



Analysis of trends in area, production and yield of important crops of India

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Abstract

Information related to trends in different crops can aid the policy makers in recommending policies leading to sustainable increase in the food production. The present study was aimed at analyzing the trends in area, production and yield of important crops viz. Cotton, Castor and Banana of India. A time series data from 2000-01 to 2011-12 (12 years) regarding the area, production and yield of these crops were collected. The trend analysis in terms of area (at country (India), state (Gujarat) and district (Vadodara) level); production (at state (Gujarat) and district (Vadodara) level); and yield (at district (Vadodara) level) of three crops namely Cotton, Castor and Banana exhibited variations. Cotton crop showed an increasing trend in area under crop at both country and state level while slight ups and downs were observed at district level. Production of cotton also showed overall increasing trend at state and district level and its yield showed upward trend at district level. Area under castor crop showed an increasing trend at country level and variations were found at state and district level. Its production also showed instability but on average increase was observed at state and district level. Yield of castor crop also showed variations but on average an increasing trend was observed. Area under banana crop showed variations at all three levels. Its production showed annual instability at state level but overall decrease at district level. Its yield also showed decreasing trend at district level. The study can aid the planners in deciding the growth rates to be achieved in accordance with the planned targets. Further, it can contribute towards basis for predicting the future supply.

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Introduction

Several authors have analyzed the trends in terms of area, production and yield of different crops grown in different regions of the world (Kumar and Mittal, 2006; Ali *et al.*, 2013; Abid *et al.*, 2014). Such information can aid the policy makers in recommending policies leading to sustainable increase in the food production (Chand *et al.*, 2007; Reddy and Mishra, 2009). These workers have also showed that the rapid growing population has increased pressure on agricultural land to produce more food (Anonymous, 2010). There are several reasons such as slowing agricultural yields, limited land availability and the increasing demand for biofuels leading to competition for available land and lag in the food supply. Recently, the phenomenon of land-grabbing has also intensified adding to the pressure on agricultural land and thereby on food supply. Thus, for the sustained agricultural growth, a holistic approach considering factors related to this resource cannot only balance the demand and supply but also augment growth in the rural economy and associated secondary activities like food processing and retail trading (Kannan and Sundaram, 2011).

The present study was undertaken to analyze the trends in area, production and yield of Cotton, Castor and Banana grown in India. This analysis was done at different levels viz. country, state and district level.

Methodology

A time series data from 2000-01 to 2011-12 (12 years) regarding the area, production and yield of selected crops viz. Cotton (*Gossypium hirsutum* L.), Castor (*Ricinus communis* L.) and Banana (*Musa paradisiaca* L.) were collected from the website of Directorate of Economics and Statistics, Ministry of Agriculture, Government of India. Trends studied for each crop are listed in the Table 1.

Country, State and District designates India, Gujarat and Vadodara respectively.

Results

The present study undertaken with a view to analyze

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the trends in area, production and yield of different crops of the study area during period 2000 to 2012 when done for the country, state and district showed variations. This type of information generated proves to be significant for the policy makers for developing their strategies. Such type of analysis therefore was done for major crops observed during the study viz Cotton, Castor and Banana.

Table 1. Trends analysis of different crops at different scales.

Sr. No.	Trend
1	Area at country level
2	Statewise area in country
3	Area at state level
4	Production at state level
5	Area at district level
6	Production at district level
7	Yield at district level

Cotton

a) At country level

Among all the major states of India, Maharashtra Gujarat, and Andhra Pradesh occupy the first, second and third position respectively, accounting for over 75% cotton sown area (Figure 1).

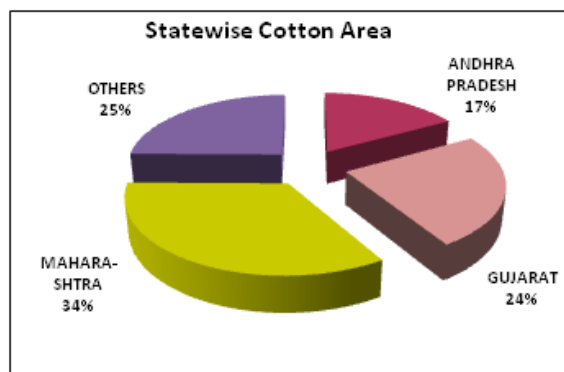


Fig. 1. Statewise Area under Cotton (in '000 hectares) in India 2011-12.

Trends in area under cotton crop in the country during 2000-2012 witnessed significant increase in the area covered by this crop (Figure 2). A 41.9% of increase from 2000-01 to 2011-12 was observed.

b) At state level

Gujarat has achieved significant quantitative increase

in cotton production over the years. The analysis has revealed an 85.9% increase in an area under cotton and 793.3% increase in cotton production during 2000-2001 to 2011-2012 respectively (Figure 3 and 4).

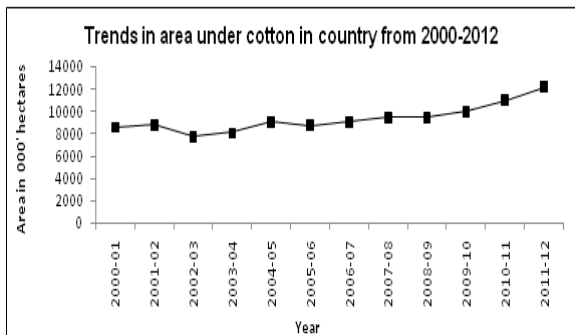


Fig. 2. Trends in area under cotton in country from 2000-2012.

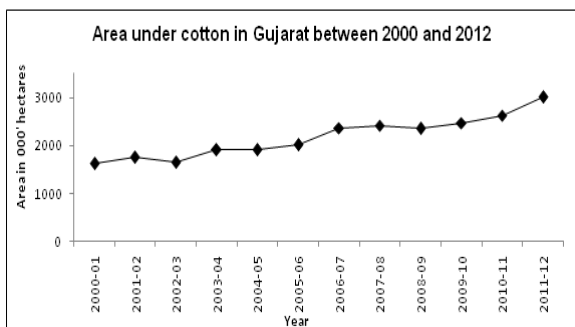


Fig. 3. Area under cotton in Gujarat between 2000 and 2012.

c) At district level

Vadodara district showed slight ups and downs in the cotton grown area but as such an overall increase in an area was observed from 2000 to 2012 (Figure 5). Concomitantly the production of crop has also drastically increased (Figure 6). A 268.3% increase in the production of cotton bales each of 170 kg has also been noted.

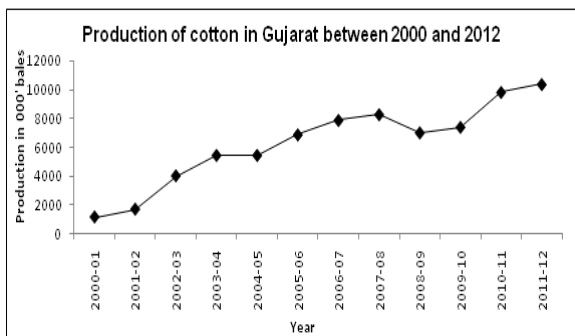


Fig. 4. Production of cotton in Gujarat between 2000 and 2012.

Cotton crop showed upward trend in cottonseed yields from 2000 to 2011. Yield climbed up by 261.8% in these years. Slight decrease in yield was observed in the year 2011-12 (Figure 7).

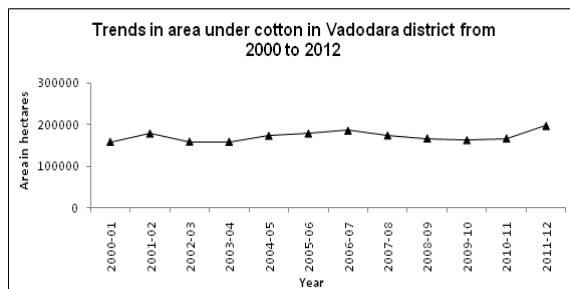


Fig. 5. Trends in area under cotton in Vadodara district from 2000 to 2012.

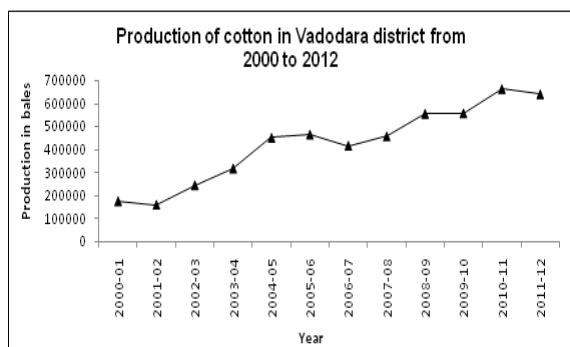


Fig. 6. Production of cotton in Vadodara district from 2000 to 2012.

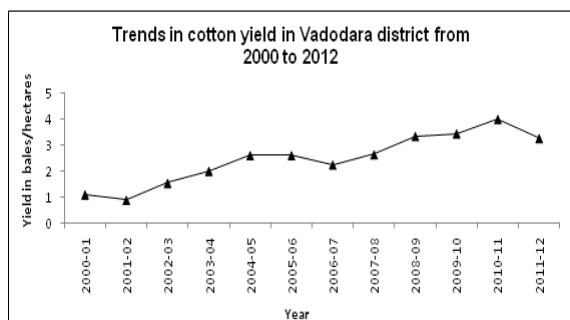


Fig. 7. Trends in cotton yield in Vadodara district from 2000 to 2012.

Castor

a) At country level

Gujarat covers the maximum area under castor (60%) compared to the whole country in the year 2011-12 which signifies the role of the state in terms of castor production in the country (Figure 8). Castor area in India increased from 678 thousand ha (2002-03) to 1459 thousand ha (2011-12) showing an increase of 115.9% percent (Figure 9).

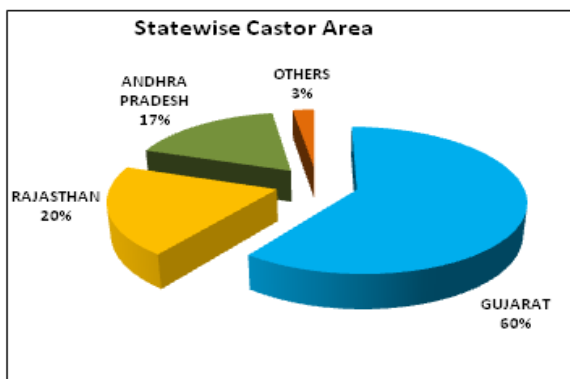


Fig. 8. Statewise Area under Castor (in '000 hectares) in India 2011-12.

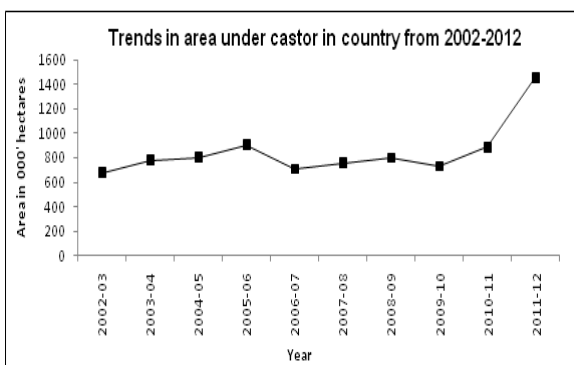


Fig. 9. Trends in area under castor in country from 2002-2012.

b) At state level

In Gujarat the area under castor crop decreased by 47.2% during the period of 2000-2003. The decrease in the area correspondingly resulted into the decrease in the production during the same period. In year 2011-12, a huge increase in an area has been noted which was the greatest among the years studied (Figure 10). Concurrently the production estimates of this oil seed has also increased during this year and the production recorded was the highest annual production over these years (Figure 11).

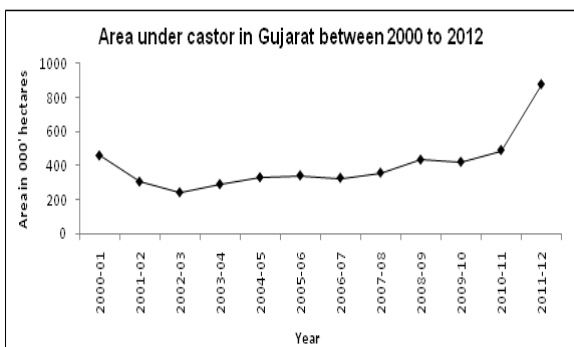


Fig. 10. Area under castor in Gujarat between 2000 and 2012.

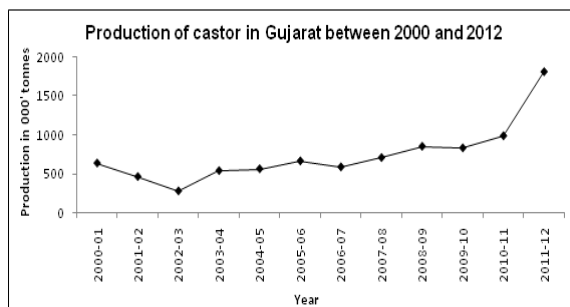


Fig. 11. Production of castor in Gujarat between 2000 and 2012

c) At district level

At district level, though there occurred variations in the area, the production and the yield in relation to castor crop, on average an increasing trend was observed from 2000 to 2012 (Figure 12, 13 & 14).

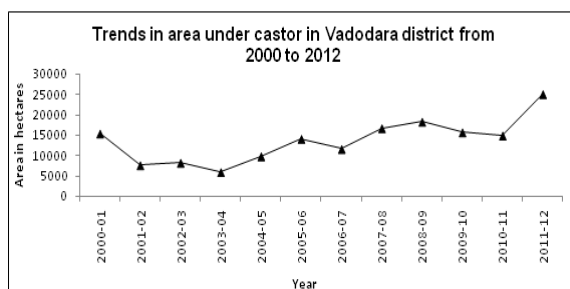


Fig. 12. Trends in area under castor in Vadodara district from 2000 to 2012.

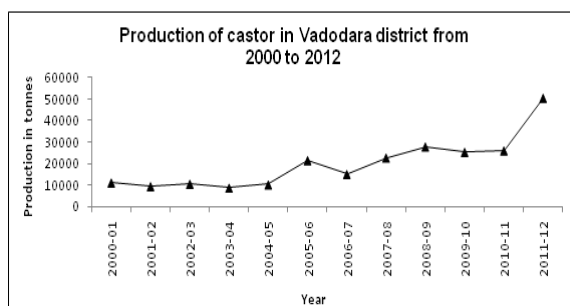


Fig. 13. Production of castor in Vadodara district from 2000 to 2012

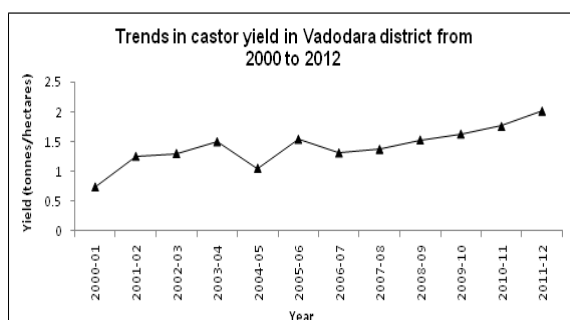


Fig. 14. Trends in castor yield in Vadodara district from 2000 to 2012.

Banana

a) At country level

Statewise distribution of banana in the country has highlighted that Gujarat covers only 7% of total area under banana plantation (Figure 15). In India, trends in banana area have shown gradual increase in an area sown under banana till 2008-09. A gradual decrease in an area has been recorded from 2009 to 2012 (Figure 16).

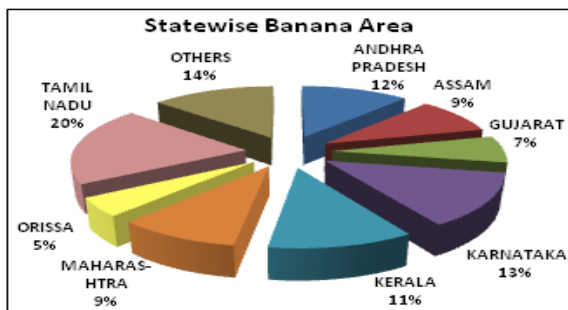


Fig. 15. Statewise Area under Banana (in '000 hectares) in India 2011-12.

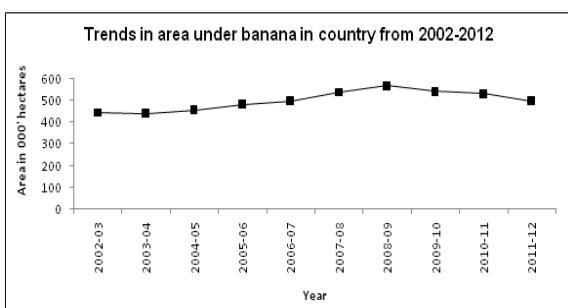


Fig. 16. Trends in area under banana in country from 2002-2012.

b) At state level

Area under banana plantation in Gujarat showed variation from 2000-2012 but an average increase of 25.4% in banana covered area and 60.5% in banana production has been observed with annual instability (Figure 17 and 18).

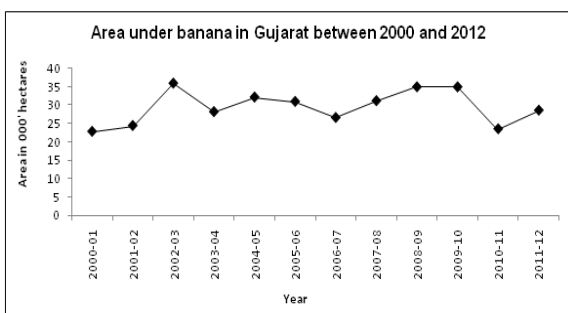


Fig. 17. Area under banana in Gujarat between 2000 and 2012.

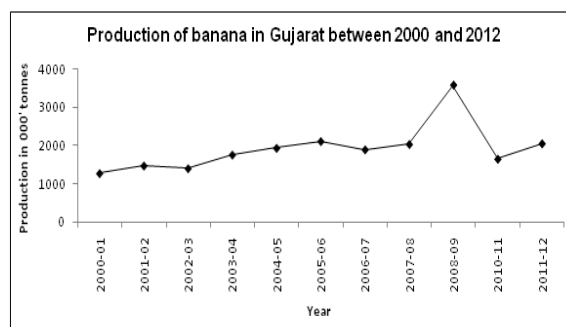


Fig. 18. Production of banana in Gujarat between 2000 and 2012.

c) At district level

Area, production and yield of Banana showed an instability in the trend over the years (Figure 19, 20 and 21). An overall decrease of 52.4% and 56.7% was observed in an area and the production respectively during the period 2000-12 along with decrease of 9.2 % in the yield.

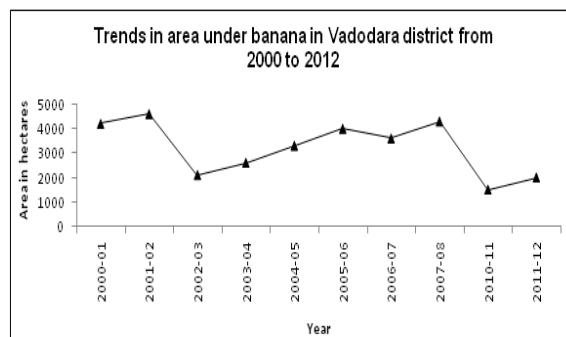


Fig. 19. Trends in area under banana in Vadodara district from 2000 to 2012.

Discussion

India is an agrarian country occupying 43% of India's geographical area. It ranks second world wide in farm output and accounts for 13.7% of Gross Domestic Product (GDP). It has been observed that there was a drastic drop in the agriculture GDP due to higher growth in the other sectors. In such circumstances, it is necessary that analysis of factors responsible for decreasing GDP should be looked into. Several workers have considered crop area, production and yield as few of the factors which are directly associated to GDP (Akintunde *et al.*, 2013; Golder *et al.*, 2013). The present study has confirmed to such association from the trend analysis of the selected crops viz cotton, castor and banana with respect to their area, production and yield. The analysis has

shown that no doubt country's GDP is crippling but Gujarat is quite vigilant in this matter both at state as well as district level.

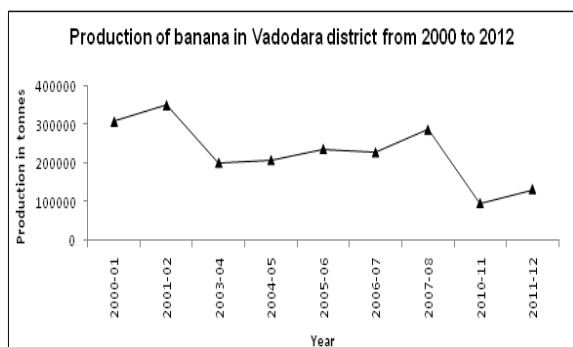


Fig. 20. Production of banana in Vadodara district from 2000 to 2012.

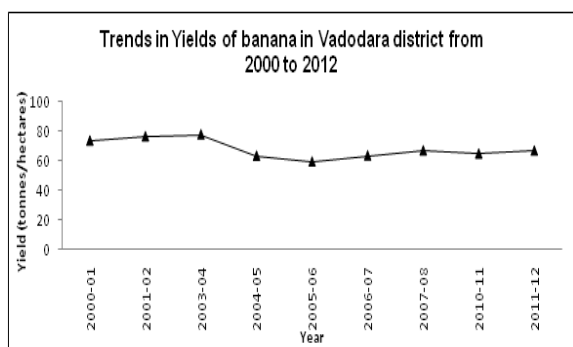


Fig. 21. Trends in yields of banana in Vadodara district from 2000 to 2012.

Conclusion

The world is experiencing rising demands for crop production, stemming from one of the key forces namely continuous enhancing human population. To meet these growing demands as well as to provide food security, some good researches on the trend analysis of important crops with respect to their area, production and yield has become a need of the hour. In the present work, an attempt was made to examine the trends in area of three important crops namely cotton, castor and banana at country (India), state (Gujarat) and district (Vadodara) level. Trends in production at state and district level, and trends in yield at district level were also examined. Results demonstrated the variations in area, production and yield of the selected crops. The study can aid the planners in deciding the growth rates to be achieved in accordance with the planned targets. Further, it can contribute towards basis for predicting the future

supply. Area increase nowadays has become constraint so focus should be given to yield increasing measures rather than increasing area under a specific crop.

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