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Research Article

Implementation and Economics of Fodder Seed Production Scheme to Augment Green Fodder Cultivation

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ABSTRACT

Cumbu Napier hybrid grass COCN4, Fodder Sorghum COFS29 and Hedge lucerne fodder crops were cultivated for fodder seed/slip production under a scheme implemented at Veterinary College and Research Institute, Tirunelveli during 2017-18 and 2018-19. A total of 707640 nos. of COCN4 stem cuttings (slips) and 2060 kg of COFS29 and Hedge lucerne seeds were produced and distributed to 2769 farmers during the scheme period. Dairy farmers (78.73%) constituted the majority of the beneficiaries. An estimated 151.01 ha of additional land was brought under fodder cultivation utilising the distributed seeds/slips with a projected increase in production of 15,744 MT of green fodder during the scheme period. The cost economics was also in favour of fodder seed production with the highest Benefit Cost ratio observed for Cumbu Napier hybrid grass COCN4 (1.29), followed by Fodder Sorghum COFS29 (0.87) and Hedge lucerne (0.65).

Keywords: *Cumbu Napier hybrid grass, Fodder Sorghum, Hedge lucerne, Seeds/slips, Benefit Cost ratio*

INTRODUCTION

The beneficial effects of feeding green fodder to dairy animals and small ruminants are well documented. Green fodder is a good source of β-carotene, minerals, essential amino acids and unidentified factors to stimulate rumen microbial growth. Increased supply of green fodder is useful in ensuring availability of nutrients for optimising milk production, reproductive efficiency and growth rate in ruminant animals (Bacchu Singh et al., 2011) According to the National Commission on Agriculture, the green fodder requirement for the existing livestock in India is around 1136 Mt, whereas the availability is 695 Mt, indicating a 61% deficit in fodder supply (Singh & Roy, 1999). The projected demand for green fodder and dry fodder in our country by 2025 will be 1170 and 650 million metric tonnes with a projected deficit of 64.87% and 24.92% respectively.

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Though many reasons could be attributed to the existing state of poor green fodder cultivation, the main reason observed being the non availability of quality seeds at desired quantities at the right time of cultivation. Projected annual requirement of fodder seed to cultivate green fodder crops at current level of cultivated area of 8.47 million hectares has been worked out to be 3.35 lakh tonnes. Though a number of fodder varieties have been developed, seeds are not available because it is trapped in a vicious cycle of lack of demand due to lack of extension, which inhibits production of seed. (Meena & Singh, 2014). Concerted and coordinated efforts are imperative in ensuring timely availability of seeds as well as increasing the seed replacement rate (Trivedi & Gunasekaran, 2013). Thirunavukkarasu et al. (2011) had estimated a high deficit in green fodder availability in southern districts of Tamilnadu *viz*. Tirunelveli, Thoothukudi, Virudhunagar and Kanyakumari districts. As a means to overcome this localised problem and to meet the high demand for fodder seeds from livestock farmers, a fodder seed production scheme was implemented in Veterinary College and Research Institute, Tirunelveli with an aim to cultivate fodder crops suited to the southern agroclimatic zone, produce fodder seeds through multiplication process and to establish a steady source of supply of high quality fodder seeds. During the implementation period of the scheme, the quantity of fodder seeds and slips produced and supplied to beneficiaries, its anticipated impact on fodder cultivation and the cost economics of fodder seed production were studied.

MATERIALS AND METHODS

During the years of 2015-16 and 2016-17, the demand for fodder seeds was assessed through direct interview of livestock farmers who participated in training on animal husbandry practices and other extension programmes of Veterinary College and Research Institute, Tirunelveli, adopting a structured interview schedule. On the basis of analysis on the responses of the farmers on the perceived demand for fodder seeds, Cumbu Napier hybrid grass variety, Cereal Sorghum fodder and leguminous Hedge lucerne were identified as the three major fodder crops which were also observed to be well suited for the soil and climatic conditions of the southern districts of Tamilnadu. Hence, a fodder seed production scheme was designed and implemented in the Department of Animal Nutrition, Veterinary College and Research Institute, Tirunelveli since 2017-18 with the objective of cultivation of the three fodder crops - Cumbu Napier hybrid grass – CO CN4 variety, Fodder Sorghum – COFS29 variety and Hedge lucerne (*Desmanthus virgatus*) and production of seeds through multiplication process and slips from stem cuttings and thereby improve the availability of high quality fodder seeds and slips to the farmers of the southern region of Tamilnadu. Under this scheme, 0.80 ha of land in the fodder farm of Veterinary College and Research Institute, Tirunelveli, was developed, existing irrigation facilities were strengthened and Cumbu Napier hybrid grass – CO CN4 variety, Fodder Sorghum – COFS29 variety and Hedge lucerne (*Desmanthus virgatus*) were cultivated in 0.40, 0.20 and 0.20 ha respectively adopting the cultivation package of practices prescribed for fodder crops by Tamilnadu Agricultural University. Matured seeds from each individual plant of Fodder sorghum and Hedge lucerne crops were hand harvested periodically, air-dried, cleaned, and weighed. Stem cuttings of CO CN4 crop were harvested as fodder slips. The fodder seeds and slips were sold to farmers throughout the year at sale price fixed by Tamilnadu Veterinary and Animal Sciences University (CNCO4 slips - Rs.0.50 per slip; COFS 29 seeds – Rs.400.00 per kg; Hedge lucerne seeds – Rs.500.00 per kg). The details of production and distribution through sale of fodder seeds and slips and the number and type of beneficiaries during the scheme period of two years (2017-18 & 2018-19) were recorded. The variable cost of fodder cultivation in terms of expenditure incurred for land development, foundation fodder seeds,

irrigation, weed removal, harvesting of crops, seed collection, packing of seeds, cost of labour etc. and the returns obtained on income generated due to sale of fodder seeds and slips during the scheme period were recorded in order to work out the cost economics. Though, the crop residues obtained on harvest of fodder crops were used in the farm for feeding farm animals and actual monetary income was not realised, the market values of the crop residues @ Rs.1.00 per kg of COCN4 grass and Sorghum fodder and Rs.2.00 per kg of Hedge lucerne were taken into account for the calculation of gross returns. The Benefit Cost (B:C) Ratio was calculated as Net Returns / Cost of cultivation.

RESULTS AND DISCUSSION

The details of actual production and distribution of fodder seeds/slips, the estimated additional area brought under fodder cultivation and the anticipated quantity of green fodder production up on distribution of fodder seeds/slips to the beneficiary farmers during the scheme period are given in Table 1.

Table 1: Distribution of fodder seeds/slips, projected additional area under fodder cultivation and the anticipated increase in green fodder production

S. No.	Fodder crop	Year	Quantity of Seeds/slips distributed	Area under fodder cultivation* (in ha)	Green fodder production** (in MT)
01.	Cumbu Napier Hybrid Grass CO CN4 (slips)	2017-18	219110 nos.	5.48	1370.00
		2018-19	490530 nos.	12.26	3065.00
		Total	709640 nos.	17.74	4435.00
02.	Fodder Sorghum COFS 29 (seeds)	2017-18	412 kg	32.96	2472.00
		2018-19	597 kg	47.76	3582.00
		Total	1009 kg	80.72	6054.00
03.	Hedge lucerne (*Desmanthus virgatus*) seeds	2017-18	464 kg	23.20	2320.00
		2018-19	587 kg	29.35	2935.00
		Total	1051 kg	52.55	5255.00

* Requirement of seeds/slips for cultivation : CO CN4 slips – 40,000 nos./ha; COFS 29 – 12.5 kg/ha & Hedge lucerne – 20 kg/ha

** Anticipated Green fodder yield (minimum values) : CO CN4 – 250 MT/ha; COFS 29 – 75 MT/ha & Hedge lucerne – 100 MT/ha

Cumbu Napier hybrid CO CN4 variety stem cuttings were produced @ 2,19,110 and 4,90,530 nos. and sold as fodder slips to needful farmers (254 & 815 nos.) during 2017-18 and 2018-19 years respectively and hence 5.48 and 12.26 ha were additionally brought under CO CN4 cultivation resulting in an estimated production of 1370 and 3065 MT green grass fodder during these two years in the southern districts. During the same period, 412 kg and 597 kg of Fodder Sorghum COFS29 seeds were produced and supplied 350 and 530 beneficiaries with the resultant increased cultivation in 32.96 and 47.76 ha that augmented production to the tune of 2472 MT and 3582 MT green fodder respectively. Similarly, the production and supply of 464 kg and 587 kg of Hedge lucerne seeds to 310 and 510 beneficiaries amplified the cultivation in 23.20 and 29.35 ha of additional land that might have resulted in an increase in green fodder production of 2320 MT and 2935 MT during the two years respectively. The estimated values of fodder production in this study reiterated the observation of Chauhan et al. (2016) that increase in quality seed availability has a huge bearing on crop production and quality seed is the key input for realizing full potential of crop productivity. The results also revealed that production was higher in the second year (2018-19) of the scheme compared to the first year (2017-18). This difference was due to fodder cultivation in only nine months as the first 90 days were taken up for land development and creation of additional facilities for fodder cultivation during the first year of the scheme when compared to the second year wherein fodder production activity was done throughout the entire twelve month period.

The details of beneficiaries in terms of numbers and type, distributed with fodder seeds and slips during the scheme period are given in Table 2.

Table 2: Number and type of beneficiaries distributed with fodder seeds/slips

S. No	Fodder crop	Year	No. and type of beneficiaries						
			Dairy farmers			Sheep & Goat farmers			Total
			M	F	T	M	F	T	
01.	Cumbu Napier Hybrid Grass CO CN4 slips	2017-18	138	42	180	65	09	74	254
		2018-19	615	71	686	110	19	129	815
		Total	753	113	866	175	28	203	1069
02.	Fodder Sorghum COFS 29 seeds	2017-18	285	23	308	37	05	42	350
		2018-19	445	28	473	51	06	57	530
		Total	730	51	781	88	11	99	880
03.	Hedge lucerne (*Desmanthus virgatus*) seeds	2017-18	165	19	184	115	11	126	310
		2018-19	317	32	349	141	20	161	510
		Total	482	51	533	256	31	287	820
		Grand Total	1965	215	2180	519	70	589	2769

M – Male ; F – Female, T - Total

The results as given in Table 2 showed that a total of 2769 beneficiaries were distributed with fodder seeds and slips during the scheme period of 2017-18 and 2018-19 years. Cumbu Napier hybrid CO CN4 variety stem cuttings were distributed as fodder slips to the highest number of beneficiaries (1069) followed by Fodder sorghum COFS29 (880) and Hedge lucerne seeds (820). Dairy farmers with intensive system of rearing milch animals constituted majority of the beneficiaries, the proportion being much higher (78.73 %) than the sheep and goat farmers (21.27 %) with mostly semi intensive system of management. The increase in purchase and utilisation of fodder seeds and slips by the farmers in the second year could not only be attributed to the increased availability but also to the propagation of information to other farmers of the region by the first year beneficiaries on ready availability of fodder seeds/slips at a local source of supply. Local level seed production is always favourable to farmers as it will result in a saving in the overall costs since cutting out the long-distance transport of seed from production site to distribution points would substantially reduce costs (Cromwell & Tripp, 1994).

The cost economics of fodder seed production worked on the basis of expenditure incurred for fodder cultivation for fodder seed/slip production and gross returns accrued on sale of seeds/slips to farmers and market value of crop residues during the scheme period are given in Table 3.

Table 3: Economics of Fodder seed production:

S. No.	Fodder crop	Year	Cost of cultivation (in Rs.)	Gross returns (in Rs.)			Net returns (in Rs.)	Benefit cost ratio
				SS	CR	Total		
01.	Cumbu Napier Hybrid Grass CO CN4	2017-18	63542	109555	24500	134055	70513	1.11
		2018-19	117727	245265	35000	280265	162538	1.38
		Total	181269	354820	59500	414320	233051	1.29
02.	Fodder Sorghum COFS 29	2017-18	101558	164800	8400	173200	71642	0.70
		2018-19	124594	238800	12000	250800	126206	1.01
		Total	226152	403600	20400	424000	197848	0.87
03.	Hedge lucerne (*Desmanthus virgatus*)	2017-18	151960	232000	11200	243200	91240	0.60
		2018-19	182674	293500	16000	309500	126826	0.69
		Total	334634	525500	27200	552700	218066	0.65

SS – Seeds / Slips; CR – Crop residues

The results (Table 3) showed a more favourable benefit cost ratio for Cumbu Napier hybrid grass COCN4 (1.29) when compared to both Fodder Sorghum COFS 29 (0.87) and Hedge lucerne (0.65). The cost of cultivation of the leguminous Hedge lucerne crop was the highest and hence it showed the lowest benefit cost ratio. Similar low benefit cost ratio of 0.64 was recorded for Breeder seed production of Wardan variety of Berseem legume as per the annual report data of IGFRI, Jhansi (2003-04). However, the monetary returns realised from seed/slip production was much higher than the monetary returns from crop residues in all the three crops. Similar observation was made by Digvijay Singh *et al*. (2018) on economic analysis of oat production that oat seed production provided greater returns as compared to green fodder production.

CONCLUSION

Establishment of a fodder seed production unit at Veterinary College and Research Insitute, Tirunelveli, resulted in a continuous production and distribution of fodder seeds and slips to the beneficiaries of Southern districts of Tamilnadu during the scheme implementation period of two years. Availability of quality seeds in the vicinity increased its uptake by dairy and small ruminant farmers for fodder cultivation. The distribution of inputs like seeds and slips was estimated to have increased the land under fodder cultivation with an anticipated increase in production and improved availability of green fodder for feeding dairy cattle, sheep and goats. The cost economics was also observed to be mostly favourable for fodder seed production. Hence, it is concluded that the technology of establishing fodder seed production and distribution units could be propagated for implementation at vantage places to meet the demand of local farmers and to ensure augmentation of green fodder cultivation in the region.

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