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Profitability of Smallholder Dairy Cattle Farming in the Kamuli Plains of Eastern Uganda

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Abstract: The viability of dairy farming by smallholders is an outcome of various market access factors. This study was carried out to evaluate the profitability and management systems of dairying among households (n = 120) selected from two locations, Kamuli Town (urban) and Namasagali (rural) and who responded to a questionnaire during one-to-one interviews. Tethering of cows was the dominant system of management practiced, limiting feed intake and productivity. Most farmers (45%) kept crossbred cows that yield 1-5 L of milk for home use and sale to generate income. Milk prices were mainly determined by competitive pricing with farmers setting prices depending on their competitors' prices. Profitability of dairying, assessed by regression was found to be affected by cattle owner's age and education level, number of cattle kept, cattle management system, milk yield, revenue and total costs incurred per day. A unit change in any of these factors affected the gross margin. Revenue and total costs incurred per day were the most significant factors ($p<0.05$). Diseases, insufficient feeds, drought, labour shortage and absence of formal milk markets were the most constraining elements to dairy farming and efforts must be put to address them.

Key words: Cattle management systems, dairy farming, milk yield, profitability, marketing

INTRODUCTION

Livestock are very important to the agricultural sector in most developing countries where their contribution to rural livelihoods and particularly those of the poor is well recognized (Upton, 2004; Mirando and Reynolds, 2007). Livestock and their products are estimated to market up to about a third of the total value of agricultural gross output in developing countries and this share is rising from time to time (Woldemichael, 2008). Livestock keeping was and will continue to be integral to improving the well-being of people in developing countries, both from a health and nutrition perspective and from a socioeconomic one (Mirando and Reynolds, 2007).

A decade ago, cattle rearing especially dairy farming contributed 40-50% of the livestock GDP in Uganda, about 17-19% of the agricultural GDP (DDA, 2002) about 20% to the food processing industry and in turn, the food industry contributed about 4.3% of the national GDP (Staal and Kaguongo, 2003). Despite some developments in the sector, the overall outlook has hardly changed. Due to the high rate of resistance to diseases, ticks and other insect pests, indigenous breeds of cattle dominate Uganda's cattle farming (Dobson and Combs, 2005). According to the recent census, the indigenous cattle breeds constituted about 93.3% and only 6.7% were exotic breeds (UBOS, 2010), therefore their role in the livelihoods of Ugandans cannot be underrated.

According to the Uganda Bureau of Statistics, the agricultural sector performance in Uganda has declined. Real growth in agricultural output decreased from 7.9% in 2000/2001 to 0.7% in 2007/2008 (UBOS, 2008) and 0.9% in 2010/2011. On the contrary, there has been a steady growth in the dairy sector which has been increasing at an average of 7% annually from the early 1990s (DDA, 2009). Some dairy farmers in Uganda have invested in improved breeds and also adopted better livestock management systems which have led to an increase in milk yield. However, the major basis of increased milk production is a blend of higher yields per cow and an increased number of cows (Hemme and Otte, 2010).

Several studies regarding dairy farming have been done for many agro-ecosystems in different parts of the

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world. However, study outputs regarding enterprise profitability generally and those focusing on the factors that affect the profitability of dairy cattle are still scanty hence, the main driver behind this study. Farmers and policy makers will use this information to improve the conditions of dairy farming, hence making it profitable and cost effective.

MATERIALS AND METHODS

Study area: A cross sectional study was carried out in Kamuli District in the plains of Eastern Uganda. The district had a population density of 236 persons km^{-2}. Males comprise 40.5% of the population and females make up 59.5%. The population growth rate is estimated at 5.1% $year^{-1}$.

The population get their livelihood from fishing in River Nile and Lake Kyoga; farming cattle, goats, sheep and chicken; crop farming (upland rice, paddy rice, sweet potatoes, bananas, maize, millet, vanilla, coffee, cocoa, cotton, groundnuts, citrus fruits, mangoes) fish farming, bee keeping and retail trading in the urban centres. The study was carried out in Kamuli Town Council and Namasagali sub-County. Both sites are well known for keeping livestock under different management systems, such as zero grazing/stall feeding, tethering and open range grazing.

Sample selection and data collection: Dairy production was the criterion considered in drawing the sampling frame for the selection of farmers in the two study locations. The simple random sampling technique was used to choose 60 dairy farmers from each location, giving equal chance to those who had kept milking cows for at least one lactation before the study. Primary data was collected from the dairy cattle farmer households using a standard questionnaire administered during one-on-one interviews and observations. Observations involved physical watching of what was happening at the farm and interviews involved listening and recording of what the respondent said and the expressions he/she made. To minimize errors in data collection, enumerators were well trained and maintained throughout the entire data collection period. Enumerators made close visits in and around the residential houses of the selected households in order to make clear observations on some of the essential aspects of dairy farming. Secondary data was collected from Makerere University main library and the internet.

Data analysis: The qualitative data was reduced to themes reflecting the objectives of the evaluation. On the other hand, quantitative data sets were analysed using the Statistical Package for Social Sciences (SPSS, 2007). Descriptive statistics and a multiple linear regression model were used for this study.

In order to estimate the significance of the factors affecting the profitability of dairy farming in the study areas, a Multiple Linear Regression Model was run using the method of Ordinary Least Squares (OLS). The level of significance of the variables was tested using a t-test at 5% level of significance. Gross margin was the dependent variable, a constant α indicates the profit or loss a farmer would make holding other factors constant. The error term, μ was included in the model to account for other factors that were not included in the model but affect the profit levels. A multiple linear regression model of the factors affecting profitability was specified as:

$$P = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \mu$$

Where:

P = Gross margin
α = Constant (intercept)
X_1 = Age of cattle owner
X_2 = Education level of cattle owner
X_3 = Number of cattle kept
X_4 = Management level of cattle
X_5 = Total milk yield
X_6 = Revenue earned per day
X_7 = Total costs incurred
μ = Random error term

Gross margin is expected to change by a certain factor, β (coefficient) if any of the above variables changed by one unit.

RESULTS

Socio-economic and demographic characteristics of dairy farmers: From the total of 120 interviewed dairy farmers, 78.3% were males and the rest females. Majority (53.7%) of the respondents were aged between 31-50 years and had a mean age of 44.7±1.8 years while the rest were distributed in the different age categories as shown in Table 1. Majority (75%) of the respondents had attained formal education and were aware of how to account for profits from milk sales, however the uneducated (25%) were also able to account for milk sales by relying on common knowledge. Households were mainly (78.3%) male headed and 76.7% of the household heads were married. Majority (83.2%) of the families had a family size of between one and ten members with an overall mean of 8±1 persons. Therefore, most households had

Table 1: Socio-economic and demographic characteristics of the dairy farmers

		Percentage of farmers (n = 60)	
Variables	Category	Namasagali	Town council
Age of farmer (years)	≤30	3.4	10.1
	31-50	23.6	30.1
	>50	16.8	31.6
Gender of dairy farmer	Male	30.0	48.3
	Female	13.3	8.3
Education level	Tertiary	1.7	8.4
	Secondary	16.7	30.0
	Primary	10.0	8.3
	None	15.0	10.0
Household size	1-10	35.0	48.2
	>10	8.3	16.8
Marital status	Married	28.3	48.3
	Not married	15.0	8.4
Major farming activities	Livestock	15.0	26.7
	Crops	16.7	21.7
	Both	11.7	8.3
Major source of income	Off-farm business	6.7	18.3
	Livestock	18.3	20.0
	Crops	16.7	11.7
	Salary	1.7	6.7

enough family labour to perform all the animal management activities. Other demographic features of the respondents in the study area are presented in Table 1. Almost half (41.7%) of the dairy farmers had livestock keeping as their major farming activity and almost as many of them (38.3%) generate all their income from livestock. Interestingly, many other dairy farmers mainly earn their major incomes from a diversity of activities, such as off-farm business, crop production and a few are salaried workers.

Cattle management activities: One third of the dairy farmers practice daily full time tethering of their cattle as they graze. The rest practice zero grazing/stall feeding (16.7%) occasional tethering (16.7%) keeping the cattle in small paddocks (13.3%) and free/open/extensive range grazing (20%). Most of the farmers (45%) kept cattle, goats and chickens in their households but interestingly, 40% kept cattle alone as their farming activity. Majority (66.7%) of the dairy farmers acquired the animals by buying them or the progenitor using their personal income. However, 16.7% inherited cattle from their parents while 15% acquired theirs from the central governments' National Agricultural Advisory Services (NAADS) on payment of a small cash fee and 1.7% acquired cows from other NAADS farmer groups which still provide the farmers with animals after they paid some money.

Of all the animals kept, 83.3% were owned by household heads and the rest were owned by the spouses. In most households (45%), the cattle kept were crossbred and farmers perceived the animals to be relatively resistant to diseases and weather conditions as

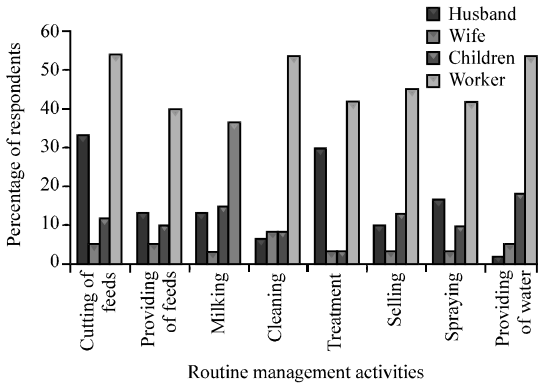

Fig. 1: Routine management activities of the dairy animals

compared to the exotic breeds. The rest of the dairy farms either kept indigenous breeds only (35%) exotic breeds only (12%) or a combination of exotic and crossbreds (8%). Among all the breeds kept by the dairy farmers, 55% of the farmers indicated that exotic breeds are the most excellent as they produce a lot of milk as compared to other breeds. Nevertheless, majority (51.7%) of the farmers were contented with the type of breed they kept though the rest were not. Additionally given a chance, most of the farmers (52.5%) would opt for crossbreds while 37.3% opted for exotic breeds and only 10.2% wanted to stick to indigenous breeds.

Most of the routine management work of the dairy animals was done by hired workers (Fig. 1). For instance, cutting/chopping of fodder (53%), providing the feeds (40%), milking (36%), cleaning cattle sheds (53.3%), treatment of sick cattle (41.7%), selling of milk (45%) spraying the animals against ecto-parasites (41.7%) and providing drinking water (53.3%). Clearly, the rest of the household members, i.e., the husband, wife and children contributed much less labour for cattle management. Interestingly, though generally believed by gender analysts to provide much labour compared to other players, the women were least involved in the routine management activities of the cattle. The implication of the findings on labour source is that the farmers have to save the profits generated from the enterprise in order to clear off the worker's salaries and wages.

Productivity of the dairy cattle: Majority of the farmers opted for crossbred dairy cows because such cattle were more adapted to the adverse conditions and variable management conditions of the study area than exotic breeds. Results show that all the farmers (100%) knew that exotic breeds give the highest milk yields. However, only 37.3% were found keeping exotic breeds due to their

Table 2: Productivity of dairy cattle in the study area

		Percentage of farmers (n = 60)	
Variables	Category	Namasagali	Town council
Frequency of milking	Once a day	8.7	35.0
	Twice a day	5.0	51.7
Morning milk yield per cow (L)	1-5	24.8	23.4
	6-10	16.6	30.1
	>10	1.7	3.4
Evening milk yield per cow (L)	1-5	34.0	47.6
	6-10	8.0	6.8
	>10	1.5	2.1
Milk consumed at home (L/day)	None	5.0	6.7
	1-4	36.6	41.7
	≥5	1.7	8.3

Table 3: Marketing of milk

		Percentage of farmers (n = 60)	
Variables	Category	Namasagali	Town council
Buyer(s) of milk	Neighbours	23.3	41.7
	Hotels	1.7	3.3
	Middlemen	15.0	10.0
	Schools	1.7	1.7
	Distant households	1.7	0.0
Proportion of milk sold	100%	36.0	50.7
	50%	6.7	6.7
Ways of attracting customers	Offer discounts	1.7	5.0
	Offer credits	5.0	16.7
	Deliver milk to buyers	5.0	3.3
	Maintain high quality	31.7	31.7
Presence of competitors	Yes	43.3	56.7
Sale point of milk	Farm gate	16.7	31.7
	Market	3.3	3.3
	Middlemen	10.0	10.0
	Hawking	13.3	11.7
Distance to market (km)	None	10.0	33.0
	1-5	31.8	20.1
	≥6	1.7	3.4
Means of transport to market	On foot	16.7	6.7
	Bicycle	15.0	15.0
	Motorcycle	1.7	0.0
	Car	0.0	1.7

vulnerability to adverse conditions. Most of the cows kept produced 1-5 L of milk/cow/day in Namasagali and Kamuli T/C and also that cows yielded more milk in the morning as compared to evenings (Table 2). Several households (11.7%) did not consume any of the milk they produced. On this, farmers mentioned that they wanted to maximize profits so as to cater for other domestic necessities. Accordingly, farmers made profits from the sale of milk ranging between Us h 16,200 and 1,440,000 month^{-1} (where US$ 1 = 2600 US h).

Marketing of milk: All the dairy farmers who participated in the study were involved in the selling of milk. Workers (45%) and children (13.3%) were the household members mainly involved in the selling of milk although, 48.3% of the farms sold their milk at the farm gate. Most of the milk sold was surplus milk to home consumption, though some households indicated that they sell all the milk they

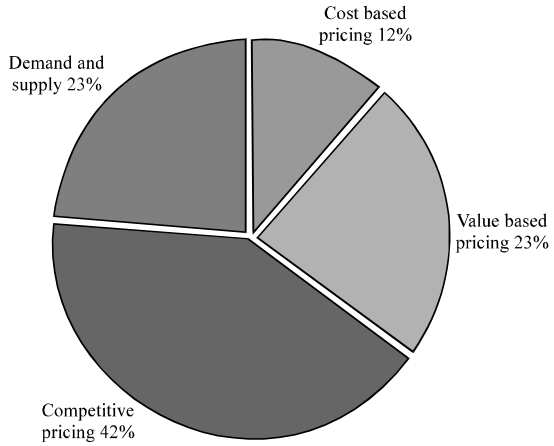

Fig. 2: How farmers determined their prices at which to sell milk?

produced. Sale of milk was done immediately after milking by all the selling households. Farmers sold the milk to such customers as households in the neighbourhood (65%) and others including hotels, schools, middlemen and individual consumers in trading centres. There were no formal markets, such as milk collection centres where farmers could sell the milk. Besides the many customers that some of the farmers had 86.7% sold all their milk to a single customer since production was low. All farmers reported to have competitors in the dairy business but the concentration of the dairy farmers per area was generally low, at about five dairy farmers for every 10 km^2. Farmers had to put extra effort to attract customers to buy the milk (Table 3).

The farmers who never sold their milk at farm gate travelled an average distance 2.6±1.2 km to their customers. Bicycles were the main means of transport used to deliver milk to the consumers (Table 3). Milk prices were different from place to place depending on the form of pricing used. They ranged from 400-1000 US h L^{-1} of fresh milk. In the farmers' opinion, the demand for milk increases each other day but the supply is sometimes inconsistent due to seasonal effects.

Majority (42%) of the farmers did not have a say on what price to sell milk and all they had to do was to find out which price fellow farmers were selling at and also sells at that same price. However, 58% of the farmers were distributed in the different price determination categories as shown in Fig. 2.

Challenges faced by the dairy farmers: The challenges faced by the dairy farmers of the Kamuli plains are presented in Table 4.

Table 4: The major constraints faced by dairy farmers

	Percentage of farmers (n = 60)	
Challenges	Namasagali	Town council
Inadequate feeds	18.3	16.7
Diseases	10.0	25.0
Drought	11.7	6.7
Labour shortage	1.7	5.0
Breaking of the fence	0.0	1.7
Lack of support from agricultural organizations	1.7	1.7

Table 5: Results of the multiple regression model

Variables	β	SE	t-statistic	p-value
Constant	8710.0	61034	0.143	0.887
Age of cattle owner	173.00	867	0.200	0.842
Education level of cattle owner	3923.0	8439	0.465	0.644
Number of animals kept	660.00	1229	0.537	0.594
Management system	3778.0	6115	0.618	0.539
Total milk yield per day	2669.0	3873	0.689	0.494
Revenue earned per day	6.6700	2.319	2.870	0.006**
Total costs incurred	-0.2700	0.134	2.020	0.048*

Dependent variable: Gross margin; *,**Significant at 5 and 1% respectively; $R^2 = 0.53$

Regression analysis of the factors affecting dairy farming profitability: The results of the regression model are summarized in Table 5. The dependent variable was gross margin (Uganda shillings) which was regressed against seven independent variables namely; age of cattle owner, education level, number of animals kept, management systems of animals, total milk produced per day, revenue earned per day and total costs incurred. From Table 5, the profit function is as shown below:

$$P = 8710 + 173X_1 + 3923X_2 + 660X_3 + 3777X_4 + 2668X_5 + 6.667X_6 + 0.270X_7 + \mu$$

The model explains 53% of the extent to which the selected factors affect profitability of dairy farming. A dairy farmer is able to get a gross margin of 8710 Ugandan shillings per animal when all the other independent variables are equal to zero. Revenue earned per day was found to be significant at 1% and was positively related to gross margin. A unit increase in the revenue earned per day lead to 6.7 Ugandan shillings increase in gross margin. It is important to note that the higher revenue, the higher the profits that will be made thus increase in gross margin. Conversely, total costs incurred were found to be significant at 5% and were negatively related to gross margin. A unit increase in total costs incurred leads to a 0.27 shillings decrease in gross margin. Therefore, profit is affected by a number of factors, such as age, education level, costs incurred, management levels, total milk got, revenue earned per day and number of animals. A unit increase in any of the independent variables has an effect on gross margin indicated by beta (β).

DISCUSSION

This study examined the factors affecting the profitability of dairy farming in both Kamuli Town Council and Namasagali sub-County. Several important factors that influence the profitability of dairy farming were determined. Majority of the dairy farmers were middle aged (31-50 years) and were mainly male, implying that females were less involved in the keeping and managing dairy cattle. These results were in agreement with an earlier study (Natukunda *et al*., 2011) which reported that in the same study area, women were less involved in agricultural enterprises. Most of the farmers were married and culturally, men have greater control over income generating activities.

Most of the farmers attained formal education, hence farmers face a limited challenge in accounting (conducting cost and revenue analysis) of their dairy cattle enterprises. However, those farmers who had not attained any formal education were also able to account for their costs, revenues and profits basing on their common knowledge. Education was therefore not a limiting factor for engagement in dairy farming/production. Dairy farming was considered a major farming activity by majority of the famers and as a result, farmers generated their income mainly from the sales of milk. This helped them solve their immediate financial needs. To supplement income from dairy farming, other minor income generating activities were carried out (Table 1).

Researchers found that farmers kept a few cattle, ranging between 1-10 heads. There is still low uptake of dairy production, hence room for improving profitability of dairying by increasing herd size and using reduced cost feeding systems. Generally due to having few cattle, farmers faced less challenges in managing their dairy animals. Most households had an average family size ranging from 1-10 individuals hence availability of labour to look after the animals was assured. While studying the status of dairy cattle keeping households in central Uganda, Nakiganda *et al.* (2006) found that family numbers ranged between 8 and 17 per household for both urban and rural areas. This necessitated that most of them carry out the simpler tasks of dairy cattle management. However, some families had >10 family individuals and this still meant availability of labour.

The study revealed that farmers managed their animals mostly by tethering system. This was made possible because the number of cattle that the farmers kept were few and hence, easy to manage under this system and also because grazing land is still available in the valleys. The intensive cropping system present in the area ensures that more land is put to crop agriculture.

This does not promote open range grazing which would give cattle more choice of feed resources and also supplies more biomass for intake. No wonder, other studies have reported that cattle managed under pastoral system had higher weights and were morphologically bigger than their counterparts raised under crop-livestock systems (Kugonza *et al*., 2011). Farmers obtained their cattle mostly by buying using their savings and money from the sales of their agricultural products. However, a few of the farmers acquired their cattle from the National Agricultural Advisory Services (NAADS) under a small loan scheme with the loan payable within a stipulated time period. Despite this development, generally farmers in the study areas have not been fully motivated and supported by farmer organizations to engage in commercial agriculture. However, the farmers are aware of how to increase the amounts of milk production and productivity. This is deduced from the finding that majority of the farmers kept crossbred cattle and that some farmers wished to obtain pure exotic breeds which produce more milk as compared to other breeds.

Farmers obtained milk in fair quantities which could meet their domestic consumption needs and small surpluses for sale to enable them get some income to procure other household necessities. Generally, the cattle are not as productive as would be desirable, especially the indigenous cattle that take about 2 years to calve following a previous milking season and these calves also take about 5-6 years to reach the reproductive stage. Earlier, a related study reported that indigenous cattle are less productive with a calving interval of 24 months, give about 3.5 L of milk day^{-1} at their lactation peak have a lactation length of 150-200 days and take 6 years to reach maturity (King, 2002). For Ankole cattle, the age at sexual maturity was 23.6±0.5 months for bulls and 22.7±0.5 months for cows (Kugonza *et al*., 2011). They also found that age at first calving was 33.2±0.5 months, calving interval was 12.9±0.8 months, lactation length in crop livestock production systems was 6.3±0.3 months and mean daily milk off take was 2.2±0.1 kg/cow. It is, hence observable that the Zebu cattle as those kept in the study area are inferior to Ankole cattle in all traits except milk yield (Payne and Hodges, 1997).

Farmers obtained between 1 and 10 L of milk per day in this study in variance to two recent studies in Kenya (Njarui *et al*., 2009, 2010) which reported for similar production systems that 15% of dairy cattle farmers produced 11-20 L of milk day^{-1}. With this level of production, there would be surplus milk available for sale or for processing into other derivatives. Besides, milk for sale being surplus, farmers had to sell milk because they needed to fulfil other livelihood objectives, such as paying school fees, meeting daily home maintenance requirements, buying cow requirements. These farmers' objectives were similar to those reported by Nakiganda *et al*. (2006) that farmers needed to keep dairy cattle to fulfil their objectives which include: Paying school fees, daily home maintenance, buying cow requirements, increasing soil fertility and home consumption.

There were no formal markets for the farmers to sell their milk. Informal milk markets handle 85% of all Uganda's milk (Dobson and Combs, 2005). Researchers found that most of the farmers sold milk at the farm gate, partly due to lack of transport means to more lucrative markets in the trading centres. In some way, this saved the farmers from incurring marketing costs. Farmers have had to pay Us h 3000 as a market fee and US h 500 for the movement permit of milk in Uganda (King, 2002). These are costs which farmers have to keep in consideration when they attempt to penetrate better markets. In a way, dairy farming was relatively cheap in the study area, as close to half of the dairy farmers (48.3%) never incurred any costs in moving the milk to the market. However, some farmers delivered the milk to the buyer's home. Generally, farmers had several customers and hence were not facing problems of lack of market, milk spoilage as others related challenges. Despite the many customers that the farmers had most sold all their milk to a single customer due to the little quantities of milk produced. Farmers ensured that they sold their milk by maintaining and attracting new customers by ensuring a higher milk quality than competitors. They also used delivery of milk to the buyers as a strategy to boost sales. Farmers who hawked the milk were moving distances of up to 5 km, mainly by use of bicycles.

Milk prices differed from place to place depending on the price setting method used. Price ranged from UShs 400-1000. Farmers reported that the demand for milk increases every day but the supply is neither stable nor increasing. This is because some cows fail to go on heat in order to conceive while others lose their calves. Farmers majorly determined the price at which to sell milk basing on prices set by competing sellers.

The single most pressing constraint faced by dairy farmers in the study areas was insufficiency of feeds for the cows. Feed costs for the dairy cattle are very high in relation to the total costs associated with the production of milk (Nakiganda *et al*., 2006). Some researchers have put the costs of feeding dairy cows at over 50% the total costs of production. Other major constraints in dairy management in order of importance were diseases, drought and labour shortage. These results are contrary to what was found from West Africa (Fonteh *et al*., 2005).

For the Lake Victoria region, the major limiting factor to dairy cattle production was then reported to be land. Escape of cattle into other people's crop gardens was an exceptional challenge to all farmers. This results into farmers having to pay fines to the owners of the crop gardens. Escape of animals is exacerbated by the cows being confined in weak enclosures or being tethered on bare pastures or roadside grazing when lush crop fields are nearby.

Furthermore, farmers mentioned that besides the fines they pay for the erring cows, their animals are at times hurt by the garden owners and this sometimes results into severe injury leading to death. For some farmers who kept exotic breeds, lack of artificial insemination services was a limitation. Here <2% of communities in Uganda have AI services locally availability and in some parts of the country, there is reportedly no artificial insemination service at all (Staal and Kaguongo, 2003).

CONCLUSION

Dairy farming in the Kamuli plains is still on a relatively small scale with individual farmers owning less than ten animals each and thus, there was room for improving profitability by increasing herd size and using low-cost feeding systems. Most of the animals were tethered for feeding but some farmers also supplemented the dairy cattle with potato vines and cassava peelings. Marketing of milk was largely informal in both study areas. There were hardly any organized/group markets that dealt in milk. The milk was marketed mostly at farm gate. Inadequate feeds, diseases, drought, labour shortage, breakage of fences and lack of facilitation to dairy farmers were the most constraining elements to dairy farming in both study areas. The study identified a number of important factors that influence the profitability of dairy farming and these were: Age, education level, costs incurred, management levels, total milk got, revenue earned per day and number of animals kept.

RECOMMENDATIONS

There is need for the farmers to improve the feeds for their lactating cows. The farmers should be provided with appropriate training on how to formulate balanced diets for lactating animals. They should be introduced to various supplementary feed rations that they can make locally. Extension services should be strengthened at the smallholder rural farmers, so as to avail the farmers with the necessary skills and information on improved dairy production. Farmers should be trained about the different management systems of pure exotic breeds which are heavy milk yielders so as to boost improved production and hence, increased profits from dairy production. Farmers should be trained about Savings And Credit Cooperatives (SACCOs) to enable them keep their savings and at times acquire simple loans with relatively low interest rates to enable them improve the dairy sector. Farmers should adopt collective marketing systems as a community so as to generate good prices for their milk and also be able to minimize price fluctuations.

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