

VALIDATION OF TEN-CENT MODEL FODDER PLOT FOR SUSTAINABLE RUMINANT PRODUCTION

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ABSTRACT

*Fodder quality and availability are major determinants in profitable ruminant production system. Tamil Nadu Veterinary and Animal Sciences University and Department of Animal Husbandry, Government of Tamil Nadu and other related institutions promote fodder production through several schemes and projects. Intensive fodder production through promotion of sustainable fodder production model under irrigated condition is one among them. The objective of the present study was to validate the fodder production potential of the ten-cent model for livestock feeding. In livestock farm complex Madhavaram, ten-cent model fodder plot was established with Hybrid Napier grass variety Co (BN) 5 in 4 cents area; fodder maize (African Tall) in 1 cent; fodder sorghum (CoFS 31) in 2 cents; fodder cowpea (Co 8) and Velimasal (*Desmanthus virgatus*) in 1.5 cents area each; Agathi (*Sesbania grandiflora*) and Subabul (*Leucaena leucocephala*) were cultivated as boundary plantation. Standard agronomical management practices were adopted during the study period (15 months) and fodder was harvested at specified intervals. The total biomass yield realized was 9918 kg. The average yield/cut (kg) of Co5, sorghum, maize, cow pea, *Desmanthus* and Agathi/Subabul were 1340.0, 264.6, 160.0, 178.0, 71.0 and 98.0 kg respectively. Highest fodder yield was noticed during south west monsoon season (2492.0 kg) followed by north east monsoon season (1796.5 kg) and lowest yield noticed in summer season (1465.0 kg). The total CP and TDN yield (on dry matter basis) of ten-cent model fodder plot, estimated from available standards were 1121.71 kg and 5586.58 kg respectively during the study period. The results of this study revealed that quantity and quality of fodder harvested from the ten-cent model fodder plot can support one cattle or five goats for a year. It is possible to sustain one cow or five goats through fodder production in the ten-cent model fodder plot.*

Key words: Biomass yield, Crude protein, Fodder, Ruminant, Total digestible nutrients

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INTRODUCTION

Livestock farming remains as an integral component of farmer's culture and livelihood. It also plays a pivotal role in the rural economy. Tamil Nadu, holds 4.56%

of India's livestock population contributing 4.39% to country's milk production and 7.88% to meat production (DAHDFD, 2021). In Tamil Nadu, the area under fodder crops is 0.09 million hectare which is approximately 1% of total cultivated area. The state faces net deficit of 54% of green fodder and 15% of dry fodder. Non availability of feed and fodder for livestock could be a serious limitation to livestock production (Kaasschieter *et al.*, 1992; Earagariyanna *et al.*, 2017). Farmers with small holdings show little interest in planting pasture and cultivated fodders. So, there is need to cultivate the fodder in an intensive manner to feed the livestock. Intensive fodder production through promotion of sustainable fodder production model under irrigated condition (ten-cents) is one of the projects implemented by Government of Tamil Nadu in the year 2019 (GO Ms. No. 125, Animal Husbandry, Dairying and Fisheries (AH4) Department). Hence the present study was carried to validate the fodder production potential of the ten-cent model fodder plot for livestock feeding.

MATERIALS AND METHODS

This experiment was carried out in fodder farm of Livestock Farm Complex, located at Madhavaram Milk Colony, Chennai-51 (1.15° N 80.24°E). A ten cent land (Fig. 1) was prepared as per standard agronomical practices for fodder cultivation. High biomass yielding grass fodder like Cumbu Napier grass variety Co (BN) 5 was planted in 04 cents area; Cereals fodder maize (African Tall) in 01 cents and fodder sorghum (CoFS 31) in 02 cents area. Annual legume, fodder cowpea (Co 8) and perennial legume, velimasal

(*Desmanthus virgatus*) were cultivated in 1.5 cents area each. Tree fodders, Agathi (*Sesbania grandiflora*) and Subabul (*Leucaena leucocephala*) were cultivated as boundary plantation. The fodder yield was recorded at recommended harvesting period for 15 months. The season wise yields of the different component fodder varieties were studied. The nutritive value for the yield obtained was estimated from existing reference values.

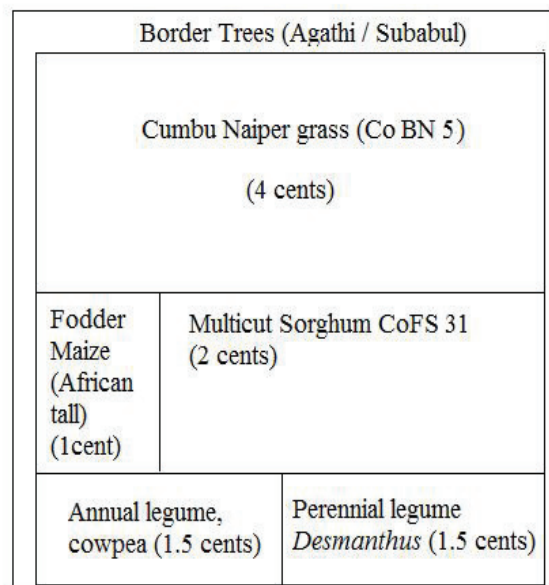


Fig. 1. Ten cent model fodder plot design (GO Ms.No.125, Animal Husbandry, Dairying and Fisheries (AH4) Department)

RESULTS AND DISCUSSION

Biomass yield of fodder crops

The total biomass yield of the fodder crops harvested during the study period of 15 months in ten-cent model fodder plot was 9918 kg. Except fodder maize, all other fodder crops were harvested five times. The average yield/cut (kg) of Co5, Fodder

sorghum, Fodder maize, Fodder cow pea, Desmanthus and Agathi/Subabul were 1340.0, 264.6, 160.0, 178.0, 71.0 and 98.0 kg respectively. (Table 1).

The highest fodder yield (6700 kg) was recorded in hybrid Napier Co5 which remained high on subsequent cuttings also (Fig. 2) as compared with other fodder crops. This is in agreement with the findings of Ramya *et al.* (2017), who observed that yield and nutrient content of Co5 was better than Co4 and CoFS29. The harvest days of

different fodder crops were presented in Table 1. The initial harvests were as per recommendation but subsequent harvest days were longer in this study.

On an average a crossbred cattle weighing 300 kg requires 20 kg green fodder per day and 30 kg goat requires 4 kg green fodder per day. The total quantity of fodder obtained from ten-cent model fodder plot can support one adult cattle or five goats. However, the biomass yield of fodders in the ten-cent model fodder plot

Table 1. Biomass yield and days to harvest for different component crops of the 10 cents plot

Sl. No	Fodder	No. of Harvest	Total yield in 15 months (kg)	Average yield / cut (kg)	From date of sowing to first harvest	Days between subsequent harvests			
						2	3	4	5
1	Hybrid Napier Co(BN)5	5	6,700	1340.00± 160.09	71	80	109	93	69
2	Fodder sorghum-CoFS31	5	1,323	264.60± 42.71	69	102	67	94	93
3	Fodder maize	1*	160	160	72				
4	Fodder cow pea	5	890	178.00± 32.73	62	90	64	78	67
5	Desmanthus	5	355	71.00± 14.70	92	63	68	109	94
6	Agathi and Subabul	5	490	98± 33.31	162	59	91	58	61
Total Biomass yield			9,918	381.46± 99.40					

*Fodder maize subsequent harvest failure was due to pig/squirrel menace, seed sprouting failure

is not uniform throughout the year (Fig. 2). This may due to sowing and harvesting interval between the crops and seasonal variations (Dhillon and Sidhu, 2020). In this study, out of 15 months, only 5 months the fodders were harvested in excess. This may be due to the sowing of fodder crops at the same time without following the standard staggered sowing. The above issue can be trouble shooted by adopting the following strategies. (i) Staggered sowing of different fodder crops for extended supply of fodders throughout the year. (ii) Optimize the cutting schedule of different fodder crops. (iii) In

this ten-cent model fodder plot, crops were harvested 2-4 times excess as required. This excess fodder crops can be preserved as quality silage and it can be used whenever there is a shortage of green fodder. (iv) Tree fodders as boundary plantations provide feed for animals during lean periods. This ten-cent model fodder plot is suitable for cut and carry system of fodder feeding which is widely practised by small holders where access to grazing land is prohibited. This model is helpful to maximize the forage production in limited space and time.

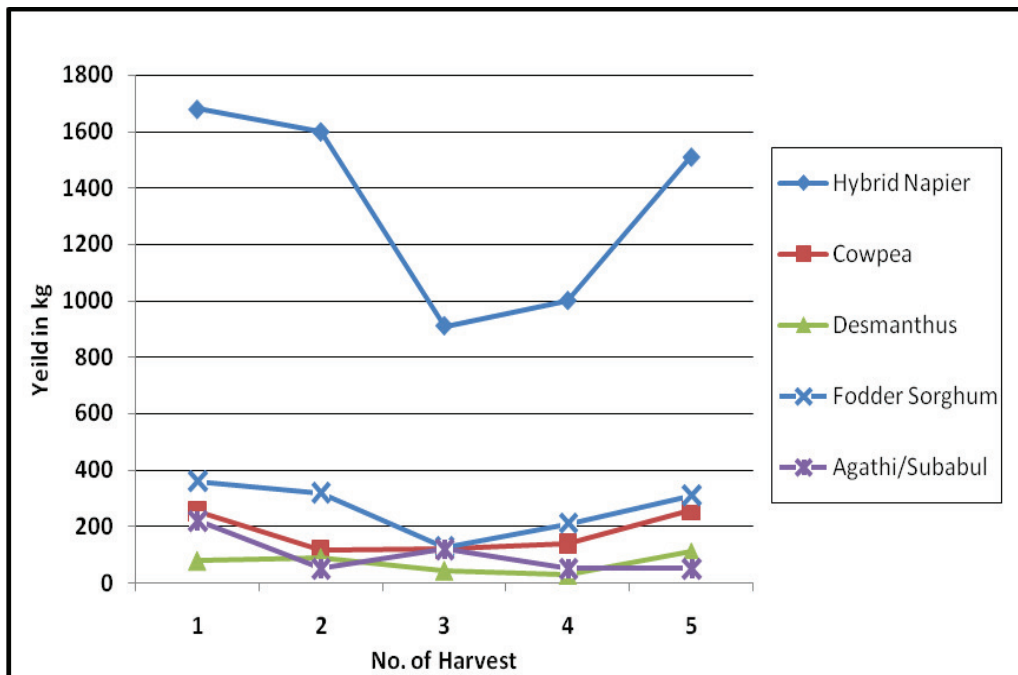


Fig. 2. Fodder crop yield trend

Season-wise yield of fodder crops

The quantity of fodder consumed by animal species varies in different seasons. The season-wise fodder yield (Table 2) in the ten-cent model fodder plot was 2492.0 kg, 1796.5 kg and 1465.0 kg in South-

west Monsoon, North-east Monsoon and summer season respectively. The lowest fodder yield was noticed during summer season. The analysis of feeding practices by season assumes importance as the availability of fodder is influenced by the seasonality of their production. Similar

to our findings, Kannan (2012) found that the average consumption rate of green fodder for crossbred cattle in Karnataka was higher during kharif (17.51 kg) than the rates observed in rabi (16.40 kg) and

summer seasons (13.86 kg). Concentrate supplementation is used to compensate nutritional deficiencies in the forage supply (Capstaff and Miller, 2018) especially in summer.

Table 2. Season wise yield of different fodder crops

SI. No	Crop	South-west monsoon (July-October)	North-east monsoon (November-February)	Summer (March-June)
1	Hybrid Napier Co(BN)5	1595.0	1255.0	1000.0
2	Fodder sorghum-CoFs31	335.0	221.5	210.0
3	Fodder maize	160.0	-	-
4	Fodder cow pea	257.0	117.5	140.0
5	Desmanthus	95.0	67.5	30.0
6	Agathi and Subabul	50.0	135.0	85.0
Total biomass yield		2492.0	1796.5	1465.0

Nutritive value of fodder crops

Production of good quality fodder is of a great importance for the economical ruminant production (Khan *et al.*, 2007). The uncultivable range lands i.e. used for animal grazing are poor in quality, being deficient in available energy, protein and minerals (ICAR, 2012). The demand for crude protein (CP) and total digestible

nutrients (TDN) in 2030 will be around 67.01 MT and 388.24 MT respectively (Kumar *et al.*, 2018). The total CP and TDN yield (on dry matter basis) of ten-cent model fodder plot was 1121.71 and 5586.58 kg respectively during the study period (Table 3). The CP and TDN value shows the quality of fodders harvested from the ten-cent model fodder plot.

Table 3. Nutritive value of different fodder crops

SI. No	Crop	CP yield in kg	TDN yield in kg
1	Hybrid Napier Co(BN)5	703.50	3685.00
2	Fodder sorghum-CoFS31	108.88	740.88
3	Fodder maize	14.18	96.00
4	Fodder cow pea	146.85	552.69
5	Desmanthus	63.19	208.21
6	Agathi and Subabul	85.11	303.80
Total		1121.71	5586.58

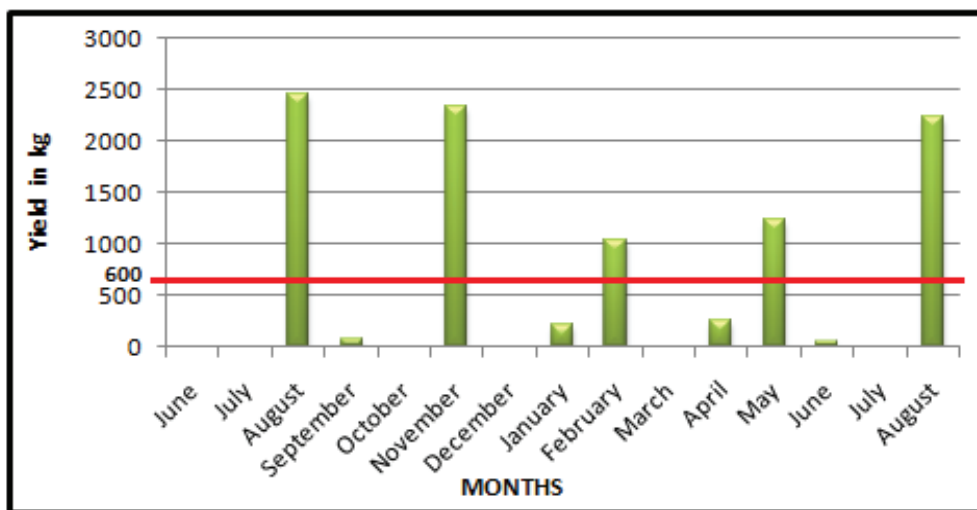


Figure 3. Fodder crop yield month wise particulars

CONCLUSION

It is possible to maintain one dairy cow or five goats with the ten-cent model plot with minimal supplementation during lean periods.

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