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Feeding Practices of Lactating Buffaloes in Gurgaon District of Haryana, India

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A B S T R A C T

A survey was conducted to study the conventional feeding systems and plane of nutrition of dairy buffaloes in Gurgaon district of Haryana state. From each of the four blocks, three villages were randomly selected. Sorghum and wheat straw were the main green and dry fodder crops adopted in the area during *Kharif* season. Among the concentrate feeds, wheat dalia and cottonseed cake were found to be most popular. Results showed that the body weight of buffaloes of landless farmers was (P<0.05) less than other three categories, followed by small, medium and large farmers. Further, it was observed that the average milk yield of buffaloes owned by large farmers was (P<0.05) higher than other three categories, followed by medium, small and landless farmers. Daily dry matter intake and dry matter intake per kg $W^{0.75}$ per buffalo owned by landless and small farmers did not differ significantly, however, was (P<0.05) lower as compare to buffaloes of medium and large farmers which among themselves did not vary statistically. The dry matter per 100 kg body weight did not differ significantly in lactating buffaloes reared by different categories of farmers. Total digestible nutrient (TDN) intake and TDN intake per $W^{0.75}$kg was found to be significantly higher (P<0.05) in buffaloes of medium farmers which was followed by large, small and landless farmers. However, comparison of energy requirement and supply revealed that the buffaloes owned by different categories of farmers were receiving excess energy than the requirement. Total crude protein (CP) intake and CP intake per $W^{0.75}$kg was found to be (P<0.05) higher in buffaloes of medium farmers which was followed by large, small and landless farmers. However, the CP supply was deficit. The approach of utilize better, produce more and import could be resorted to fill the nutritional gap and optimize milk production the district.

Introduction

Over 65% of the population in India is still living in rural India and most of them are dependent on agriculture for their livelihood. However, more than 75% of them being small and marginal landholders deprived of fertile soils and assured water for irrigation and even landless, they are dependent on livestock for supplementary income. Livestock is the only source of livelihood in many arid and semi-arid regions in the country and cattle and buffaloes are prominent among them. However, in spite of its economic importance, the performance of the livestock sector has not been optimum, due to non-availability of critical inputs and services, and poor linkage with the market. Under such a situation, even

these valuable assets turn into liabilities and start making negative contribution to sustainable development. We are now at the crossroads of livestock development and should not miss the opportunity of transforming this sector into a lucrative sector to enable millions of small farmers and rural poor to earn their livelihood. Dairy farming provided supplementary employment and an additional source of income to many small and marginal farmers. Livestock keeping along with crop husbandry maximizes the agricultural production (Singh *et al.*, 1996).

Profit from the dairy animals depends upon the input of nutrients supplied and output received in the form of milk. Poor inputs in terms of underfeeding will result in poor economic gains even from the high yielding animals. Underfeeding in dairy animals is the major obstacle in the development of an efficient animal production system in developing countries (Fahimuddin, 1975).

Imbalance feeding leads to excess feeding of some nutrients while others remain deficient. This not only reduces milk production and increases cost per kg milk, but also affects various physiological functions including long term animal health, fertility and productivity. To ensure improved productivity it is necessary to augment and secure feed resources through short and long term planning. It is also essential that milk producers feed their animals the nutrients in amounts that match the physiological needs and objective of keeping the animal, where possible locally available feeds should be used. Since many smallholder farmers do not have the necessary skills and knowledge to prepare balanced rations, this can be achieved through providing ration balancing advisory services direct to the farmer through village based trained local resource persons. In order to utilize the animal feed and economical resources as efficiently as possible, one must know the nutrient requirements of the animals. If the animal is wrongly fed this may lead to diseases, loss of production and thereby economic losses. Purpose of an ideal feeding system is the maximum yield with minimum cost and stress to animals. This can be achieved by proper feeding management of dairy animals. The purpose of present investigation was to study the feeding practices and status of nutrition of the lactating buffaloes in different blocks of Gurgaon district.

Materials and Methods

A survey was conducted to study the conventional feeding systems and plane of nutrition of dairy buffaloes in Gurgaon district of Haryana state. The survey was conducted accordingly during July and August 2015 (Kharif season) through personal approach at the doorstep of individual farmers to collect the required information. Gurgaon district has four blocks. To have a systematic and planned study, all the blocks were included in the survey.

From each block, three villages were randomly selected to have a fairly representative sample. From each village, four categories of farmers i.e. landless, small (having up to five acres of irrigated land), medium (five to ten acres of irrigated land) and large (more than ten acres of irrigated land) and having dairy animals were purposefully selected. In each village, five families under each category were interrogated on the prescribed Performa for this study, thus, making a total of 240 families. The farmers cooperated well in recording body weight, milk yield, feed intake and answering the questionnaire for collection of data. The samples of feed, fodders, blood and hair were collected for chemical analysis. The proximate analysis of feed and fodder samples was done following standard

procedure (AOAC, 2007). The data was statistically analyzed as per statistic methods of Snedecor and Cochran (1994).

Results and Discussion

The different feedstuffs fed to the buffaloes and their proximate composition and nutritive value are given in Table 1. Though variations, as indicated by standard error, were observed in relation to proximate composition of the feedstuffs, but the mean values corroborated well with the values reported by Sen *et al.*, (1977). The variation in proximate.

Composition might be due to varietal differences, different processing techniques employed and possible adulterations. Concentrates were mostly offered twice a day at the time of milking. Among the concentrate feeds, wheat dalia and cottonseed cake were found to be most popular amongst all categories of farmers. The other main sources of concentrates used were mustard cake and pelleted feed. It was a common belief among village farmers that feeding of cottonseeds enhanced milk fat content and also facilitates separation of butter from milk.

There are evidences that feeding cottonseeds and other oilseeds like soyabean or sunflower (Maynard *et al.*, 1979) caused significant increase in the milk fat content. However, there was significant (P<0.01) increase in fat-corrected milk (FCM) yield in Murrah buffaloes due to higher level of cottonseeds in rations (Grewal, 1993). However, gram churi, gram husk and flour mill byproducts were also being fed by different farmers depending upon availability and relative acceptance by the individual buffaloes as experienced by the farmers. Sorghum was the main green fodder crop adopted in the area during *Kharif* season. Wheat straw was the only dry roughage being used by the farmers when the study was conducted.

Feeding plane

The comparative feeding plane of milch buffaloes owned by different categories of farmers of Gurgaon district indicated that the average body weight of buffaloes owned by different categories of farmers are presented in Table 2. The highest body weight was observed in case of buffaloes owned by large farmers while, the body weight of buffaloes owned by landless farmers was lowest. The body weight of buffaloes of landless farmers was significantly (P<0.05) less than other three categories and there was also significant (P<0.05) difference between small, medium and large farmers. Further, it was observed that the average milk yield of buffaloes owned by large farmers was highest (9.05 kg) and was lowest (5.86 kg) in case of landless farmers. The average milk yield of buffaloes owned by small and medium farmers was 6.83 and 8.08 kg., respectively (Table 2). The results revealed that milk yield of the buffaloes owned by large farmers had significantly (P<0.05) high milk yield as compare to others, followed by medium, small and landless farmers. The total dry matter intake (kg), DM intake/100 kg body weight and DM Intake per $W^{0.75}$kg (gm) in the respective categories are given in Table 2. Lowest (13.27 kg) intake of DM was consumed by buffaloes owned by landless farmers and highest (14.83) in case of medium farmers. Daily dry matter intake per buffalo owned by landless and small farmers did not differ significantly, however, was (P<0.05) lower as compare to buffaloes of medium and large farmers which among themselves did not vary statistically. The dry matter per 100 kg body weight did not differ significantly in lactating buffaloes reared by different categories of farmers. The dry matter intake per kg $W^{0.75}$ was (P<0.05) high in buffaloes of medium farmers as compared to as compare to small and landless famers, but at par with large farmers.

Table.1 Proximate composition (%) and nutritive value (%) of common feed stuffs used by farmers of Gurgaon district

Feed Stuffs	DM	CP	EE	CF	Ash	NFE	TDN**
Sorghum fodder	18.8 (17-20)	7.67 (6-9)	1.98 (1-3)	32.09 (30-34)	7.69 (6-9)	50.57 (45-57)	55
Wheat Straw	89.96 (88-92)	3.59 (2-5)	1.12 (0.5-1.6)	34.46 (33-36)	14.23 (12-16)	46.6 (41.4-52.5)	44
Mustard Cake	90.12 (89-92)	35.29 (33-37)	8.19 (6.5-9)	9.2 (7-11)	6.73 (5-8)	40.59 (35-48.5)	78
Cotton seed cake	88.67 (86-90)	24.43 (23-26)	8.49 (7-10)	21.81 (20-23)	8.85 (7-11)	36.42 (30-43)	71
Gram Husk	91.2 (88-93)	5.89 (4-7)	2.31 (1-3)	48.76 (47-50)	9.06 (8-10)	33.98 (30-40)	55
Wheat Dalia	88.81 (86-90)	13.11 (12-14)	1.98 (1-3)	9.34 (7-11)	10.91 (10-13)	64.66 (59-70)	70
Cotton Seed	87.75 (85-89)	18.19 (17-19)	16.32 (15-17)	23.76 (21-25)	7.45 (6-9)	34.28 (30-41)	80
Churi	92.71 (90-95)	15.59 (14-17)	2.76 (1-4)	25.14 (23-27)	5.94 (4-8)	50.57 (44-58)	78
Feed Pellets	86.85 (84-89)	12.68 (11-14)	3.69 (2-5)	16.12 (15-18)	13.87 (12-15)	53.64 (48-60)	62

* Each figure is means of 12 values.
** Calculated values (Sen *et al.*, 1977).
*** Figures in Parenthesis indicate range.

Table.2 Comparative feeding plane of milch buffaloes owned by different categories of farmers of Gurgaon district

Attributes (n)	Landless (60)	Small (60)	Medium (60)	Large (60)
Body wt. (kg)	510.80^{a}±5.83 (490-518)	529.21^{b}±6.62 (510-548)	547.04^{c}±6.39 (527-563)	557.56^{d}±5.19 (530-587)
Milk yield (kg)	5.86^{a}± 0.22 (2-7)	6.83^{b}±0.25 (3-10)	8.08^{c}±0.35 (5-15)	9.05^{d}±0.26 (6-18)
Dry matter intake Total, kg/day	13.27^{a}±0.14	13.45^{a}±0.22	14.83^{b}±0.13	14.61^{b}±0.11
Percent of body wt.	2.59±0.07	2.54±0.08	2.71±0.08	2.62±0.07
Per W $^{0.75}$ kg (g)	123.56^{b}±3.10	121.93^{a}±3.51	131.19^{d}±2.98	127.37^{c}±3.06
TDN intake Total, kg/day	6.92^{a}±0.22	7.49^{b}±0.16	8.39^{d}±0.19	8.21^{c}±0.12
Percent of body wt.	1.35±0.01	1.42±0.01	1.53±0.01	1.47±0.01
Per W $^{0.75}$ kg (g)	64.43^{a}±0.74	67.94^{b}±0.81	74.20^{d}±0.69	71.54^{c}±0.77
CP intake Total, kg/day	1.13^{a}±0.05	1.21^{b}±0.04	1.38^{d}±0.06	1.32^{c}±0.08
Percent of body wt.	0.22±0.01	0.23±0.01	0.25±0.01	0.24±0.01
Per W $^{0.75}$ kg (g)	10.57±0.13^{a}	10.98^{b}±0.17	12.27^{d}±0.12	11.53^{c}±0.18

* ^{a,b,c,d}: Mean values in a row bearing different superscripts differ significantly (P<0.05).
** Figures in Parenthesis indicate range.

Table.3 Nutrient deficiency/excess in milch buffaloes owned by different categories of farmers of Gurgaon district

Category of Farmers	Body Wt.(kg)	Milk yield (kg)	TDN(kg)			CP(kg)		
			Required*	Supplied	Percent Excess	Required*	Supplied	%Deficit
Landless	510.80 ±5.83	5.86 ± 0.22	6.54 ±0.19^{a}	6.92 ±0.22^{b}	5.49	1.25 ±0.03^{y}	1.13 ±0.05^{x}	9.6
Small	529.21 ±6.62	6.83 ±0.25	7.11 ±0.18^{a}	7.49 ±0.16^{b}	5.07	1.38 ±0.05^{y}	1.21 ±0.04^{x}	12.31
Medium	547.04 ±6.39	8.08 ±0.35	7.75 ±0.14^{a}	8.39 ±0.19^{b}	7.62	1.55 ±0.03^{y}	1.38 ±0.06^{x}	10.97
Large	557.56 ±5.19	9.05 ±0.26	8.19 ±0.17^{a}	8.21 ±0.12^{a}	0.24	1.68 ±0.04^{y}	1.32 ±0.08^{x}	21.43

*** Requirements (Ranjhan, 1998)**
****a, b (TDN) or xy (CP): Means in a row under a parameter bearing different superscripts differ significantly (P<0.05).**

The total digestible nutrient (TDN) intake was highest (8.39kg) for milch buffaloes of medium farmers while, it was lowest (6.92kg) for the animals owned by landless farmers (Table 2). There was significant (P<0.05) difference in the amount of TDN supplied by different categories of farmers. Total TDN intake and TDN intake per $W^{0.75}$kg was found to be significantly higher (P<0.05) in buffaloes of medium farmers which was followed by large, small and landless farmers.

The total crude protein (CP) intake (kg) and CP intake Per $W^{0.75}$kg (g) for the milch buffaloes of landless, small, medium and large farmers was given in Table 2. Total CP intake and CP intake per $W^{0.75}$kg was found to be significantly (P<0.05) higher in buffaloes of medium farmers which was followed by large, small and landless farmers. Difference in protein intake might be due to the economic status of the farmers because landless and small farmers were using more wheat dalia and less amount of cakes in concentrate mixture of animals.

The data pertaining to comparison of nutrient intake and required by the animals under study are presented in the Table 3. When the supplied values were compared with the required (Ranjhan, 1998), the statistical analysis of data revealed that the buffaloes owned by landless, small, medium and large farmers were receiving 5.49, 5.07, 7.62 and 0.24% excess energy than the requirement. It was further observed that significantly (P<0.05) higher TDN was supplied by landless, small and medium farmers in comparison to their requirement, whereas, there was no significant difference between the TDN required and TDN supplied by large farmers.

The calculated values of CP offered to the animals reared by landless, small, medium and large farmers are given in Table 3. When these were compared with required, the statistical analysis of data revealed that the differences between the CP required and CP supplied were significant (P<0.05). On an average, the CP supply was short by 9.6, 12.31, 10.97 and 21.43% in landless, small, medium and large farmers, respectively. Though, the large farmers were offering more protein to their animals as compared to other categories, however, the deficit percentage

was high in large farmers which might be due to the more body weight and high milk yield.

The excess energy fed is deposited in animal body which might be beneficial during lean period, when the dry and low quality roughages constitute the major part of the diet and energy intake is limited especially in high yielders. Deficient protein was being fed to the animals as compared to their requirements. Difference in protein intake might be due to the economic status of the farmers. Feeding diets sufficiently high in crude protein for maximum milk production may not be always profitable (Clark and Davis, 1980). The most profitable amount of crude protein to be fed will vary from time to time depending on the prices of protein supplement and price of milk (Satter *et al.*, 1979).

The protein supplements are costlier and there is little scope of utilizing excess protein to yield energy for milk production. The results of this study are in general agreement to the study conducted by Singh (1997), Randhe *et al.*, (1993) and also to that of another study conducted by Singh (2002) who reported that buffaloes in Mohindergarh district were found to be fed 7.54% excess TDN and 7.41 % deficient CP. Jarial *et al.*, (2013) reported that in Tehri Garhwal and Pithoragarh districts of Uttarakhand, the lactating buffaloes were underfed in terms of quantity (DM). The DCP and TDN requirements of the animals kept by farmers were met to the level of 71.92, 76.81, 79.74, 87.02 and 90.14 percent and 97.37, 92.69, 85.92, 89.78 and 93.94 percent in landless, marginal, small, medium and large farmers respectively (Lal *et al.*, 1997).

Results of the present investigation inferred that body weight, milk yield and dry matter intake in lactating buffaloes of large and medium farmers were ($P<0.05$) higher as compare to landless and small farmers. According to body weight and milk yield, all categories of farmers were offering excess energy and deficit protein to their buffaloes. Farmers did not supplement mineral mixture and even common salt to their animals. The approach of 'utilize better' (improving the quality of present feed stuffs), 'produce more' (increasing biomass production) and 'import' (bringing nutrient supplements) could be resorted to fill the nutritional gap and optimize milk production in the district.

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