

Nutrient Availability and Milk Production of Cows in Bundelkhand Region*

P. N. Dwivedi¹ and Hari Singh

Department of Animal Husbandry and Dairying, PG College Rath Campus, Bundelkhand University, Jhansi 284001, Uttar Pradesh

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Fodder shortage exists in most parts of the Bundelkhand region and the crop residues constitute the main source of roughage. Free grazing system of animals is a major practice in this region. From April to September, animals graze freely in arable land, forests and grazing lands. Most of the animals remain underfed and are in low productivity. In high cropping intensity villages, where crop residue production is more, there is stall feeding. A comparative account of free range grazing and managed feeding (in which controlled grazing and supplementary stall feeding is followed) reveals the opportunities for farmers to accrue benefit and make livestock production sustainable.

Materials and Methods

The present study was designed to compare the Free Range Grazing (FRG) system with Managed Feeding (MF) system. For this purpose 10 villages from different parts of the region were selected and from each village fifteen farmers from different categories were selected. Two feeding systems and three categories of landholders as small, medium and large were considered. There were 84 cows under the experiment, divided equally into 4 in each treatment. Animals under Free Range Grazing (FRG) system were allowed for grazing on crop harvested lands, wastelands or forest lands during summer and part of the monsoon seasons. Such animals were fed limited amount of supplemental feed at home. The Managed Feeding (MF) system included stall-feeding, cut and carry of rangeland grasses, rotational

grazing and feeding of concentrates.

The experiment was conducted for a period of one year. Feed intake of cattle during grazing was estimated by clipping random quadrates in grazing areas (Alan Smith, 1987). Body weights of cattle were calculated on the basis of their body measurements using modified shalfers formula (Thomas and shastry, 1991). Laboratory analyses of feed samples were carried out as per standard methods (AOAC, 1990). Digestible Crude Protein (DCP) and Total Digestible Nutrients (TDN) values for different feeds were computed using the digestibility values (NRC, 1988). Statistical analysis of data was carried out as per standard procedures.

Results and Discussion

The annual average dry matter intake (DMI) of milch cows was significantly higher ($P < 0.05$) in MF system (6.81 kg/h/d) than FRG system (5.70 kg/h/d), in the region. The feed intake was similar among animals of different landholders in FRG system. In MF system large farmers fed their animals with higher amount of feed compared to small and medium landholders. The DM was lower than requirement of 6 to 8 kg (ICAR, 1985) in FRG system. The decrease of DMI in summer season might be due to poor availability of feed resources. This indicates that feeding care was better in MF system especially by the large farmers owing to more feed resource available with large holding (Patange *et al.*, 2002).

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¹Corresponding Author : Email : pndwivedi@gmail.com

The feed intake of milch cows in FRG and MF system differed significantly in summer and monsoon seasons. In winter season DMI of milch cows was comparable in FRG and MF system (6.98 and 7.07 kg/h/d, respectively). Free range grazing of cows did not exist in winter season. The amount of concentrate feeding increased upward with increase in land holdings of the farmers, in MF system. The amount of concentrate, fed through out the year by the dairy farmers in the area, was 1.48 and 1.07 kg/h/d in MF and FRG system respectively. The wide ratio of roughage and concentrate in the both feeding systems might be due to high cost of concentrate.

Milch cows under MF system were fed round the year higher ($P < 0.05$) DCP and TDN (0.354 and 4.116 kg/h/d) than FRG system (0.315 and 3.959 kg/h/d). The average supply of DCP and TDN to milch cows in MF system was as per with standard recommendations (ICAR, 1985). Cows, under FRG system faced deficit of 20.7% DCP and 14.7% TDN, due to feeding of less quantity of green fodder and concentrate to FRG cows. Acute nutrient deficit (-46% DCP and -36% TDN) in FRG cows during summer season was due to non-availability of green fodder, limited quantity of concentrate feeding and major supply of poor quality crop residues during summer season. Thus, farmers maintaining low to medium yielding cows in FRG system need to augment the nutrient supply by providing more of greens, concentrate and dry roughage to support the production potential of cows.

The year wise mean yield of cows was 3.42 l/day in managed feeding system, which was significantly higher ($P < 0.05$) than FRG mean yield (2.39 litre/day). The milk yield of the cows of FRG and MF system was similar during winter season, but the cows under MF system yielded significantly higher quantity of milk in monsoon and summer seasons (3.67 and 2.90 l/day) than the cows reared in FRG system (2.84 and 1.05 litre/day, respectively). This might be due to the free grazing cows receiving

less nutrient supply than the recommended level (ICAR 1985) except in winter season. The cows of large farmers in MF system produced highest quantity of milk throughout the year due to constant supply of nutrients.

The total input cost of rearing a milch cow was lower in FRG system (Rs. 6560/year) as compared to MF system (Rs. 10591/year). The total income from sale of products was also lower in FRG system (Rs. 10125/cow/year) than MF system (Rs. 14550/cow/year). But the net income from a cow under FRG was Rs. 3565/year and MF system Rs. 3959/year showing only marginal difference. However milk productivity of cows was higher in MF system (1252 l/day) than FRG system (872 litre/day). Concentrate was the resource, which had highest marginal value productivity in dairy animals and income could be increased by expenditure on feeding (Shalander *et al.*, 1994; Deepak shah *et al.*, 1995). Increase in investment also increases the annual return from dairy farms (Lee keejong *et al.*, 1996). FRG cows require much more feed supplementation to exploit their production potential.

Summary

The present study was designed to compare the Free Range Grazing system with Managed Feeding system regarding, availability and nutrient supply, milk production and economics of both systems for lactating cows in Bundelkhand region of central India.

The feed intake and milk production of milch cows in FRG was significantly higher as compared to MF system in summer and monsoon seasons. Acute nutrient deficit (-46% DCP and -36% TDN) in FRG cows was observed during summer season. The total input cost of rearing a milch cow was lower in FRG system as compared to MF system. Similarly, the total income from sale of products was also lower in FRG system. This indicates that FRG cows require much higher feed supplementation to exploit their production potential.

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