Evaluation of Frontline Demonstration on Wheat Crop in Western Zone of Tamilnadu

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ABSTRACT

Wheat is a second most important cereal crop cultivated in India. A study was conducted in western zone of TamilNadu, India to increase the yield of samba wheat variety in Germalam and Kadambur hilly regions during Rabi 2019 in 10 farmers' field. The frontline demonstration technologies comprised of new samba wheat variety HW 1098, seed treatment with azospirillum and other technologies adopted as per the recommendations' of Tamil Nadu Agricultural University, Coimbatore. The performance of HW 1098 was superior in test weight and yield over farmer practice in all 10 locations. The farmers harvested an average grain yield of 32.35 qha^{-1} with the highest grain yield of 33.8 qha^{-1} and the lowest grain yield of 29.8 qha^{-1} with yield advantage of 33.90 per cent over the existing variety HW 1095 in all locations. The productivity of wheat per unit area has been increased by adopting appropriate scientific management practices with a suitable variety. Similarly HW 1098 recorded the test weight of 41.62 gram where is in HW 1095 it is 39.2 grams. The higher net return of Rs. 44,670 / ha was recorded in HW 1098 with benefit cost ratio of 2.69 which was significantly superior than the existing variety HW 1095. The result reveals that the samba wheat variety HW 1098 was accepted by the farmers mainly because of its yield and yield attributes by adopting scientific production technologies.

Key words: *Frontline Demonstration; Samba Wheat; Scientific Management Practices; Varieties;*

Wheat (*Triticum aestivum* L.) is the second most important cereal crop cultivated in India during the Rabi season and nearly contributes to one - third of the total food grain production. The area under wheat cultivation in gradually gone up in north India, whereas in southern region, the crop was cultivated in limited areas, especially in the Western Ghats of TamilNadu and Karnataka. 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*).

Through the area under wheat cultivation is very low, the farmers in Western Ghats of TamilNadu are traditionally cultivating wheat as one of the predominant crop in the Rabi season. The farmers are harvesting grain yield of 18 -20 quintals / ha by using the variety HW-1095. The productivity of crop per unit area could be increased by adopting recommended scientific management practices using suitable varieties (*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 productivity of wheat could be increase in Western Ghats to sustain its area under cultivation.

The samba wheat variety HW - 1098 had released from IARI regional station, Wellington during the year 2017. The variety having the special features of semi-dwarf, non lodging, non shattering, resistant to rust and matures in 110 days. The average yield of the variety is 4553 kg / ha. 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.

METHODOLOGY

The present study was carried out in Talavadi regions of Western Ghats, TamilNadu during Rabi 2019. 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 was taken as a local check. A total of 10 frontline demonstrations conducted on integrated crop management practices in samba wheat HW-1098 at Germalam and Kadambur region of Erode District to study the production potential of the crop. 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. To study the impact of frontline demonstrations, data from FLD and farmers practices were analyzed.

The yield gap analysis is a potent research technique that has been introduced in the 1970s. Developed by the International Rice Research Institute (IRRI), it is extensively used to measure and analyze determinants of the yield gaps. It is also observed that, even though the production level has increased to a great extent in the recent past; still there exists a wide gap between the actual yield obtained by the growers and the production level actually possible with the existing modern technology.

Yield gap refers to the difference between the potential yield and actual farm yield. Potential yield refers to that which is obtained in the experiment station. The yield is considered to be the absolute maximum production of the crop possible in the given environment, which is attained by the best available methods and with the maximum inputs in trials on the experiment station in a given season. Demonstration yield is the yield obtained on the demonstration plots on the farmers' fields in the study area. The conditions on demonstration plots closely approximate the conditions on the cultivators' fields with respect to infrastructural facilities and environmental conditions. Actual yield refers to the yield realized by the farmers on their farms under their management practices. The data output were collected both in FLDs as well as control plots and finally the extension gap, technology gap, technology index (%) were worked out (*Samui et al., 2000*) as given below

$$\text{Ext. gap } \left(\frac{\text{qtl}}{\text{ha}}\right) = \text{DY (Qtl /Ha)} - \text{LY (Qtl/ Ha)}$$

$$\text{Tech. gap } \left(\frac{\text{qtl}}{\text{ha}}\right) = \text{PY (Qtl /Ha)} - \text{DY (Qtl/ Ha)}$$

$$\text{Tech. Index (\%)} = \frac{\text{PY (Qtl /Ha)} - \text{DY (Qtl/ Ha)}}{\text{PY (Qtl /Ha)}} \times 100$$

Where,
DY = Demonstration Yield
LY = local check Yield
PY = Potential Yield of variety

RESULTS AND DISCUSSION

The results of the trials conducted on the farmer's field are presented in Table 2. The performance of HW - 1098 was superior in test weight and grain yield over HW - 1095 in all 10 demonstrations. Results were elicited with farmers wise obtained by growing HW - 1098 in germalam and kadambur region. The average

Table 1. Scientific Interventions Demonstrated in Frontline Demonstration

Scientific intervention	Recommendations
High yielding suitable variety	Samba wheat HW - 1098
Seed rate	100 kg / ha
Seed treatment	Treat the seeds with Carbendazim @ 2 gram/ kg seed
Time of sowing	First fortnight of November
Spacing	Row to row spacing : 22 cm
Manures and fertilizers	12.5 ton FYM, 80:40.:40 kg N,P,K/ha
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
Plant protection	As per the recommendation of TamilNadu Agricultural University
Harvest	Harvest the crop when the grain moisture comes to 20 – 25 %

Table 2. Test weight and yield of samba wheat in Germalam and Kadambur regions

Year	Test weight (gram)		% Increase	Yield (qtl/ha)		% yield
	HW - 1098	HW-1095	over HW-1095	HW - 1098	HW-1095	increase
2010-2011						
Farmer -1	41.3	38.9	6.17	32.7	24.9	31.33
Farmer -2	41.4	38.6	7.25	31.9	24.7	29.15
Farmer -3	41.3	39.4	4.82	32.9	24.2	35.95
Farmer -4	40.8	39.7	2.77	33.2	23.3	42.49
Farmer -5	42.5	40.3	5.46	33.1	23.7	39.66
Farmer -6	41.9	39.2	6.89	31.8	24.2	31.40
Farmer -7	41.2	38.7	6.46	32.7	23.7	37.97
Farmer -8	41.8	38.8	7.73	33.8	23.8	42.02
Farmer -9	41.9	38.9	7.71	29.8	24.1	23.65
Farmer -10	42.1	39.3	7.12	31.6	25.2	25.40
Mean	41.62	39.2	6.23	32.35	24.18	33.90

test weight recorded of 41.62 gram with the highest test weight of 42.5 gram and the lowest test weight of 40.8 gram with the average percent increase of 6.23 per cent over the existing variety HW - 1095. The average yield under demonstration of HW – 1098 was 32.35 qtl / ha was higher than the average yield of farmers practice (24.18 qtl/ha). The integrated crop management practices showed that 33.90 per cent yield increase over the farmers practice. These results indicated that the frontline demonstrations gave good impact over the farming community in Erode district as they were motivated by the adoption of integrated crop management technologies applied in the demonstration plots. The findings of the present study are in line with *Jyothi Swaroopa et al, (2016)* and *Hiremath and Nagaraju (2009)*.

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 HW – 1098 under scientific adoption of technology was Rs 26500 ha^{-1} in Rabi 2019 and average cost of Rs. 25,000 ha^{-1} in farmers practicing variety. The additional cost incurred in the scientific adoption of technology was mainly due to the high seed cost. Frontline demonstrations demonstrated fields recorded the higher mean gross return of Rs. 71,170 ha^{-1} and net return (Rs. 44,670 ha^{-1}) with high benefit cost ratio of 2.69. 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.

Table 3. Economics of demonstration of samba wheat varieties

Economic Parameters	HW – 1098	HW – 1095
Yield	32.35	24.18
Percent Yield Increase	33.90	-
Gross Cost (Rs / ha)	26,500.00	25,000.00
Gross Return (Rs / ha)	71,170.00	50,778.00
Net Return (Rs / ha)	44,670.00	25,778.00
BCR	2.69	2.03

Technology Gap and Extension Gap : The technology gap shows the gap between the potential yields of the crop over demonstrated yield. The technology gap was recorded as 13.38 qtl / ha (Table 4). The extension gap shows the gap between the demonstration yield and local yield and it was 8.17 qtl/ha. The observed extension gap and technology gap may be attributed due to dissimilarities in soil fertility levels, pest and disease incidence, improper usage of manures and fertilizers in this region (*Mukherjee, 2003*). More and more use of latest production technologies will subsequently change this alarming trend. The new technologies will eventually lead to discontinue the old technologies and to adoption of new technologies by the farmers.

Technology Index : Technology index shows the feasibility of the technologies at the farmers' field. The lower the value of the technology index more is the feasibility. Table 4 revealed that the technology index

Table 4. Yield, Extension gap, Technology gap and Technology index of the demonstration

Variables	Yield (Qtl/ha)	Extension gap (Qtl/ha)	Technology gap (Qtl/ha)	Technology index (%)
HW - 1095	24.18			
HW - 1098	32.35	8.17	13.38	29.3

value was 29.3 per cent. The findings of the present study are in line with the findings of *Rai et al, (2015)* and *Hiremath and Nagaraju (2009).*

CONCLUSION

Based on the findings, it is concluded that the scientific adoption of integrated crop management technologies along with new variety HW – 1098 performed superior than the existing variety in all the demonstrations. Yield potential of the samba wheat HW – 1098 is increased over 33.90 per cent. 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. The findings also concluded that the adoption of integrated crop management practices along with new variety HW – 1098 paved the way for improving the productivity of wheat per unit area.

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