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To study the livestock integration with milk, fodder and dung production of Barabanki district in eastern Uttar Pradesh

Saurabh Kanauajia, SK Verma, Indresh Kumar and Ritik Arya

Abstract
The study was conducted in five blocks viz., Siddhaur, Haidergarh, Dariyabad, Trivediganj, and Banikodar of Barabanki district had been selected, 3 villages from which 20 households from which sample size of 300 farmers was selected. 300 respondents including 273 agroforestry adopters and 27 are non-adopters were finally selected for the study. Results revealed that maximum number of cows (95) was recorded in Banikodar, buffaloes (136) in Trivediganj and goat (192) in Siddhaur block of Barabanki district. Minimum number of cows (86) was obtained in Trivediganj, buffalo (106) and goats (149) in Dariyabad block of Barabanki district. It was also reported that maximum production of cow milk (777.1 L) was recorded in Banikodar, Buffalo milk (1173 L) in Trivediganj and goat milk (222.6 L) in Siddhaur block of Barabanki district, however, minimum production of cow milk (684.7 L) was recorded in Haidergarh, buffalo milk (889.8 L) and goat milk (170.2 L) in Dariyabad block of Barabanki district. Maximum consumption of fodder by cow (1078.9 kg) was recorded in Banikodar, by buffalo (2202.5 kg) in Trivediganj and by goat (138.3 kg) in Siddhaur block of Barabanki district, however, minimum consumption of fodder by cow (754.4 kg) was recorded in Trivediganj, by buffalo (1765.5 kg) and by goat (111.5 kg) in Dariyabad block of Barabanki district. It was revealed that maximum production percentage of cow dung (755.3 kg) was obtained in Haidergarh, by buffalo (3467.0 kg) in Dariyabad and by goat (169.2 kg) in Siddhaur block of Barabanki district, however, minimum production percentage of cows dung (669.4 kg) in Trivediganj, buffalo dung (2785.0 kg) in Trivediganj and goat dung (134.1kg) in Trivediganj block of Barabanki district.

Keywords: Livestock integration, dung production percentage, milk production, fodder production and consumption

Introduction
The livestock sector plays an important role in the national economy and household food security in India. During 2018-19, India accounted for 22% of world's milk share (FAO, 2018) [2] and largest milk producer in the world constituting around 187.7 million tons with 394 g/day per capita availability (GOI, 2018-2019) [3]. For successful dairy farming, the continuous supply of quality fodder throughout the year is needed (Mahanta *et al*., 2020) [6]. Dairy animals are an important source of regular cash/income and livelihood under smallholder production system in developing countries like India. The demand of milk and milk products is increasing, especially in developing countries due to increase in the human population, income and urbanization (Herrero and Thornton, 2013) [4]. Livestock rearing is a major livelihood activity and contributes greatly to income generation in the region (Ahmed *et al*., 2016) [1]. It forms an integral part of farming as livestock not only substantiated the sources of livelihood, but also ensured sustainable maintenance of soil fertility through addition of farm yard manure and by providing draught force for farming as well as transport (Tiwari *et al*., 2016) [11]. However, the average productivity of cattle and buffalo milk in the country is about 4.65 kg/day (2015-16) which is far below as compared to the productivity levels of milk from developed nations (Mishra *et al*., 2019) [8]. Tree foliages are rich in protein, energy and most mineral contents, but they often contain anti-nutritional factors (Polyphenols, tannins, alkaloids, proanthocynidins etc.) which limit their utilization in livestock feeding (Singh *et al*., 2019) [10]. Utilization of nutrient rich fodder shrubs has long been recognized the most effective means for improving both the supply and the quality of forage in tropical small holder livestock systems, especially during the dry season (Katoch *et al*., 2017) [5]. Thus keeping in view that the present study was undertaken to study the livestock integration with milk, fodder and dung production in certain blocks of Barabanki district.

Materials and Methods

The study was conducted during 2021-22 at Acharya Narendra Deva University of Agricultural and Technology, Kumarganj, Ayodhya to study the livestock integration with milk, fodder and dung production in certain blocks of Barabanki district. Five Blocks viz; Siddhaur, Haidergarh, Dariyabad, Trivediganj, and Banikodar of Barabanki district had been selected, 3 villages from which 20 households from which sample size of 300 farmers was selected. 300 respondents including 273 agroforestry adopters and 27 are non-adopters were finally selected for the study from each of the studied village.

Inferential analysis was applied to test a working hypothesis and to prove the significance of study and socio-economic variables mentioned in contingency Table. It was done by bi-variate analysis by means of a χ^2 test of independence at (α=0.05) 5 percent level of significance as this method was also applied by Kabwe *et al.* (2009).

χ^2 test of in dependence was computed at 5 percent (α=0.05) level of significance .χ^2 calculated values were used for different attributes that had been calculated by using the formula given below:

χ^2statistic = Σ[(observed frequency– expected frequency)^2/ expected frequency]

Or

$\chi_c^2 = \sum [(f_o-f_e)^2/f_e]$

Where $\chi^2 = \chi^2$ statistic(Test value or TV)

F_o= observed frequency

F_e= expected frequency

The subscript "c" is the degree of freedom.

The formula is used to obtain a test static of Chi-square.

Results and Discussion

Number of livestock percentage of farmers

The numbers of livestock percentage of farmers were varied in different blocks of Barabanki district (Table 1 and Fig 1). Maximum number of cows (95) was recorded in Banikodar, buffaloes (136) in Trivediganj and goat (192) in Siddhaur block of Barabanki district, however, minimum number of cows (86) was reported in Trivediganj, buffalo (106) and goats (149) in Dariyabad block of Barabanki district. x^2 analysis result has indicated that calculated TV (4.22) of this attribute was lower than CV (15.51), confirming a non-significant association between number of livestock of different blocks of Barabanki district. The recent agroforestry interventions to support livestock- keeping have included the planting of mostly-exotic tree-fodders, and where most parts of the region are expected to become drier in the next decades, although smaller areas may become wetter. Wider cultivation and improved management of fodder trees provides adaptation and mitigation opportunities in the region. Similar results have also been reported by (Mathuria *et al*., 2016) [7].

Table 1: Number of livestock percentage in a selected block of district

Sl. No	Block	Cow		Buffalo		Goat		Mean	Chi-square
		F	%	F	%	F	%		
1.	Haidergarh	87	22.60	116	30.13	182	47.27	128.33	TV statistic = 4.22
2.	Trivediganj	86	21.88	136	34.61	171	43.51	131.00	CV table (0.05) = 15.51
3.	Siddhaur	93	22.30	132	31.66	192	46.04	139.00	X^2 statistic is not significant
4.	Dariyabad	88	25.66	106	30.90	149	43.44	114.33	
5.	Banikodar	95	24.42	126	32.39	168	43.19	129.66	
	Total	449	23.30	616	31.97	862	44.73		
	Mean	89.80		123.20		172.40			

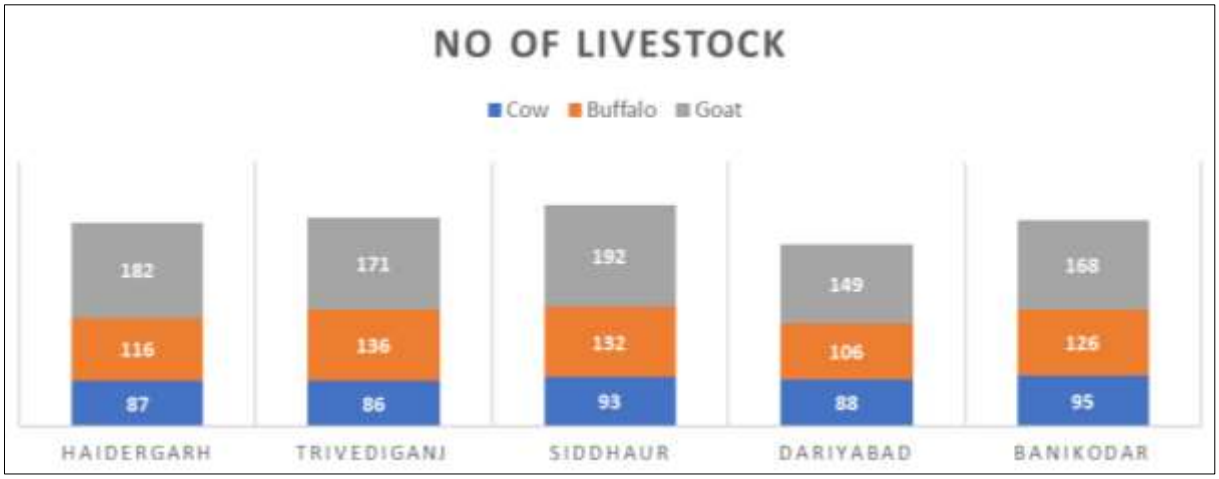

Fig 1: Number of livestock percentage in a selected blocks

Milk production percentage of farmers

It is evident from the Table 2 that the milk production percentage by different livestock were varied in different blocks of Barabanki district (Table 2 and Fig 2). Maximum number of cow milk (777.1 L) was reported in Banikodar, buffalo milk (1173 L) in Trivediganj and goat milk (222.6 L) in Siddhaur block of Barabanki district. Minimum production percentage of cow milk (684.7 L) was obtained in Haidergarh, buffalo milk (889.8 L) and goat milk (170.2 L) in Dariyabad block of Barabanki district. x^2 analysis result has indicated

that calculated TV (19.88) of this attribute was higher than CV (15.51), confirming a significant association between milk production of different livestock in different blocks of Barabanki district.

Table 2: Milk production percentage in a selected block of district

Sl. No.	Block	Cow		Buffalo		Goat		Mean	Chi-square
		Freq	%	Freq	%	Freq	%		
1.	Haidergarh	684.7	36.58	991.6	52.98	195.4	10.44	623.90	TV statistic = 19.88
2.	Trivediganj	692.2	33.70	1173.0	57.11	188.6	9.18	684.60	CV table (0.05) = 15.51
3.	Siddhaur	776.1	36.00	1156.8	53.67	222.6	10.33	718.50	X^2 statistic is significant at 5% level of significance
4.	Dariyabad	690.2	39.44	889.8	50.84	170.2	9.72	583.40	
5.	Banikodar	777.1	37.70	1095.0	53.12	189.2	9.18	687.10	
	Total	3620.3	36.59	5306.2	53.64	966	9.77		
	Mean	724.06		1061.24		193.20			

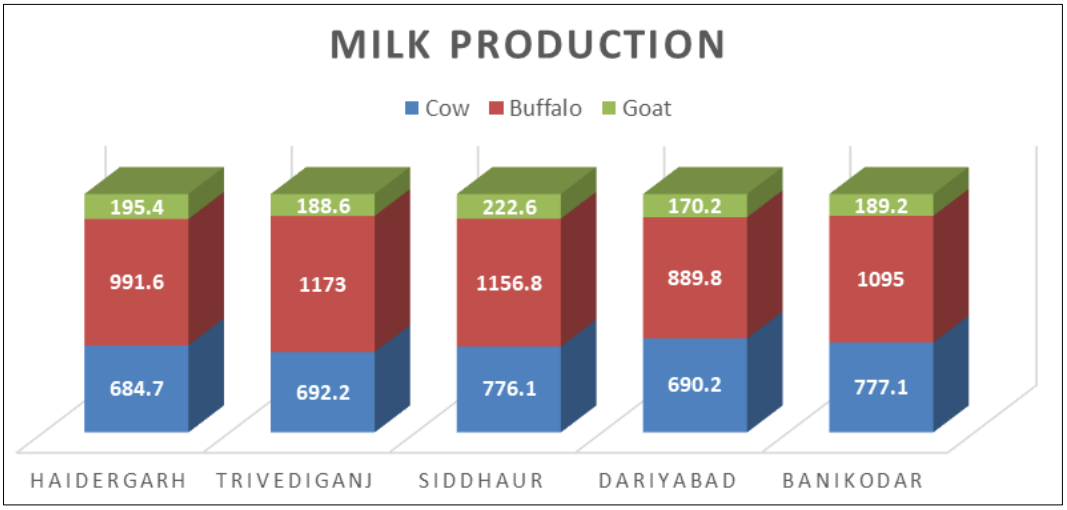

Fig 2: Milk production percentage of farmer in a selected Blocks

Consumption of fodder by different types of animals

The consumption of fodder percentage by different types of animals was varied in different blocks of Barabanki district (Table 3 and Fig 3). Maximum consumption of fodder percentage by cow (1078.9 kg) was reported in Banikodar, buffalo (2202.5 kg) in Trivediganj and goat (138.3 kg) in Siddhaur block, however, minimum consumption of fodder by cows (754.4 kg) was recorded in Trivediganj, buffalo (1765.5 kg) and goat (111.5 kg) in Dariyabad block of Barabanki district. x^2 analysis result has indicated that calculated TV (122.39) of this attribute was higher than CV (15.51), confirming a significant association between consumption of fodder percentage by different animals of different blocks of Barabanki district. Fodder trees have long been considered as an alternative resources to ensure feed to animals during pronounced dry periods where other feeds have been exhausted (Katoch *et al*., 2017) [5].

Table 3: Consumption of fodder percentage by different animals in a selected block

Sl. No.	Block	Cow		Buffalo		Goat		Mean	Chi-square
		Freq	%	Freq	%	Freq	%		
1.	Haidergarh	806.7	27.72	1969.6	67.67	134.3	4.61	970.20	TV statistic = 122.39
2.	Trivediganj	754.4	24.47	2202.5	71.44	125.9	4.08	1027.60	CV table (0.05) = 15.51
3.	Siddhaur	1005.3	33.60	1848.6	61.78	138.3	4.62	997.40	X^2 statistic is significant at both 5% & 1% level of significance
4.	Dariyabad	882.2	31.97	1765.5	63.99	111.5	4.04	919.73	
5.	Banikodar	1078.9	35.63	1821	60.14	128.1	4.23	1009.33	
	Total	4527.5	30.65	9607.2	65.03	638.1	4.32		
	Mean	905.500		1921.440		127.620			

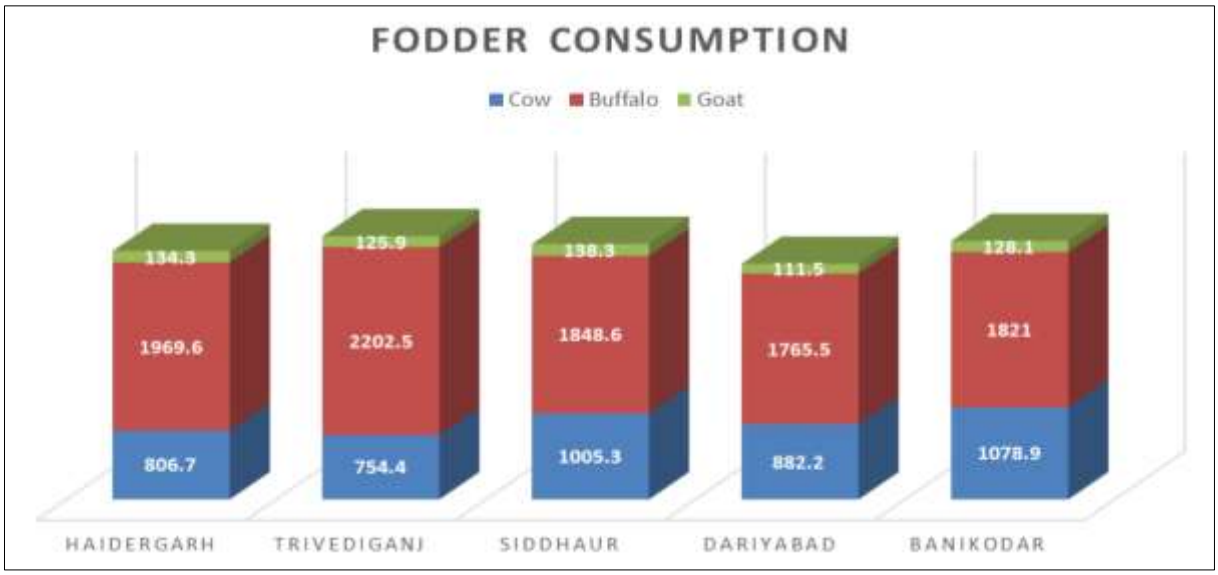

Fig 3: Consumption of fodder percentage by different animals in a selected block

Dung production percentage by different animals

Data on dung production percentages by different animals were significantly varied in different blocks of Barabanki district (Table 4 and Fig 4). It was evident from the Table that maximum amount of dung production percentage of cow (755.3 kg) was recorded in Haidergarh, buffalo (3467.0 kg) in Dariyabad and goat (169.2 kg) in Siddhaur block of Barabanki district, however, minimum dung production percentage of cow (669.4 kg), buffalo (2785.0 kg) j and goat (134.1kg) was obtained in Trivediganj block of Barabanki district. X^2 analysis result has indicated that calculated TV (17.26) of this attribute was higher than CV (15.51), confirming a significant association between dung production percentage by different animals of different blocks of Barabanki district. Adoption of agroforestry practices in livestock production resulted in increased income to the farmers due to enhanced crop production, reduced labour especially for rearing of cattle and improved soil fertility through application of manure from livestock rearing. Similar results have also been reported by Raj *et al* (2019) [9].

Table 4: Dung production percentage by different animals in a selected blocks

Sl. No.	Block	Cow		Buffalo		Goat		Mean	Chi-square
		Freq	%	Freq	%	Freq	%		
1.	Haidergarh	755.3	18.05	3281.5	78.42	147.5	3.53	1394.76	TV statistic = 17.26
2.	Trivediganj	669.4	18.65	2785.0	77.61	134.1	3.74	1196.16	CV table (0.05) = 15.51
3.	Siddhaur	734.3	17.00	3416.5	79.08	169.2	3.92	1440.00	X^2 statistic is significant at 5% level of significance
4.	Dariyabad	678.3	15.79	3467.0	80.71	150.3	3.50	1431.86	
5.	Banikodar	687.1	17.63	3048.5	78.23	161.3	4.14	1298.96	
	Total	3524.4	17.37	15998.5	78.87	762.4	3.76		
	Mean	41.00		41.40		31.20			

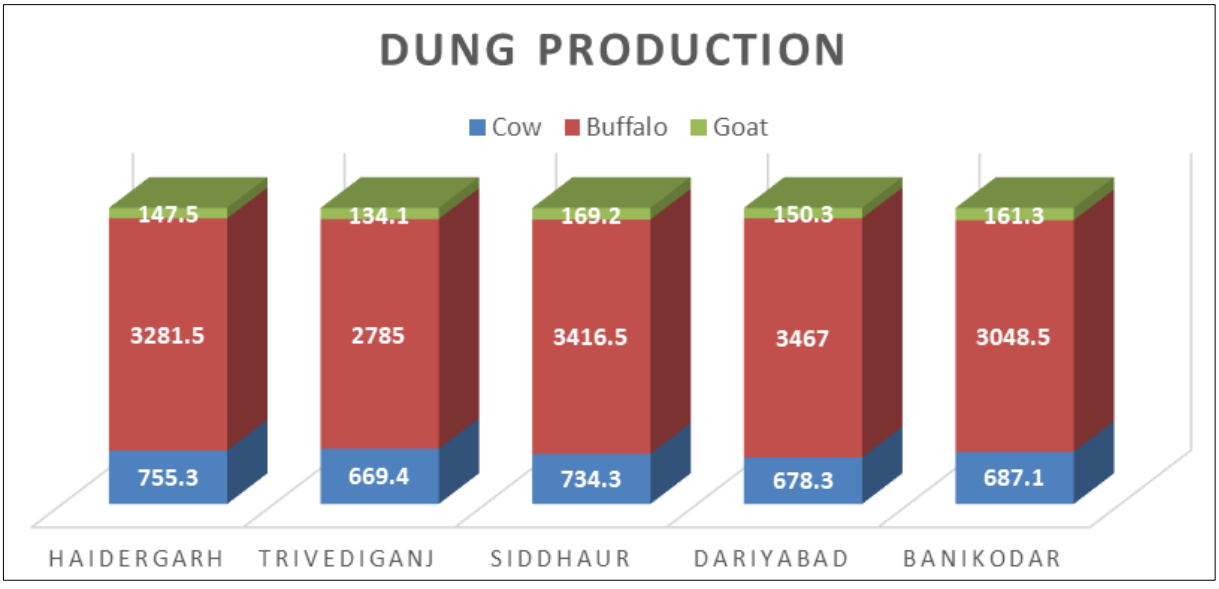

Fig 4: Dung production percentage by cow, buffalo and goat in different blocks

Conclusion

It is concluded from the study that the maximum number of cow was recorded in Banikodar, Buffaloes in Trivediganj and goat in Siddhaur block, maximum cow milk production was obtained in Banikodar, buffalo milk in Trivediganj and goat milk in Siddhaur block of Barabanki district, maximum amount of consumption of fodder percentage of cow in Banikodar, buffaloes in Trivediganj and goat in Siddhaur block and maximum dung production percentage by cow was recorded in Haidergarh, buffaloes in Dariyabad and goat in Siddhaur block of Barabanki district during the study of area of Barabanki district.

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