Research article

Feeds and Feeding Practices for Dairy Cattle Farming in Selected Areas of Myanmar

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Abstract This study was carried out to evaluate the feeds and feeding practices of dairy cattle farming in Yangon, Mandalay and Sagaing regions. The secondary data and questionnaires were assessed from 60 farmers of 60 households in the study area and made discussion with them. According to the findings of this study, zero grazing was the main production practices used by smallholder dairy farmers in the study area. Most of farmers used locally available feed resources such as cut and carry grass, forage crops, crop residue after harvesting and local feedstuffs. Common feedstuff used by dairy farmers in the studied areas are broken rice, rice bran, wheat bran, beer cake, bean cake, oil cakes, cotton seed cake, sorghum, yellow corn, soybean meal, mineral block, and sugar syrup. Feeding input among the farmers in the studied areas is similar. However, the availability and quality of these resources are varied, but farmers are properly selected and combined according to their nutritional characteristics, adequate and productive diets had been provided all year round for sustainable production and productivity. There are generally two feeding practices: compound cattle feeding and home-mixed feeding in the studied areas. Among the respondents, 84.77% preferred to use compounded cattle feeding and others 15.23% used home- mixed feeding. Most of the farmers in the study area used natural mating methods than artificial insemination method (AI). Over 90% of the respondents had knowledge on the signs for oestrus detection. The average 7.45liter and 6.48liter of milk per cow per day was recorded in wet and dry season from the study area. Seventy three percent of dairy farmers used concentrate to their animals based on milk production.

Keywords dairy, feedstuff, forage, fodder, feeding, grazing

INTRODUCTION

In Myanmar, dairy farmers face many feed constraints such as inadequate feeding, quality and quantity of feed, price of feed, poor storage facilities for feed conservation as well as insufficient water supply. Feed and feeding practices among dairy farmers are different due to lack of information on composition and utilization of locally available feed resources, poor access to the market and high cost of feed inputs and low income from production. Dairy development in Myanmar has played a vital role in improving the nutritional standards, generating employment opportunities and increasing the level of income of dairy farmers in rural areas. Nowadays scarcity of feed and rising feedstuff prices affect the dairy farming especially for small scale farmers. Farmers used seventy percent of total production cost for feed and feeding practices. There is a limited access to adequate grazing pastures and fodder production during the dry season. Many researchers have conducted feeding trials to solve the feed problems to improve the utilization of crop residues and optimal feeding practices. There are several approaches to improve the nutritive value of crop residues for dairy cattle feeding including improved handling and processing to increase palatability, feed intake and digestibility to release nutrients to animals. But the challenge to researchers is to work with farmers to identify improved practices that improve productivity and are feasible, profitable and acceptable for farmers to adopt. Selection of proper feeding standards, using the right combination of feeds in

adequate quantity along with other related practices are some of the ways which will enable the farmers to increase the milk production and make dairying more profitable. Therefore, the present study was undertaken to ascertain the prevailing feeding practices of dairy animals in the selected areas.

METHODOLOGY

The study was conducted in Rangoon, Mandalay and Sagaing Regions. Two locations were randomly selected from each region and 10 dairy farmers were randomly selected from each village, making the total sample of 60 dairy farmers. Questionnaire was prepared in light of the objective. The data was collected through interview method and personal observations for only one year i.e. 2018-2019. The structured questionnaire was used to collect information on individual household's characteristics (e.g. age, gender, education and family size, etc.). Other information collected included food and cash crop production, livestock herd structure, livestock production practices, husbandry activities, reproductive performance, livestock feeds and feeding practices, sources of feeds, major feeding constraints and milk yield were also recorded. Secondary data such as Demographic, climate and feeding constraints, were collected using reports from Project of non - governmental organization. The collected secondary data provided additional information to understand the dairy cattle performance in the study area.

Data Analysis

Statistical Package for Social Science (SPSS, 2003) was used to analyze the data obtained from baseline survey. Descriptive statistics analysis for percentages, means, ranges, cross tabulation were employed to assess household characteristics, feed and feeding practices, breeding and milk yield.

RESULTS

General Observations

Zero grazing was the main production practices used by smallholder dairy farmers in the study area. Under zero grazing, farmers were confined dairy cattle in their backyard. Feeds and drinking water were regularly offered to them. Most of farmers hired labour to do dairy farming activities as they had other income generating activities i.e, crop farming, civil service and other businesses. Dairy farmers who did not own land for forage cultivation, brought forage bundles from different feed sources such as communal grazing lands, around the road side and river banks. Farmers, who own land, cultivated the grass and sorghum to feed their animals. During the dry season when there was a shortage of forages, farmers used rice straw, grass hay, silage feed and beer cake as supplement to feed dairy cattle. These crop residues were mainly offered to milking cows purposely for increasing milk yield. However, during the dry season, these feeds were not enough for normal production performances, since most of these roughages had low nutritive values due to high lignification.

Demographic Characteristics

Table 1 shows the household characteristics of smallholder dairy farmers in studied areas. The mean age of farmers was 54 years. The respondents comprised of both male and female headed-households. The level of education of dairy farmers varied from one household to another, ranging from primary school, middle school to high school level. Majority of heads of households had middle education, followed by high school level. Information from the formal survey also indicated that 68% of the farmers had training in dairy cattle husbandry. In the current survey, farmers had owned an average of 0.96 ha. The land owned under established fodder by farmers was 0.94 hectare.

Table 1 Demographic characteristics of sample households

Parameter	Unit	Average	Max.	Min.
Household age of farmer	Year	54.00	74.00	45.00
Household head's education	Year	7.00	14.00	1.00
Household head's farming experience	Year	8.00	12.00	4.00
Household's family size	Number	6.00	8.00	4.00
Farmers received training in dairy cattle	Number	1.20	3.00	1.00
Farmers who did not received training in dairy cattle	Percent	31.67	0.00	0.00
Total land owned	Hectare	0.96	3.20	0.40
Land owned under established fodder	Hectare	0.94	1.60	0.20

Sources of Feeds for Dairy Cattle

Table 2 Sources of feeds for dairy cattle as indicated by respondents in studied areas

Type of feeds	Sources		
Roughages	**Own Farm %**	**Outside %**	**Do not Used %**
Local pasture grass	10	90	0
Fodder grass	20	10	70
Rice straw	60	40	0
Silage	25	0	75
Concentrates			
De Heus/CP	0	100	0
Cotton seed cake	20	60	20
Bean cakes	15	85	0
Bean and rice powder	20	80	0
Sorghum	15	0	85
Maize bran	30	70	0
Beer cake	0	85	15
Rice bran	10	90	0
Oilseed cakes (cotton, sesame)	0	100	0
Mineral block	0	80	20
Sugar syrup	0	80	20

Table 2 shows the main sources of feed materials for dairy cattle. The main source of local pastures in the study area was outside lands. Other sources were farmers' own farms. The main sources of ingredients for concentrates and minerals were from shops and milling machines.

Feeding Practices of Dairy Animals Followed by Dairy Farmers in the Studied Areas

Table 3 showed the feeding practices of dairy animals followed by dairy farmers in the studied areas. All the smallholder dairy farmers used zero grazing. Ninety two percent of farmers practiced individual feeding while only 7.97% used group feeding. Among the respondents, 84.77% preferred to used compounded cattle feed and others 15.23% used homemade mixture. In the study area, 65.57% of the respondents fed the animals thrice or more daily followed by 34.43% who fed their animals two times in a day. More than half of the respondents (78.21%) used rice straw, 10.06% green fodder and 11.73% used maize straw as dry fodder. The dairy farmers (89.91%) fed concentrate feed separately while 10.09% respondents mixed with fodder. Seventy three percent of dairy farmers used concentrate to their animals based on milk production while remaining 14.82 and 11.87 percent of the respondents fed it on flat rate and body weight. Dairy farmer (62.54%) fed concentrate to their animals after milking followed by 28.76% during milking and 8.70 % before milking. More than half of respondents 57.35% and 56 % did not feed mineral mixture and salt to their animals respectively.

Breeding System of Dairy Cattle

Breeding system of dairy cattle is shown in Table 4. Most of the farmers in the study area used Natural mating methods than Artificial Insemination method (AI). There were some limitation of AI methods, i.e. storage of frozen semen, transportation, communication and availability of frozen

semen. Over 90% of the respondents had knowledge on signs for oestrus detection i.e. changes in cows' behaviour (shouting, mounting and restlessness) followed by mucus discharges. However, there were no records kept by farmers relating to reproductive performances.

Table 3 Feeding practices of dairy animals followed by dairy farmers in studied areas

No.	Feeding Practices	Percentage
1.	**Feeding system**	
a.	Zero grazing	100
b.	Grazing	0
2.	**Feeding of animal**	
a.	Individual feeding	92.03
b.	Group feeding	7.97
3.	**Frequency of feeding**	
a.	Twice	34.43
b.	Thrice or more	65.57
4.	**Fodder availability**	
a.	Green fodder	10.06
b.	Rice straw	78.21
c.	Maize straw	11.73
5.	**Type of concentrate**	
a.	Homemade mixture	15.23
b.	Compound cattle feed	84.77
6.	**Methods of feeding concentrate**	
a.	Mixed with fodder	10.09
b.	Separately	89.91
7.	**Feeding standard based on**	
a.	Milk production	73.31
b.	Body weight	11.87
c.	Flat rate	14.82
8.	**Time of feeding concentrate**	
a.	During milking	28.76
b.	After milking	62.54
c.	Before milking	8.70
9.	**Feeding mineral mixture**	
a.	Yes	42.65
b.	No	57.35
10.	**Feeding salt**	
a.	Yes	44.00
b.	No	56.00

Table 4 Percentage of respondents indicating breeding of dairy cattle

Breeding Method	Unit	Yes	No
AI	%	45	55
Natural mating	%	65	35
Use of signs of oestrus			
Change in feed intake	%	40	60
Change in cows behaviour	%	90	10
Change in milk production	%	25	75
Mucus discharge	%	80	20

Milk Yield (litres/day/cow) of Lactating Cows as Reported by Respondents

The results for milk production, milk prices and feed cost reported by respondents during baseline survey were summarized in Table 5. Average milk production was highest in Monywa industrial zone (10.79 Liter) followed by Mingaladon (8.45 Liter) and Patheingyi (6.29 Liter). The availability of feed and feeding system was affecting the milk yield. It is consistent with the previous study

reported by Gillah et al., 2012, which said feeding systems and calving season were affect milk yield. Milk prices were varied within and among the regions between US $0.42 and US $ 1.00 with an average of US $ 0.66/ Liter. At and around Yangon region was about 1.0 US$/ L. Price for raw milk around Mandalay was 0.56 US$/ L. Raw milk price at and around Sagaing regions was about 0.42 US $/ L. Sagaing and Mandalay farmers were always complaining on the low milk price given by the collectors in their regions. Value added technology and contract farming were urgently needed in the studied areas. The higher demand of milk in urban population, consumption pattern, seasonality and calving season will affect the price of milk. Feed costs used by farmers were different between US $ 0.23 and 0.57 US $ with an average cost of US $0.38/liter milk. The feed cost and availability of feed resources depends on season in the studied areas. Feeds are generally not available in sufficient quantities owning to overgrazing of lands and uncertain weather conditions. However, concentrate feeds, crop residues and conserved forage are used both in wet and dry seasons. Sintayehu et al.,(2008) said that feed shortage problems in terms availability of quality, quantity and costs of feeds were also noted as major constraints in development of dairy production.

Table 5 Milk yield (litres/day/cow) of lactating cows as reported by respondents

Location	Mean Milk Yield Liter/cow/day	Milk Prices Liter / US $	Feed Price US $/day/cow	Feed Cost US $/liter milk	Gross Margin US $/liter milk
Mingaladon (Yangon)	8.45	1. 00	3.57	0.57	0.43
Patheingyi (Mandalay)	6.29	0.56	2.69	0.35	0.21
Monywa Industrial Zone (Sagaing)	10.79	0.42	2.71	0.23	0.19
Average	**8.51**	**0.66**	**2.99**	**0.38**	**0.28**
Max	11.00	1.00	4.00	0.57	0.43
Min	6.00	0.42	3.00	0.23	0.19

Source: Own Calculation based on farmers from studied areas

DISCUSSION

The present feeding management practice adopted by dairy farmers are feeding on crop residue, additionally grain by-products are provided only to the lactating animal during milking stage. However, the nutritional availability for productive animals is much lower than the requirement. Extension of fodder cultivation can contribute significantly to dairy farmer to feed their animals. Integrated fodder production and feeding management demonstrations from NGOs and INGOs can assist the dairy farmers to improve the feeding practice. The farmers' expenditure on feeding of the productive animal is influenced by the price of milk and the cost of concentrate feed. Cost effective feeding practice for productive animal can be done by reducing the used of concentrates and increasing fodder production. Therefore, demonstration plot such as nutrient rich Azolla production farm, use of byproducts from crop farming, field training, and motivation of farmers to take up fodder farming (i.e. providing seed and planting materials) in their own lands can assist nutrient availability for optimum productivity. Education level of most dairy farmers had primary and middle school education. It is also very important to farmers to handle the farm management practices to attend the training and to use the information regarding dairy cattle farming (Luhosi, 1998). Educated farmers had the ability to keep record on the reproduction and production, the performance of dairy cattle and identify area of weakness for improvement (Gimbi, 2006). In the current study, it was revealed that dairy farmers practiced crop farming apart from dairy farming. Rice cultivation can provide not only food for dairy farmers but also income generation for the family as a supplementary income obtained from dairy farming. Husbandry practices such as feeding, collection of feeds, cleaning, milking and health management were performed by both family and hired labour. The main sources of forages given to dairy cattle were Para grass, Mombasa grass, Mulato, Millet, Rhodes and Seteria. Natural growing leguminous species such as Leucaena spp., Stylosanthes spp., Arachis spp., and Sorghum and Centrosema pubescens were available in the study area. Feeding grasses alone without

combining with other forage species do not meet the nutrient requirements of dairy cattle for maintenance and production. Similar observation was reported by Mlay (2001) that dairy farmers in Morogoro were feeding their animals largely on natural grass and that these feeds were unable to meet nutritional requirements of the animals for both maintenance and production. Feeding one type of forage to dairy cattle attributed to lack of knowledge on proper feeding of dairy cattle for achieving higher performance. It can happen true since most of respondents interviewed had no training in dairy cattle husbandry. Training of these farmers on how to feed their animals properly could bring greater improvement in animal performance. Therefore, regular training of farmers on various methods of improving quality of crop residues could be one of the strategies of supplementing nutrients to cattle during dry season and hence reduce the problem of underfeeding. Mlay, (2001) and Mtamakaya, (2002) reported that molasses and urea supplementation and treating of the straws using wood ash and urea are some of the feeding strategies to improve utilization of crop residues.

CONCLUSION

Farmers should establish enough fodder during the rainy season when there is adequate moisture and conserve them in the form of silage ready for being utilized in the dry season. Farmers know the importance of feeding fodder grasses to cows especially during dry season area but they were neither conserving forages nor natural grasses in form of silage or hay due to lack of enough knowledge and skills in silage and hay making and conservation methods. Therefore it can be concluded that optimal feeding of dairy cattle in zero grazing is not attained probably due to lack of knowledge on proper feeding. Feeding mixture of local pasture grasses and legumes, proper mixing of concentrates, proper utilization of crop residues, use of fodder grasses and feed conservation could be the good strategies to be used by farmers to improve the existing feeding practices for better animal performance. Research and extension activities are recommended to find a way to reduce the problem of shortage of fodder during dry season.

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