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Performance of Samba Wheat Variety by Adopting Production Technology in Western Zone of Tamil Nadu

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ABSTRACT

A study was conducted in western zone of Tamil Nadu, India to assess the performance of samba wheat variety HW 1095 vs CO (W) 1 in Talavadi hilly regions. A total of 40 frontline demonstrations were laid out at farmer's field to demonstrate the production potential of samba wheat during Rabi season from 2010 - 2011 to 2011 - 2012. The performance of HW 1095 was superior in test weight and yield over farmer practice in all 40 locations. The farmers harvested an average grain yield of 39.6 qha^{-1} with the highest grain yield of 40.9 qha^{-1} and the lowest grain yield of 38.6 qha^{-1} with an yield advantage of 15.06 per cent over the existing variety CO (W) 1 in all locations. The productivity of wheat per unit area has been increased by adopting appropriate scientific management practices with a suitable variety. The result reveals that the samba wheat variety was accepted by the farmers mainly because of its yield and yield attributes by adopting scientific production technologies.

1. Introduction

Wheat (*Triticum aestivum* L.) is the second most important cereal crop cultivated in India after rice which contributes nearly one - third of the total food grain production. The area under wheat cultivation has steadily gone up since the start of wheat revolution in 1967 and its production and productivity have increased tremendously. The wheat area has risen from 12.8 million ha in 1966-67 to 28.15 million ha in 2009-10. During the same period production has increased from 11.4 to 84.27 million tones and the productivity has gone up from 887 kg/ha to 2785 kg/ha (Anonymous, 2011). Traditionally, the farmers in Western Ghats of Tamil Nadu are cultivating wheat as one of the predominant crop in the Rabi season. The productivity of wheat per unit area could be increased by adopting recommended scientific management practices using suitable varieties (Dhaka *et al.,* 2010 and Ranawat *et al.,* 2011). Frontline demonstration is the concept evolved by Indian Council of Agricultural Research(ICAR) with the objective of demonstrating newly released varieties and technologies in the farmer's field in order to show the production potential of this particular variety or technology to the specific agro climatic conditions. The samba wheat HW-1095 was formally released by Tamil Nadu Agricultural University in 2010 for cultivation. HW-1095 is high grain yielding (4.4 t/ha) with more productive tillers, erect to semi erect, resistant to rust and heat tolerant suitable for cultivation in hilly regions of Tamil Nadu. With this background, the present study was carried out with the following specific objectives to study the performance of samba wheat in Western Ghats region, to estimate the adoption of scientific management practices by the wheat growers and field constraints faced by the farmers while adopting the technologies.

2. Materials and Methods

The present study was carried out in Talavadi regions of Western Ghats, Tamil Nadu during 2011 and 2012. The farmers constraints in adoption of technologies, adoption level of technologies and selection of progressive farmers in wheat cultivation were identified through focused group discussion and community based organization working in this regions.

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Based on the problems faced by the farmers, the frontline demonstrations were designed and conducted at farmers field. Each demonstration was conducted in an area of 0.4 ha and adjacent to the farmers fields in which the crop was cultivated with farmers practice/variety. Scientific interventions under frontline demonstrations were taken as mentioned in Table 1. The selected progressive farmers were trained on all scientific wheat cultivation aspects before starting of frontline demonstrations. Indicators like test weight and grain yield were considered to compare the performance of samba wheat variety. Frequency and percentages were worked out for analysis and interpretation of data.

3. Results and Discussion

The results of the trials conducted on the farmer's field are presented in Table 2. The performance of HW - 1095 was superior in test weight and grain yield over CO (W) 1 in all 40 demonstrations. Results were elicited with farmers wise obtained by growing HW - 1095 in Talavadi region. The average test weight recorded of 39.6 gram with the highest test weight of 40.9 gram and the lowest test weight of 38.6 gram with the average percent increase of 15.06 per cent over the existing variety CO (W) 1. Similarly the farmers harvested an average grain yield of 31.1 qha^{-1} with the highest grain yield of 33.9 qha^{-1} and the lowest grain yield of 27.1 qha^{-1} with an yield advantage of 36.39 percent over the existing variety. The findings of the present study are in line with the findings of Hiremath and Nagaraju (2009) and Dhaka *et al*. (2010). The economic feasibility of the scientific adoption of technologies over farmers practice was calculated depending on the prevailing prices of inputs and output costs (Table 3). It was found that the average cost of cultivation of wheat under scientific adoption of technology was Rs 28958.5 ha^{-1} and Rs. 29077.5 ha^{-1} in 2010- 2011 and 2011-2012 respectively with an average of Rs. 29018 ha^{-1} and an average cost of Rs. 27579 ha^{-1} in farmers practice. The additional cost incurred in the scientific adoption of technology was mainly due to the high labour cost incurred for carrying out the operations in time. Frontline demonstrations demonstrated fields recorded the higher mean gross return of R. 46616.25 ha^{-1} and net return (Rs. 17598.25 ha^{-1}) with high benefit cost ratio of 1.61. These results are in line with the findings of Hiremath and Nagaraju (2009) and Sreelakshmi *et al*. (2012). These results are clearly indicated that the adoption of scientific technologies was enhancing the wheat production and economic returns from the wheat farming in Western Ghats region. The results on adoption of recommended production technology by wheat growers were assessed and the same was presented in Table 4. Majority of the farmers (87.50 per cent) has adopted harvesting process in timely, proper preparatory tillage (85.00 per cent), timely sowing (82.50 per cent) and 80 percent farmers are using recommended seed rate for sowing. Nearly, three fourth (72.50 per cent) of the respondents are practicing weeding operations in timely followed by proper spacing (70 per cent). 67.5 Percent farmers are not applied the recommended dose of manures and 40 per cent of the farmers are applying more than the recommended dose of fertilizers. Only 7.50 percent of the farmers are using less than the recommended dose of seeds for sowing and the similar results were also reported by Ben *et al.* (2010). The data with respect to the constraints experienced by the wheat growers in adoption of scientific management practices have been furnished in Table 5. It could be noticed that all the wheat growers expressed that the high wages of labour (95 per cent) followed by non availability of labours for weeding and intercultural operations (92.5 per cent), non availability of inputs in right time (80 per cent), irrigation at critical stages of crop growth (80 per cent), non availability of labour for harvesting & threshing and application of plant protection chemicals (65 per cent) as major constraints. The present findings in are conformity with the findings of Shivalingaiah and Nagabhushanam (2010).

Table 1. Scientific Interventions Demonstrated in Frontline Demonstration

Sl. No	Scientific intervention	Recommendations
1.	High yielding suitable variety	Samba wheat HW - 1095
2.	Seed rate	100 kg / ha
3.	Seed treatment	Treat the seeds with Carbendazim @ 2 gram/ kg seed
4.	Time of sowing	First fortnight of November
5.	Spacing	Row to row spacing : 20 cm
6.	Manures and fertilizers	12.5 ton FYM, 80:4.:40 kg N,P,K/ha
7.	Weeding	Hand weeding at 20-25 DAS and 40 DAS or use pre-emergence application of Isoproturon or pendimethalin as a broad spectrum control of weeds
8.	Irrigation management	Five irrigations: Crown Root Initiation, Late Tillering, Flowing, Milking and Dough stage
9.	Plant protection	As per requirement
10.	Harvest	Harvest the crop when the grain moisture comes to 20 – 25 %

Table 2. Test weight and yield of samba wheat in Talavadi regions N=40

Year	Test weight (gram)		Percent Increase over CO (W)1	Yield (qtl/ha)		Percent Increase over CO (W)1
	HW-1095	CO(W)1		HW-1095	CO (W)1	
2010-2011						
Farmer -1	39.2	35.2	11.36	27.1	22.8	18.86
Farmer -2	38.6	36.4	6.04	33.3	23.6	41.10
Farmer -3	39.7	33.4	18.86	32.7	22.6	44.69
Farmer -4	39.8	34.6	15.03	31.6	23.2	36.21
Farmer -5	40.2	32.1	25.23	30.5	23.5	29.79
Farmer -6	39.3	33.7	16.62	33.5	23.9	40.17
Farmer -7	38.6	34.8	10.92	33.8	23.2	45.69
Farmer -8	38.9	36.4	6.87	33.1	22.6	46.46
Farmer -9	38.7	36.2	6.91	32.1	23.4	37.18
Farmer -10	39.2	35.9	9.19	33.9	22.9	48.03
Farmer -11	39.4	33.8	16.57	33.6	23.2	44.83
Farmer -12	39.5	34.9	13.18	28.2	22.8	23.68
Farmer -13	39.2	35.9	9.19	27.6	23.1	19.48
Farmer -14	39.8	32.8	21.34	29.8	23.9	24.69
Farmer -15	39.7	36.8	7.88	30.4	23.1	31.60
Farmer -16	38.7	34.4	12.50	33.2	21.9	51.60
Farmer -17	38.6	35.1	9.97	26.8	22.2	20.72
Farmer -18	38.9	35.8	8.66	28.8	23.4	23.08
Farmer -19	39.2	33.7	16.32	29.7	22.6	31.42
Farmer -20	39.7	36.8	7.88	29.7	22.3	33.18
Mean	**39.2**	**34.9**	**12.53**	**31.0**	**23.0**	**34.62**
2011-2012						
Farmer -1	39.4	36.7	7.36	28.6	22.7	25.99
Farmer -2	40.2	32.9	22.19	28.7	22.7	26.43
Farmer -3	40.6	33.1	22.66	26.8	23.1	16.02
Farmer -4	40.9	33.8	21.01	27.9	22.9	21.83
Farmer -5	40.5	33.1	22.36	27.8	23.4	18.80
Farmer -6	38.7	32.5	19.08	29.7	21.9	35.62
Farmer -7	39.4	32.9	19.76	28.4	23.2	22.41
Farmer -8	40.2	33.1	21.45	32.5	22.4	45.09
Farmer -9	39.2	33.8	15.98	33.9	21.8	55.50
Farmer -10	39.5	33.4	18.26	33.2	22.2	49.55
Farmer -11	39.7	32.1	23.68	33.7	21.8	54.59
Farmer -12	38.9	36.7	5.99	32.1	22.7	41.41
Farmer -13	38.6	34.6	11.56	32.5	23.3	39.48
Farmer -14	39.4	34.1	15.54	31.8	22.5	41.33
Farmer -15	40.9	36	13.61	31.9	22.6	41.15
Farmer -16	40.8	32.8	24.39	32.8	22.4	46.43
Farmer -17	40.6	33.5	21.19	33.9	21.7	56.22
Farmer -18	40.8	34.2	19.30	33.7	23.3	44.64
Farmer -19	40.3	33.7	19.58	31.2	22.8	36.84
Farmer -20	38.6	36.1	6.93	32.6	22.7	43.61
Mean	**39.9**	**34.0**	**17.59**	**31.2**	**22.6**	**38.15**
Average of 40 FLDs	**39.6**	**34.4**	**15.06**	**31.1**	**22.8**	**36.39**

Table 3. Cost of Cultivation, Gross Return, Net Return and Benefit Cost Ratio of Wheat Cultivation Influenced by Scientific Intervention

Year	Cost of cultivation ($Rs.ha^{-1}$)		Gross Return ($Rs.ha^{-1}$)		Net Return ($Rs.ha^{-1}$)		Benefit : Cost ratio ($Rs.ha^{-1}$)	
	HW-1095	CO(W)1	HW-1095	CO(W)1	HW-1095	CO(W)1	HW-1095	CO(W)1
2010-2011	28958.5	27710.0	46455.0	34515.0	17496.5	6805.0	1.61	1.25
2011-2012	29077.5	27448.0	46777.5	33907.5	17700.0	6459.5	1.61	1.24
Total	58036	55158	93232.5	68422.5	35196.5	13264.5	3.22	2.49
Average	29018	27579	46616.25	34211.25	17598.25	6632.25	1.61	1.24

Table 4. Adoption of Scientific Production Technology by Wheat Growers N=40

Sl. No	Production technologies	Adoption	
		Frequencies	Per cent
1.	**Preparatory tillage**		
	a. Proper	34	85.00
	b. Improper	06	15.00
2.	**Seed rate (100 kg/ha)**		
	a. As per recommendation	32	80.00
	b. More than recommendation	05	12.50
	c. Less than recommendation	03	07.50
3.	**Seed treatment (carbendazim 2 gram/kg seed)**		
	a. Used	26	65.00
	b. Not used	14	35.00
4.	**Time of sowing**		
	a. Timely sowing	33	82.50
	b. Untimely sowing	07	17.50
5.	**Spacing**		
	a. Proper	28	70.00
	b. Improper	12	30.00
6.	**Use of manures**		
	a. As per recommendation	13	32.50
	b. Less than recommendation	27	67.50
7.	**Use of chemical fertilizers**		
	a. As per recommendation	14	35.00
	b. More than recommendation	16	40.00
	c. Less than recommendation	10	25.00
8.	**Weeding**		
	a. Timely	29	72.50
	b. Untimely	11	27.50
9.	**Irrigation**		
	a. As per recommendation	27	67.50
	b. More than recommendation	07	17.50
	c. Less than recommendation	06	15.00
10.	**Harvest**		
	a. Timely	35	87.50
	b. untimely	05	12.50

Conclusion

Based on the findings, it is concluded that the scientific adoption of technology along with samba wheat HW-1095 performed superior than the existing variety all the demonstrations. Yield potential of the wheat crop is increased over 36 percent. It is also suggest that conducting large scale adoption demonstrations and ensuring the critical inputs in time for adoption of technologies play a critical role in enhancing wheat production. This will subsequently increase the income and livelihood of the farming community of the Western Ghats of Tamil Nadu. The findings also concluded that the mechanization in wheat cultivation is need of the hour for carry out the cultural operations in time and enhancing the farmer's knowledge on scientific adoption of technology for improving the productivity of wheat per unit area.

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Table 5. Constraints in Adoption of Scientific Interventions by Wheat Growers in Talavadi Region N=40

Constraints	**Adoption**		**Mean value of percentage**
	Frequency	**Per cent**	
High wages of labour	38	95.00	95.00
Non availability of inputs in right time	28	70.00	70.00
Irrigation at critical stages	32	80.00	80.00
Non availability of labour for			
Weeding and intercultivation	37	92.50	78.33
Plant protection chemicals	26	65.00	
Harvesting and threshing	31	77.5	

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