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Performance of cotton cultivation in Tamil Nadu – an empirical study

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Abstract: In 1996-97 the maximum area of 9.16 million hectare was achieved leading to a production of 17.5 million bales. Over the last 40 years this was the record production. In spite of achieving the maximum production in 1996-97 the area and production came down to 8.7 million hectares and 16.8 million bales respectively during 1999-2000. To know the reason for this decline trend in cotton cultivation in Tamil Nadu the present study was proposed and conducted at Salem District of Tamil Nadu. By employing snowball sampling technique 144 farmers were selected in this study. The well structured and pre-tested questionnaire was used for collecting the relevant data. By adopting percentage analysis, suitable inferences was made from the collected results. It was found that the majority of the respondents (64 %) reduced their acreage under cotton from their potential cotton area and one – fourth of the respondents had reduced their area under cotton to the extent of 26–50 per cent of their total potential cotton area. Among the reasons for the decline, more pests and diseases, high cost of cultivation, income not to commensurate with cost of production, reduction in yield year after year and no remunerative prices were the most important reasons for decline of cotton cultivation as expressed and ranked I to V by the majority of the respondents. It is suggested that the policy maker, chief executives and field level workers may take this research findings in positive way and work to restore the situation as soon as possible to enrich our farming community wealth and health by producing quality kapas. (*Key words:* Performance of Cotton, Extent of Decline of Cotton, Research for Decline of cotton).

India has the distinction of having the largest area under cotton cultivation but its productivity per hectare is extremely low. Although cotton production in the country has increased from 2.2 million bales in 1947 to 16.8 million bales in 2000. In 1996-97 the maximum area of 9.16 million hectare was achieved leading to a production of 17.5 million bales. Over the

last 40 years this was the record production. In spite of achieving the maximum production in 1996-97 the area and production came down to 8.7 million hectares and 16.8 million bales respectively during 1999-2000, at the same time they were found to be the second best set over the last more than four and half decades. In Tamil Nadu, cotton is cultivated in 1.848 lakh

hectares with a production of 2.885 lakh bales during 1999-2000 (Technology Mission for Cotton Report 2000). The major cotton growing districts in Tamil Nadu are Virudhunagar, Perambalur, Salem, Tuticorin and Dharmapuri. The area under cotton stood at a maximum of 3.92 lakh hectares during 1960-61 and it declined over the years attaining a minimum of 1.848 lakh hectares during 1999-2000. To overcome the above set back the Tamil Nadu Government has constituted a State Cotton Council (1999) to coordinate various aspects of cotton development in the State. At present, Tamil Nadu production is about 2.885 lakh bales of cotton, as against a requirement of 28 lakh bales. The deficit is made good by supplies from other areas. Transportation charges alone about Rs.300/bales (Kairon, 1999). Likewise, increase of cost of cultivation, occurrence of more pests and diseases and poor yield performance led reduction of cotton yield and area over the period in our country. Perhaps other commercial crops are giving more profits than the cotton during these days. The study conducted by Balasubramanian (1985) revealed that the area under cotton at state as well as district level was widely fluctuating over years. About 53 per cent of the respondents decreased their acreage under cotton. Again the same study reported that causes for decline in area under cotton were want of remunerative price, increased pest and diseases, high cost of cultivation, poor quality of pesticides, reduction in yield year after year and scarcity of labour. To overcome problems of reducing cotton area, production and productivity and to revamp the present cotton status, the Government have to frame and implement the need and area based programme in cotton. Before framing the policy, assessment of performance of cotton and reason for the same is essential. Hence the present study was formulated with the objectives of performance of cotton cultivation and reasons for the poor performance in Tamil Nadu.

Materials and Methods

Assessment of performance of cotton cultivation and reasons for the poor performance of cotton was carried out in Salem district of Tamil Nadu. Since Salem district is the one of the important cotton-growing environment in Tamil Nadu, which is growing irrigated, summer and rainfed cotton and third largest area under cotton in this state. In addition Government, NGO's and Private agencies equally contributing for cotton development in this district. Hence this district was selected for this study. By employing the Snowball Sampling technique, sample size of 144 was selected from the three

taluks of the district. The well-structured and pre-tested questionnaire was prepared for collecting relevant data from the farmers. Suitable statistical tools was used for analysing the collected data. Based on the analysis the relevant inference was made in this study.

Results and Discussion

Performance status of cotton cultivation

Performance status of cotton cultivation was assessed in the selected study area. The status was observed based on the trend of changes in area under cotton over the years at farmers' level. In addition to that the extend of decline in area under cotton and reasons for decline of cotton area was also studied and the results are presented hereunder.

Trend of changes in area under cotton over years at farmers level

Table 1 revealed that majority (65.97%) of the respondents reduced their area under cotton cultivation. A little higher than one-fifth maintained the acreage under cotton, while only 12.5 per cent of the respondents increased the area under cotton. Cotton being a commercial crop require special attention of the farmers and high investment on inputs like seed, fertilizers, labour, pest and disease control measures. In addition to fluctuation in the yield and cotton price over the years, the respondents were not in a position to take up cotton cultivation continuously. Hence, majority of the respondents had reduced their area under cotton cultivation. The result is in agreement with the finding of Balasubramanian (1985) who reported that majority of the respondents had reduced their area under cotton cultivation. This condition emphasized the need for efforts to increase the area under cotton with a view to increase the production and productivity of cotton.

Extent of decline in area under cotton

The farmers were asked to give details of actual area under cotton for five years from 1994 to 1999. Based on the responses the extent of decline were worked out and the results are presented in the following Table No.2.

It could be observed from the Table No.2 that one-fourth of the respondents had decreased their area under cotton cultivation to an extent of 26-50 per cent from their total potential cotton area. A little higher than one-fifth of them maintained their cotton area. Further, 76-100 percentage of cotton area has been reduced by the 13.36 per cent of the respondents. A little higher than half per cent to one-third per cent of area under cotton had decreased by the 13.19

Table 1. Trend of changes in area under cotton over years at farmers' level

(n=144)

Sl. No.	Trend of changes	Number	Per cent
1.	Decrease	95	65.97
2.	Maintenance	31	21.53
3.	Increase	18	12.50

Table 2. Distribution of the respondents according to the extent of decline in area under cotton cultivation

(n=144)

Sl. No.	Extent of decline		Number	Per cent
1.	1-25%	decline	15	10.42
2.	26-50%	decline	36	25.00
3.	51-75%	decline	19	13.19
4.	76-100%	decline	25	13.36
5.	Cotton area maintained (No decline and no increase)		31	21.53
6.	1-25%	increase	6	4.17
7.	26-50%	increase	8	5.56
8.	51-75%	increase	2	1.39
9.	76-100%	increase	2	1.39

Table 3. Reason for decline of cotton area as expressed by the respondents

(n=144)

Sl. No.	Reason for decline	Per cent*	Rank
1.	More pests and diseases	92	I
2.	High cost of cultivation	87	II
3.	Income not to commensurate with cost of production	80	III
4.	Reduction in yield year after year	76	IV
5.	No remunerative price	70	V
6.	Scarcity of labour and higher labour wages	68	VI
7.	Poor quality of inputs	65	VIII
8.	Lack of assured irrigation	55	VII
9.	Low knowledge about latest technologies	42	IX
10.	Lack of guidance	35	X
11.	Occurrence of micro-nutrient deficiency	24	XI
12.	Attraction to other commercial crops	17	XII

* Multiple response

percentage of the respondents. Only meagre percentage had increased the area under cotton cultivation to a range upto 25 percentage (4.17%), 5.55 per cent of the respondents had increased the cotton area from their actual potential by 26-50 percentage and few by 51-75 percentage and 76-100 percentage had increased their area

under cotton. Again the finding is in line with that of Balasubramanian (1985). The above findings indicated that majority of the respondents had reduced their area under cotton cultivation. The study further thus explored the reasons for decline of cotton cultivation among the respondents and the same is detailed below.

Reasons for decline in cotton area

The different causes for decline in area under cotton as expressed by the respondents were tabulated in the Table No.3 and discussed hereunder.

Among the reasons for the decline, more pests and diseases, high cost of cultivation, income not to commensurate with cost of production, reduction in yield year after year and no remunerative prices were the most important reasons as expressed and ranked I to V by the majority of the respondents.

Damage by 'more pests and diseases' was the first and foremost reasons expressed by the majority of the farmers for decline of cotton area. Dependability on chemical methods, occurrence of new pests and new form of attack, lack of technical assistance in identifying pest and adopting proper control measures, existence of long duration cotton varieties which attract more pests and diseases and escalation of cost of chemicals might be the grounds on which these reasons would have been stated by the respondents. In addition, IPM has strongly recommended to the farming community with provision of all required facilities, but, the farmers were still confident with chemical methods to eradicate/control the pests and diseases in cotton cultivation. This is in agreement with the findings of Ramachandran (1980), Senthil (1983) and Balasubramanian (1985).

The second important reason encountered was 'high cost of cultivation' (87.00%). It was due to increased costs of the inputs. An analysis on cost of labour and inputs revealed that the labour alone had taken 48 per cent, pesticides 9 per cent and fertilizer 6 per cent in total cost of cotton cultivation. With the present day high cost of inputs, increased wage structure and the insufficient income from cotton might not have created much enthusiasm among the respondents in cotton cultivation. Such a situation might have driven the respondents to state that 'high cost of cultivation' was one of the reasons for declining of their area under cotton. This finding is in conformity with the findings of Banerjee (1974), Ramachandran *et al.* (1980) and Balasubramanian (1985) who also reported that decline in area under cotton was due to high cost of cultivation.

'Income not to commensurate with cost of production' was the third major reason for decline of cotton area as expressed by the respondents. The possible reason might be due to the escalation of input cost, the magnitude of which was much more than the price of kapas

might be the reason for reducing area for cotton. For example, the cotton price fluctuated between Rs.1000 and Rs.2500/Q for the past one decade while there was four fold increase in input costs. But there was no proportionate increase in the price of kapas. This situation might have made the cotton growers to reveal the above reason. This is in agreement with the findings of Banerjee (1974), Ramachandran *et al.* (1980), Senthil (1983) and Balasubramanian (1985) who also reported that income from cotton did not commensurate with cost of the production.

The next important reason as stated by 76.00 per cent of the cotton growers was 'reduction of yield year after year'. This might be due to the growing of several varieties differing in quality and susceptibility. It might also be due to the incidence of more pests and diseases, micro-nutrient deficiency and the exploitation by the private cotton seed producers who selling poor quality cotton seeds to the innocent growers, and failure of monsoon at times of demand which resulted in genetic variation paving way to poor yield year after year. This finding is in line with the findings of Balasubramanian (1985), Koranne (1996), Lande (1996) and Kairon *et al.* (1999).

'Lack of remunerative price' was the major reason for seventy per cent of the cotton growers. Want of minimum guaranteed price, lack of proper marketing facilities, exploitation by commission agents and middlemen, lack of knowledge about the current market rates and escalation of input cost might be the grounds on which majority of the respondents expressed this reason for the decline of cotton area. Similar findings were reported by Singh *et al.* (1961), Kamaladevi (1964), Balasubramanian (1965), Sankaran (1971), Senthil (1983) and Balasubramanian (1985) with reference to cotton.

'Scarcity of labour and higher labour wages, poor quality of inputs, lack of assured irrigation, poor knowledge about latest technologies, lack of guidance, occurrence of micro-nutrient deficiency and shift to other commercial crops' were the other important reasons expressed by respondents for the decline of cotton area. These reasons were ranked VI to XII.

'Scarcity of labour and higher labour wages' was expressed as sixth major (68.00%) reason for decline of cotton area. This might be due to be existence of a number of textile mills, building works (construction works) and small industries in the study area, operation of town buses in the villages and the proximity to the

nearby city making the availability of labour very difficult for farming. The scarcity of labour lead to the demand for labour. As the cotton crop requires more labour especially at harvest stage, the cotton growers have to necessarily engage the required labour inspite of the demanded increased wage structure. But farmers were not in position to pay higher wages due to low return in this crop, which resulted in decline of cotton area. Balasubramanian (1985) and Sriram (1997) also reported similar reasons for decline of cotton area in Tamil Nadu.

Sixty five per cent of the respondents expressed 'poor quality of inputs' as one of the reasons for decline of cotton area. This might be due to immunity created by pests owing to over-doing of plant protection measures by farmers and also might be due to improper enforcement of quality control measures against the pesticide and fungicide dealers. This is in agreement with the findings of Balasubramanian (1985), Lande (1996), Koranne (1996) and Sriram (1997) who also reported that 'poor quality of inputs' as one of the reasons for decline of cotton area.

A little more than half of the respondents stated that 'lack of assured irrigation' as the eighth important reason for decline of area under cotton. This might be due to the excessive exploitation of ground water and frequent failure of monsoons. The finding derived support from the findings of Balasubramanian, Koranne (1996), Sriram (1997) and Kairon *et al.* (1999).

'Poor knowledge about the latest technologies' was ranked as the ninth important reason for decline of area under cotton by forty-two per cent of the respondents. The farmers did not know alternate furrow irrigation, latest varieties, plant protection through bio-control agents and other latest sustainable practices in cotton cultivation which resulted in poor adoption of profit making technologies in cotton. It led reduction in cotton cultivation in this area. This result is in line with the findings of Koranne (1996) and Sriram (1997).

Thirty five per cent of the respondents expressed 'lack of guidance' as one of the reasons for decline of area under cotton. Latest technologies of cotton crop required special expertise and care in handling them, which could be provided by scientists or extension staff alone. However, on enquiry it was found that some of the private dealers in pesticides knowingly or unknowingly recommend the use of bio-control agents along with other chemicals, thereby defeating the very purpose of adopting them. Hence, an expectation

had developed among the farmers to have proper technical guidance on the use of latest technologies before adopting them. This might be the reason for expressing 'lack of guidance' for decline of area under cotton among the respondents. Similar finding was observed by Sriram (1997).

A little less than one-fourth of respondents expressed 'occurrence of micro-nutrient deficiency' as one of the reason for decline of area under cotton. This might be due to fact that cotton crop required balanced nutrients including macro and micronutrients. But, the cotton crop suffered with deficiencies of micronutrient like magnesium, zinc and other nutrients over the period, which resulted in poor yield. This finding is in line with the finding of Kairon *et al.* (1999) who observed that nutrient imbalance particularly sulphur and zinc deficiency were one of the issues threatening the sustainability of cotton production.

'Attraction of other commercial crops' was one of the reason for decline of cotton area as expressed by 17.00 per cent the respondents. The commercial crops like sugarcane, flowers, fruits and vegetables and tapioca were attracting the farmers due to the reason of high profit and steady market, low labour requirement and good remunerative price which altogether resulted in declining cotton crop and attracted towards other major commercial crops. All these discussed factors would have contributed to the decline of area under cotton.

It could be concluded that the majority of the respondents (64 %) reduced their acreage under cotton from their potential cotton area and one - fourth of the respondents had reduced their area under cotton to the extent of 26 - 50 per cent of their total potential cotton area.

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Influence of moisture levels and storage temperature on storability of neem stones

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Abstract: Studies were carried out with neem stones to trace the influence of stone moisture and storage temperature on its storability each at three different levels. The six months study expressed that neem stones with 15-20% moisture content could be stored at ambient temperature for 3 months, at 5°C for 4 months and at 10°C for 6 months. (*Key words:* Moisture level, Storage temperature, Neem Stones).

Roberts (1973) introduced the term recalcitrant in seed storage. Later on Ellis *et al.* (1990) introduced the terminology intermediate in storage of seeds that falls inbetween orthodox and recalcitrant storage behaviour of seeds. Bellefontaine and Audinet (1992) noted a characteristic difference between neem seeds from India, Pakistan and Tailand on one side and those from Africa and latin America on the other side. Seeds of African and Central American varieties could be lowered to 5.7% moisture content and can be stored well for many years, while the seeds of provenances like India and Pakistan could not be so. Hong and Ellis (1998) reported that *Azadiracta indica* expresses intermediate storage behaviour, while Sacande *et al.* (1998) reported that neem seeds with initial moisture content of around 10 per cent can be stored at 10-15°C for upto 2 years. Hence studies were

conducted to elucidate the influence of moisture level and temperature on storage life of neem stones collected from Coimbatore location of Tamil Nadu. India.

Materials and Methods

Fruits collected from fifty years old neem trees located at Tamil Nadu Agricultural University, Coimbatore (11°N 77°E 426.72 MSL) formed the base material for the study. Physiologically matured yellow fruits were collected and depulped with water. Stones were extracted carefully by hand without damaging the kernel and were shade dried to bring the moisture content to different levels *viz.* 20% (M₁), 15% (M₂) and 10% (M₃). The stones were treated with thiram @ 4g kg⁻¹ of stone and packed in 300 gauge polythene bag and kept at different temperature conditions *viz.* T₀ (room temperature), T₁ (10°C)