

Full length paper

DAIRY FARMING ENHANCES HOUSEHOLD INCOME IN PERI-URBAN AND RURAL AREAS OF CHOEKOR IN BUMTHANG, BHUTAN

GYEM TSHERING

Livestock Sector, Department of Livestock, Ministry of Agriculture and Forests,
Punakha, Bhutan

Author for correspondence: gthsering@punakha.gov.bt

Copyright © 2018 Gyem Tshering. The original work must be properly cited to permit unrestricted use, distribution, and reproduction of this article in any medium.

ABSTRACT: A study was carried out with the objective to determine the contribution of dairy farming to the total household income in Bumthang. Choekor subdistrict was selected for the study. The study considered Lower Choekor as peri-urban areas and Upper Choekor as rural areas. A multistage sampling method was employed to select representative households from peri-urban and rural areas. A total of 100 households were randomly selected from two study areas, using the systematic random sampling method. A semi-structured survey questionnaire was used to collect both quantitative and qualitative data. The mean gross income from dairy farming in peri-urban (Nu. 63,836) was significantly higher than the rural areas (Nu. 31,918). Dairy farming was ranked as the most important source of income in peri-urban areas and second most important income source for the farmers in rural areas. Dairy contributed over 42% to the total households' income in peri-urban areas and over 26% in rural areas. Dairy production can be further enhanced through supply of subsidized commercial feed, improvement in nutritional quality of available crop residues and development of market networks.

Keywords: Dairy farming; income; peri-urban; rural.

INTRODUCTION

Dairy farming is an integral part of Bhutanese farming system. It is a major component of Renewable Natural Resources (RNR) sector, which contributes to rural economy and poverty alleviation. The contribution of dairy sector to the Gross Domestic Product (GDP), exclusive of manure and draft power, was reported to be 8% exclusive of the important livestock functions (Roder 2001). Traditionally, dairy measures the wealth and plays an important role in household security and finance (Luethi 1999). In Bhutan, the total dairy cattle population estimated was 325,628 heads (RGoB 2008), owned by about 77% households in the country. Since the inception of first Five Year Plan,

dairy farming was considered as the most important source of livelihood for the people of Bumthang district. However, the documentation on contribution of dairy farming to the total household income, particularly in Bumthang district, is limited, and those available are not useful (Phanchung et al. 2002). Further, a need for systematic research and documentation on small dairy farming was emphasized (Dorji et al. 2007; Derville and Tenzin 2007). Therefore, the study objective was to determine the contribution of dairy farming to the total household income in peri-urban and rural areas in Choekor subdistrict of Bumthang.

1. MATERIALS AND METHODS

2.1 Study areas

Choekor subdistrict under Bumthang district was selected for the study. Bumthang is one of the priority districts identified for dairy development in the country. The subdistrict is divided into Upper and Lower Choekor, wherein the upper Choekor represents rural areas and lower Choekor represents Peri-urban area, considering accessibility of milk to markets or milk processing unit.

2.2 Sampling method

A total of 50 farmers each was selected from upper and lower Choekor, using a multistage sampling technique. In the first stage, all villages were listed. There were 22 villages in peri-urban and 21 villages in rural areas. Among the enlisted villages, eight villages were randomly selected from each study area. In the second stage, all dairy farmers in selected eight villages for both study areas were enlisted. There were about 180 dairy farmers in peri-urban area and 174 dairy farmers in rural area. From the enlisted dairy farmers, 50 households each were randomly selected from both study sites.

2.3 Data analysis

The dataset was statistically analyzed using SPSS software version 16. T-tests were performed wherever required to test significant differences in parameters between peri-urban and rural areas. The map for the study area was generated using Geographical Information System (GIS) software – ARC MAP 9.3.

2. RESULTS AND DISCUSSION

3.1 Household income sources in the study areas

Different sources of income for peri-urban and rural areas are presented in Table 1. The main income generating activities in the study areas were broadly classified into four main groups viz. dairy, agriculture, *cordyceps*, and off-farm activities. Agricultural farming included field crops such as buckwheat and horticultural crops like potato, vegetables, and other farm-related activities. Off-farm activities included business, contracts, weaving and other jobs performed outside the farm to generate income.

The mean total gross income of household from different sources of income in peri-urban areas (Nu.128,563) was not significantly different ($t_{(98)}=1.315$, $p\leq 0.05$) from rural areas (Nu. 123,198). The mean gross income from dairy farming in the peri-urban area (Nu. 63,836) was significantly higher ($t_{(98)}=3.558$, $p\leq 0.01$) than rural areas (Nu. 31,918) (Table 1). The higher income from dairy farming for the farmers in peri-urban area could be attributed to more milk production per household, which is mainly due to different milking and management practices in the study areas. It is also interesting to note that farmers in peri-urban owned small farms and were mostly involved in dairy farming as the main source of income generation since farmers had limited land for expansion of agricultural activities. It is in agreement with Singh and Maharjan (2009) who reported similar case between small and large farms. On the contrary, the lack of organized market for the sale of milk and milk products in rural areas could have discouraged farmers to take up dairy as a primary activity, therefore, dairy production was more oriented towards meeting the domestic requirements only.

Income from agriculture farming in peri-urban areas (Nu. 52,200) was significantly higher than the rural areas (Nu. 27,488). This difference could be attributed to increasing sale of vegetables and potato in the peri-urban areas as compared with rural areas.

Cordyceps collection was the main income generating activity for the farmers in rural areas (Figure 1). The mean gross income per household from *cordyceps* collection in peri-urban (Nu. 43,000) was significantly lower ($t_{(46)}=.972$, $p\leq 0.05$) than the rural areas (Nu. 72,050). The legalization of high-value *cordyceps* gave more importance to *cordyceps* collection for income generation, which is apparent from the contribution made by *cordyceps* to the total household income. Tashi (2010) reported similar finding from western Bhutan.

There was a significant correlation ($p\leq 0.01$, $r=0.418$) between herd size and income from dairy farming, indicating that large herds earned more income as compared to small herds (Table 2).

3.2 Contribution to household income

Figure 1 presents the contributions of dairy farming and other activities to the total household income in

Table 1: Comparison of income between peri-urban and rural areas.

Income sources	t	df	Peri-urban	Rural	Significance
Dairy farming	3.558	98	Nu. 63836	Nu. 31918	***
Agriculture farming	3.284	71	Nu. 52200	Nu. 27488	**
<i>Cordyceps</i> collection	0.972	44	Nu. 43000	Nu. 72050	**

** $p\leq 0.01$, *** $p\leq 0.001$, ns: non-significant

peri-urban and rural areas. Dairy farming contributed significantly to the household income in both the study areas, although income from dairy farming was second to income generated from the sale of *cordyceps* in rural areas. The contribution of dairy farming to the household income in peri-urban was 42.2% and 26.2% in rural areas. These figures are, however, exclusive of the important livestock functions in terms of draft power and manure. Current finding in the peri-urban area is comparable with the findings of Phanchung et al. (2002) who reported that dairy farming contributed as high as 50% to the total household income in livestock intensive areas of Chukha, Bumthang and Thimphu districts. The contribution from dairy farming in rural area is also comparable with the findings of Joshi (1992) and Tamang (2005) who reported that dairy farming contributed about 21.2% and 22% of total household income in the mixed farming system, respectively.

Gyamtsho (2000) reported income from dairy production up to 5% for Bumthang district. This shows that the income from dairy farming has increased by around nine folds over a period of 11 years, which may be due to improved breeding systems, management practices, and animal health services in the study areas. A significant contribution of dairy farming to household income has also been reported in South-east Asian countries and dairy has potential for poverty alleviation (Muriuki et al. 2001).

3.2 Farmers’ perception of income from dairy farming

Table 3 provides the farmers’ perception on income generated from dairy farming in both the study areas. The majority of rural households (64%) felt that dairy farming did not contribute significantly to the total household income; whereas majority in peri-urban households (74%) felt that dairy farming is an

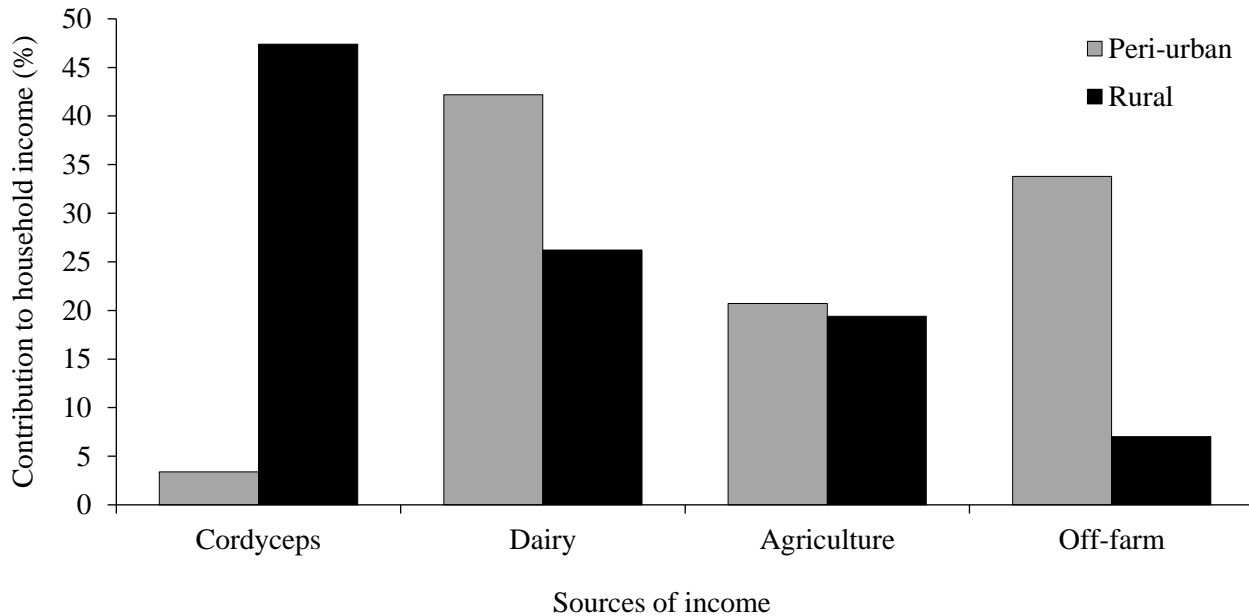


Figure 1: Contribution of dairy farming and other activities to total household income.

Table 2: Correlation between herd size, farm size and income from dairy farming in the study areas.

Variables	Herd size	farm size	Income
Herd size	1	0.154	0.42**
Farm size		1	0.02
Income			1

**p≤0.01

important activity that contributed to the total household income.

The majority of peri-urban households were divided on whether the income from dairy farming has remain unchanged or decreased over the years (Table 4). Similar views were expressed by respondents in rural areas that the income from dairy farming has not changed. However, the majority

Table 3: Farmers’ perception on income from dairy farming.

Area	n	Contribution of dairy to total household income				
		no income	<25%	25-50%	50-75%	>75%
Peri-urban	50	26%	32%	16%	10%	16%
Rural area	50	64%	26%	8%	2%	0%

were of the view that the number of households rearing dairy cattle has increased over the years.

Table 4: Farmers' perceptions on trends of dairy farming and income (%).

Variables	Trend	Respondents	
		Peri-urban (n=50)	Rural areas (n=50)
Income	Increased	6%	16%
	Decreased	46%	18%
	No change	46%	66%
	No idea	2%	0%
Households rearing cattle	Increased	88%	72%
	Decreased	10%	06%
	No change	02%	22%

3.4 Constraints to dairy production

The constraints to dairy farming, as perceived by respondents, are presented in Table 5. Fodder shortage was mentioned as a major constraint by both peri-urban and rural farmers, which could be attributed to limited landholding for growing grasses for dairy cattle. This is in agreement with Phanchung et al. (2001) who reported that shortage of fodder is the most important constraint hindering dairy production. Fodder production receives lower priority compared with field crops. The finding also concurs with that of Roder et al. (1998) who reported that less priority is given to fodder development due to competition from other crops.

The second most important constraint to dairy production, according to peri-urban farmers, was labor shortage in the household. This could be attributed to increasing number of children being enrolled in schools due to high priority given to

Table 5: Constraints to dairy farming.

Study areas	N	Feed shortage	Labor shortage	Financial	Marketing
Peri-urban	48	47.9%	47.9%	4.2%	0.0%
Rural area ^s	41	60.4%	14.6%	0.0%	25.0%
Total	89	59.1%	32.6%	2.1%	12.5%

education. Moreover, after education, most family members get employed in government and private organizations away from home and they cannot extend their help to the needy parents (Tamang 2005). Generally, most youths migrate to urban areas to seek better opportunities, which also contributes to labor shortage. UNDP (2011) reported that rural-urban migration in the country is one of the highest in the South Asian region. Dorji et al. (2007) also reported that younger generations do not perceive

dairy as a profitable business but prefer taking up government jobs, business, contract works and plying taxis. Family division and separation were also reported as a reason causing labor shortage in a farm household (Tamang 2005).

3. CONCLUSION

The contribution of dairy farming to the total household income was significant at household level in both the study areas. The contribution of dairy farming to household income is higher in peri-urban areas, compared with rural areas. Cattle holding, number of milking animals and breed composition per household do not affect the household milk production and income. Different milking practices and poor management are the main factors affecting milk production and income generation between peri-urban areas and rural areas. Therefore, there is a need to create awareness of milking practices and improved dairy husbandry practices among rural population. Shortage of fodder and labour are the main constraints hindering dairy production in the study areas. To make dairy farming attractive to the people in rural areas, the labor-saving devices such as cream separators, portable machines, churners etc. should be encouraged. There is a need to provide commercial feed through subsidy program, improve nutritional quality of available crop residues and develop market network to enhance dairy production and improve livelihood of farmers.

Acknowledgements

We are thankful to the Department of Livestock (DoL) for the generous financial support to conduct this study. We also acknowledge the support provided by the management of CNR and RNR-RDC, Jakar. The cooperation and support of rural communities of Choekor subdistrict are highly acknowledged.

REFERENCES

- Dervile M and Tenzin G (2007). Dairy Chain Analysis. Ministry of Agriculture, Thimphu.
- Devendra C and Thomas D (2002). Crop-animal systems in Asia: Importance of livestock and characterization of agro-ecological zones. *Agricultural Systems*, 6: 5-15.
- Dorji J, Tshering G, Sherpa DL, and Bhujel P (2007). Smallholder Dairy Farming Practices in Peri-

- urban areas of Chamkhar. RNR-RC, Jakar, Bumthang.
- Gyamtscho P (2000). The economy of Yak. *Journal of Bhutan Studies*, 2 (1): 52-56.
- Joshi BR (1992). The role of large ruminants. In: Abington J, Sustainable Livestock Production in the Mountain Agro-ecosystem of Nepal. Food and Agriculture Organization of UN, Rome: 47-75.
- Leuthi N (1999). Bovine and Equine in Bhutan. Bumthang: RNR-RC, Jakar, Special Publication No. 2.
- MoAF (2010). Agriculture Commercialisation and diversification in Bhutan. SD-IFRI, Thimphu.
- Muriuki HG, Mwangi DM, and Thorpe W (2001). How smallholder dairy systems in Kenya contribute to food security and poverty alleviation. Proceedings of the 28th scientific conference of Tanzania Society of Animal Production, Morogoro, Tanzania: 7-9.
- Phanchung, Dorji P, Sonam T, and Pelden K (2002). Smallholder Dairy in Bhutan. Characteristics, constraints and Development Opportunities. In: Tulchand M, Smallholder Dairy in Mixed Farming Systems of the HKH (pp. 22-35). Hill Sede Press (P) Ltd., Kathmandu, Nepal.
- Singh M and Maharjan KL (2009). Dairy Production and Implication in the Household Income in Terai Region of Nepal: A Case study of Chitwan district. *CNAS Journal*, 32 (2): 213-141.
- Tamang NB (2005). Comparative milk yield of Mithun-Siri cross and Siri cattle managed on village farms in Bhutan. Victoria, Australia: University of Melbourne.
- Tashi S (2010). Sustainable Livelihoods of the People in the Alpine Region of Western Bhutan. Proceedings of the seminar on sustainable rural development. College of Natural Resources (CNR), Lobesa, Punakha: 23-30.