h i.e. 9.30 per cent in the period-III. The overall change is 190.69 kg/h which is only 21.08 percent. Soya bean shows an increasing trend in the productivity per hectare from 92.44 kg/h in period-I to 104.83 kg/h in period-II and 142.90 kg/h in period-III which is 12.78 per cent in period-I, 10.48 percent in period-II and 14.20 percent during the period-III.

Table 1.4

| CROPS | PERIOD-I | PERIOD-I | | PERIOD-II | | PERIOD-III | | OVERALL | |
|--------------------|----------|----------|---------|-----------|---------|------------|---------|---------|--|
| | SD | CV | SD | CV | SD | CV | SD | CV | |
| GROUNDNUT | 122.02 | 13.94 | 130.11 | 13.14 | 213.29 | 19.65 | 188.06 | 18.76 | |
| RAPESEED & MUSTARD | 113.28 | 16.23 | 95.03 | 10.79 | 97.68 | 9.30 | 190.69 | 21.08 | |
| SOYABEAN | 92.44 | 12.78 | 104.83 | 10.48 | 142.90 | 14.20 | 201.53 | 21.32 | |
| TOTAL OILSEEDS | 84.33 | 13.04 | 64.31 | 7.73 | 117.36 | 12.54 | 175.22 | 20.94 | |
| COFFEE | 167.99 | 23.90 | 69.33 | 8.25 | 63.54 | 7.60 | 123.38 | 15.45 | |
| COTTON | 30.44 | 16.85 | 18.69 | 7.89 | 98.79 | 30.49 | 107.63 | 39.92 | |
| RAW JUTE & MESTA | 153.64 | 11.21 | 65.89 | 3.81 | 102.72 | 4.49 | 331.69 | 18.73 | |
| SUGARCANE | 2640.36 | 4.45 | 2645.91 | 3.88 | 2829.75 | 4.29 | 4579.06 | 7.06 | |
| TEA | 91.73 | 5.89 | 66.76 | 3.76 | 26.47 | 1.56 | 123.25 | 7.29 | |

Standard Deviation and Coefficient of Variation of Productivity

S.D. = Standard Deviation (Kg /Hectare)

C.V. = Coefficient of Variation (In Percent)

The overall change is 201.53 kg/h which is about 21.32 percent, but the productivity of total oilseeds decreased from 84.33 kg/h in period-I to 64.31 kg/h in period-II but further increased to 117.36kg/h in period-III. The overall change is 175.22 kg/h which is 20.94 percent. There is no much change in the yield of sugarcane production. Tea and coffee shows a decreasing trend in the yield. The overall variability in the yield of tea is about 123.25 kg/h i.e. 7.29 per cent and 123.38 kg/h in case of coffee i.e. 15.45 per cent. Cotton and raw jute & Mesta show a fluctuating trend. Their productivity in the period-II decreased and further increased in the period -III. The overall productivity per hectare is 107.63 kg/h of cotton and 331.69 kg/h of raw jute & Mesta i.e. 39.92 per cent of cotton and 18.73 percent of raw jute & Mesta.



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Table 1.5

| CROPS | PERIOD-1 | | PERIOD-2 | | PERIOD-3 | | OVERALL | |
|--------------------|----------|-------|----------|-------|----------|-------|---------|-------|
| | SD | CV | SD | CV | SD | CV | SD | CV |
| GROUNDNUT | 0.63 | 8.52 | 0.55 | 7.12 | 0.58 | 9.57 | 0.99 | 14.14 |
| RAPESEED & MUSTARD | 0.42 | 9.95 | 0.35 | 5.44 | 0.89 | 14.83 | 1.09 | 19.61 |
| SOYABEAN | 0.53 | 42.91 | 1.26 | 26.52 | 1.56 | 18.82 | 3.18 | 62.62 |
| TOTAL OILSEEDS | 1.61 | 8.29 | 0.85 | 3.30 | 2.07 | 8.08 | 3.28 | 13.81 |
| COFFEE | 0.01 | 5.22 | 0.03 | 13.39 | 0.04 | 9.79 | 0.08 | 26.39 |
| COTTON | 0.45 | 6.06 | 0.75 | 9.08 | 1.41 | 14.83 | 1.33 | 15.58 |
| RAW JUTE & MESTA | 0.17 | 15.77 | 0.08 | 7.87 | 0.06 | 6.49 | 1.13 | 12.78 |
| SUGARCANE | 0.23 | 7.44 | 0.26 | 6.54 | 0.47 | 10.32 | 0.68 | 17.37 |
| TEA | 0.01 | 2.85 | 0.02 | 5.25 | 0.03 | 5.64 | 0.07 | 15.21 |

Standard Deviation and Coefficient of Variation of Area

S.D. = Standard Deviation (Million Hectares)

C.V. = Coefficient of Variation (In Percent)

However, it would be interesting to analyze the contribution of different crops in percentage. Maximum percentage change was observed in the area under cultivation of soybean during period-I, II and III. In case of groundnut there was only 8.52 per cent change observed during period-I and 7.12 percent during the period-II and further it was increased to 9.57 percent during the period-III. Percentage change in the area of rapeseed and mustard was declined during the period - II and sharply increased during the period-III.

Conclusion:

It is quite understandable from the above discussion that commercial crops are taking

the lead in terms of area, production and productivity share. The average area under the cultivation of major commercial crops like oilseeds, coffee, cotton, sugarcane, and tea has increased during the study period. But the average area under cultivation of raw jute and Mesta has declined. With the increase in the average area under the cultivation of different commercial crops, average production as well the as productivity of these commercial crops has also increased. There was a sharp increase in the average production of all the commercial crops during the study period except rapeseed and mustard. The expansion of area under commercial crops resulted in contraction of area under food grains except area under rice and wheat. However, the area



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under commercial crop like coffee and tea remained almost constant and that of sugarcane registered marginal increase.

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