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Feeding Management Practices in Dairy Farms of Herat Province, Afghanistan

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ABSTRACT

Background: Animals require carbohydrates, proteins, fats, vitamins, and minerals for optimal health, growth, and reproduction. Insufficient nutrient intake can lead to decreased productivity, deficiency diseases, impaired growth, weight loss, reduced milk production, and affected calf production. Insufficient minerals cause issues like infertility, poor bone growth, and hair/wool loss. Nutritional balance is crucial for animal health and productivity. The research purpose is to assess dairy farming practices and animal management, identifying challenges faced by dairy farmers in selected districts of Herat Province.

Materials and Methods: The research was conducted in Herat Province's five districts, reliable information gathered from 100 randomly selected dairy owners through a systematic questionnaire. Prior to the interviews, the clarity of the questionnaires was ensured, and the respondents were briefed on the study's objective.

Finding: Out of 100 dairy farms studied, only 8% used balanced ration, while the remaining 92% were unaware of it. In spring, green fodder was ranked 1st, followed by straw treet (local ration), plain straw and oil cake ranked 2nd, 3rd and 4th positions, respectively. In summer, green fodder remained 1st, followed by straw treet, plain straw, and hay. In fall, straw treet was ranked 1st, followed by hay, plain straw, and oil cakes. In winter, hay took 1st place, followed by straw treet, plain straw, and oil cakes (2nd, 3rd and 4th), respectively.

Conclusion: Balanced feed was used by only 8% of farmers. Majority of them feed thrice daily and 74% of dairy owners did not feed concentrate. All dairy owners use straw treet to feed their animals, and most of them use straw treet twice daily. During spring and summer season, largest volume of animal feed in most farms comes from green fodder, straw treet, and hay, and it is different in the fall and winter season (more dried forage, straw treet, oil cakes, etc).

Keywords: Animal feeding, Concentrate, Dairy cow, Dry fodder, Green fodder

INTRODUCTION

Animal feeding plays a crucial role in ensuring the health, productivity, and overall well-being of livestock. Proper nutrition is essential for animals to meet their energy, protein, vitamin, and mineral requirements, which directly impacts their growth, reproduction, and resistance to diseases. The quality and composition of animal feed have a significant influence on the performance and profitability of livestock operations (Anderson et al., 2020).

According to research conducted by experts in animal science and nutrition, they said that nutrition is the single most important factor affecting animal performance, thus, feeding strategies should be carefully designed to optimize animal health and productivity. This emphasizes the significance of understanding animal feeding practices and implementing appropriate feeding strategies (Smith et al., 2019).

Livestock farmers and animal nutritionists strive to develop balanced rations that meet the specific nutritional needs of different animal species at various stages of their life cycles. These rations typically consist of a combination of forage, grains, protein sources, vitamins, minerals, and other additives. It is essential to consider factors such as nutrient availability, digestibility, palatability, and cost-effectiveness when formulating animal diets (Davis et al., 2019). The frequency and timing of feedings are also critical factors in animal feeding management. Feeding schedules may vary depending on the species, age, and production goals of the animals. Some animals may require multiple feedings throughout the day, while others may have specific feeding times associated with their natural feeding behaviors (Sinha, 2009).

Furthermore, the method of feeding, whether individual or collective, can impact animal behavior, social interactions, and feed efficiency. Individual feeding allows for better control over individual animal intake and monitoring, while collective feeding promotes social interactions and reduces competition among animals (Lukuyu, 2007). By understanding the nutritional requirements, formulating balanced rations, and implementing appropriate feeding strategies, livestock producers can enhance the health and productivity of their animals, leading to sustainable and profitable farming operations (Jadav, 2014).

According to research conducted by Smith et al. (2021), "Optimal nutrition plays a key role in maximizing the growth, reproduction, and overall health of animals." This highlights the significance of providing animals with appropriate and well-formulated diets to ensure their nutritional needs are met. Feeding practices vary depending on factors such as the species of animals, their age, physiological status, and production goals. For instance, lactating cows have higher energy and nutrient requirements compared to dry cows or growing young stock. Research by Johnson et al. (2018) emphasized the importance of "tailoring feeding practices to meet the specific nutritional demands of different production stages to optimize animal performance and well-being".

Balanced rations, which include a combination of forage, concentrates, and supplements, are formulated to provide animals with the necessary nutrients. The formulation process takes into account factors such as nutrient content, digestibility, and availability. Research by Anderson et al. (2020) highlighted that "proper ration formulation ensures that animals receive adequate amounts of energy, protein, minerals, and vitamins to support their physiological functions and maximize production".

The frequency and timing of feedings also play a crucial role in animal nutrition. Research by Davis et al. (2019) indicated that "providing feed multiple times a day can improve nutrient utilization, reduce digestive disorders, and promote better animal welfare." Understanding the natural feeding behaviors of animals and designing feeding schedules accordingly can enhance their overall well-being and performance. Thus, this study was conducted to assess dairy farming practices and animal management, identifying challenges faced by dairy farmers in selected districts of Herat province.

MATERIALS AND METHODS

Study Area and Duration

This research was conducted in following five districts of Herat province i.e. Guzara, Injel, Karokh, Ghurian and Zindajan. During the five months of field study (April-August, 2021), required observations on various techniques of animal feeding, in the five districts of Herat province were recorded through a developed questionnaire using an interview schedule, interview guide and direct observational approach. The materials utilized and procedures employed in this investigation are discussed in the sub-sections below.

Sample Size

The study was conducted in five districts of Herat province, which was selected purposively. Herat province comprised of 19 districts, out of which five district were selected purposively. The selected districts were Guzara, Injel, Karokh, Ghurian and Zindajan. A comprehensive list containing the number of cattle farmers in each district was obtained from The Department of Agriculture, Cow Farmers' Union and Artificial insemination center of Herat Province For the purpose of this research, a targeted approach was adopted, specifically focusing on cattle farmers who owned ten or more cows. This selection criterion aimed to ensure an adequate representation of larger-scale cattle farming operations within the study sample. By utilizing the available data and applying the specified eligibility criteria, a suitable group of cattle farmers was identified to be included in the research study. Further, 20 farms from each selected district were identified. Thus, the entire sample consisted of 100, respondents from selected five districts (Table 1).

Table 1. Number of samples from different districts

	Districts	**No. of samples**
Herat Province	Guzara	20
	Injel	20
	Karokh	20
	Ghurian	20
	Zindajan	20
	Total	**100**

Data Collection

The development of an interview schedule to achieve the objectives of the research is an important step in any research endeavor. A systematic questionnaire was designed and instituted to obtain relevant and reliable information about farmers and their animals. The questionnaires were checked for clarity of the questions prior to the interview and the respondents were briefed on the objective of the study. Following that, the actual questionnaires were presented. Accordingly, a total of 100, dairy owners were selected through Stratified Sampling in this system dairy owners which have at least 10 dairy cows where selected. The data was collected through personal interview techniques and direct observation from each selected districts.

Tabulation and Analysis of Data

After completion of data collection, each question in the interview schedule all data were summarized on a spreadsheet and tabulated respondent-wise in a master table. Variables were grouped according scheduled questioners and manage mental practices where applied by farmers. For coding, simple numbers 1, 2, 3, 4 and so

on were used for each variable. After coding, data were entered in a computer spreadsheet using Microsoft Excel for making master table to be used for analysis and making charts and figures. The qualitative data were quantified accordingly and tabulated to draw meaningful inferences. The tabulated data were analyzed using Statistical Package for Social Sciences (IBM SPSS, Version 25). To analyze the collected data, several basic statistical tools (including frequency distribution and percentage) and methods were used.

RESULTS

For optimum milk or meat production, appropriate feeding is one of the most important aspects, balanced and adequate feeding is important. From 100 farms under investigation, only 8% dairy farmers said that they used balanced ration for their animals. However, rest of the 92% dairy farmers said that they did not know about the balanced ration and fed their animals traditionally. Around 10% of dairy owners fed their animals 2 times daily followed by 71%, who fed their animals 3 times daily, and the lowest portion of farmers (19%) fed their animals 4 times daily. About 18% of dairy owners fed concentrate to their animals in the morning followed by (5%), who fed concentrate in the evening and the lowest portion of farmers (3%) fed concentrate at the time of milking. However, majority of farmers (74%) were not feeding concentrate to their animals (Table 2). About 7% of these dairy owners fed concentrate to their animals individually followed by 19%, who fed concentrate collectively. However, majority of these dairy farmers (74%) do not feed concentrate to their animals.

Table 2. Distribution of the dairy owners according to feeding management /24 hours (n =100)

Sr. No.	Particulars	Frequency	Percent	Cumulative Percent
Balanced ration used by dairy farmers (n =100)				
1	Yes	8	8.0	8.0
2	No	92	92.0	100.0
No. of feeding /24 hours(n =100)				
1	2 Times	10	10.0	10.0
2	3 Times	71	71.0	8.0
3	4 Times	19	19.0	100.0
Time of feeding concentrate(n =100)				
1	In the morning	18	18.0	18.0
2	In the evening	5	5.0	23.0
3	At the time of milking	3	3.0	26.0
4	Not feeding	74	74.0	100.0
Method of feeding concentrate(n =100)				
1	Not feeding concentrate	74	74.0	74.0
2	Individual	7	7.0	81.0
3	Collective	19	19.0	100.0

Around 20% of dairy owners fed their animals treet (popular type of ration among dairy farmers in Herat province, which is obtained from soaking of straw and mixed with barley or corn flour) in the morning followed by 35%, who fed treet in the evening and the highest portion of farmers (45%) fed treet in both morning and

evening. It was also observed that 20% of dairy owners fed their animals treet individually followed by 80%, who fed treet collectively (Fig. 1). In the cattle farms, animals are fed daily with different types of feeds and fodders to meet out the nutritional needs of these animals at different times. The dairy farmers in Herat province fed their animals with different simple and local feeds and fodders. These items vary slightly depending upon different seasons of a year.

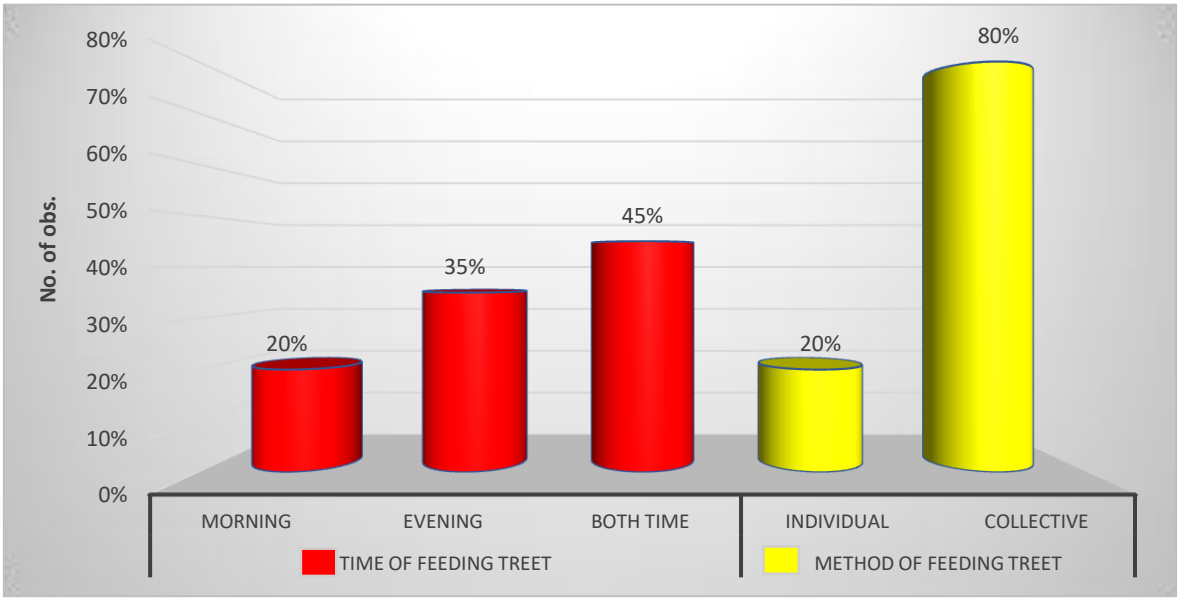

Figure 1. Distribution of the dairy owners regarding time and method of feeding treet (n=100)

The results indicated that green fodder was fed by 100% of dairy owners. Straw treet was fed by 83% followed by 46% who fed plain straw. Oil cakes, hay and concentrate was fed by 23, 22 and 19%, respectively. Silage making/feeding along with urea treatment was not done by any of these dairy farmers during spring season (Fig. 2).

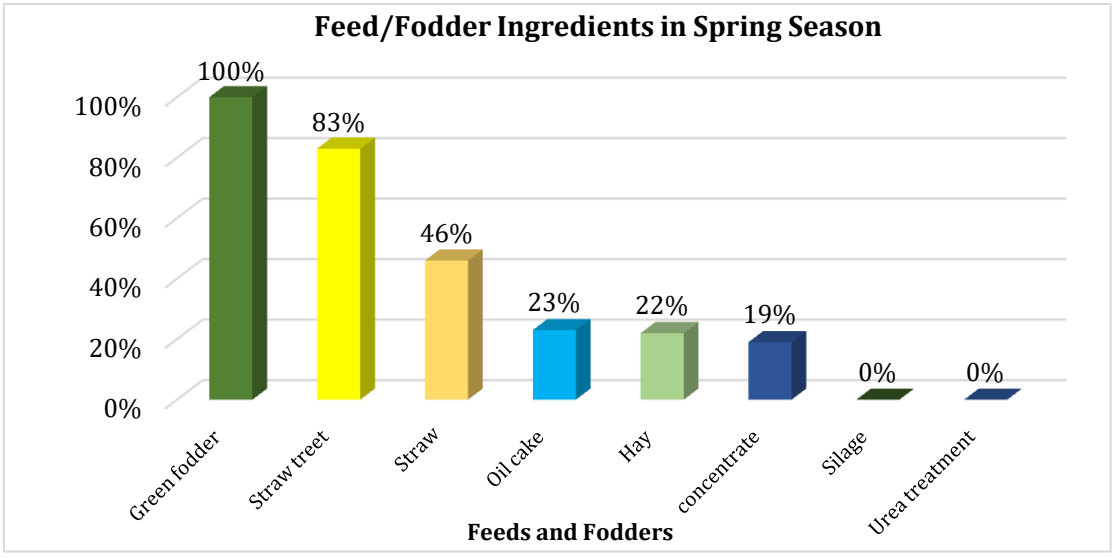

Figure 2. Feeds and fodders offered during spring season (n =100)

Green fodder was fed by 100% of dairy owners. Straw treet was fed by 88% followed by 46% who fed plain straw. Hay, oilcakes and concentrate were fed by 22, 21 and 19 %, respectively. Silage feeding and urea treatment was not done by any of these farmers in summer season (Fig. 3).

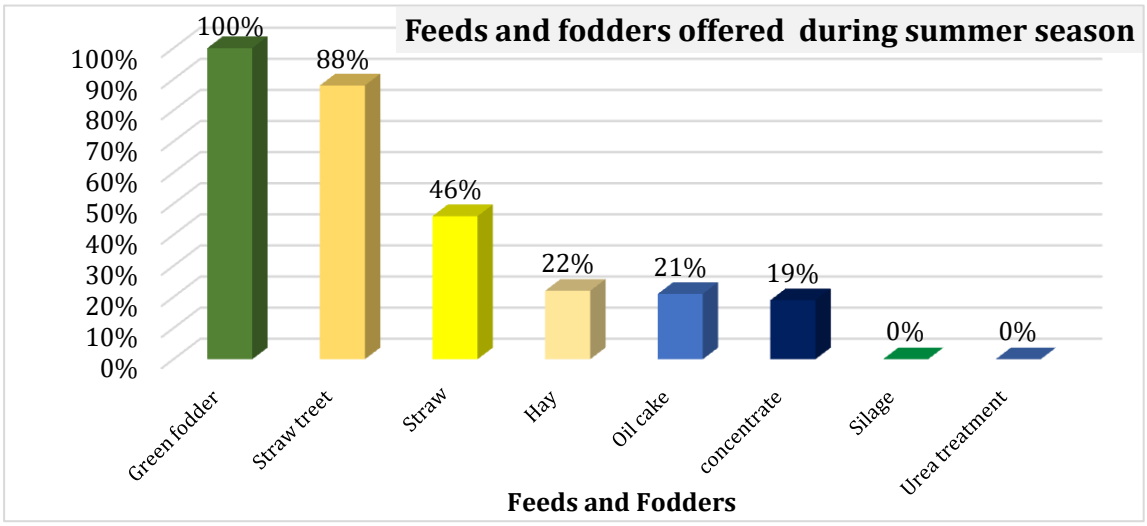

Figure 3. Feeds and fodders offered during summer season (n=100)

During fall season, straw treet was fed by 94% of dairy owners. Hay was fed by 92% followed by 83% dairy owners who offered plain straw. Oil cakes, concentrate, green fodder was fed by 18, 8 and 6 %, respectively. Urea treatment and silage feeding was done by 6 and 4%, respectively (Fig. 4).

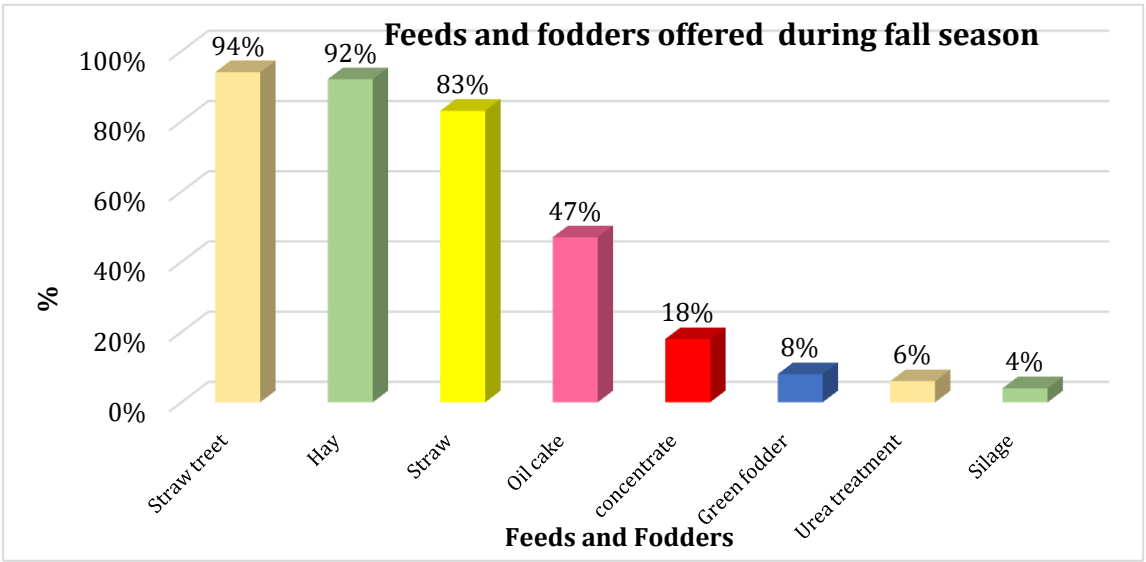

Figure 4. Feeds and fodders offered during fall season (n=100)

During winter season, hay was fed by 100% and straw Treet by 94% of these dairy farmers. Plain straw was fed by 89%. The oil cakes and concentrates were fed by 47 and 18%, respectively. Urea treatment and silage feeding was done by 5 and 4%, respectively. Green fodder was not fed in winter season by these farmers (Fig. 5).

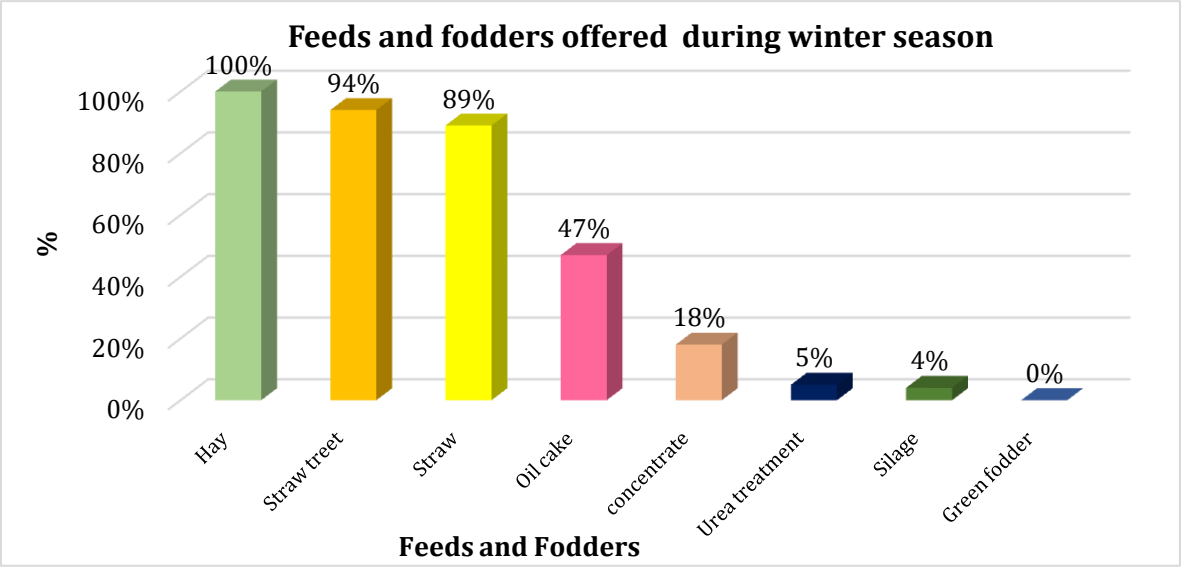

Figure 5. Feeds and fodders offered during winter season (n=100)

In the spring season, green fodder ranked 1 followed by straw treet (ranked 2), plain straw and oil cakes (ranked 3 and 4, respectively). In the summer season, green fodder ranked 1 followed by straw treet (ranked 2), plain straw and hay (ranked 3 and 4, respectively). Fall season is like transitional season and feed and fodders offered changed in this season, as we can observe that straw treet ranked 1 followed by hay (ranked 2), plain straw and oil cakes (ranked 3 and 4, respectively). In winter season, slight changes than the fall season was observed. During this season, hay ranked 1 followed by straw treet (ranked 2), plain straw and oil cakes (ranked 3 and 4), respectively (Fig. 6).

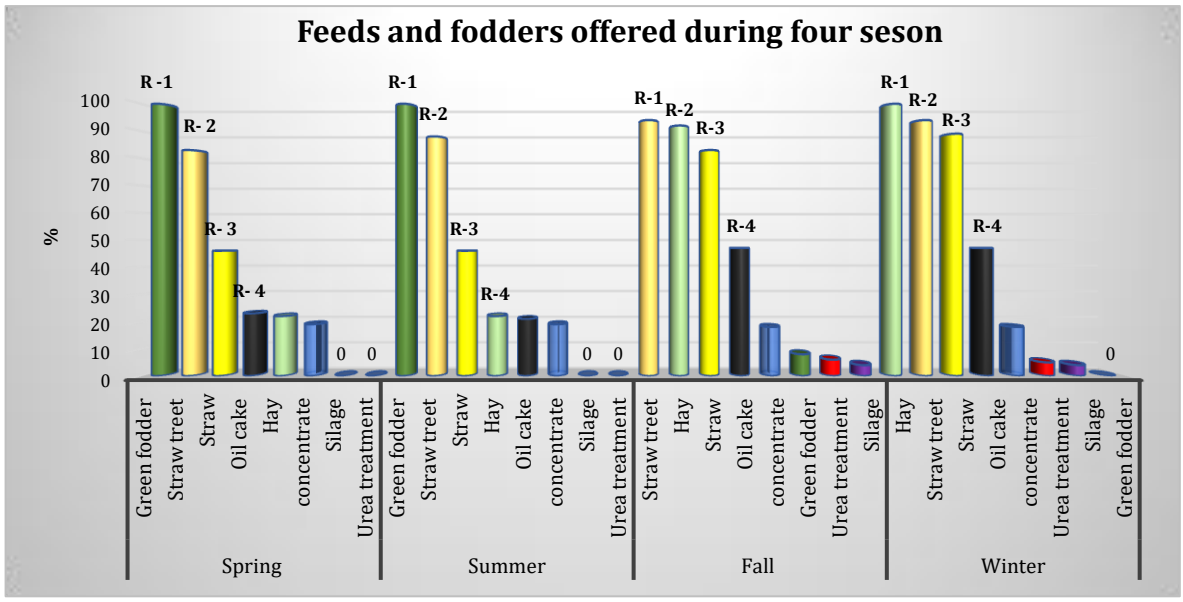

Figure 6. Feeds and fodders offered during all four season (n=100)

DISCUSSION

From 100, farms under investigation, only 8% dairy farmers were used balanced ration for their animals. However, rest of the 92% fed their animals traditionally, this is the same as Sonil (2015), who indicated that only 5% of dairy owners used balanced ration for their animals. About 18% of dairy owners fed concentrate in the morning followed by (5%), in the evening and the lowest portion (3%) at the time of milking. However, majority of farmers (74%) were not feeding concentrate, this findings were supported by Aichi et al. (2018) which indicate the Kenya smallholder dairy farmers currently feed 2 kilograms of concentrate per cow daily, resulting in milk yields of 5-7 liters. However, when the concentrate amount was increased to 8 kilograms per day for a specific period, there was a significant 24% increase in the total milk production.

About 7% of these dairy owners fed concentrate to their animals individually followed by 19%, who fed concentrate collectively. However, majority of these dairy farmers (74%) do not feed concentrate to their animals. this study, supported by Margaret et al. (2007) which indicate, concentrates based on cows' individual requirements significantly increased milk yield by 2.9%, milk fat yield by 11.1% and milk solids yield by 7.0%. These results are in agreement with previous observations by Pecsok et al. (1992). They reported an increase of 0.8 L milk/cow/day fat-corrected milk when feeding management was changed from group-based to individual feeding. Around 20% of dairy owners fed their animals whit straw treet in the morning followed by 35% in the evening and the highest portion (45%) in both morning and evening. These results are almost similar to Sinha et al. (2009), who reported that in Uttar Pradesh (India), majority of dry fodder for cattle was wheat straw and it was fed by 86-98% of farmers.

Green fodder was fed by 100% of dairy owners. Straw treet was fed by 83% followed by 46% who fed plain straw. Oil cakes, hay and concentrate was fed by 23, 22 and 19%, respectively. Silage making/feeding along with urea treatment was not done by any of these dairy farmers during spring season. This finding was in contrary to Khan et al. (2009) which indicates generally dry mater intake of dairy animals vary between 2 to 3.0 kg per kg body weight. Forage dry mater minimum 40% of total dry mater intake or approximately 1.5 % of body weight. Maximum grain dry mater intake is 80% or 2 % of body weight for 5 to 30 Lit milk/day. Feed grain 500g for 1.5 Lit lb of milk.

CONCLUSION

Balanced ration was used by only 8% of farmers. Majority of them feed thrice daily and 74% of dairy owners did not feed concentrate. All dairy owners use treet to feed their animals, and most of them use treet twice daily. During spring and summer season, largest volume of animal feed in most farms comes from green fodder, treet, and straw, and it is different in the fall and winter season (more dried forage, treet, oil cakes etc).

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