

## Impact analysis of cotton technologies developed by cotton scheme at RARS, Nandyal for a period of one decade (1991-2001)

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### ABSTRACT

The study was conducted to assess the adoption pattern, costs and returns of different cottons besides the impact of technology generated by cotton section of RARS, Nandyal. For this, 12 mandals in Kurnool, Cuddapah and Prakasam districts were selected where cotton was grown extensively. From these mandals 48 villages and 160 farmers were selected at random. The impact due to hybrid cotton seed production technology and due to cultivation of elite varieties Narasimha and Aravinda was 46, 6 and 3 crores of rupees respectively. The total impact due to research and development of technologies on cotton was 630 crores of rupees since 1990-91 onwards.

**Key words :** Cotton technology, Analysis, Cotton scheme.

### INTRODUCTION

In the scarce rainfall zone different cottons, grown are Desi Cotton, American cottons and hybrids. In Desi cottons Pandaripur Mungari is local variety and an improved var Aravinda was evolved in 1996 from RARS, Nandyal and found popular among the farmers. The local popular hybrid is NHH-44. But the elite variety Narasimha which was released in 1994, is competing with NHH-44 and replacing NHH-44 in this zone and in many parts of the state also. Hence to assess the impact of the cotton research, the performance of Aravinda and Narasimha was studied. Cotton seed production technology was popularized to the farming community by the cotton scientists of RARS, Nandyal since 1980's through number of training programmes. The Kurnool district is famous for cotton seed production. Hence the impact of this aspect was also estimated here.

### MATERIAL AND METHODS

Cotton is not grown uniformly throughout the zone. It is concentrated in some pockets of the district in certain mandals only. Hence depending on the area, 10 mandals in Kurnool district, one mandal in each of Prakasam and Cuddapah districts were selected. From each mandal 4 villages were selected at random and totally 48 villages were selected. A total of 160 farmers @ 3-4 farmers from each village were selected from 48 villages. Among these farmers, each of 40 farmers were growing Pandari Mungari, Aravinda, Narasimha and hybrid cotton NHH-44. The required information from these farmers was collected, tabulated and processed to arrive at conclusions. Cost and returns per hectare were also computed.

### Data Analyzed:

The information on adoption pattern of technology such as variety, FYM and chemical fertilizers applied, method of application, delinting of seeds, seed treatment with chemicals, seed rate, spacing adopted, inter cultivations, use of weedicides, plant protection measures, IPM and INM measures, irrigation etc., were collected for Mungari, Aravinda, Narasimha varieties and hybrid cotton NHH-44 for the crop period 2000-2001. Operation-wise cattle and human labour unit required were also collected. To calculate the cost of cultivation, interest on working capital was assessed. Lease amount was also added to the cost of production. For computing gross returns, the yields obtained by the farmers and unit cost of kapas sold by the individual farmer was collected during survey. The information thus collected was tabulated and processed to arrive at conclusions.

### RESULTS AND DISCUSSION

The study was conducted to assess the adoption pattern, costs

and returns of different cottons besides to impact of technology generated by cotton section. For this, in Kurnool, Cuddapah and Prakasam districts, 12 mandals where cotton was grown extensively were selected. From these mandals 48 villages and 160 farmers were selected randomly. The relevant information was collected to achieve the objectives and the results are furnished below.

In Desi cotton, delinting of seed was not used and similarly seed treatment was also not done. In case of cotton hybrids and Narasimha var all the farmers used delinted seed, but seed treatment was not a practice and only limited farmers adopted this aspect. In Pandaripur Mungari and Aravinda higher seed rate of 14.5 and 16.2 Kg/ha was adopted as against the recommendation of 10-12 Kg/ha respectively. The Narasimha cotton growers were using low seed rate than the recommendation. The spacing adopted by the cotton growers of Narasimha was high as much as 120x30 cms against the recommendations of 90x45 cms. All Pandaripur Mungari cotton growers, 40 per cent of Aravinda and 60 per cent of Narasimha cotton growers were sowing cotton seed by drilling, whereas all the hybrid cotton growers adopted dibbling method.

Application of FYM for Desi cottons and hybrid cottons was less than the half of the recommendation of 10 t/ha while for Narasimha, it was 8.3 t/ha. The farmers were not adopting soil test based fertilizer application. Very limited number of five per cent of Aravinda growers and about 10 per cent of hybrid and Narasimha growers have got tested their soils. Most of the farmers were not applying basal dose of fertilizers for P.Mungari, Aravinda and hybrids and 60, 82 and 77 per cent of the farmers did not apply basal dose respectively while none has applied to Narasimha. The average quantity of basal dose applied was 11+13+2, 7+7+0 and 9+20+3 NPK kg/ha for P.Mungari, Aravinda and hybrids respectively as against the recommendation of 10+20+0 for desis and 60+60+30 NPK kg/ha to hybrid cottons. Top dressing of fertilizers was applied by 80-83% of Desi cotton growers and by all farmers of hybrid and Narasimha. The top dressing of fertilizer were 2-3 times more than recommendation in desis. Similarly in hybrids and Narasimha also, the top dressing was more than double the recommendation.

The total quality of fertilizers applied for P.Mungari was 41+43+6 and Aravinda 37+38+10 as against the recommendation of 20+20+0 NPK Kg/ha. Hence the farmers were applying double the recommended fertilizers. The expenditure on cost of cultivation can be reduced by Rs.650 per hectare if recommended fertilizer dose was adopted.

The total quantity of fertilizers applied for cotton hybrids was 145+135+40 and for Narasimha var 117+95+39 as against the recommendation of 120+60+60 for hybrids and 40+20+0 NPK Kg/ha for Narasimha respectively. Hence it is found that all the farmers

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Table 1 : Adoption pattern of technology in cotton hybrids and Narasimha-Use of manures, fertilizers and sprayings.

Technology	Recommendation	Adoption	
		Hybrids	Narasimha
Application of FYM:			
No. applied FYM	--	68%	100%
Qty. of FYM applied (t/ha)	10	3.7	8.3
Application of fertilizers:			
No. not applied basal dose		77%	100%
No. applied basal dose by drilling		23%	Nil
Average quantity applied as basal	(N+P+K Kg/ha)	Hybrids: 60+60+30 Narasimha: 20+20+0	9+20+3 --
No. applied as top dressing		100%	100%
No. applied as top dressing by drilling		91%	90%
No. applied top dressing by dibbling		9%	10%
Average qty. as top dressing	(N+P+K kg/ha)	Hybrids: 60+0+30 Narasimha: 20+0+0	136+115+37 --
Total qty. of fertilizers applied (N+P+K kg/ha)		Hybrids: 120+60+60 Narasimha: 40+20+0	145+135+40 117+95+39
No. of spraying done		20	18
No. done soil testing		9%	10%
No. used weedicides		Nil	Nil
No. used IPM practices		5	--

Table 2 : Adoption pattern of technology in P.Mungari and Aravinda-Use of manures, fertilizers and sprayings.

Technology	Recommendation	Adoption	
		P. Mungari	Aravinda
Application of FYM:			
No. applied FYM	--	90%	80%
Qty. of FYM applied (t/ha)	10	4.3	4.5
Application of fertilizers:			
No. not applied basal dose	--	60%	82%
No. applied basal dose by drilling	--	30%	10%
No. applied basal by broadcasting	--	10%	8%
Average qty. applied as basal (N+P+K kg/ha)	10+20+0	11+3+2	7+7+0
No. applied as top dressing	--	80%	83%
No. applied top dressing by drilling	--	80%	63%
No. applied top dressing by dibbling	--	--	20%
Average qty. applied as top dressing (N+P+K kg/ha)	10+0+0	30+30+4	30+31+10
Total qty. applied (N+P+K kg/ha)	20+20+0	41+43+6	37+38+10
No. sprayings done	Two sprayings for bollworms	Nil	Nil
No. done soil testing	--	Nil	5%
No. used weedicides	--	Nil	Nil

Table 3 : Per hectare Costs and Returns of Hybrids and Narasimha

Item	Hybrids (Rs.)	Narasimha (Rs.)
Gross returns:		
Hybrids 18.3 q @ Rs.1946 per q	35,612	--
Narasimha 18.0 q @ Rs.2290 per q	--	41,220
Total cost of production (including lease)	34,228	29,412
Net returns	1,384	11,808
Input - Output ratio	1:1.40	1:1.40

Table 4 : Per Hectare Costs and Returns of Desi Cottons P. Mungari and Aravinda

Item	Hybrids (Rs.)	Narasimha (Rs.)
Gross returns:		
P.Mungari 7 q @ Rs.1850 per q	12,950	--
Aravinda 11.625 @ Rs.1820 per q	--	21,157
Total cost of production (including lease)	10,775	14,172
Net returns	2,175	6,985
Input - Output ratio	1:1.20	1:1.49

Table 5 : Impact due to Narasimha since 1994

Year	Net returns/ha	
	Narasimha	NHH-44
1994-95	16,455	11,210
2000-01	11,808	11,384
Average	14,132	11,297

Impact of Narasimha over NHH-44 = 7835  
 Impact over 9 years in 8000 ha. =  $6.27 \times 9 = 56.43$  crores

Table 6 : Impact due to Aravinda since 1996.

Year	Per ha. Returns	
	Aravinda	P. Mungari
1994-95	3,510	1,540
2000-01	6,985	2,175
Average	5,248	1,858

Impact of Aravinda over P.Mungari = 3,390  
 Per year for 8000 ha (Aravinda) = 2.71 crores

Table 7 : Impact due to hybrid cotton seed production from 1990-91 onwards

Year	Net returns/ha.	
	Hybrid Seed Production	Commercial Hybrid Cultivation
1990-91	43,465	3,447
1998-99	84,930	6,760
Average	64,198	5,104

Impact of hybrid seed production = 57,594  
 Net returns/ha per year over 8000 ha. = 46.08 crores  
 For 12 years, Impact of hybrid seed production = 553.96 crores

were applying higher dose than the recommendation and the total cost of production can be reduced by Rs. 1600 per hectare in hybrids and Rs. 2217 in Narasimha var if the recommended fertilizers were applied.

None of the farmers used weedicides and engaged human labour force for weeding. For reduction in cost of cultivation weedicides have to be applied.

The IPM practices were also not adopted by cotton growers. Only five per cent used IPM practices, that too partially. The IPM practices are to be adopted by the cotton growers for reduction in the cost reduction in the cost of cultivation and to avoid ill effects if indiscriminate use of pesticides.

The impact due to hybrid cotton seed production technology, and elite var Narasimha and Aravinda was 46, 6 and 3 crores of rupees respectively per year and the total impact due to cotton research was 630 crores of rupees for a period of one decade since 1990-91 to 2000-01.

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