A review: Feeding practices and status of nutrition of the lactating buffaloes

Saurabh Baloda and Promila

Abstract
Dairy animals inherit certain genetic potentialities which could be exploited fully by proper feeding and management. Proper feeding is the cornerstone of a successful dairy operation because feed cost account for over half of the total costs of milk production. The primary purpose of keeping dairy animals is to transform feeds into high quality human foods i.e. milk. But this conversion could be made efficiently and economically by applying the principles of nutrition which can further be augmented by superior breeding, good health and competent management.

Keywords: management, feeding, dairy and nutrition

Introduction
Concept of optimum production and feeding
Most of the dairy farmers manage their herds for maximum milk production. The question still remains whether maximum production and economical production is the same under most conditions. Factors that tend to decrease profitability of increased production per buffalo include decreased digestibility of feeds with increased feed intake and substitution of higher priced concentrates for lower priced forages and increased health costs (Soliman, 2007) [31]. Broderick (2003) [4] reported that maximum production of milk by a cow reduces its reproductive efficiency. As the level of feeding increases, the digestibility of the diet decreases. Grains are the essential component of ration of high yielding animals to meet energy requirement, and the point of optimum level of grain feeding is, where the last increment of grains fed still makes a profit in terms of milk production. Arzul (1994) [2] observed that changes in the milk industry encourage trends towards large herds and fewer dairy units and using complete feeds. The advantages of using such diets is that it provides easier and efficient herd management, better economic gains and choice of feed mixer, and feed formulation and management in batches. Sharma et al. (1991) [27] suggested that a better understanding of the dynamics of rumen function and more accurate prediction of nutrient flow from the rumen are necessary. Feeding system, design management and diet formulation technique need to be developed that recognize the dynamic nature of buffalo physiology and the variability in feedstuffs and buffalo requirements.

Leng (1991) [15] gave two concepts to optimize feeding strategies for farmers in tropics: (i) making the cows digestive system as efficient as possible by ensuring optimum conditions for microbial growth in the rumen. (ii) Balancing the nutrients so that those are used most efficiently for milk production without jeopardizing reproduction and health. These concepts can be implemented by feeding a combination of Non-Protein Nitrogen (NPN), minerals and bypass proteins as demonstrated by studies in India. Milk production can also be improved by feeding alkali treated straw but for economic, sociological and logistic reasons this practice is not widely adopted by small farmers.

The negative energy balance was greater and lasted for one week longer in overfed animals. Mixed farming of livestock and crop husbandry in rain fed areas is the common practice in India (Rangnekar, 1993) [22]. Providing quality feeds and developing breeding programs led to improved quality and quantity of milk production (Gill, 1995) [7]. Adult buffaloes could maintain their body weight when fed oat straws as the whole ration (Kakkar et al., 1997) [13]. There are certain constraints in the adoption of improved feeding practices in the home tract of Murrah buffaloes (Yadav and Yadav, 1997) [32].
Feeding of milch animals
A balanced ration is essential for optimum performance. A shortage or an imbalance in the supply of energy, protein, vitamin or minerals may subject the animal to nutritional stress, resulting in metabolic disorders or reduced milk production. Requirements for these nutrients depend largely on milk yield and body weight. Maximum dry matter intake and milk production can be obtained if buffaloes are fed during the dry period so that they are in good body condition without becoming excessively fat (Mudgal et al., 2003) [18]. Overfeeding during dry period is more common than underfeeding because in many situations dry buffaloes are group fed with lactating buffaloes. Fat cows are more susceptible to calving difficulties, metabolic disorders and infectious diseases (Ferguson, 2001) [10]. Decreased feed intake after parturition may result in a serious shortage of nutrients, thus reducing milk production or leading to metabolic disorders. The most critical period for nutrient supply to the high yielder animals is from parturition until peak production which usually occurs 4-10 weeks postpartum. Therefore, feeding the buffalo during early lactation presents special problem, because often she is not offered either adequate amount of feed or it cannot consume enough feed to supply the energy and protein needed for maximum milk production. The largest increase in milk yield is obtained when diets low in CP (9-10%) are supplemented upto 13-14% CP. Increasing CP above 14% decreased the rate of increase in the milk yield compared to the diet with lower level of CP in ration (Paul, 2002) [20]. An increase or deficiency of nitrogen in the ration also causes a reduction in overall efficiency of utilization of energy by the dairy cow (Moe et al., 1977) [17]. Animals of surveyed area exhibited a deficiency in DM, DCP and TDN intake. In view of the scarcity of green fodder and high cost of concentrates, use of unconventional feeds with supplementation of mineral may be beneficial to improve the nutritional status of the dairy animals. There is further scope for improvement in production by feeding the dairy animals as per recommended feeding standards (Sagar et al., 2013) [23].

Balanced diet for dairy animals
At present, around 95% of the world buffalo population is contributed by Asia; where animals are mostly fed on low quality roughages and crop residues with poor nutritive value resulting in poor production, reproduction with delayed onset of puberty in heifers and high mortality in young stock (Pasha et al., 2013) [19]. Nutrients supplied to the dairy animals varied significantly between seasons and between categories. 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 (Lall et al., 1997) [14]. Low productivity of milch animals in Tarai belt of of eastern UP was observed merely due to deficiency of nutrients in the feed and fodder existing in the area (Sagar et al., 2013) [23]. The large farmers offered significantly more quantity of green fodder than other type of farmers. The type of soil, irrigation facilities and size of land holding have significant effects on the fodder cultivation and feeding pattern (Singh et al., 1997) [29]. Size of land holding was found directly proportional to the high cost of feeding practices by farmers due to their resourcefulness (Yadav and Yadav, 1997) [32]. In a survey conducted to study the livestock production system as a component of agricultural farming system, it was observed that landless and poor farmers keep more number of buffaloes which yield more milk than cows. Milk yield per animal increased with increasing land holding (Singh et al., 1997) [20]. Data recorded on mineral status of buffaloes and different fodders in Gurgaon district of Haryana indicated that dry roughages contained lesser amount of zinc than the specified level. But green fodder was rich in zinc and copper. The calcium and phosphorus contents of feeds and fodders were sufficient to meet the maintenance requirement of the buffaloes under study (Yadav et al., 1997) [33]. Large-scale implementation of a ration balancing programme can help in improving the production efficiency of milch buffaloes with the available feed resources in an environmentally sustainable manner (Sherasia et al., 2014) [28]. The most critical period in the life of a dairy animal is from calving until its peak production. The reports available in the literature indicated that if the highest peak is to be achieved, then it must be fed a balanced ration. Energy and protein are the two nutritional factors which most likely limit the milk production. There should be a balanced proportion of degradable and non-degradable proteins in the rumen for maximum efficiency of feed utilization. Nutritional deficiency as well as imbalance was responsible for problems of production and reproduction in dairy animals. Feeding of green fodders and concentrates as a technological tool for achieving production targets is essential for avoiding breeding problems related to nutritional hazards (Goswami, 1995) [8]. Chauhan et al., (1992) [5] observed that nutritive value of legume hays fed to adult buffaloes provided sufficient DCP and TDN over and above the maintenance requirement when fed ad libitum as a sole ration.

Reports of survey studies on feeding of milch buffaloes.
Top producers as defined in a survey study (Borghese and Mazzi, 2005) [1] were adopting a large percentage of the management techniques that researchers have determined to be beneficial in enhancing the production efficiency. The producers want to increase profitability but they may face some problems of metabolic and reproductive disorders in herd, but they have been able to overcome these by management of details. The technique adopted by these producers in improved profitability should enable prediction of practices to be adopted by other producers for the same goal. New relationships may be needed among professionals from extension service and mass media.
In a study by Randhe et al. (1993) [23] on nutritional status of different categories of buffaloes owned by farmers with different land holding capacity in Maharashtra revealed that there was deficiency of DM supply in all the groups. DCP intake was also deficient except in dry buffaloes where it was surplus. However, TDN supply was significantly above the normal requirements in all the groups. Malik (1992) [16] reported that the large and medium farmers were feeding more concentrates as well as green fodder where as small and landless farmers were providing more grazing, less concentrate and less cultivated fodder. Singh et al. (2002) [30] revealed that in Mohindergarh district of Haryana state, DM intake of buffaloes reared by small holding farmers were significantly lesser than others. They also reported that digestible CP supplementation in buffalo diets were deficient in small as well as medium land holding farmers. Jariel et al. (2013) [12] reported that in Tehri Garhwal and Pithoragarh districts of Uttarakhand, the lactating buffaloes were underfed in terms of quantity (DM). They
suggested that 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 both the districts. Hayashi et al. (2006) [10] had done a survey to identify the feeding traits, milk productivity and nutritional status of lactating cattle and buffalo in Terai, Nepal. Constituents and dry matter (DM) of feed supplied, body condition score (BCS), heart girth (HG), bodyweight (BW), milk yield (MY) and plasma metabolites were obtained in the pasture-sufficient, pasture decreasing and fodder-shortage periods. The different supplies of CP, NDF and TDN among the periods and between the villages might have affected MY and nutritional status in cattle and buffalo. Sarwar et al. (2009) [25] revealed that Low per head milk yield, poor reproductive performance (seasonal breeding behavior, anestrous, and longer calving interval) and low growth rate in buffaloes have been attributed to insufficient supply of nutrients. Balanced nutrition and better management can enhance buffalo productivity.

Economic feeding and milk production
Feed cost per Kg of milk production was lowest in green berseem based diets than the concentrate based diet suggesting that leguminous forage based diet reduced the cost of milk production in Murrah buffaloes (Sagar et al., 1997) [24]. Animals of surveyed area exhibited a deficiency in DM, DCP and TDN intake. In view of the scarcity of green fodder and high cost of concentrates, use of unconventional feeds with supplementation of mineral may be beneficial to improve the nutritional status of the dairy animals. There is further scope for improvement in production by feeding the dairy animals as per recommended feeding standards (Sagar et al., 2013). [24] Jabbar et al. (2013) [11] reported that feeding lactating Nili- Ravi buffaloes a diet containing more (i.e.,120%) than the NRC level of ME recommended for large breed dairy cows conferred no advantage while feeding a diet containing less than the recommended level decreased both milk production and feed efficiency.

The national strategies for the irrigated intensive agricultural system in developing countries should focus upon producing less expensive milk from dairy buffaloes that, efficiently, utilize the limited expensive produced feed resources. The less costs of production will strength the competition of domestic supply either against in the international export market or against the dumping policies followed by exporters to the domestic market (Soliman, 2007) [31], Hamid et al. (2003) [8] concluded from the study that buffaloes maintained in farms located in urban and periurban areas had better performance than those in rural areas. Improvement in peak and lactation yield and growing own fodder crops would increase profit. Shah (2012) [28] revealed that milk production performance and inter-relationship among traits of economic importance in buffaloes were maintained at commercial dairy farms.

Feeding and managing for increased production is profitable when income over total costs is positive. Factors that affect profit in dairy enterprise are labour costs, land values, taxes, building and equipment costs and depreciation. Except for labour, others are fixed costs can’t be changed by individual dairyman. A dairyman can control feeding practices and costs to a large extent, therefore maximizing income over feed costs. Individual dairyman need to adjust levels of grain feeding which would depend upon not only the costs of feeds but also the inherent capabilities of buffaloes to convert grain to milk and the quality of forages (Adkinson et al., 1993) [11]. Generally, feeding is the most important component of cost of rearing herd replacement which account for 78% of the total costs. Hayashi et al. (2006) [10] reported that the various supplies of CP, NDF and TDN among the periods might have affected milk yield and nutritional condition in buffalo. It is likely that the higher supplies of CP for buffalo in the pasture sufficient period improved the nutritional status for milk production. A priority for the future is the development of high yielding, disease resistant varieties of cultivated forages as the need to give priority to food crops for human population limits the feeding of green fodder which can reduce feed costs.

Conclusion
Feeding a diet containing less than the recommended level decreased both milk production and feed efficiency. So feeding of animal should be according to the recommendations.

Reference
12. Jarial S, Kumar AN, Padmukumar V. Assessment of feeding practices, nutritional status and gap for dairy buffaloes in hilly districts Tehri Garhwal and Pithoragarh of Uttarakhand, India.