



## TMC MM 5.1: Total Factor Productivity of Cotton in India

### Introduction:

Total Factor Productivity (TFP) analysis is an attempt to measure the amount of increase in the total output, which is not accounted for by increase in total inputs. There is a large residual, measured by total factor productivity, which is the contribution of improvement of technology/knowledge, infrastructural developments, human capital improvement and policy interventions. Total factor productivity relates output to all inputs simultaneously. The changes in Total Factor Productivity (TFP) indices over a substantially long period of time reflects extent of sustainability of the system as this indicates role of technology in increasing resource use efficiency and thus widening carrying capacity of the system.

### Objectives:

1. To examine the trends in area, production and productivity of cotton in major cotton growing states of India and issues related to overall performance of the

2. To construct the district-wise total factor productivity indices under different agro climatic zones of cotton growing states in India
3. To examine the changes in TFP of cotton and to identify the factors influencing such changes
4. To suggest policies and strategies to sustain the growth in TFP by district and region wise with reference to cotton economy.

### Salient findings:

Trends in area, production and productivity of cotton in major cotton growing states were analyzed. Data on state level cost of production of cotton, quantities of inputs used in cotton and productivity of cotton were collected from various sources belonging to the nine cotton producing states of India. Total input, output and productivity indices were worked out for each state using Tornquist-Theil indexing procedure. District level TFP was also worked out for some districts of Maharashtra. Compound growth rates of these indices were

worked out and their significance were tested.

### State wise TFP of cotton in India: (1980-81 to 2003-04)

The TFP index of Punjab state was the highest during the period 1986-87 (1.39) and the lowest during the period 1997-98 (0.47). In this state growth of TFP was negative during 1990s. But after 2000 TFP index showed positive growth. In Haryana TFP index showed negative growth during the entire period of analysis (1987-2003). It was due to more rapid growth of input index than the output index. In Rajasthan growth of TFP was positive during the period of analysis.

Input growth was significantly negative in Gujarat, while it was positive in Madhya Pradesh. Growth rate of output was highest in Madhya Pradesh. In this state output increased at the rate of 8.6698 per cent per annum. Output growth in Gujarat and Maharashtra was 4.98 and 4.43 per cent per annum. Total factor productivity growth was maximum in Gujarat (6.11 per cent)

followed by Madhya Pradesh (5.4242 per cent) and Maharashtra (3.9073 per cent). In Gujarat contribution of productivity growth to output growth was 110 per cent. Productivity growth contributed to 86.63 per cent of output growth in Maharashtra and 65.36 per cent in Madhya Pradesh

The result of Total Factor Productivity of cotton revealed that the total input index of cotton in the case of Andhra Pradesh has been increasing constantly from 1.14 to 2.55 during the period 1994-95 to 2003-04, In A.P. the TFP growth fared well during 1990s with 1.75 per cent when compared to 80s and 2000s during which it was negative. The TFP index of cotton for Karnataka during the period 1994-95 was maximum (1.66), followed by 1995-96 (1.14), 1996-97 (1.19) and 1999-2000 (1.14). For rest of the periods the indices were lesser than one, which indicated that return to the cost of cotton was very low during the recent years in Karnataka. In

Karnataka, the TFP growth rate rose to 0.80 per cent after 2000 when compared to 80s and 90s where the input use surpassed the output growth rate resulting in negative growth rate of TFP. In Tamil Nadu, the TFP of cotton revealed that the total input index of cotton has been increasing constantly from 1.13 to 2.03, during the period 1994-95 to 2003-04. The TFP index of Tamil Nadu has shown a declining trend till 2003-04. In Tamil Nadu, the scenario was a positive TFP growth rate to the tune of 0.28 per cent in the 80s but declined during 90s to the tune of -0.94 per cent respectively. After



2000, there was an improvement in TFP growth rate to -0.16 per cent with the increased output more when compared to the increase in the input.

#### District wise TFP growth of cotton in Maharashtra :

Total input, output and productivity indices were worked out for ten important cotton growing districts of Marathwada and Vidharba regions of Maharashtra for the period 1990-2008. During the overall period, input index as well as output index showed positive significant growth in almost all districts of Marathwada region. Total factor productivity growth was also positive and significant in all the districts except Beed. Contribution of productivity growth to total output growth ranged from 45.22 percent to 76.35 percent. It was highest (76.35 percent) in Nanded followed by Jalna and Parbhani in the Marathwada region. Growth of output index was positive in Yavatmal, Wardha and Buldhana districts while it was negative in Akola and Amaravati districts of Vidarbha region. Growth of total factor productivity was positive in all the districts except Amaravati. Contribution of productivity growth to output growth ranged from 30.99 percent to 121.08 percent in Vidarbha region.

