Research Article

A Study on Livestock Status and Its Nutrient Requirement of Western Uttar Pradesh

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Abstract

Study of 160 farmers belonging to 4 holding size i.e. zero, 0- 5, 5-10, 10-20 and above 20 acres of land from 16 villages spread over 4 districts and from each district 4 villages were selected randomly.Total number of buffaloes was found to be significantly ($P<0.05$) difference among the C_1, C_3, C_4 and C_4 category. C_5 recorded maximum number of buffalos. Total number of buffaloes did not differ no-significant among district. In case of total bovine population, Drafts animal units were higher in the C_5 of farmers and there was significant difference between the category and not significant difference between districts. Growing and young animals were recorded significantly higher in C_5 and C_4 farmer categories. Among the districts there is no significant difference in growing animals. It was observed that requirement of energy for pregnant animals were significant lower in C_1 as compared to C_2 and C_3. However difference was significant among C_1 C_4, C_4 and C_5.

Maximum ME for pregnant animals among farmer categories was recorded for C_5 and among districts for Gautambudhnagar. Similarly C.P. was also significant difference among different categories of farmers and districts and it was recorded maximum in C_5 and Gautambudhnagar. In Cattle, C.P. was also found to be differing significantly. C_5 recorded significantly higher of the farmer and districts.

Keywords: Livestock, Metabolic Energy and Crude Protein

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Introduction

Livestock husbandry emerged as an important diversified form of farming systems in developing countries, especially in tropical monsoon Asian countries recently [1]. It is an allied and complementary activity to existing cropping systems. A large segment of workforce of these various countries has been employed in this sector of agricultural economy. Livestock husbandry is looked at as having a latent potential and boon for employment generation and poverty alleviation in poor resource regions [2, 3].With rising population, declining land-man ratioand increasing mechanization in farm operations,agriculture alone is not able to provide adequateincome and employment to households in India.Integration of farm enterprises provides betterlivelihood in terms of increased food production,higher net income, improved productivity, andreduced income imbalance between agriculturalla bourer and urban factory worker. Introduction ofappropriate farming systems has been proposed asone of the approaches to achieve better growth in agriculture and livelihood [4]. [5] have found feed scarcity as the main limiting factor to improving livestock productivity.

Material and Methods

In the present *investigation* of a particularly four districts namely Meerut, Hapur, Bulandshahar and Gautambudh nagar were considered in order to take holistic view of the farms of different sizes. For this purpose160 farmers belonging to 4 holding size i.e. zero, 0-5, 5-10, 10-20 and above 20 acres of land from 16 villages spread over 4 districts and from each district 4 villages were selected randomly. The villages and farmers of the particular district were selected randomly of the concerned villages.

Statistical analysis

Statistical analysis was done by Computer FRBD5x4x4, and was used to compare the differences between categories. The null hypothesis tested was the different categories of farmers within and between districts have same feeding status [6].

Result and Discussion

Details of Buffalo population

The average milch buffalo was 0.64, 1.30, 1.66, 1.73 and 2.36 unit/family in C_1, C_2, C_3, C_4, and C_5 category of farmers respectively. As for as concern average milch buffaloes of the district it was 1.33, 1.45, 1.61 and 1.77 unit/family in Meerut, Hapur, Bulandshahar and Gautambudhnagar respectively. There were significant ($P<0.05$) deference was observed in average milch buffaloes size among the district as well as in different categories of the farmers (**Table 1**). There was highest number of milch buffalo (2.36 unit/family) which was significantly different over other category.

Table 1 Details of number of Buffaloes population per family in different categories of farmers in four districts

Parameters	Milch	Pregnant	Dry	Growing	Draft	Total
Categories						
C_1	0.64	0.47	0.61	0.77	0.12	2.69
C_2	1.30	0.46	0.73	0.84	0.62	3.95
C_3	1.66	0.49	0.42	0.79	0.48	3.84
C_4	1.73	0.70	0.84	0.88	0.88	5.03
C_5	2.36	1.15	0.87	1.44	0.92	6.74
Mean	1.54	0.65	0.69	0.94	0.60	4.42
Districts						
Meerut	1.33	0.60	0.64	0.93	0.57	4.07
Hapur	1.45	0.65	0.69	0.93	0.63	4.35
Bulandshahar	1.61	0.66	0.68	0.91	0.56	4.42
Gautambudhnagar	1.77	0.71	0.76	1.01	0.66	4.91
CD: Category Districts	0.113	0.048	0.067	0.157	0.037	0.422
	0.101	0.043	0.060	0.140	0.033	0.377

Pregnant buffaloes differ significantly ($P<0.05$) among the categories of farmers and C_3, C_4 and C_5 recorded significantly higher unit/family over the C_1 and C_2 category but there was non- significant difference between C_1 and C_2 categories of farmers (Table 1). A pregnant buffalo was no significant among districts. However, Gautambudhnagar recorded the highest pregnant buffaloes (0.71 unit/family) over the other districts (Table 1).

Number of dry buffaloes was highest in C_5 (0.87unit/family) followed by C_4 (0.84 unit/family) and were significantly different over the C_1, C_2, C_3 and C_5. Revealed that there were no significant ($P<0.05$) differences among the district of farmers Meerut and Hapur. Significant differance was observed Bulandhsahar and Gautambudhnagar districts.

Number of growing buffaloes was also found to be highest in C_5 (1.44) followed by C_4 (0.88) and were significantly different over the C_1, C_2 and C_3. However, the number of growing buffaloes was significant C_4 and C_5. Among districts, number of growing buffaloes also did not differ significantly in the Meerut, Hapur, Bulandshahar and Gautambudhnagar districts, respectively.

The C_1 recorded significantly lower number of draft buffaloes than other categories. C_4 and C_5 were found to be significantly different over the C_1, C_2 and C_3. Average values of draft buffaloes was 0.57, 0.63, 0.56 and 0.66 unit/family in Meerut, Hapur, Bulandshahar and Gautambudhnagar districts. Number of draft buffaloes were significantly ($P<0.05$) between Meerut and Gautambudhnagar districts.

Total number of buffaloes was found to be differ significantly ($P<0.05$) among the C_1, C_3, C_4 and C_5 category. C_5 category recorded maximum number of buffalos. Total buffaloes were 2.69, 3.95, 3.84, 5.03 and 6.74 unit/family in C_1, C_2, C_3, C_4 and C_5 categories of the farmers. Total number of buffaloes was no significantly differ Meerut and Hapur district However the numbers of buffaloes were significant deference in Bulandshahar and Gautambudhnagar districts.

Details of Cattle population

The average milch cattle was 0.62, 0.75, 0.87, 0.56 and 1.41 unit/family in C_1, C_2, C_3, C_4, and C_5 category of farmers. As for as concern average milch cattles of the district it was 0.84, 0.86, 0.75 and 0.90 unit/family in Meerut, Hapur, Bulandshahar and Gautambudhnagar district. There were no significant ($P<0.05$) deference was observed in average milch cattle size among the district as well as in different categories of the farmers (**Table 2**).

Table 2 Details of number of Cattles population per family in different categories of farmers in four districts

Parameters	Milch	Pregnant	Dry	Growing	Draft	Total
Categories						
C_1	0.62	0.44	0.47	0.42	0.00	1.95
C_2	0.75	0.42	0.39	0.53	0.93	3.02
C_3	0.87	0.39	0.37	0.37	0.94	2.94
C_4	0.56	0.60	0.78	0.57	0.83	3.34
C_5	1.41	0.87	0.82	0.89	1.33	5.32
Mean	0.84	0.54	0.57	0.55	0.80	3.3
Districts						
Meerut	0.84	0.54	0.53	0.51	0.71	3.31
Hapur	0.86	0.57	0.59	0.57	0.81	3.40
Bulandshahar	0.75	0.51	0.53	0.54	0.71	3.04
Gautambudhnagar	0.90	0.55	0.61	0.60	0.97	3.63
CD: Category	0.118	0.061	0.036	0.038	0.155	0.408
District	0.105	0.055	0.032	0.034	0.130	0.356

The number of pregnant cattle was differ non-significantly among districts. Higher number of pregnant cattle was found in Hapur and Gautambudhnagar 0.57 and 0.55 districts. total number of dry cattle was found highest in C_5 0.82 unit/family and lowest C_3 0.37 unit/family comparison to other category respectively. However, C_2 and C_3 were no significantly different than C_4 and C_5 in this respect. In case of districts, Dry cattle were found to be significant. However highest number of dry cattle was recorded for Gautambudhnagar and Hapur 0.61 and 0.59 districts.

Total number of the growing cattle differ significantly among the categories of farmers. All the categories recorded significantly higher number of growing cattle over C_5 0.89 unit/family which recorded minimum growing cattle C_3 0.37 unit/family. C_1, C_2 and, C_4 recorded 0.42, 0.53, and 0.57 numbers of growing cattle, respectively. In case of districts, Growing cattle were found to be significant deference. However highest number of Growing cattle was recorded for Gautambudhnagar 0.60 districts.

Total number of draft cattle was no significantly differences among the farmer categories. All the categories recorded significantly higher number of draft cattle over C_5 which recorded minimum draft cattle C_1 0.00. C_2, C_3, and C_4 recorded 0.93, 0.94, and 0.83 unit/family. Draft cattle were also found to be non-significant in district. Number of draft cattle in Gautambudhnagar (0.97 unit/family) was found to be maximum which was significantly higher over all the other districts.

Total number of cattle differ significantly ($P<0.05$) among all categories of the farmers. All the categories recorded significantly higher number of total cattle over C_5 which recorded minimum number of total cattle C_1 1.95 unit/family. C_2, C_3, and C_4 recorded 3.02, 2.94 and 3.34 unit/family numbers of total cattle. In case of districts, number of total cattle was found to be significant. However highest number of total cattle was recorded for Gautambudhnagar 3.63 districts (Table 2). These results were also supported [7] who reported the number of cattle increased faster with an increase in size of land holding.

Total Bovine unit per family

Total number of lactating buffaloes was found 0.62, 1.27, 1.61, 1.69 and 2.32 unit/family for C_1, C_2, C_3, C_4 and C_5 category of farmers. C_1 was recorded significantly less number of lactating buffaloes in comparison to other categories. Districts were not significantly ($P<0.05$) differ in this aspect. Total numbers of lactating cattle were differ significantly among farmer categories. C_5, C_3 and C_2 recorded significantly higher number of total lactating cattle over C_1 and C_4. Again districts were differ significantly in this aspect also **(Table 3)**. [7] also reported similar results. The milkmen after purchasing the milk from farmers either con get opportunity to adulterate the milk and separate the cream and then sale the milk he or they fetch(s) better money from Halwai in the market due to higher percentage Khoa. This increases the demand of buffalo milk still more and hence farmers try to increase the milking buffaloes. Similar results were also reported [8] and [9].

Pregnant animal unit differ significantly between the category and maximum number of pregnant animals found in C_5 category. However, number of pregnant animal was differ non-significantly among districts. Maximum pregnant animals were found in Gautambudhnagar (1.41unit/family) comparison to other group. Average number of pregnant animals was 0.99, 1.12, 1.20, and 1.41 in Meerut, Hapur, Bulandshahar and Gautambudhnagar districts. Dry animals units were significantly differ among categories and districts. Drafts animal units were higher in the C_5 category of

farmers and there was significant difference found between the category and not significant difference found between districts. Growing and young animals were recorded significantly higher in C_5 1.44 and followed by C_4 0.87 farmer categories. Among the districts there is non- significant difference in Meerut and Hapur as for as they were significant of the Bulandshahar and Gautambudnagar districts.

Table 3 Total Bovine units per family in different categories of farmers in four districts

Parameters	Lactating			Non Lactating				Total
Categories	**Buffalo**	**Cattle**	**Total**	**Pregnant**	**Dry**	**Growing and young**	**Draft**	
C_1	0.62	0.59	1.12	0.87	1.00	0.70	0.15	2.72
C_2	1.27	0.70	1.97	0.90	1.05	0.84	1.55	4.34
C_3	1.61	0.82	2.43	0.95	0.77	0.77	1.46	3.95
C_4	1.69	0.52	2.21	1.27	1.50	0.87	1.68	5.32
C_5	2.32	1.31	3.63	1.91	1.75	1.44	2.10	7.20
Mean	1.50	0.79	2.29	1.18	1.21	0.92	1.39	4.70
Districts								
Meerut	1.24	0.61	1.85	0.99	0.95	0.79	1.14	3.87
Hapur	1.42	0.63	2.05	1.12	1.04	0.85	1.33	4.34
Bulandshahar	1.61	0.82	2.43	1.20	1.34	0.94	1.43	4.91
G.B.nagar	1.74	1.10	2.84	1.41	1.52	1.12	1.65	5.70
CD: Category District	0.262	0.089	0.351	0.236	0.132	0.127	0.264	0.759
	0.234	0.079	0.313	0.211	0.118	0.114	0.236	0.679

Daily requirement of energy and protein for lactating animals

It was found that daily requirement of energy was significant ($P<0.05$) deference. Revealed that there were significant differences among each other categories of the farmers and C_5 category recorded significantly higher values as compared to other category (**Table 4**). Requirement of energy also significant among the districts. Gautambudhnagar districts recorded significantly higher ME as compared to Meerut while difference was significant among Hapur and Meerut, Gautambudhnagar and Bulandshahar district. Similarly C.P. also exhibited significant difference among the categories of farmers. C_5 category recorded higher 881.60 gm/day C.P. as compared to C_1 (235.60gm/day) requirement. Revealed that there were did not similarity with C_2, C_3 and C_4. As for as Gautambudhnagar district recorded significantly higher daily requirement of C.P. over Meerut while at par with other districts.

Table 4 Daily requirement of ME (M.cal.) and CP (gm.) for lactating buffaloes and cattle per family/per day in different categories of farmers in four districts

Parameters	Buffalo		Cattle	
	ME	**CP**	**ME**	**CP**
Categories				
C_1	78.12	235.60	74.34	224.20
C_2	160.02	482.60	88.20	266.00
C_3	202.86	611.80	103.32	311.60
C_4	212.94	642.20	65.03	197.60
C_5	292.32	881.60	165.06	497.80
Mean	189.25	570.76	99.19	299.44
Districts				
Meerut	186.25	566.82	96.54	294.55
Hapur	187.94	568.92	98.15	297.48
Bulandshahar	189.76	571.60	100.00	301.06
Gautambudhnagar	193.07	575.71	102.06	304.68
C:D Category	0.50	478.37	0.78	0.72
District	0.45	427.86	0.70	0.65

Energy requirement differ significantly among C_1, C_3, C_4 and C_5 categories. Requirement of energy for cattle was 74.34, 88.20, 103.32 and 65.03 and 165.06 M cal/day/family in C_1, C_2 C_3, C_4 and C_5 category of farmers. Protein

requirement also differ significantly between districts. Requirement of protein was significantly (P<0.05) deference Gautambudhnagar recorded highest requirement compare to the Meerut. ME requirement of the lactating buffaloes was significantly differing among all district and category of the farmers, respectively. C_5 category requirement was higher 497.80g/day while C_4 recorded lowest requirement of C. P. for lactating buffaloes (Table 4).

The requirement of C.P. and ME was higher in C_5 category (Table 4). It may be due to higher number of milch buffaloes in C_5 category compared to milch cattle. The milk production of buffaloes were higher than cattle, which enhanced the requirement of ME and C.P. since requirement for synthesis of buffalo milk required more energy and protein than cattle due to higher percent of fat in the buffalo of milk. This trend was also found in study carried out [7], [10], [11] and [12].

The average pregnant animal was 95.70, 99.00, 104.50, 139.70 and 210.10 M cal/day/family in C_1, C_2, C_3, C_4, and C_5 category of farmers. As for as concern average pregnant animal of the district it was 126.53, 128.56, 130.34 and 133.77 M cal/day/family in Meerut, Hapur, Bulandshahar and Gautambudhnagar respectively. There were significant (P<0.05) deference was observed in pregnant animal among the district as well as in different categories of the farmers (**Table 5**). Maximum ME for pregnant animals among farmer categories was recorded for C_5 categories and among districts for Gautambudhnagar. Similarly C.P. was also significant diference among different categories of farmers and among districts. The maximum requirement was observed C_5 categories as for as the maximum requirement was observed in gautambudhnagar districts, respectively. The metabolizable energy in the dry matter, thus ranges from 4.8-7.5 MJ/kg DM [13].

Table 5 Daily requirement of ME (M.cal.) and C.P. (g) for pregnant, dry, draft and growing bovines per family in different categories of farmers in four districts

Parameters	**Pregnant**		**Dry**		**Draft**		**Growing**	
Categories	**ME**	**CP**	**ME**	**CP**	**ME**	**CP**	**Me**	**CP**
C_1	95.70	261.00	110.50	300.00	17.40	48.00	77.00	210.10
C_2	99.00	270.00	115.50	315.00	179.80	496.00	92.20	252.00
C_3	104.50	285.00	84.70	231.00	169.36	467.20	84.70	231.00
C_4	139.70	381.00	165.00	450.00	194.80	537.60	95.70	261.00
C_5	210.10	573.00	192.50	525.00	243.60	672.00	158.40	432.00
Mean	129.80	354.00	133.64	364.20	160.99	444.16	101.60	277.22
Districts								
Meerut	126.53	350.58	130.66	360.22	158.11	440.49	98.51	273.70
Hapur	128.56	352.38	132.30	362.50	159.10	442.46	100.31	275.67
Bulandshahar	130.34	354.94	134.02	365.05	161.59	445.02	101.70	277.89
Gautambudh Nagar	133.77	358.09	137.59	369.02	165.18	448.67	105.89	281.62
CD: category	0.56	0.60	0.44	0.65	2.79	0.76	0.60	0.66
District	0.50	0.53	0.39	0.58	2.49	0.68	0.54	0.59

Requirement of energy and crude protein for dry animals was medium. Energy and protein requirement was significant (P>0.05) difference among the districts and category of farmers (Table 5). Crude protein was also significantly differing among categories of the farmers and among districts. ME requirement for dry animals was recorded for maximum C_5 categories of the farmer and among districts for Gautambudhnagar. Similarly C.P. was also significant differences among different categories of farmers and among districts. It was recorded maximum requirement by C_5 and Gautambudhnagar for categories of the farmers and districts, respectively.

Protein and energy requirement of draft animals was significant (P<0.05) difference in the categories of the farmers and maximum requirement was observed C_5 category. Revealed that there was also significant difference among the districts and Meerut recorded significantly lower ME as compare to each other districts. In growing animals energy and protein requirement was higher in Bulandsahar and Gautambudhnagar districts, respectively, where a small difference was observed among the recommendations with a 5-10% higher values for [14].

Amount of nutrient offered to an average bovine unit

ME was significant (P<0.05) difference among categories of the farmers. C_3 category recorded maximum ME offered (16.60 M cal/day/family) while C_1 was lowest ME offered (2.35 M cal/day/family). Among the districts ME was significant difference and Gautambudhnagar (13.63 M cal/day/family) recorded maximum ME offered from dry

fodder, while Bulandsahar (10.28 M cal/day/family) recorded minimum ME offered from (**Table 6**). C.P. also found to be significant difference and C_3 recorded maximum (349.98 gm/day/family) and significantly higher C.P. over the other farmer categories. Among districts no significant difference was recorded for C.P. However, Gautambudhnagar recorded maximum C.P. (276.41 gm/day/family).

Table 6 The amount of nutrients offered daily to an average bovine unit through different feeds and fodders in terms of ME and Crude Protein in different categories of farmers in four districts

Parameters	**ME (M. cal./ day)**				**C.P. (g/day)**			
Categories	**Dry Fodder**	**Green Fodder**	**Concentrate**	**Total**	**Dry Fodder**	**Green Fodder**	**Concentrate**	**Total**
C_1	2.35	7.35	7.77	17.47	51.83	325.39	561.50	938.71
C_2	13.39	18.93	13.75	46.07	301.57	468.20	795.25	1565.02
C_3	16.60	19.14	7.97	43.71	349.98	569.09	493.72	1412.79
C_4	13.97	22.57	10.92	47.46	317.54	522.23	480.84	1320.61
C_5	13.91	25.99	17.98	57.88	321.21	541.50	595.46	1458.17
Mean	12.04	18.79	11.68	42.51	268.43	485.28	585.35	1339.06
Districts								
Meerut	10.28	17.70	10.11	38.09	263.98	484.05	579.53	1327.56
Hapur	11.56	18.25	10.71	41.64	264.83	485.97	585.95	1336.75
Bulandshahar	12.70	18.87	11.83	43.40	268.49	481.26	587.32	1337.07
Gutambudh Nagar	13.63	20.36	14.05	48.04	276.41	489.85	588.62	1354.88
CD: Category	0.21	0.30	0.36	0.87	4.18	11.41	4.82	20.41
District	0.19	0.26	0.32	0.77	3.74	10.20	4.31	18.25

For green fodder, there was significant ($P<0.05$) difference for ME offered in different categories of the farmers. There was also C_5 recorded maximum (25.99 M cal/day/family) and significantly higher ME over the other categories of the farmer. ME was also significantly difference among districts and Gautambudhnagar recorded maximum (20.36 M cal/day/family) and significantly higher ME over Meerut, Hapur and Bulandsahar. Crude protein was also significant difference among categories of the farmer and districts. C_3 (569.09 gm/day/family) and Gautambudhnagar (489.85 gm/day/family) recorded maximum crude protein available from green fodder in different farmer categories and districts. Nutritive value of chopped sugarcane tops was found to contain more ME and digestible nutrients than other dry roughage [15]. There was significant ($P<0.05$) difference for ME in different categories of the farmers. C_5 recorded maximum (17.98 M cal/day/family) and significantly higher ME over the other farmer categories. ME was significantly difference among districts. However, Gautambudhnagar (14.05 M cal/day/family) recorded maximum ME. Crude protein was also significantly difference among categories of the farmer. C_2 (795.25 gm/day/family) recoded significantly deference higher C.P. over C_1, C_3, C_4 and C_5. Among districts, Gautambudhnagar recorded maximum (588.62 gm/day/family) and no significant deference higher CP over Bulandshahar and Meerut districts (Table 6). [16] observed deficit supply (13.01%) of TDN in dairy animals in Sonbhadra district of Uttar Pradesh. Deficit supply of TDN in lactating buffaloes was also reported by [17] and [18] in their study.

Conclusion

The majority of all the milch animal of the areas surveyed in the selected district were being adequately fed in terms of energy and proteins. In general, the surveys of different districts in different states aimed at evaluating nutritional status of dairy animals and high producing dairy animals in particular have shown a trend of deficit supply of DCP and ME to the dairy animals. However, the overall supply of DCP and ME in comparison to their calculated requirements to buffaloes indicated that the farmers of the selected district used their traditional wisdom in feeding their livestock. The conventional feed resources enhancement on Dry matter basis has to be achieved through giving weightage not only to grain yields but also to fodder quantity as well as quality. So emphasis in research could be to look for these qualities in the cultivars and promote their cultivation for enhanced supplies of crop residues.

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Reference

[1] Nizamuddin, Khan., Zebu, Siddiqui MD., Asif, Iqubal, MD., Minhajul, Hoda. (2008) Livestock revolution in monsoon Asia during post economic reform period. Asian Profile, 36 (5): 529-544.

[2] Picca, C. U. (2008) Livestock Policy for Poverty Alleviation. Theory and Practicalevidence from Africa, Asia and Latin America.Pro-Poor livestock Initiative Working Paper No. 27, FAO.

[3] Leonard, D. K. (2006) The Political economy of International development and Pro-Poor Livestock policies. A Comparative Assessment, Pro-Poor Livestock InitiativesWorking. Paper No. 35, FAO.

[4] National Commission on Farmers (2005) A Draft National Policy on Farmers, Ministry of Agriculture, Government of India, New Delhi.

[5] Birthal, P.S. and Jha, A.K. (2005) Economic losses due to various constraints in dairy production in India. Indian Journal of Animal Sciences, 75: 1476-1480.

[6] Bouler, J.M., Trecant, M., Delecrin, J., Royer, J., Passuti, N., Daculsi, G. (1996) Macroporous biphasic calcium phosphate ceramics: Influence of five synthesis parameters on compressive strength. J. Biomed Mater Res. 32:603–609

[7] Anshu, (1998) Evaluation of dairy animal feeding subsystern under crop based animal farming system in different agro-climatic zones of Uttar Pradesh with special emphasy on role of women. Thesis Ph.D., G.B.P.U.A. &T. Pantnagar, Uttranchal.

[8] Shree Shailaja, K. T. (2000) Factors influencing the productivity of milch animals managed by dairy farm women in Eastern Dry Zone of Karnataka.Ph.D. Thesis, University of Agricultural Sciences, Bangalore.

[9] Chandra Kala, H. T. (1999) Extent of knowledge, adoption and time utilization pattern of farm women labours in dairy management - An analysis. M.Sc. (Agri.) Thesis, University of Agricultural Sciences, Bangalore. 36(4): 60-64.

[10] Singh, G., SidhuI, S.S., Verma, H. K. and Singh, G., (2001) Management practices in dairy animals in relation to reproduction in Punjab. Journal of Research, PunjabAgricultural University, 38 (1&2): 98-103.

[11] Sah, A.K. and Ram Chand, (2002) Adoption of dairy innovations and their socio-economic correlates.Journal of Extension Education, 13(4): 3413-3417.

[12] Nalawade, T. H., Pawar, B. K., Jagtap, D. Z. (2002) Studies on feeding and breeding practices of bovine in tribal area of Pune District.Journal of Maharashtra Agricultural Universities, 27(2): 215-216.

[13] Khan, A. G., Azim, A., Nadeem, M. A., Ayaz, M. (2000) The effect of formaldehyde treatment of solvent and mechanical extracted cottonseed meal on the performance, digestibility and nitrogen balance in lambs. Asian-Aust. J. Anim. Sci., 13 (6): 785-790

[14] Ranjhan, S. K. (1990) Nutritional value of Animal Feeds and Feeding of Animals, ICAR, New Delhi.

[15] Polser, J., Burdin, S., Charoy, J. and Nabos, J. (1996) Lenfouissement des pailles de mil Pennisetum dans les sols sableux dunaires: Son influence sur les rendements et al nutrition minerale du mil; son action sur les caracteristiques chimiques du sol et al. dynamique de l'azote mineral, Agronomie Tropicale 29: 995-1005.

[16] Vidya S., Anand R.K. and Dwivedi, S.V. 2013. Nutritional status and reproductive performance of dairy cattle and buffaloes in Sonbhadra district of Uttar Pradesh. International J. Sci. and Nature 4: 494-498.

[17] Singh V.K., Singh P., Verma A.K. and Mehra U.R. 2008. On farm assessment of nutritional status of lactating cattle and buffaloes in urban, periurban and rural areas of Middle Gangetic Plains. ttp://www.lrrd.org/ lrrd20/8/singh20130.htm, Accessed Dec. 18, 2015.

[18] Chaturvedi, O.H., Mann, J.S. and Verma, D.L. 2009. Feeding practices and nutritional status of Lactating buffaloes at farmer's field in semi arid region- A case study. Indian J. of Anim. Nut. 26: 265-268.

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