Studies on Milk Production and Health Management for Livestock in Western Uttar Pradesh, India

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A B S T R A C T

Studies of the 160 farmers were selected randomly from 16 villages of Meerut, Hapur, Bulandshahar and Gautambudhnagar districts i.e. 4 villages from each district. The average milk production was 9.38, 9.40, 9.39 and 9.52 litter/day/family in Meerut, Hapur, Bulandshahar and Gautambudhnagar districts. It was found that there was non-significant (P<0.05) difference among the districts. Over all milk production was higher in the C_5 category of farmers and lower in C_1 category. There was significant difference among the C_1 and other categories of farmers in respect to total milk production. Value of animal feed grade was also significantly higher in C_5 (4.13 kg/day) category of farmers over all other categories and it was followed by C_4 (3.00 kg/day). C_1 category recorded lowest value of animal feed grade. Similarly difference among districts was statistically significant and Gautambudhnagar recorded maximum value of animal feed grade over other districts. Meerut tended to lowest value of animal feed grade. Significant difference was observed for vaccination in buffaloes by C_5 (0.11) over C_1, C_2 and C_3 and followed by C_4 (0.09) over C_1 and C_2. Difference between C_1 and C_2, C_2 and C_3, C_1 and C_3, C_3 and C_4, C_4 and C_5 was no significant. Among districts Bulandsahar (0.10) recorded maximum vaccination value which was significant higher over Gautambudhnagar. Other districts were at par with the each other. Overall breeding differ significant among farmer categories. C_4 (2.22) recorded maximum and significantly higher breeding score in buffaloes over other famer categories. Among districts, Gautambudhnagar recorded maximum (1.99) breeding score which was significantly higher than Meerut (1.23) and Hapur (2.29).

Introduction

There is an increasing consensus that in the developing countries, growth in agriculture is more poverty-reducing than the growth in other economic sectors. In India, agriculture and allied activities, despite their falling shares in the gross domestic product, are central to livelihood of millions of rural people. Nearly 72% of India's population lives in rural areas, and 75% of it depends on agriculture and allied activities for livelihood.

In 2002–03, the small farm households (<2 ha) comprised 60% of the rural households, controlled 76% cattle, 72% buffaloes, 80% small ruminants, 83% poultry and 90% pigs. Thus, faster growth in livestock sector has considerable potential to contribute to agricultural growth and thereby poverty reduction by Birthal and Taneja (2006). The National Agricultural Policy targets 4% growth in agriculture sector over the next two

decades and envisages an important role for the livestock sector in achieving it. The livestock industry success depends on health of the livestock, good health increases productivity and any compromise on health ground will shatter the hope of livestock sector. Total bovine population of Himachal Pradesh was 3.03 million, which was approximately 1% of India's bovine population (304.42 million). India is the highest milk producer in the world (121.85 million tons of milk, 2010-11) out of which bovine milk production was 117.253 million tons) by BAHS 2012. Uttar Pradesh (U.P.) is the highest populous state in India as well as the largest contributor to the national milk production (210.33 lakhs mt) contributing around 18% of total milk production in the country. It has got the second highest cattle population (18883 thousand) and highest buffalo population (26119 thousand) and share of milk production by cattle and buffaloes is 47825 and 59201 thousand tonnes, respectively. Per capita availability of milk in the state is 289 grams BAHS, 2012.

Consumption of milk and milk products is expected to differ for different occupational groups due to differences in the habits and social customs. Average monthly per capita expenditure (MPCE) of Uttar Pradesh is about rupees 899 and rupees 1574 out of which per capita expenditure on food in rural and urban areas of Uttar Pradesh is about rupees 521 and rupees 728, respectively; and percentage share of food in consumer expenditure is about 57.9 percent and 46.3 percent, respectively NSSO, GOI, 2009-10.

Materials and Methods

Selection of farmers

Farmers were selected randomly from the selected villages. From a selected village five farmers were selected on the basis of size of land holdings, i.e. zero, up to 5, 5-10, 10-20 and above 20 acres. Land less farmers termed as C_1, up to 5 acre C_2, 5-10 acre C_3, 10-20 acre C_4 and above 20 acres C_5 category of farmers.

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 Bouler *et al.,* 1996.

Results and Discussion

Milk production was significantly (P<0.05) difference between Gautambudhnagar and other districts. Cattle milk production was significantly difference among the category of farmers.C_5 category produced significantly higher milk by cattle (5.00 litter/day/family) while C_1 produced lowest (1.70 litter/day/family). Among the districts Gautambudhnagar produced significantly higher milk as compared to Meerut and Hapur while at par with Bulandshahar. There were significant difference in milk production among the districts and categories were significantly difference among each other and buffalo milk production was higher in the C_5 category (9.05 litter/day/family). Among districts maximum milk production (6.31litter/day/family) was found in Bulandshahar.It was found that there was non-significant difference among the districts. Over all milk production was higher in the C_5 category of farmers and lower in C_1 category. There was significant difference among the C_1 and other categories of farmers in respect to total milk production (Table 1).

It was observed that milk consumption significant (P<0.05) difference among the districts viz. Meerut, hapur, Bulandshahar and

Gautambudhnagar. Milk consumption was significantly lower in C_1 category (1.85 litter/day) in comparison to other categories but C_3, C_4 were not significantly difference and C_4, C_5 were significantly difference from each other. Quantity of sold milk is also not significant differences among the Meerut, Hapur, Bulandshahar and Gautambudhnagar districts. Quantity of sold milk was significantly (P<0.05) higher in the C_5 category (Table 1).

The value of animal health was higher in C_5 category (4.56 kg/day) of farmers followed by C_1 and it was significantly (P<0.05) deference higher over C_2, C_3 and C_4 categories of farmers. C_2 category recorded lowest value of animal health grade. Similarly difference among Hapur and Gautambudhnagar was statistically significant and Gautambudhnagar (3.99 kg/day) recorded maximum value of animal health grade.

Hapur tended to lowest value of animal health grade. Value of animal feed grade was also significant higher in C_5 (4.13 kg/day) category of farmers over all other categories and it was followed by C_4 (3.00 kg/day). C_1 category recorded lowest value of animal feed grade. Similarly difference among districts was statistically significant and Gautambudhnagar recorded maximum value of animal feed grade over other districts. Meerut tended to lowest value of animal feed grade (Table 2).

Artificial insemination in buffaloes was significantly (P<0.05) differ among farmer categories. C_5 (0.53) recorded maximum and significantly higher artificial insemination over C_1, C_2 and C_3 categories. Among districts Gautambudhnagar was having maximum (0.42) and significantly higher artificial insemination over Hapur (0.26). Other districts were at par with the each other in this aspect. Vaccination of the buffaloes was observed Significant differ for by C_5

(0.11) over C_1, C_2 and C_3 and by C_4 (0.09) over C_1 and C_2. Difference between C_1 and C_2, C_2 and C_3, C_1 and C_3, C_3 and C_4, C_4 and C_5 was no significant. Among districts Bulandsahar (0.10) recorded maximum vaccination value which was significantly superior over Gautambudhnagar. Other districts were at par with the each other.

It was recorded maximum for C_1 category (3.00) of the farmers which was significantly higher over the other farmer categories. Gautambudhnagar (0.76), Bulandsahar (0.73) and Hapur (0.67) recorded significantly higher shelter management over Meerut (0.52) district (Table 3).

Artificial insemination in cattle was significant (P<0.05) difference among farmer categories. C_5 (0.39) recorded maximum and significantly higher artificial insemination over C_1, C_2 and C_3 categories. Among districts the difference was found to be non-significant in this aspect. However, Gautambudhnagar was having maximum (0.29) artificial insemination followed by Bulandsahar (0.24).Vaccination of the cattle was observed Significant difference for among different categories of the farmers. C_2 (4.00) and C_3 (3.00) recorded significantly higher vaccination score over C_3 (0.05), C_4 (0.06) and C_5 (0.07). However, difference between C_3 and C_4, C_4 and C_5, C_3 and $C_5$was no significant. Among districts Gautambudhnagar (1.64) recorded maximum vaccination value which was significantly higher over Meerut (1.17). Other districts were at par with the each other. It was recorded maximum for C_2 category (3.69) of farmers which was significantly higher over the other farmer categories. Among districts, Bulandsahar (1.50) recorded maximum and statistically higher shelter management grad for cattle over Meerut (1.17). Difference of shelter management grad in Hapur (1.46) and Gautambudhnagar (1.40) was also

significantly difference over Meerut (Table 4). In buffaloes viral diseases score was significantly (P<0.05) difference among farmer categories. The score was maximum and significantly higher in C_5 (0.10) over C_1 (0.04). C_3 (0.08) and C_4 (0.09) also recorded statistically higher viral disease score over C_1. Meerut and Hapur recorded maximum (both 0.09) while Hapur recorded minimum (0.06) viral disease score.

Farmer categories were significantly (P<0.05) difference for bacterial diseases in buffaloes. C5 recorded maximum (0.10) and significantly higher score of bacterial diseases over other farmer categories. Districts were no significantly differing from each other. Bulandsahar and Gautambudhnagar recorded higher (both 0.07) score of bacterial diseases than Meerut and Hapur (both 0.06).Fungal diseases significantly difference in buffaloes of farmer categories. C_5 (0.11) showed significantly higher value of fungal diseases than C_1 (0.05) and C_2 (0.07). C_1 recorded minimum incidence score of fungal diseases in buffaloes. Among districts Bulandsahar (0.10) showed maximum and significantly higher fungal diseases value over Gautambudhnagar (0.06) (Table 5).

In cattle, viral diseases score was significantly (P<0.05) difference among farmer categories. The score was maximum and significantly higher in all the farmer categories i.e. C_2, C_3, C_4 and C_5 over C_1 (0.03). Districts were no significantly differing from each other. Bulandsahar and Gautambudhnagar recorded higher (both 0.07) score of bacterial diseases than Meerut and Hapur (both 0.06).Farmer categories were significant differ for bacterial diseases in cattle. C5 recorded maximum (0.10) and significantly higher score of bacterial diseases over other farmer categories. Districts were no significant differ from each other. Gautambudhnagar (0.07) and Hapur (0.06) recorded higher score of bacterial diseases than Meerut and Hapur (both 0.06).Fungal diseases significant difference in cattle of the farmer categories and C_4 (0.12) showed significantly higher value of fungal diseases than all other categories. C_1 recorded minimum incidence score of fungal diseases in cattle also. Among districts Gautambudhnagar (0.12) showed maximum and significantly higher fungal diseases value over Meerut (0.07), Hapur (0.08) and Bualandsahar (0.07) (Table 6).

Table.1 Milk Production and Milk disposal (litter/day/family) in Different categories of farmers in four districts

Parameters Categories	Milk Production			Milk Disposal	
	Cattle	Buffalo	Over all	Consumed	Sold
C_1	1.70	2.65	4.35	1.85	2.50
C_2	2.25	4.95	7.20	4.10	3.10
C_3	3.00	6.80	9.80	6.00	3.80
C_4	4.40	7.30	11.70	5.90	5.80
C_5	5.00	9.05	14.05	7.30	6.75
Mean	**3.27**	**6.15**	**9.42**	**5.03**	**4.39**
Districts					
Meerut	3.20	5.91	9.38	4.95	4.25
Hapur	3.07	6.17	9.40	5.05	4.40
Bulandshahar	3.31	6.31	9.39	5.05	4.44
Gautambudhnagar	3.50	6.21	9.52	5.06	4.48
CD: Category	**0.17**	**0.42**	**0.24**	**0.23**	**0.28**
District	**0.15**	**0.38**	**0.21**	**0.20**	**0.25**

Table.2 Animal health grade and animal feed grade in
Different categories of farmers in four districts

Parameters Categories	Animal Health Grade	Animal feed Grade
C_1	4.06	1.50
C_2	3.06	2.13
C_3	3.50	2.56
C_4	3.44	3.00
C_5	4.56	4.13
Mean	**3.72**	**2.66**
Districts		
Meerut	3.79	2.26
Hapur	3.40	2.53
Bulandshahar	3.71	2.75
Gautambudhnagar	3.99	3.12
CD: Category	**0.50**	**039**
District	**0.45**	**0.35**

Table.3 Details of number of Buffalo artificial insemination, vaccination and shelter
Management grade in different categories of farmers in four districts

Parameters Categories	Artificial insemination	Vaccination	Shelter management Grad
C_1	0.10	0.05	3.00
C_2	0.23	0.07	0.10
C_3	0.41	0.08	0.06
C_4	0.42	0.09	0.11
C_5	0.53	0.11	0.07
Mean	**0.34**	**0.08**	**0.67**
Districts			
Meerut	0.32	0.09	0.52
Hapur	0.26	0.07	0.67
Bulandshahar	0.35	0.10	0.73
Gautambudhnagar	0.42	0.06	0.76
CD: Category	**0.11**	**0.036**	**0.14**
District	**0.10**	**0.032**	**0.12**

Table.4 Details of number of Cattle artificial insemination and vaccination of shelter
Management grade in different categories of farmers in four districts

Parameters Categories	Artificial insemination	Vaccination	Shelter management Grad
C_1	0.07	3.00	3.00
C_2	0.11	4.00	3.69
C_3	0.26	0.05	0.07
C_4	0.33	0.06	0.07
C_5	0.39	0.07	0.08
Mean	**0.23**	**1.44**	**1.38**
Districts			
Meerut	0.20	1.17	1.17
Hapur	0.20	1.50	1.46
Bulandshahar	0.24	1.40	1.50
Gautambudhnagar	0.29	1.64	1.40
CD: Category	**0.10**	**0.23**	**0.31**
District	**0.09**	**0.21**	**0.28**

Table.5 Details of number of Buffalo and Viral Disease, Bacterial Diseases and
Fungal Diseases in different categories of farmers in four districts

Parameters Categories	Viral Disease	Bacterial Diseases	Fungal Diseases
C_1	0.04	0.04	0.05
C_2	0.07	0.05	0.07
C_3	0.08	0.06	0.08
C_4	0.09	0.07	0.09
C_5	0.10	0.10	0.11
Mean	**0.08**	**0.06**	**0.08**
Districts			
Meerut	0.09	0.06	0.09
Hapur	0.06	0.06	0.07
Bulandshahar	0.09	0.07	0.10
Gautambudh Nagar	0.07	0.07	0.06
CD: Category	**0.033**	**0.024**	**0.036**
District	**0.029**	**0.021**	**0.032**

Table.6 Details of number of Cattles and Viral Diseases, Bacterial Diseases and
Fungal Diseases in different categories of farmers in four districts

Parameters Categories	Viral Diseases	Bacterial Diseases	Fungal Diseases
C_1	0.08	0.03	0.04
C_2	0.04	0.04	0.05
C_3	0.07	0.06	0.11
C_4	0.08	0.07	0.12
C_5	0.09	0.08	0.10
Mean	**0.06**	**0.06**	**0.09**
Districts			
Meerut	0.06	0.06	0.07
Hapur	0.07	0.05	0.08
Bulandshahar	0.06	0.05	0.07
Gautambudh Nagar	0.08	0.06	0.12
CD: Category	**0.028**	**0.019**	**0.023**
District	**0.025**	**0.012**	**0.021**

Table.7 Details of number of Buffaloes and Artificial Insemination Breeding and Natural
Breeding (units/family) in different categories of farmers in four districts

Parameters Categories	Artificial Insemination Breeding	Natural Breeding	Total
C_1	0.40	0.90	1.30
C_2	0.55	1.10	1.65
C_3	0.90	1.80	2.70
C_4	0.96	2.80	3.76
C_5	0.80	1.20	2.00
Mean	**0.72**	**1.56**	**2.28**
Districts			
Meerut	0.52	1.45	1.97
Hapur	0.61	1.60	2.21
Bulandshahar	0.71	1.60	2.31
Gautambudhnagar	1.05	1.59	2.64
CD: Category	**0.14**	**0.31**	**0.45**
District	**0.13**	**0.28**	**0.41**

Table.8 Details of number of Cattles and Artificial Insemination Breeding and
Natural Breeding (unit/family) in different categories of farmers in four districts

Parameters Categories	Artificial Insemination Breeding		Natural Breeding	Total
C_1	0.30		0.56	0.86
C_2	0.47		0.95	1.42
C_3	0.69		1.00	1.69
C_4	0.72		1.50	2.22
C_5	0.60		1.14	1.74
Mean	**0.56**		**1.03**	**1.59**
Districts				
Meerut	0.52		0.71	1.23
Hapur	0.46		0.83	1.29
Bulandshahar	0.61		1.22	1.83
Gautambudh Nagar	0.63		1.36	1.99
CD: Category	**0.69**		**0.23**	**092**
District	**0.62**		**0.20**	**0.82**

There were significant (P<0.05) deference was observed in average Artificial insemination breeding among the district as well as in different categories of the farmers. C_4 recorded maximum (0.96 unit/family) and statistically higher score over the other farmer categories. Gautambudhnagar recorded maximum (1.05 unit/family) score for artificial insemination followed by Bualandsahar (0.71). Natural breeding significant difference among categories of the farmer and C_4 recorded maximum (2.80 unit/family) and significant higher natural breeding score than the other categories. It was no significantly difference among districts. Hapur and Bulandsahar recorded higher (both 1.60 unit/family) score than Meerut (1.45 unit/family) and Gautambudhnagar (1.59 unit/family).Overall breeding significantly differ among categories of the farmer. C_4 (3.76) recorded maximum and significant higher breeding score in buffaloes over other famer categories. It was no significantly differ among districts. Among districts, Gautambudhnagar recorded maximum (2.64) breeding score which was significant higher than Meerut (1.97) and

Hapur (2.21) (Table 7). Score of artificial insemination was no significant (P<0.05) differ among farmer categories. However, it was higher in C_4 followed by C_3 (0.69 unit/family). Among district also there was no significant difference regarding artificial insemination in cattle. Gautambudhnagar recorded maximum (0.63 unit/family) score of artificial insemination followed by Bualandsahar (0.61 unit/family).Natural breeding significant difference among of the farmer categories and C4 recorded maximum (1.50) and significantly higher natural breeding score than other categories.

It was also significant differ among districts. Gautambudhnagar (1.36) and Bulandsahar (1.22) recorded significantly higher natural breeding value over Meerut (0.71) and Hapur (0.83).Overall breeding significant difference among the farmer categories and C_4 (2.22) recorded maximum and significantly higher breeding score in cattle over other famer categories. Among districts, Gautambudhnagar recorded maximum (1.99) breeding score which was significantly higher than Meerut (1.23), Hapur (1.29) and Bualandsahar (1.83) (Table 8).

The cattle milk production was significantly ($P<0.05$) higher in C_5 category (5.00 litter/day/family). The trend was similar in case of buffalo milk production under C_5 category (9.05 litter/day/family) villages on overall basis. There were also significantly higher milk production of cattle in Gautambudhnagar district as compared to Hapur (3.07 litter/day/family) and Meerut districts. However in Bulandsahar and Gautambudhnagar districts the difference was significant. Milk production was buffalo were significantly higher in Bulandshahar district in comparison to all four districts. The study of Shukla *et al.,* 1995; Ashalatha *et al.,* 2004 were also reported similar observations. It was found that coefficient of Variation (CV) of milk production was low in high group as compared to medium and low groups of dairy owners. CV of milk consumption was low in low group followed by medium and high groups of dairy units. CV of milk sale was low in high group as compared to low and medium groups by Patil *et al.,* 2010.

While studying the consumption pattern of milk and milk products in Meerut district of Uttar Pradesh observed that economic status, season, occupation, food habits and education level affect the consumption pattern significantly. As the economic status improved, the percentage share of expenditure on dairy products decreased from 22 to 18 percent. Per capita milk and milk products consumption expenditure in winter was highest rupees 280, followed by summer rupees 247 and rainy rupees 239. It showed that family budget of graduates were at least double to that spent by illiterate families. Consumption pattern of milk products increased with increase in family budget by Singh and Kalra 2004.

It might be due to the availability of feeds & fodder and numbers of milch animals. The milk producing cattle and buffaloes both increased with the increased in size of land holding in all the category of farmers. This might be due to an increase in proportion of lactating animals. A similar increase in mean milk production was reported by Kaur and Gill 1989.

They observed that daily milk production increased from 8.8 litters on small farms to 16.43 litters on medium and 31.50 litter on large farms in Ludhiana districts. Daily milk yield of cow and buffalo were reported 3.0 and 4.0 litter/day by Singh, R. B. and Krishna, P. V. 1975 in Meerut division of UP. In general western region of UP farmers did not allow mineral mixture feeding to the animals.

Animals were offered only wheat bran, rice, police, MOC and crushed wheat as concentrate, Chaffed fodder was fed with mixing of concentrate in this region. It was observed that heifers and other adult animals conscious lose. It may be due to lack of minerals.

Grewal and Rangi 1980 reported average milk yields of 3.0 and 4.22 kg/cow and buffalo, respectively in Punjab. Singh 1980 reported daily milk yield of 4.05 litter for Murrah buffalo and 2.8 litter crossbred cow. The yield from local cows and buffalo were 1.8 and 3.1litter, respectively in Jaunpur district of UP. The daily milk yield in key village and non-key village areas around Karnal were reported as 2.34 and 2.37 kg for cows and 4.03 and 3.72 kg for buffalo Agarwal and Sharma, 1986. Bahadur 1988 reported daily milk of 3.6 kg in buffaloes in Hamirpur district of UP.

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