Abstract

Human Capital, Financial Capital, Infrastructure and Productivity of Indian Cotton

ABSTRACT

Cotton is one of the most important commercial crops of the world as also an important cash crop in India. It occupies 5 per cent of total cultivated area in the country and about 60 million people are dependent upon its cultivation, trade and processing for their livelihood. India had been a cultivator and exporter of cotton historically. Today India occupies a prominent position in world cotton hierarchy by ranking first in area under cotton and third in production. Cotton is grown in more than 20 states in here, but nine states namely Punjab, Haryana and Rajasthan in the Northern zone, Gujarat, Madhya Pradesh and Maharastra in the central zone, and Andhra Pradesh, Karnataka and Tamil Nadu in the Southern zone account for more than 99 per cent of the area and production.

India occupying more than one fourth of the area (25.4 per cent) contributed only 8.5 per cent (20.7 lakh tonnes) of the world output (245 lakh tonnes) of raw cotton during 1999-2000. This dismal performance is attributed to the yield level of Indian cotton. The yield of cotton is extremely low (223 kg/ha)compared to the other major producing countries like Bangaladesh (3655 kg/ha), China (1147 kg/ha), Pakistan (648kg/ha), etc. and the world average of 671 kg/ha. Even in India, the state level yield varied from 139 kg/ha in Maharashtra to 416 kg/ha. in Gujarat. Against this background, the specific objectives of the study were the following.

i. To identify the major determinants of productivity of cotton including human capital, financial capital and infrastructure like rural roads.

ii. To estimate the impact of human capital, financial capital and infrastructure on cotton productivity.

iii. To identify critical components of human capital, financial capital and infrastructure that influence cotton productivity.

The thesis is presented in 10 chapters. Following the first chapter on introduction to the study, review of literature relevant to the study is cited in chapter II while chapter III discusses the data and methodology used in the study. Chapter IV gives an overview of cotton cultivation in India. Chapters V & VI explain the characteristics of the study area and demographic and socio economic characteristics of the sample households. Chapter VII discusses the package of practices followed for cultivation of cotton by the sample households. Chapter VIII relates various variables such as human capital, financial capital and infrastructure to cotton productivity. Chapter IX presents the conclusions and chapter X gives policy implications emerging from the study.

The review of various studies using human capital as one of the explanatory variables for measures of economic development in general and agricultural production in particular showed that they have used various measures of human capital, like school enrollment ratios at the macro/ aggregate level or number of years of schooling of the entrepreneur at the individual level. The evidences are cited from studies in India as well as from other countries. Studies have also measured the relationship between various physical inputs, institutional factors like credit, extension service, etc. , infrastructural factors like availability of road, elec-

tricity, etc. and agricultural productivity. The results indicate that human capital, either as the education level of the farmer or average education level of the farm household, enters the production function by way of the farmer's ability to receive and decode new information and adopt modern technology in his production process.

The present study was conducted in the year 2001 in two districts of Maharashtra, the state with largest area under cotton. The study districts of Amravati and Nagpur were selected at random from two groups of major cotton districts in the state varying in infrastructural development. A three-stage sampling procedure was used to select farmers for the study. Data were collected from primary and secondary sources. Primary data, which pertained to the cropping season 2000-01 were collected from 240 sample farmers using a structured questionnaire. Analytical techniques used were mainly production functions and logistic regression models. Frequency and means were estimated for different variables.

An analysis of pattern of cotton cultivation in the country reveal that the northern zone covers 19.3 per cent of the total area under cotton and account for 19.2 per cent of the total production. Cotton is grown as a kharif crop and around 95 per cent cotton area in this zone is irrigated. The central cotton zone account for 57.2 per cent of the area and 57.3 per cent of the production. Only 15 per cent of the total cotton area sown in this zone is irrigated. The southern zone occupies 22.9 per cent of the area and account for 22.7 per cent of the production. One-third of the cotton area in the zone is irrigated. Among the major states, Maharashtra, Punjab, Rajasthan and Haryana registered positive growth in area under cotton throughout the period from 1950-51 to 1998-99. The rate of growth

was higher in Rajasthan (2.92 per cent). The states to record negative growth in area and experienced absolute decline in area under cotton were Karnataka and Madhya Pradesh. During 1984-85 to 1997-98, most of the states recorded impressive growth rates in yield, which included Maharashtra (4.16 per cent), Gujarat (5.30 per cent), Madhya Pradesh (4.69 per cent), Karnataka (3.84 per cent), Rajasthan (2.56 per cent) and Andhra Pradesh (2.23 per cent). The states of Punjab and Tamilnadu recorded negative rates of growth in yield due to decline in the higher yield level that achieved earlier, although their yield levels were higher than the average.

Marketing of cotton is done mainly by the private sector which handle 70 per cent of the output while the public sector comprising of the State Co-operative Marketing Federations and Cotton Corporation of India (CCI) handles 30 per cent of the output. The Maharashtra State Co-operarive Marketing Fedeartion, major agency in the public sector, which handles 20 per cent of the output due to the cotton monopoly procurement scheme operating in the major cotton state while CCI handles around 8 per cent and all other State Federations together 2 per cent.

The study district of Amravati has a net sown area of 751 thousand hectares forming 61.5 percentage of the reporting area. Only 7 per cent of the net sown area is irrigated. Economy of the district is predominantly agrobased. Cotton is the important cash crop of the district occupying more than half of the gross cropped area. Over the years, there has been decline in area under coarse crereals like jowar and increase in area under Soyabean. Green gram and black gram are other important crops in the district, black gram mostly grown as intercrop in cotton.

The other study district, Nagpur, has a net sown area of 55.9 per cent. Irrigated area forms 35 per cent of the net sown area. Cropping pattern of the district is dominated by cereals covering nearly 50 per cent of the gross cropped area followed by pulses, which occupy nearly 30 per cent of the gross cropped area. Cotton is the important commercial crop occupying 16 per cent of the area. There is a trend of replacing cotton by soyabean in the district during the recent years.

As per the demographic profile of the sample cotton farmers, the average age was 47 years in Amaravati and 56 years in Nagpur with average experience in cotton farming of 20 years and 30 years, respectively. Around 20 per cent of the sample farmers in both the districts had services as subsidiary occupation. Nearly 16 per cent of the sample farmers in Amravati and 9 per cent in Nagpur district were illiterate. One third of the sample farmers in Nagpur and 10 per cent in Amaravati had education above higher secondary.

Among the various sources of technical information received by the sample farmers, the Marathi program *Amchi Mati Amchi Manase* in television ranked first in both the districts. Out of 120 sample farmers, 99 farmers (82.5 per cent) were reportedly watching this programme in Amaravati district and 84 farmers (70 per cent) in Nagpur. Reading farm related information in Marathi dailies like *Sakal, Lokmat, Loksatta, etc.* was the second largest source of technical information among various one-way channel or passive sources. Listening to Marathi radio programme *Majhe Ghar Majhevavar* was the third largest source of technical information in Amaravati district while it was reading farm journals in Marathi viz. *Kshetkari* and *Baliraja* was in Nagpur district. The prominent source of two-way channel or active source

of technical information was progressive farmers in Amaravati while it was visit by extension officer in Nagpur. Visit by extension officer to the farm at least once during the reference crop duration was reported by 62 sample farmers (51.7 per cent) in Amaravati. Attendence in farmer training programmes was reportedly negligible in both the districts as only 10.8 per cent of the sample farmers in Amaravati and 7.5 per cent in Nagpur reported to have attended at least once such programme.

Majority of the sample households (91.6 per cent in Amaravati and 79.2 per cent in Nagpur) had availed credit facilities from various sources. Institutional source comprising of co-operatives and commercial banks accounted for 92 per cent of the borrowers and 96.7 per cent of the amount of borrowings. In terms of infrastructure, the sample cotton farms in Amaravati were having comparatively less connectivity, less electrification and less coverage of irrigation.

The parameter estimates of the productivity function of cotton for Amaravati indicated that the years of education of the head of the household has psitive and statistically significant effect at 1 per cent level. This confirms the positive education-productivity hypothesis. Other education variables such as the average number of years of education of all members of the household, maximum number of years of schooling attained by anyone member of the farm household, education of the head of the household upto 4 years and education of the head of the household from 4 to 10 years, although had expected positive signs, were not significant even at 10 per cent level.

Education of the head of the household above 10 years had a statistically significant effect at 1 per cent level. The findings implies that the education productivity relationship is significant with respect to the education level of the farmer himself (decision maker). Education level of 10 years and above is required to have a significant education-productivity relationship.

Visit by Extension Officer to the farm had a positive influence on cotton productivity statistically significant at 10 per cent level. Adoption of recommended package of practices for cotton had positive influence on productivity statistically significant at 1 per cent level. Use of fertiliser nutrients, use of organic manure and crop loan from institutional sources had strong positive effect on cotton productivity, all statistically significant at 1 per cent level. Irrigation, though had expected positive sign, effect on productivity was not significant even at 10 per cent level. The other infrastructural variable, i.e. road dummy variable had a positive effect on productivity statistically significant at 5 per cent level in 2 specified equations and statistically significant at 1 per cent level in the rest 4 specifications. The results of the study in Nagpur district were similar with respect to human capital variables. The impact of education variable on productivity was higher in Nagpur compared to Amravati. This implies that the education productivity relationship is strong in an environment of better infrastructure. The impact of visit by Extension Officer, another human capital variable, was also higher in Nagpur district compared to Amravati district. This results corroborates the hypothesis that the education productivity relationship is stronger in a dynamic setting.

Education of the head of the household was having a positive effect on demand for credit statistically significant at 10 percent level. This result is in confirmation with the hypothesis that education has positive and significant influence on demand for credit facilities. The farm size although had positive sign, was not significantly influencing the demand. The use of fertiliser nutrients affects the credit demand positively and statistically significant at 5 per cent level.

The productivity of cotton in Amaravati was higher for adopters (14.4qtl/ ha) compared to non adopters (7.45 qtl/ha) and the difference was statistically significant at 1 per cent level. Percentage of irrigated area, application of organic manure and application of fertiliser nutrients were higher for adopters and statistically significant.

The logit regression model gave a good fit to the adoption behaviour of the sample farmers. Education in years of the head of the household influences the adoption decision positively and significant at 5 per cent level. The adoption of recommended package of practices, was influenced positively by visit by extension officer and the influence was statistically significant at 1 per cent level. Other variables that emerged to affect adoption decision positively were crop credit and irrigation each significant at 1 per cent level. Infrastructure variable like road also emerged as positively influencing adoption decision, coefficient statistically significant at 10 per cent level. The average probability of adoption of recommended package of practices of sample farmers in Amaravati was 0.26 and 0.33 in Nagpur. Age variable, as observed in

Amaravati, had positive sign contrary to the expectation that older farmers may be slower in adoption.

The marginal impact of different variables indicate that one extra visit by the extension officer increases the probability of adoption by 31 per cent and 42 per cent in Amaravati and Nagpur, respectively. Similarly, one year of additional education of the farmer increases the probability of adoption of the recommended package of practices by 11 per cent and 19 per cent. It could also been seen that the marginal impact of each of the variables are more in district (Nagpur) which is infrastructurally better developed.