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Performance of Multicut Fodder Sorghum Under Rainfed Conditions of Chamarajanagar District, Karnataka

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ABSTRACT

ICAR-KVK, Chamarajanagar has conducted 170 (17 ha) demonstrations on multicut fodder sorghum during 2016-17, 2018-19, 2019-20 and 2020-21 in 8 villages. The critical inputs were identified in existing production technology through farmers meeting and group discussions with the farmers. The study revealed that the demonstrated technology recorded significantly a mean yield of 28.14 t/ha which was 133.14 % higher than farmers' practice (12.07 t/ha). The palatability was also significantly higher with CoFs-29 (92.8 %) as compared to local variety (80.5 %) and similar trend was followed with respect to number of cuttings. Average extension gap, technology gap and technology index were found 16.07 t/ha, 7.86 t/ha and 21.83% respectively. Higher mean gross and net returns and Benefit: Cost ratio of Rs. 46435/ha, Rs.31489/ha and 3.11 was obtained with multicut fodder sorghum in comparison to farmers' variety (Rs.19924/ha, Rs.7778/ha and 1.64). Therefore, there is a need to disseminate the improved technologies among the farmers with effective extension methods like training and demonstrations. The farmers should be encouraged to grow multicut fodder sorghum varieties under rainfed conditions to get higher green fodder yield and to realize higher returns.

Key words: *Multicut fodder sorghum; CoFS-29; Economics; Green fodder yield;*

Livestock sector is playing crucial role in the overall growth of agriculture sector and gross domestic product of the country. Deficit of the feed and fodder availability of the desired quality is major bottleneck restricting growth at desired level. It has been established that the cost of milk production can be significantly lowered by improving feeding system based on green fodder and replacing ingredients of concentrate with leaf meal and enriched complete feed block. But, cultivated fodder is limited to less than 4.5 per cent of the area under cultivation in country. Present area under fodder crops in India is around 8.6 million hectares. Availability of fodder resources has been estimated to be around 60% in nineties had further reduced to around 50% of the total requirement. Further increase in the acreage of the fodder crops is not possible due to increased competition between various land uses for the cultivable land. Only way to meet the fodder needs of livestock is to look for increased productivity per unit land area and also through integration of fodder crops in the cropping system. This needed breakthrough in increasing productivity and sustaining availability of green forages is possible through tailor- made technological intervention in specific niches (*Sunil kumar et al., 2012*).

In Chamarajanagara district 2, 62, 520 Cattle (142891 Cross-bred and 119629 local Cattle), 20887 Buffaloes are there (*Anonymous, 2018*). Under rainfed condition most of the farmers are dependent on local single cut fodder sorghum varieties for green fodder. However, the fodder produced from this is sufficient for one to two months. Further there will be scarcity for green fodder. As a result, the farmers are mostly dependent on dry stubbles and concentrated feeds to feed the cattle. This has led to reduced milk yield as well as quality and increased the production cost also. In order to address this fodder issues, front line demonstrations on multicut fodder sorghum variety CoFS-29 were taken to evaluate the green fodder yield and its economics under rainfed conditions of Chamarajanagara district, Karnataka.

METHODOLOGY

Multicut fodder sorghum variety CoFS-29 was demonstrated to the farmers through frontline demonstrations (FLDs) during 2016-17, 2018-19 and 2019-20 and 2020-21 by ICAR- KVK in different locations of the Chamarajanagara district, Karnataka. In 17 ha, 170 demonstrations were conducted in the selected villages. During meeting, receptive and innovative farmers were selected for technological intervention. Improved technologies released from UAS, GKVK, Bengaluru was adopted *viz*., line sowing, integrated nutrient management and whole package was demonstrated. The technologies demonstrated under FLDs and details of farmers' practices are given in Table 1. Economical assessment was done as per prevailing market prices. Cost of cultivation, Gross returns, net returns and B:C ratio were calculated as per the procedure outlined by *Saravanakumar (2021).* Further statistical analysis (Z test for two mean) was done to green fodder yield and per cent palatability to check the level of significant (*Das and Giri, 2003*). The data on per cent palatability was subjected to square root transformation (x+0.5) as suggested by (*Das and Giri, 2003*) before statistical analysis. In the present study the data on output of multicut fodder sorghum was collected from FLD plots, besides the data on local practices commonly adopted by the farmers of this region was also collected to estimate the technology gap, extension gap and the technology index by adopting suitable formulae (*Sunil et al., 2020*). The details of different parameters and formula adopted for analysis are as follows:

Extension gap = Demo. yield - Farmers' practice yield,

Technology gap = Potential yield - Demo. yield,

$$\text{Technology index} = \frac{\text{Potential yield} - \text{Demo. yield}}{\text{Potential yield}} \times 100$$

RESULTS AND DISCUSSION

Multicut fodder sorghum variety CoFS-29 has recorded significantly higher green fodder yield (27.86 t/ha) as compared to farmers' practice (11.85 t/ha) (Table 2). The yield enhancement was due to the introduction of improved multicut fodder sorghum variety CoFS-29 was to the tune of 125.5, 154.9, 132.3 and 124.2 per cent respectively over the farmers' practice during 2016-17, 2018-19, 2019-20 and 2020-21, respectively. However, the number of cuttings of green fodder under demonstration was 4 times in each year over the farmers' field (1time) under rainfed condition. Whereas, the palatability was also significantly superior in case of multicut fodder sorghum variety CoFS-29 (92.8%) than farmers' practice (80.5%). The results were in conformity with *Rana et al. (2012)* and *Sing et al. (2018).*

Table 1. Details of multicut fodder sorghum variety CoFS-29 grown under FLD and farmers' practice

Particulars	Demonstration	Farmers Practice	Gap
Variety	CoFS-29	Local	Full
No. of cuts	Multicut	Single	Full
Seed rate	10 kg/ha	85-90 kg	Full
Sowing	Line sowing (30 cm × 10 cm)	Broadcasting	Full
Nutrient management	FYM: 10 t/ha, 90:50:40 kg NPK/ ha	FYM: 7.5 t/ha, 60:0:0 kg NPK/ha	Partial

Economics : The average cost of cultivation was higher in demonstration plot (₹14946/ha) as compared to farmers' practice (₹ 12146/ha) because of additional input applied in demonstration. The gross returns (₹46435/ha) and net returns (₹31489/ha) in farmers practice was lower than the demonstration plot (₹19924 and ₹ 7778/ha respectively). Similar trend was also observed with B:C ratio [Table-3]. Yearly fluctuations in cost of cultivation, which consequently reflected the benefits were on account of variability in cost of inputs and outputs. The higher additional return and effective gain obtained under demonstrations could be due to improved technology, non monetary factors, timely operations of crop cultivation and scientific monitoring (*Chauhan et al., 2020*)

*Extension gap, technology gap and technology inde*x: Data presented in Table 4, showed the variation in extension gap and it varied from 15.65 - 16.2 t/ha with its average 16.07 t/ha. Variations in technology gap (6.4 – 10.25 t/ha) reflected the impact of recommended technology used in front line demonstrations in subsequent years. Fluctuations in technology gap as observed may be due to several biotic and abiotic factors. Technology index showed the feasibility of the evolved technology at the farmers' fields. Lower value of technology index meant more feasibility of disseminated technology. Variations in technology index during the FLDs were found 17.78 – 28.47%. However, its average of four year was 21.83% [Table-4]. This might be due to variations in soil fertility, environmental hazards and infestation of pest (*Tiwari and Saxena, 2001)*.

CONCLUSION

Introduction of new multicut fodder sorghum variety CoFS-29 through frontline demonstrations has increased the availability of green fodder for long time.

Table 2. Yield performances of multicut fodder sorghum variety CoFS-29 under rainfed condition

Year	Area (ha)	No.	Green fodder yield (t/ha)			Palatability (%)			No. of cuts		% increase over check
			D	F	Z value	D	F	Z value	D	F	
2016-17	4.0	40	29.10±1.64	12.9±1.56	40.71**	9.65± 0.062 (91.5)	8.96 ± 0.135 (79.8)	26.80**	4	1	125.5
2018-19	6.0	60	25.75±1.59	10.1±1.58	50.43**	9.68±0.066 (93.2)	8.97± 0.133 (81.2)	37.13**	4	1	154.9
2019-20	3.0	30	28.12±1.44	12.1±1.29	45.16**	9.65± 0.082 (92.6)	9.09± 0.063 (82.1)	29.45**	4	1	132.3
2020-21	4.0	40	29.60±1.60	13.2±1.52	46.84**	9.73±0.062 (94.1)	9.73± 0.102 (78.7)	43.49**	4	1	124.2
Mean			28.14±2.20	12.07±2.02	69.93**	9.66± 0.082 (92.8)	8.97± 0.132 (80.5)	58.07**	4.00	1.00	133.14

Note: D=Demonstration; F=Farmer Practice, Values in the parenthesis are original values; **p≤0.01

Table 3. Economics of multi cut fodder sorghum variety CoFS-29 under demonstration and farmers' practice

Year	Cost of Cultivation (Rs./ha)		Gross returns (Rs./ha)		Net returns (Rs./ha)		B:C Ratio	
	IT	FP	IT	FP	IT	FP	IT	FP
2016-17	14950	11989	48015	21285	33065	9296	3.21	1.78
2018-19	14853	11289	42488	16665	27635	5376	2.86	1.48
2019-20	14931	12515	46398	19965	31467	7450	3.11	1.60
2020-21	15049	12789	48840	21780	33791	8991	3.25	1.70
Mean	14946	12146	46435	19924	31489	7778	3.11	1.64

Table 4. Technology gap, extension gap and technology index in Sorghum multi cut fodder sorghum under FLDs

Year	Area (ha)	No. of Farmers	Technology gap (t ha-1)	Extension gap (t ha-1)	Technology index (%)
2016-17	4.0	40	6.90	16.20	19.17
2018-19	6.0	60	10.25	15.65	28.47
2019-20	3.0	30	7.88	16.02	21.89
2020-21	4.0	40	6.40	16.40	17.78
Mean			7.86	16.07	21.83

This substantially increased the income as well as rescues the livestock from scarcity of green fodder. Due to its drought tolerant and multicut nature fodder sorghum has created a positive impact on livestock farming.

CONFLICTS OF INTEREST

The authors have no conflicts of interest.

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