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IMPACT OF AGRICULTURAL TECHNOLOGY ON CROP PRODUCTION IN SOLAPUR DISTRICT



ABSTRACT: -

The development of high-yielding crop varieties, improved methods of crop fertilization, use of pesticides, threshers, tractors and irrigation pumps, etc. comprises in agricultural technology. These techniques are yield increasing and help in enhancing the crops productivity. Agricultural technology is defined "as the level of existing performance of a unit of land, which differentiates from one area to another (Mohammad Ali, 1978)." The present Paper analyses the impact of agricultural technology on crop production and productivity in Solapur district of Maharashtra State. The crop productivity change has occurred in response to many technology development during the last few decades in the district. There is improvement in per hectare yield of selected crops except rice in the period of investigation. Being grown largely rainfed that yield of rice is subjected to extreme year to year fluctuations under impact of weather. The per hectare yield of jowar is marked second amongst selected cereal crops. The production of food grain is increased from 3.95 lakhs M. Tones (1993-94) to 5.83 lakhs M. Tones (2013-14), and registered 47.59 percent increase in twenty years. The production of (gram and tur) pulses was record 0.26 lakhs M.Tones in 1993-94 to 0.29 lakhs M.Tones in 2013-14. Production of sugarcane was

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marked 26.35 lakhs M.Tones (1993-94) to 174.68 lakhs M.Tones (2013-14) and marked 562.89 percent increase during the same period.

KEY NOTES: Agricultural Technology, drought-prone area, Production and productivity, Compound growth rate.

INTRODUCTION

In the late sixties and early seventies, when the food security was under threat, India launched the HYVs, chemical fertilizers centered technology in a big way. Input subsidies were instituted to ensure rapid acceptance of this technology, which has resulted into increase of agricultural production and diversifying the production pattern. There is significant scope of increasing the net area under cultivation by growing more than one crop on the same hectare with the help of agricultural technology. Particularly, irrigation technology, which need is the main plank of our agricultural strategy in all the five years Plans (Swaminathan, 1980, P. 34). The use of improve variety of seeds, chemical fertilizers etc. will not be much use, unless proper irrigation facilities are made available. Thus irrigation is the main axis, around which the whole agricultural activities revolve. In this regard, the district has about 25.22 percent cultivated area under the irrigation. Though the use of agricultural technology has been increasing day by day in the study region.

OBJECTIVE

The main objective of the present investigation is to analyze in depth, the temporal

changes in the crop production in Solapur district, since the launching of the “Green Revolution” scheme.

STUDY REGION

Solapur district is situated in southern part of Maharashtra State to the east of Western Ghat in the rain-shadow region. It is situated between 17°5’ to 18°32’ North latitudes and 74°42’ to 76°15’ East longitudes and it has an area of 14878 sq. km. and population 43,15,527 persons as per 2011 census.

This district is confined (Fig.1) by Ahmednagar district to north, Sangli district to south-west, Satara district to west and Pune district to north-west. Solapur district has a typical landscape due to variation in relief, climate, and vegetation. The hilly region in the western and south-western parts occupies its sizable area by Mahadev ranges and Shukracharya, which have average height ranging from 600 to 900 meters. Whereas, Bhalaghat range extended on the north-eastern part of the district. The study region is drained by five major rivers, i.e. the Bhima, Sina, Nira, Man and Bhogawati. The climate of the district is on the whole agreeable and characterizes by a general dryness of the major part of the year. The average annual rainfall is about 556 mm.

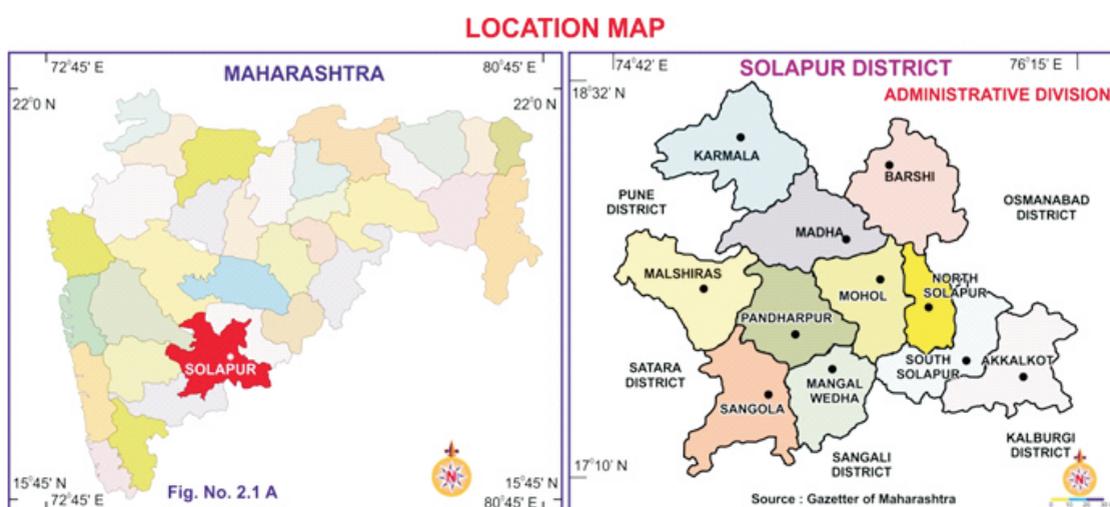


Fig.No. 1

DATABASE AND METHODOLOGY

This study is entirely based on secondary data, collected from Socio-Economic Review and District Statistical Abstract of Solapur District, for the period 1993-94 and 2013-14. The collected data was presented by statistical and cartographic techniques; compound growth rate has been calculated by using following formula.

$$y = ab^t$$

- Where, y = Is the Variable for which the growth rate is calculated
- a = Amount of the initial time
- b = 1+ r, (r = Compound growth rate)
- t = Time variable

RESULT AND DISCUSSION

Solapur district has not only variety of crops, but also extremely high percentage of yield, some of Maharashtra’s highest as well as lowest yield rate being marked in the district. The production of crops in the study region, besides natural factors is mostly dependent on HYV, number of schemes are formulated specifically to maximum agricultural production. Per hectare yield of crop is the indicator of agricultural development in any region.

TRENDS IN AVERAGE YIELD/HECTARE OF SELECTED CROPS

Table No. 1 exhibits the changes in yield/hectare of selected crops in the study area, since 1993-94 to 2013-14. There is improvement in per hectare yield of selected crops except rice in the period of investigation (Fig. 2). Average yield/hectare of rice was 900 kg in 1993-94 as against 350 kg in 2013-14 and recorded 61.11 percent negative growth rate in the period of investigation. Whereas, average yield/hectare of wheat was 1350 kg in 1993-94, which reached to 1590 kg in 2013-14. After the introduction of HYVs of wheat, per hectare yield increased rapidly in the study region.

Table 1: Average Yield Rate of Selected Crops for 1993-94 to 2013-14 (Yield Rate kg/hect.)

| Sr. No. | Crops | Years | | Change in Percentage |
|---------|---------------------------|------------------------|------------------------|----------------------|
| | | 1993-94 Yield kg/hect. | 2013-14 Yield kg/hect. | |
| 1 | Rice | 900 | 350 | -61.11 |
| 2 | Wheat | 1350 | 1590 | 17.17 |
| 3 | Jowar | 1130 | 1450 | 28.31 |
| 4 | Bajara | 640 | 770 | 20.31 |
| 5 | Maize | 1750 | 2210 | 26.28 |
| 6 | Tur | 492 | 680 | 38.21 |
| 7 | Gram | 556 | 685 | 23.20 |
| 8 | Sugarcane (M.Tones/hect.) | 80.587 | 86.00 | 6.71 |
| 9 | Groundnut | 1120 | 1335 | 19.19 |
| 10 | Cotton (Lint) | 214 | 275 | 28.50 |
| 11 | Sunflower | 975 | 1260 | 29.23 |

Source: Socio-Economic Review of Solapur District, 1993-94 and 2013-14.

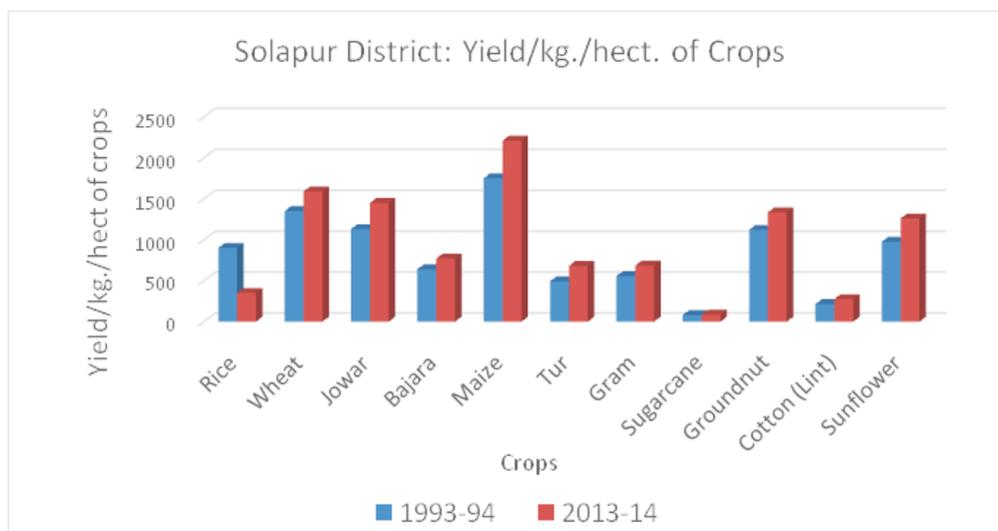


Fig. 2

In the year 1993-94 yield/hectare of jowar was registered 1130 kg, where it was marked 1450 kg/hectare in 2013-14. Maize also showed improvement per hectare yield. Among the pulses selected pulses crops i.e. tur and gram showed ascending trend during 1993-94 to 2013-14. Sugarcane, groundnut, cotton, etc. crops are showed improvement per hectare yield during the same period. After the introduction of irrigation, HYVs, chemical fertilizers, etc. of selected crops per hectare yield increases rapidly in the district.

TRENDS OF AGRICULTURAL OUTPUT

The production of food-grains increased from 3.95 lakhs M. Tones (1993-94) to 5.83 lakhs M. Tones

(2013-14), recording 47.59 percent increase in twenty years. Trends of growth rate of food-grain crops are furnished in Table No. 2. Even among food-grains, cereals have registered much faster growth than pulses in production (58.68% against 10.03%).

Table 2: Selected Crops Production and Compound Growth Rate in Solapur District (1993-94 to 2013-14)

| Crops | Production in M. T. | | % Change | Change in Production In M.T. | Compound Growth Rate (%) |
|---------------|---------------------|----------|----------|------------------------------|--------------------------|
| | 1993-94 | 2013-14 | | | |
| Rice | 700 | 200 | -71.42 | -500 | -1.50 |
| Wheat | 35800 | 47500 | 32.68 | 11700 | 2.35 |
| Jowar | 304700 | 427900 | 40.43 | 123200 | 3.85 |
| Bajara | 2200 | 3010 | 36.81 | 810 | 0.30 |
| Maize | 25200 | 75700 | 200.39 | 50500 | 1.03 |
| Gram | 17400 | 19600 | 12.64 | 2200 | 0.80 |
| Tur | 9200 | 9670 | 5.10 | 470 | 0.10 |
| Groundnut | 5900 | 6242 | 5.79 | 342 | 0.09 |
| Sugarcane | 2635200 | 17468690 | 562.89 | 14833490 | 4.35 |
| Cotton (Lint) | 215 | 278 | 29.30 | 63 | 0.02 |

Source: Socio-Economic Review and District Statistical Abstract of Solapur District, 1993-94 and 2013-14

The ratio of percentage changes in production, for both groups (cereals and pulses) of crops suggest higher of increase in yield rate of cereal than that pulses. Among the cereals, jowar and maize have been marked high increase in production (40.43% and 200.39%) during 1993-94 to 2013-14. Where bajara and wheat have registered 32.08 percent and 36.81 percent growth in production, on contrary rice has shown negative growth in the same period.

In Tur and Gram, where there is wide difference in growth rate in production, it seems logical that gram is cultivated in Rabi season, it is irrigated and non-irrigated crop in the study region, while tur is Kharif crop, it cultivation mainly depend on monsoon rain, therefore, gram is marked 12.68 percent growth in production, while tur remained far behind (5.10 percent).

Among the selected oil seeds, i.e. groundnut. Whereas groundnut has recorded 5.79 percent increase in growth rate during the period of investigation. Sugarcane and cotton have cultivated as cash crops in the study region. Both cash crops are registered 562.89 percent and 29.30 percent increase in the growth rate during the study period. A perusal of Table No. 2 also shows that compound growth rate of ten crops, out of these only rice indicates negative compound growth rate from 1993-94 to 2013-14.

CONCLUSION

The preceding discussion regarding the impact of farm technology on crops production in Solapur district reveals that there is more improvement in the production of selected crops during the period of investigation. Adequate and assured irrigational facilities and input subsidies provide by government are responsible for the diffusion of farm technology in the study region. Due to this technology, which led to increase of crops production and diversifying the production pattern. Therefore, the production of food grain has increased 47.59 percent during the period of investigation. The production of gram and tur are recorded 12.64 and 5.10 percent increase in growth rate respectively during the same period. Whereas, groundnut has registered 5.79 percent increase between 1993-94 to 2013-14. Sugarcane and cotton are marked 562.89 and 29.30 percent increase in growth rate during the study period. In short, farm technology plays vital role in crops production of study area.

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