

PEARL MILLET DEMONSTRATION FOR FODDER YIELD GAP ANALYSIS IN DAUSA DISTRICT OF RAJASTHAN

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SUMMARY

Fodder yield of front line demonstration trials and potential yield of the respective variety and year were compared to estimate the fodder yield gap which was further categorized into technology and extension gaps. Technology gap (3154 kg/ha) was highest in case of RHB 121 at village Singwara in 2008 and lowest (840 kg/ha) of RHB 121 at village Aluda, Reta in the year 2011. Average technology gap was 2272 kg/ha. Extension gap was highest in variety RHB 121 (880) at village Aluda, Reta in the year 2011, and lowest (190) at village Malwas in variety RHB 121 in the year 2012. The average extension gap was 443 kg/ha. Technology index was the highest (110.82%) at village Singwara in the year 2008, and lowest (16.28%) at village Aluda, Reta in 2011 with the variety RHB 121. The average technology index was found 69.30 per cent. The highest pearl millet fodder yield of FLD were found 5290 kg/ha and lowest yield was found 2846 kg/ha. Average fodder yield of front line demonstration was found 3854 kg/ha and in local check/farmers' practice it was 3411 kg/ha. The study indicated that average per cent increase in fodder yield was 13.16 (443 kg/ha). Average per cent increase of gross returns was found 15.98 per cent and average net returns were found 25.44 per cent which showed front line demonstrations which could increase the living standard of farming community of Dausa district. Across the years, front line demonstrations found higher fodder productivity ranging from 8.75 to 20.56 per cent and higher B : C ratio from 1.67 to 4.34. Front line demonstrations showed in respect of per cent increase of yield and B : C ratio was sufficient for increasing production of pearl millet and increasing living standard of farming community of Dausa district. The study revealed that overall per cent increase in net returns was 25.44 (Rs 1920/ha). It assumes that if farmers of Dausa district adopt the demonstrated technology in current pearl millet area (125000 ha), they can earn additional benefit in terms of net returns over farmers' practice Rs. 24 crores per year improving the socio-economic status of the farmers.

Key words : Front line demonstration, dry fodder yield of pearl millet, impact, economics, B : C ratio

District Dausa falls in Agroclimatic zone IIIa, namely, "Semi-Arid Eastern Plains" covering Dausa, Ajmer, Tonk and Jaipur districts. The headquarter of the zone is situated at Rajasthan Agricultural Research Institute, Durgapura, Jaipur. The technologies generated by scientists of Rajasthan Agricultural Research Institute, Durgapura were tested and disseminated through front line demonstrations to farmers of Dausa district. Pearl millet is the most important cereal crop grown in **kharif** season in Dausa district of Rajasthan. Pearl millet crop occupies the first rank in cereal crops grown in Dausa

district. It accounts for 125000 ha area and 212500 metric tonne production with 1700 kg/ha productivity (Anonymous, 2012). The hike in production in recent years has been possible due to improvement in productivity and strategies adopted by the government by launching various schemes. In view of this, a project on front line demonstration was started in order to demonstrate the production potential and latest advancement in package of practices among the farmers with the view to reduce the time lag between technology generated and its adoption. This also enables field

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functionaries to elucidate the production constraints and limitation in the adoption of technology for onward transmission to scientists to reorient their research accordingly, in order to improve the productivity all the latest and unfolded technologies were carried out in front line demonstration plots under the direct supervision of the scientist by supplying the critical inputs.

Keeping in view the importance of dry fodder of front line demonstration in Dausa district of Rajasthan in productivity enhancement and increase in the monetary returns, the present study was carried out.

MATERIALS AND METHODS

The present study was conducted at the farmers' fields of Dausa district of Rajasthan during the **kharif** season of consecutive seven years from 2006 to 2012. A total of 124 demonstrations and 60 ha area having similar number of traditional practices or local check were carried out in sandy loam soil under rainfed conditions. The pearl millet crop was sown around June to mid July and harvested in mid September across the years. The variety RHB 121 was used in demonstration in all the villages and years except in 2006 and 2009 at Nadi Malwas and Bhojpura, Peechupada villages, here the variety ICMH 356 was demonstrated. The front line demonstration was conducted in Kota-Patti, Digaria, Singwara, Udala Aluda and Malwas villages in Dausa block and Nadi Malwas in Lalsot block and Peechupada Bhojpura and Reta village of Sikarai block of Dausa district. In front line demonstrations, especial emphasis was given to proper seed rate (4 kg/ha), balanced use of fertilizers (60 kg/ha N and 30 kg/ha P₂O₅), high yielding variety (RHB 121 and ICMH 356), seed treatment with pesticides, and proper and need-based plant protection measures. In traditional or local check plots, farmers were using higher seed rate (6 kg/ha), imbalanced use of fertilizers, local or private company seed for sowing, improper seed treatment and plant protection measures. The cross section data on output of pearl millet crop and input used per hectare have been collected from the front line demonstration trials. In addition to this in traditional or control plot followed by farmers have also been collected and used for further calculation like cost of cultivation, gross returns, net returns, additional cost, additional returns and B : C ratio. The benefit : cost ratio (B : C) was calculated dividing the net monetary returns by the total cost of cultivation.

Yield gap, extension gap and technology index were calculated as follows :

$$\begin{aligned} \text{Technology gap} &= \text{Potential yield} - \text{Demonstration yield} \\ \text{Extension gap} &= \text{Demonstration yield} - \text{Farmers/} \\ &\quad \text{Traditional yield} \end{aligned}$$

$$\text{Technology index} = \frac{\text{Pi} - \text{Di}}{\text{Di}} \times 100$$

Where, Pi–Potential yield of the crop

Di–Demonstration yield of the crop

RESULTS AND DISCUSSION

Fodder Yield Gaps

Fodder yield of front line demonstration trials and potential fodder yield of the respective variety and year were compared to estimate the yield gap which was further categorized into technology and extension gaps. Technology gap (3154 kg/ha) was highest in case of RHB 121 at village Singwara in 2008 and lowest (840 kg/ha) of RHB 121 at village Aluda, Reta in the year 2011. Average technology gap for fodder yield of pearl millet was 2272 kg/ha. Though, the front line demonstration trials were laid down under the supervision of KVK scientists at the farmers' fields, there also exists gap between the potential yield and trial yield. This may be due to the soil fertility and weather condition especially rainfall intensity, interval, etc. Hence, location-specific recommendations are necessary to bridge the gap. Higher technology gap (647 kg/ha) was also recorded by Katare *et al.* (2011) and Meena *et al.* (2012).

The extension gap for fodder yield of pearl millet during all the years in front line demonstrations was lower as compared to technology gap except in the year 2011. This emphasized the effort made by the scientist to educate the farmers in adoption of improved technology to narrow the extension gaps. Among the front line demonstrations on pearl millet in different years, extension gap for fodder yield was highest in variety RHB 121 (880) at village Aluda, Reta in the year 2011, and lowest (190) at village Malwas in variety RHB 121 in the year 2012. The average extension gap for fodder yield of pearl millet was 443 kg/ha. These findings are in line with the findings obtained by Kaushik (1993) and Meena *et al.* (2012) i. e. 406 kg/ha. All demonstrations found lower extension gap as compared to technology gap except in the year 2011. Similar findings were also reported by Sharma and Sharma (2004).

TABLE 1
Comparative statement of dry fodder yield and other parameters of front line demonstrations on pearl millet in different villages of Dausa district of Rajasthan

Year	Village	Block	Variety	No. of demo.	Area (ha)	Highest fodder yield of demo. (kg/ha)	Lowest fodder yield of demo. (kg/ha)	Average fodder yield of demo. (kg/ha)	Average fodder yield of local check (kg/ha)	Per cent increase	Technology gap	Extension gap	Technology index
2006	Nadi Malwas	Lalsot	ICMH-356	10	5	3750	2980	3370	2825	19.29	3130	545	92.88
2007	Kota-patti	Dausa	RHB-121	10	5	3300	2475	2907	2657	9.41	3093	250	106.39
2007	Digaria	Dausa	RHB-121	10	5	3725	2550	3205	2843	12.73	2795	362	87.21
2008	Singwara	Dausa	RHB-121	19	10	3275	2550	2846	2413	17.94	3154	433	110.82
2009	Bhojpara & Peechupara	Sikarai	ICMH-356	20	10	6300	4800	5290	4815	9.87	1210	475	22.87
2010	Udala	Dausa	RHB-121	20	10	5300	4600	5030	4625	8.75	970	405	19.28
2011	Aluda & Reta	Dausa & Sikarai	RHB-121	25	10	5500	4800	5160	4280	20.56	840	880	16.28
2012	Malwas	Dausa	RHB-121	10	5	3600	2500	3020	2830	6.71	2980	190	98.68
Total	-	-	-	124	60	-	-	-	-	-	-	-	-
Average	-	-	-	-	-	4344	3407	3854	3411	13.16	2272	443	69.30

Potential dry fodder yield of ICMH 356=6500 kg.
Potential dry fodder yield of RHB 121=6000 kg.

TABLE 2
Economics of the front line demonstrations on pearl millet in different villages of Dausa district of Rajasthan

Year	Village	Variety	No. of demo.	Area (ha)	Cost of cultivation (Rs./ha)	Gross returns (Rs./ha)		Per cent increase in gross returns	Net returns (Rs./ha)	Per cent increase in net returns	Additional cost returns (Rs./ha)	B : C ratio		
						Local	Demo.					Demo.	Local	Demo.
2006	Nadi Malwas	ICMH-356	10	5	7629	7000	13956	12000	6327	5000	629	1956	1.82	1.71
2007	Kota-patti	RHB-121	10	5	6300	5800	10539	9077	4239	3277	500	1462	1.67	1.56
2007	Digaria	RHB-121	10	5	6700	6000	11587	9593	4887	3593	700	1994	1.73	1.60
2008	Singwara	RHB-121	19	10	7100	6500	12653	10512	5553	4012	600	2141	1.78	1.62
2009	Bhojpara & Peechupara	ICMH-356	20	10	7900	7630	34326	30973	26426	23343	270	3083	4.34	4.06
2010	Udala	RHB-121	20	10	9142	8680	26660	23946	17518	15266	462	2714	2.92	2.76
2011	Aluda & Reta	RHB-121	25	10	10524	9598	26766	22188	16242	12590	926	4578	2.54	2.31
2012	Malwas	RHB-121	10	5	11803	10920	20740	18610	8937	7690	883	2130	1.75	1.70
Total	-	-	124	60	-	-	-	-	-	-	-	-	-	-
Average	-	-	-	-	8387.3	7766	19653	17112	11266	9346	621.3	2507	2.32	2.17

Technology Index

Technology index shows the feasibility of the evaluated technology on the farmers' fields. The lower the value of the technology index more feasibility of technology. Technology index was highest by the tune of 110.82 per cent at village Singwara in the year 2008, and lowest 16.28 per cent at villages Aluda, Reta in 2011. The average technology index was found 69.30 per cent for fodder yield of pearl millet. Similarly, technology index was also reported by Meena *et al.* (2012) i. e. 26.98 per cent and Katare *et al.* (2011) i. e. 24.21 per cent. This indicates that in FLDs a wide gap exists between the technology evaluated at research station and farmers' fields. Hence, according to the criterion fodder yield of RHB 121 variety at village Aluda, Reta in the year 2011 was best followed by village Bhojpua, Reta in the ICMH 356 variety in the year 2009.

Comparison of Yield and Economics

The highest pearl millet fodder yield of front line demonstration was found 6300 kg/ha in 2009 at Bhojpura, Peechupara village followed by 5160 and 5030 kg/ha, at villages Aluda, Reta in 2011 and Udala 2010, respectively. And lowest fodder yield was found 2475 kg/ha followed by 2500 and 2550 kg/ha at village Kota-patti in the year 2007, Malwas in the year 2012 and Singwara in the year 2008, respectively. Average fodder yield of front line demonstration was found maximum by the tune of 5290 kg/ha at village Bhojpura, Peechupada in the year 2009 with the variety ICMH 356, followed by 5160 and 5030 kg/ha at Aluda, Reta in the year 2011 with the variety RHB 121 and Udala in the year 2010 with the same variety, respectively. The maximum percentage increase over control or traditional practice recorded 20.56 per cent at village Aluda, Reta in 2011 with the variety of RHB 121, followed by 19.29 per cent at village Nadi Malwas in the year 2006 with the ICMH 356 variety. Studies show that average percentage increase in fodder yield of pearl millet was found 13.16 per cent which showed that front line demonstrations were found better than farmers' practices or control (Suryawansi and Prakash, 1993; Sagar and Chandra, 2004; Meena *et al.*, 2012) for increasing the productivity of farming community (Table 1).

On the basis of Table 2 for economics of

various front line demonstrations on dry fodder yield of pearl millet in different years, the highest per cent increase in gross returns was found 20.8 per cent at village Digaria in the year 2007 with the variety of RHB 121 followed by 20.6 and 20.4 per cent at village Aluda, Reta in the year 2011 and at village Singwara in the year 2008 with the same variety. Average per cent increase of gross returns was found 15.98 per cent which was substantial for the farming community of Dausa district. The highest increase in net returns was found 38.4 per cent at village Singwara in the year 2008 with the variety RHB 121 followed by 36.0 and 29.3 per cent in village Digaria in the year 2007 and village Kota-patti in the year 2007 with the variety RHB 121. Average net return was found 25.44 per cent increased which showed that front line demonstrations could increase the living standard of farming community of Dausa district.

Among all front line demonstrations, the highest B : C ratio was found 4.34 in village Bhojpura, Peechupada in the year 2009 with the variety ICMH 356 followed by 2.92 and 2.54 at village Udala in the year 2010 with the variety RHB 121 and village Aluda, Reta in the year 2011 with the same variety, respectively. Similar findings were also reported by Meena *et al.* (2012).

Overall results showed that variety RHB 121 was found better in per cent increase, gross returns and net returns but ICMH 356 was found better in respect of B : C ratio. Across the years, front line demonstrations found higher dry fodder productivity ranging from 6.71 to 20.56 per cent and higher B : C ratio from 1.67 to 4.34. Front line demonstrations showed in respect of per cent increase of yield and B : C ratio was sufficient for increasing production of pearl millet and increasing living standard of farming community of Dausa district. Presently 17.53 per cent increase reveals that if farmers adopt the demonstrated technologies, they will fetch Rs. 1920/ha as net returns in addition to they are getting now in traditional practices and will improve their livelihood. Presently the area of pearl millet in Dausa district is 125000 ha, by adopting the demonstrated technology farmers of Dausa district can get additional Rs. 24.0 crores in terms of net returns per year and save the domestic animals in fodder scarcity.

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