International Journal of Agriculture Innovations and Research
Volume 7, Issue 1, ISSN (Online) 2319-1473
Manuscript Processing Details (dd/mm/yyyy):
Received: 30/06/2018 | Accepted on: 08/07/2018 | Published: 14/07/2018

Socio-economic Constrains and Effect of Fodder Nursery on Dairy Farming: A Participatory Approach in Harapanahalli Taluk of Davanagere District

Veeranna. K. C.[1], Manjith Kumar B. R.[2*], Madavaprasad C. B.[3] and Nagabhushan V.[4]
*Corresponding author email id: manjeetkumar2007@gmail.com

Abstract – **Livestock farming is a profit mainly it depend adequate availability of fodder at reasonable price. The cultivation and storage of fodder is an important component for animal husbandry. The demand of fodder has been always increasing with the animal population as well as increase in production of milk. The present study was undertaken to encourage the farmers to cultivate fodder grasses in their own farm. A live demonstration of fodder crops during 2017-18 was under taken in Sattur village of Harapanahalli taluk, Davanagere district, Karnataka, to educate the farmers in cultivating perennial fodder grasses. Interested farmer were selected randomly from the Sattur village for demonstration of growing of fodder grass. The study revealed that the production of Napier CO-4 was 117.5 tons/ac/y and Napier CO-3 was 106.25 tons/ac/y, Guinea grass was 60 tons/ac/y, Rhodes grass was 90 tons/ac/y, Hedge Lucerne was 22.5 tons/ac/y, Grazing guinea was 77.5 tons/ac/y, Anjan grass was 56.0 tons/ac/y, Pyara grass was 56.0 tons/ac/y and Fodder sorghum was 24.8 tons/ac/y. The total annual expenditure per 2 gunta (200 m^2) area of different fodder grass from fodder nursery plot was ₹ 12400 and if there is no maintenance of livestock in their farm the total income generated only from the nursery from different green fodder crops production was ₹ 26360. The net profit from different fodder crops from fodder nursery plot was ₹ 13960. Moreover, availability of nutritional rich good quality green fodder and dry fodder in the beneficiary farm from fodder trees and fodder crops all-round the year and also increased lactometer reading, Fat and SNF and milk production of the cross bred cows and finally earn the income around the year.**

Keywords – **Constraints, Demonstration, Green Fodder Net Profit and Yield.**

I. INTRODUCTION

One of the major components in dairy farming is the provision of green roughage all-round the year along with dry roughage and concentrates depending upon the milking capacity of the dairy animals. Livestock sector is playing a crucial role in the overall growth of agriculture sector and gross domestic product of the country. In many parts of the country the farmers are growing monocropping along with one or two animals rearing in their farm land but they find it difficult to sustain their families' livelihoods. They often face limited landholding, lower availability of fodder, declining productivity, resulting in poverty, food insecurity and a low nutritional status. The extent of warming across India is adverse impact on wild life, agriculture, incidence of diseases, local weather, rise in sea level, more heat waves etc. Rising population, rapid urbanization, industrialization, deforestation and waste production are putting enormous pressure on our natural resource base and has led to qualitative and quantitative degradation of resources such as land, water, air, biodiversity, forests and bio-resources (Agrawal, 2008).

India is presently under heavy stress on account of a large-scale exploitation for fuel wood, timber and fodder, mismanagement of forest resources and frequent fires. There is acute shortage of fodder especially green nutritious fodder, which is major cause of low productivity of livestock (Deb Roy et al., 1989). The low productivity is mainly due to insufficient and low quality fodder and feed including grazing facilities (Deb Roy, 1993). Birthal and Jha (2005) also found scarcity of fodder as the main limiting factor to improving livestock productivity. In Harapanahalli taluk, the farmers neither provide gainful employment for the family labour round the year nor generate sufficient income to satisfy the family requirement. Low per capita availability of land, increasing population pressure, agriculture turned to be less dependable to provide adequate livelihood opportunities for a majority of rural population.

The present study was undertaken to encourage the farmers to cultivate fodder grasses in their farm. A live demonstration of fodder crops during 2017-18 was under taken in Sattur village of Harapanahalli taluk, Davanagere district, Karnataka, to educate the farmers in cultivating perennial fodder grasses.

II. MATERIALS AND METHODS

The present study with an objective to assess the socio-economic profile of respondents of Sattur village of Harapanahalli taluk of Davanagere district of Karnataka. The data were collected from 200 respondents of all the groups using structured pre tested interview schedule, tabulated, analyzed using simple statistical tools and conclusions were drawn. The interested dairy farmer with the herd size of 5- 6 lactating animals was selected randomly. Shri. Manjappa S/o Veerappa at Sattur village of Harapanahalli Taluk, Davanagere district was identified for this activity. Farmers were given 11 varieties of fodder crops, seeds and fodder trees. They also provide initial technical guidance, critical inputs such as fodder root slips, fodder seeds and fertilizers for establishing the fodder nursery in their farm plot. Each fodder crop was grown in 2 gunta area respectively. The 7 different fodder grass varieties viz., Napier Grass (CO-4 and CO-3), Guinea Grass (Samruddi), Anjan grass (Local (Cenchrus ciliaris)), Grazing guinea (Local), Pyara grass (Local (Brachiaria mutica (Forsk.) Stapf)) and Rhodes Grass.

Also given 2 different fodder crop seeds such as Multicut sorghum (COFS29), Hedge Lucerne (Desmonthus vergatis) and 2 fodder trees such as Glyricidia (Local) and Sesbania (Local) were grown in half acre land. The quantity of fodder root slips and fodder crop seeds for 2 gunta area provided for farmers are,

1. Napier grass such as CO-4 and CO-3 each was 700,
2. Rhodes grass, Guinea grass, Pyara grass, Anjan grass and Grazing guinea was 750 and
3. Hedge Lucerne and Multicut sorghum was 0.5 kg each and
4. Fodder trees such as Glyricidia and Sesbania was 250 g each.

The scientific practice such as layout of the crop, line spacing of different crop, fertilizer application and cultivation practices were adopted. The critical inputs such as fodder root slips, fodder crop seeds and fertilizer (Urea, Diammonium Phosphate and Murate of Potash) were given to the selected farmer. The farmers were educated at three different levels.

Level 1: The interested village livestock farmers assemble at a one place and highlight the objectives of the study. Among, interested one farmer should select. After selection of the farmer, they were highlighted on the necessity for growing fodder grass and the benefits they will reap out of it.

Level 2: After convincing the farmer demonstration of preparation of seed bed and sowing technique was shown

Level 3: After that planting/ sowing of grass seedlings and fodder crop seeds to the field were demonstrated and also the method of utilization of the fodder grass and fodder crop seeds was explained.

The sowing operation of fodder crops was taken during Kharif season i.e. August month of 2017-18. Farmers were trained for cultivation, management and establishment of different fodder crops. Crop protection activities such as thinning, controlling weeds through intercultivation and manual hand weeding were operated timely. The grasses can be harvested up to 6-8 years in the fixed land. So the first cutting of fodder grass verities were done during 85 DAP (Days after planting) and respective cutting was done at 45- 50 days interval, on an average 5 cutting were done in a year. The other fodder crops such as hedge Lucerne and multicut sorghum were harvested at 60-65 Days after sowing (DAS) and subsequent cutting was done at 30- 35 days. Similarly the milk yield of animals, fat and SNF content were recorded from the farmer who participated in the study. The annual expenditure for fodder production was calculated for per hectare of land.

III. Results and Discussion

Socio-economic profile of the respondents:

The socio-personal characteristics of dairy farmers of Sattur village in Davanagere district were studied and the results are presented in Table 1

Majority (58.5%) of the respondents were belonged to younger & middle age group, followed by Upper middle age and old age group. The middle aged farmers taking up dairying as income generating activity as they possessed more physical vigour and could shoulder more family responsibilities. Middle age is considered as the productive earning period in the life of an individual. Whereas younger generation is more exposed to diverse occupations and is moving towards cities/towns. These findings are in conformity with the findings of Thomaskutty (1975) and Kakoty (1980).

More than 50 per cent of the respondents were males followed by females. The males in the family are decision makers and more cosmopolite in nature. These findings are well supported by the results of Jagadeeswary et al (2010).The male members in the family were involved in labour work for income generation while, the female members carried the work of Keeping dairy and agriculture activity in their owned field.

Eleven per cent of the respondents had illiterate, while hardly 20.5 per cent had primary school education, 30.0 per cent middle school education, 30.5 per cent High school education and 8.0 per cent Higher education. This indicated that respondents had accessibility to education and realized its importance in decision making process. The findings of the study were in agreement with the findings of Mujahida and Aparna (2013) who reported that, majority of the respondents had primary school education. Nearly 43 per cent of the respondents had a small family size of 3 to 5 members, followed by medium family size of 6 to 8 members. This is because most of the respondents had nuclear family type due to social change for smaller family sizes to meet the family demands within the available sources of income.

Forty six per cent of the respondents had more than 5 acres land, 27.0 per cent had 3-5 acres of land and 11.5 per cent had 1-1 acres of land, while 15.5 per cent respondents had no land because of this they are doing work as Agriculture labour and goat rearing activity.

Twenty nine per cent of respondents were agricultural labourers and had goat rearing as their subsidiary occupation while 69.5 per cent had Agriculture along with Animal husbandry as their main occupation and 1.5 per cent of them had other occupations for earning a source of income. This is because integrated farming is widely practiced in the villages of Davanagere district by resource poor farm labourers to earn additional source of livelihood.

Fifty four per cent of the respondents had more than 10 years of experience in Animal husbandry activity, 42.5 per cent had 5-10 years and just 3.5 per cent had less than 5 years of experience in dairy farming, most of the farmers continued the tradition of agriculture and animal husbandry as it provided stable and sustainable income.

More than 50.0 per cent of the respondents had more than 5 animals in their dairy farm, while 27.0 per cent had 3-5 and just 15.5 per cent had 1-3 animals in their dairy.

Seventy seven per cent of the dairy respondents were not aware about importance of green fodder and its performance in dairy, while 23 per cent of the respondents were know the importance of green fodder for animal feed. Jagadeeswary *et al (2010)*, reported that none of the farmers cultivated fodder.

Sixty three per cent of the dairy respondents were fed dry fodder and other fodder such as weeds, grass in canals and field bunds etc., 29.5 per cent of the respondents were fed concentrated to their animals, while only 7.0 per cent of respondents were fed green fodder to their animals.

Eighty one per cent of the respondents were don not aware on source of fodder seeds/ root slips, while only 19.0 per cent of the respondents were known about the source of green fodder seeds/ root slips. There was a need to guide the farmers about enrichment and conservation of the fodder for future use by treating it with various additives and nutrients.

Majority of the respondents (65.5%) had an annual income more than Rs. 50,000/-, this may be due to they are doing both agriculture as well as animal husbandry activity, while 19.5 per cent had ranging between Rs. 35,000/- to 50,000/-. Whereas, 11.5 per cent had ranging between Rs. 25,000/- to 35,000/- and only 3.5 per cent of the respondents got less than Rs. 25,000/- of their family annual income. The annual income of the respondents was mainly from their main occupation i.e in agriculture and also by animal husbandry. Similar findings were reported by Bhople and Alka (1998).

Constraints Faced in Dairy Farming:

Constraints faced by the respondents in various areas of the dairying were recorded and are presented in the Table-2.

The present study indicated that majority of farmers (96%) reported non availability of fodder round the year and Low availability of green fodder followed by inadequate knowledge about feeding (85%) as the major constraints in dairy farming. Similar findings were previously reported by Sagari (2001). Difficult to get seeds/planting materials (81%) and High cost on feeding and storage of feed (69%) was also reported by farmers. Most of the farmers (73%) faced the problem of lack of grazing land for the animals which are in agreement with the results observed by Rathod et al (2009).

Nearly 80 per cent of the farmers reported that the lower productivity and low fat content in the milk of the local breeds were the major constraints followed by Poor adaptability of cross bred animals and lack of Knowledge about source of breeds (88.5%). Sivanarayana and Reddy (1995) also highlighted the poor productivity of the indigenous breeds and poor adaptability of the crossbreed respectively.

Health care of the animals was a major constraint for majority (96.0%) of the dairy farmers since they lacked timely veterinary and health care services. The study depicted that 77 per cent farmers felt the disease occurrence itself as the major constraint. Similar findings were reported by Rathod et al (2011). The farmers also pointed out about the Difficult to get proper information (81%) and high cost of medicine and treatment services (69%). Similar findings were also reported by Rathod et al (2011) who suggested about the need for training the dairy farmers about basic knowledge of the diseases.

The majority of respondents reported about the problem of animal shed or the housing facilities (81 %) because of their poor economic status and their inability to maintain farm and dairy records (77%).This is in conformity with the findings of Balasubramanian (1995). Few of the farmers also reported about inadequate knowledge of proper milking methods (73%). These results are found in line with the study conducted by Sharma and Intodia (1991) who revealed high educational gap in management practices like lack of knowledge about milking methods.

The study revealed that 69.0 per cent of the farmers complained about Non Functional milk cooperative societies and low price for milk (57.5%), similar also reported earlier by Rathod et al (2011).

Majority of the farmers (69.0%) opined that youth were not interested in carrying out dairy farming for their livelihood because of lower yields, so that there is need special trainings to get higher yields. Similarly, extension personnel working (81.0%) and disseminating information on fodder crops is very limited. Even in milk federations, only employ graduates to work on fodder extension because of lower knowledge about fodder production and its utilization, it becomes difficult for the farmers to obtain information on fodder crops. Green grasses lose its fodder value if it is dried. So, the crop cannot be stored and stacked for future use. This could be the reason of expressing difficult to store the produces as the constraint. Best quality fodder can be harvested when crop is at flowering stage but many farmers due to continuous requirement do not allow the crop to flower and harvest either before or after the flowering stage. In both the situations fodder quality affects. So maintaining harvest schedule is expressed as one of the constraint by the respondents. Similar findings were reported by Mapiye et al. (2006).

***Production*:**

Green fodder production/ yield of fodder plot:

The production/yield of fodder crops from nursery plot i.e., the green fodder production (cutting 3-5 times in year) was recorded from the fodder bank was depicted Table 1.

The production of Napier CO-4 and CO-3 was 117 and 106 tons/ac/y respectively, Guinea grass was 60 tons/ac/y, Anjan grass was 56 tons/ac/y, Pyara grass was 56 tons/ac/y, Rhodes grass was 90 tons/ac/y, Hedge Lucerne was 22 tons/ac/y, Grazing guinea was 77 tons/ac/y and Fodder sorghum was 24 tons/ac/y. The average green fodder yield per 2 gunta area was also furnished in the Table 3

Economics of Fodder Crops:

The cost of cultivation was estimated. The establishment (Input) cost such as seed cost, fertilizer cost, labour hiring cost and finally harvesting costs were worked out to calculate the total cost of production. Then, the establishment cost was amortized to incorporate it in the calculation of annual cost (Table 4).

The total annual expenditure per 2 gunta (200 m^2) area of different fodder grass from fodder nursery plot was ₹ 12400 and total income generated from the nursery from different green fodder crops production was ₹ 26360. The net profit from different fodder crops from fodder nursery plot was ₹ 13960. Moreover, green fodder and dry fodder were available from fodder crops

round the year for feeding of animals in their dairy farm. The net income from fodder crops was low but the nutritionally rich green fodder was available all-round the year for their own animals in the farm that led to increase in the milk production and quality of milk.

Advantages of selected former got:

1. Green fodder and dry fodder were available from fodder trees and fodder crops all-round the year for their own animals in dairy farm.
2. Good quality and nutritional rich green fodder were available to the farm animals. The objective of introducing the fodder shrubs was to provide a low-cost, easy-to-produce protein source that could also contribute to sustainable land management.
3. Increased milk production of the cross bred cows with 1.0-2.0 l/ day.
4. Improved lactometer reading (degree level) to 24 to 27.
5. Green fodder helps the animal health to be in good and productive.
6. Improving the Fat content of the milk by 0.3 to 0.5%.
7. Earning the income around the year.

Direct benefits of the fodder nursery to the farmer:

1. The economics produce from a dairy unit of about 5 milch cattle can realize a net income of 50,000 to 75,000 every year. Similar results were obtained in the studies of Jayashree and Suneetha (2010).
2. He can also cow dung and cow's urine that could be effectively recycled manure preparation and used as source of nutrient for fodder crops and also other crops. Similar results were obtained in the studies of Jayashree and Suneetha (2010).

With this demonstration Farmers have definitely observed that their livestock had performed better with the green forages and they will sustain their animals in the dry season. This study was effective in creating an impact on the dairy farmers and this has to be popularized in a large scale in this area of shrinking agricultural fields and the demand for good quality milk and milk products.

IV. Conclusion

Participatory green fodder production and establishment of forage bank technology is may be the key to improve the adoption of forage crops by small land holding farmers of Sattur village. This Research would increase nutritional value of the feeds, reduce the risk of pests and diseases and promote local biodiversity. Working with farmer may enhance adoption of the forage technologies as the farmers can share experiences and cost of inputs required for the technologies to succeed. Commercial seed production and distribution are slowly emerging in project areas; however, it is not clear if seed production will continue to grow and meet local demand.

V. Acknowledgment

The authors are grateful to the following organizations for funding the work reported in this paper: We sincerely thank to the Word Bank funding KWDP SUJALA III project by Watershed department of Karnataka to KVAFSU Bidar.

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Authors' Profile

[1]**Dean** and Professor Veterinary College, Shivamogga- 577204

[2]**Research Associate,** Department of Veterinary and Animal Husbandry Extension Education, Veterinary College, Shivamogga- 577204

[3]**Professor and Head**, Department of Veterinary and Public Health, Veterinary College, Shivamogga- 577204

[4]**Professor and Head**, Department of animal nutrition, Veterinary College, Shivamogga- 577204

International Journal of Agriculture Innovations and Research
Volume 7, Issue 1, ISSN (Online) 2319-1473

Table 1. Socio-economic profile of farmers of Sattur village of Harapanahalli taluk Davanagere district

Variable	Category	Frequency (N=200)	Percentage
Age	Young age (18-25)	60	30.0
	Middle age (25-35)	57	28.5
	Upper middle age (35-50)	65	32.5
	Old age (51or above)	18	9.0
Sex	Male	102	51.0
	Female	98	40.0
Education	Illiterate	22	11.0
	Primary school (1 to 4th)	41	20.5
	Middle school (5th to 7th)	60	30.0
	High school (8th to 10th)	61	30.5
	Higher education (PUC & Degree)	16	8.0
Family size	3-5 members	86	43.0
	6-8 members	84	42.0
	Above 9 members	30	15.0
Land holding	Landless	31	15.5
	Low (1-2 ac.)	23	11.5
	Medium (3-5 ac.)	54	27.0
	High (> 5 ac.)	92	46.0
Main occupation	Agricultural labour	24	12.0
	Agriculture	65	32.5
	Dairy animal Keeping	74	37.0
	Goat keeping	34	17.0
	Others	3	1.5
Experience in dairy farming	<5 years	7	3.5
	5-10 years	85	42.5
	>10 years	108	54.0
Animal size	1-3 animals	31	15.5
	3-5 animals	54	27.0
	>5 animals	115	57.5
Experience in green fodder performance	Good	46	23.0
	Not aware	154	77.0
Type of animal feed	Green fodder	14	7.0
	Dry fodder	64	32.0
	Concentration feeds	59	29.5
	Others	63	31.5
Availability of green fodder seeds/roots	Aware	38	19.0
	Not aware	162	81.0
Annual income (Rs)	< 25,000	7	3.5
	25,000-35,000	23	11.5
	35,000- 50,000	39	19.5
	>50,000	131	65.5

Table 2. Distribution of the dairy farmers on the basis of constraints faced in dairy farming

Constraints	Frequency	Percentage
Feeds and Feeding		
1. Inadequate knowledge about Feeding	170	85.0
2. Non Availability of fodder round the year	192	96.0
3. High costs on feeding & Storage of feed	138	69.0
4. Lack of Grazing land	146	73.0
5. Low availability of green fodder	192	96.0
6. Difficult to get seeds/planting materials	162	81.0
Breeds		
1. Low productivity of local breeds	162	81.0
2. Low fat level in milk of local breeds	177	88.5
3. Poor adaptability of cross bred animals	154	77.0
4. Knowledge about source of breeds	177	88.5
Veterinary / Health care service		
1. Lack of timely Veterinary services	192	96.0
2. High cost of medicine & treatment services	138	69.0
3. Disease occurrence	154	77.0
4. Difficult to get proper information	162	81.0
Marketing		
1. Low price of milk	115	57.5
2. Non Functional milk cooperative societies	138	69.0
Care & Management		
1. Animal Sheds (Housing Facilities)	162	81.0
2. Milking methods	146	73.0
3. Farm & Dairy Records	154	77.0
Other		
1. Requirement of special trainings to get higher yields	138	69.0
2.Irrigation problem	54	27.0
3.Difficult to store the produce	108	54.0
4. Requirement of high crop management practices	115	57.5
5. Difficult to maintain the harvest schedule	69	34.5
6. Less visit of extension personnel	162	81.0

Table 3: Production and economics of different fodder crops

Sl. No.	Crop	Variety	No. of cuttings (August 2016-February 2017)	Average yield per 2 gunta area per cutting (kg)	Average yield per 2 gunta area per year (Ton)	Green fodder Yield (t/ac/y)
1	Fodder Sorghum	COFS.29	4	310	1.24	24.80
2	Hedge Lucerne	Desmonthus vergatis	3	150	0.45	22.50
3	Rhodes grass	Rhodes	5	360	1.80	90.00
4	Guinea grass	Samruddi	4	300	1.20	60.00
5	Napier grass	CO-4	5	470	2.35	117.50
6	Napier grass	CO-3	5	425	2.13	106.25
7	Anjan grass	Local (Cenchrus ciliaris)	4	280	1.12	56.00
8	Pyara grass	Local (Brachiaria mutica (Forsk.) Stapf)	4	280	1.12	56.00
9	Grazing guinea	-	5	310	1.55	77.50

Note: The costs were adopted for calculating the economics was listed here, grass root slips 0.30/root slip, Rs.2 per kg of Cereal green fodder,Rs.3 per kg legume green fodder, labour wage 300/day, Land preparation 300/hr, Fertilizer such as Urea, DAP and MOP was 6.4, 21.6 and 19.0/kg and Bullock pair was 400/pair/day and Seed cost for sowing such as Root slips was 0.75/root slip, 500/ kg of hedge Lucerne seed and 400/ kg of multicut sorghum.

Table 4: Economics of fodder nursery of Shri. Manjappa S/o Veerappa at Sattur village

Sl. No.	Particulars	Amount (Rs./2 gunta)
Expenditure		
1	Seeds and root slips cost	**3800**
2	Cost of Fertilizers (50kg urea, 25 kg Dap and 5 kg MOP)	**1700**
3	Cost of FYM (200kg/2gunta)	**1500**
4	Hairing labours (Sowing, weeding and harvesting) (18 X 300)	**5400**
Total		**12400**
Income		
1	Selling of Green fodder (If animals are not in the farm)	
a	Cereals green fodder (Rs. 2/kg)	**25010**
b	Legume green fodder (Rs. 3/kg)	1350
Total		**26360**
Net income (Rs./ 2 gunta area per year)		**13960**