ENTREPRENEURIAL CHALLENGES AND OPPORTUNITIES OF SMALL SCALE DAIRY FARMS PRODUCTIVITY IN SELECTIVE AREAS OF AYSAETA CITY

Ali Hussien Edris, Vice President for Academic Affairs and Lecturer in Department of Management, Samara University, Samara, Ethiopia

Zewdie Kifle Doelamo, Lecturer in the Department of Management, Samara University, Samara, Ethiopia

Abstract: *This study was across-sectional with the specific objectives of determining current entrepreneurial challenges and opportunities of small scale dairy farms productivity and gross margin analysis as well as constraints of crossbred cows. Emphasis in development policy has usually been placed on increasing production to serve as a base for small dairy farms development. So in the absence of well-functioning markets, agricultural production may experience several draw backs. This study attempted to analyze the dairy productivity in Aysaeta, of Afar Regional State, Ethiopia. A total of thirty seven small scale dairy farms were selected for the study. Data were collected through structured questionnaires and scheduled interview. In this study small scale dairy farms and gross margin of milk yield was evaluated using different statistical approaches like mean, standard deviation, frequency, percentage, and market margin. In addition to this, the econometric model called multi-linear regression was employed in order to identify factors affecting milk yield. The results obtained from this analysis indicated that disease of the dairy farms cows, price of milk in 2017 G.C and the volume of milk produced were found to be the most vital positively significant variables influencing marketable supply of milk in the districts. The main constraint or problems of small scale dairy farms was high costs of feeding, landless, Storage of feed, disease occurrence as well as lack of adequate knowledge and skill about feeding. Based on the study marks (results), it is recommended that interventions are demanded to elevate productivity of milk yield.*

Key words: Entrepreneurship, Dairy farming, Productivity, Small-scale

INTRODUCTION

1.1. Background of the study

Entrepreneurship is increasingly recognized as an important driver of economic growth, productivity, innovation and employment, and it is widely accepted as a key aspect of

economic dynamism. Transforming ideas into economic opportunities is the decisive issue of entrepreneurship. History shows that economic progress has been significantly advanced by pragmatic people who are entrepreneurial and innovative, able to exploit opportunities and willing to take risks (Branstetter, *etal*, 2015). Small scale livestock systems are dominant in developing countries and several authors define them differently. As livestock system that is intermediate between commercial and subsistent farming systems with instinct to produce for increased income at household level (Loyd, 2015). Now days, urban and peri-urban agriculture has been gaining popularity in Ethiopia. Low income families are undertaking most of horticultural production where as high income families have biased towards raising dairy cattle. Most dairy cattle in urban and peri-urban areas are of the improved breeds (Urassa *et al.*, (2008). The availability of milk markets, high economic status of elite, and availability of space near housing units, labour, concentrate feeds, extension services, and lastly the laxity of urban authorities to enforce by laws governing the keeping of animals in urban areas has facilitated the development of the dairy industry (Lwelamira, 2010).

The developing countries have experienced growth of small scale livestock system because of increasing the demand of livestock products (meat, milk and eggs). In many parts of the world population pressure over land is also leading to reduced allocation of land to animal agriculture,   increased   encroachment   of   crop growing into   rangelands   and urbanization, resulting into expansion of small land based livestock farming systems (FAO, 2014). The systems have lower capital requirements, little or no mechanization is used. Small holder farmers are main players in the system but also wealthier farmers and urban dwellers invest their surplus capital in livestock because of the lack of saving and other investment opportunities. However, this tends to direct production strategies towards risk avoidance rather than improving productivity; also small holder farmers are graduating from subsistent farming into small scale livestock farming through either personal or external initiatives (Brian, 2015). Rapidly growing demand for livestock products worldwide is brought about by human population pressure, growing income and urbanization. Land use and human population pressures are leading to intensification and expansion in many livestock production systems including dairy cattle (FAO, 1995). The major function of animal production including dairy animals is to provide protein, energy, minerals and vitamins to supplement the cereal grains and pulses in the diet (Schmidt *et al.*, 1988).

1.2. Statement of Problem

The small-scale livestock farming system contributes a great deal to the household welfare interms of food security, shelter, income generation and other social services. In other parts of developing world it is found that the system is mainly carried out as an income supplementing activity rather than as a main source of income. Upon realizing its importance among majority of livestock farmers and animal agriculture at national and international levels, there is need to protect, promote and develop the systems (Mondal *et al.,* 2008). The small scale farmers who keep dairy cattle mostly practice mixed farming and on average, the size of the herd is between 2 and 8 animals per unit. The animals are on cut and carry feeding regimes and sometimes are supplemented with commercial rations, crop residues and minerals (Robbins et *al*., 2000). Depending on availability of land a small area of high potential land can be put to pasture or fodder crop production to sustain a small number of high producing cows. Commonly milking is done by hand by the owner in the shed. The milk is directly sold to yield cash income or the milk is collected or delivered to market point at fixed price. The dairy animals can be individually or collectively owned, the later depends on success of schemes (Loyd, 2015).

Ethiopia is known for its huge cattle population. However, the country's per capita milk consumption is estimated to be about 19.2 kg per year, which is far below the average per capita consumption of Africa, 37.2 kg per year (FAO, 2000). This low per capita milk consumption is mainly emanated from poor genetic potential of local cattle for dairy traits. Accordingly, enormous efforts have been made to improve the genetic potential of local cattle through cross breeding with exotic breeds, mainly Holstein Friesian. The dairy breeds comprise exotic and crosses with local breeds. The local breeds are used for the introduction of local adaptability traits (disease tolerance, low quality feed utilization), while the exotics are basically utilized for milk yield potential traits. Potential for improving food security, welfare and recent analysis provides clear evidence of increasing demand for dairy products (and other foods of animal origin) in Sub Saharan Africa and other developing regions (FAO, 2014).

The study was undertaken with the following objectives:

1. To assess gross margins of small scale dairy farms.

2. To analyze milk yield of small scale dairy farms in Aysaeta;

3. To identify major challenges and opportunities of small scale dairy farms.

2.   MATERIALS AND RESEARCH METHODOLOGY

2.1.   Data Type and Sources

This study adopted both qualitative and quantitative research approach. Both quantitative and qualitative methods were used to triangulate results and to develop richer pictures in anticipation of the phenomenon under investigation (Greener, 2008). Regarding to the source of data, primary data were used to manipulate the relevant information. Data were collected through questionnaires and scheduled interview from the small scale dairy farms. Structured and semi-structured questionnaires were used to acquire information on entrepreneurial small scale dairy farming productivities of the respondents. The questionnaires comprised of closed and open-ended questions, which were answered by respondents. Pre-testing of the questionnaire was done in the study area and necessary changes were incorporated before embarking on the actual study. Before beginning the questionnaires and interview, each respondent was given a brief description about the nature and purpose of the study.

2.2.   Research Strategy and Design

The research strategy that was employed in this particular research is both qualitative and quantitative approach. The study employed cross sectional design in which data was collected at a single point of time.

2.3.   Sampling Method

The study population constituted thirty-seven small-scale dairy farms which is census. The productivity of entrepreneurs was measuring the volume of milk yield in litters from cows were collected.

2.4.   Data management and analysis

The collected Data were processed through manual editing, coding, data entry, cleaning and consistency checking. The researcher made all these activities, to achieve the objective of study. Besides, the researcher applied both descriptive and econometric data analysis.

2.4.1. Descriptive Method

Descriptive analysis of data refers to the use of ratios, figures, percentage, mean, variances, standard deviations and charts in the process of examining and describing margin function (Accountability Modules, 1995). Muhammad *et al*., (2008) evaluate the gross margin using the formulas listed below

  ✦   GM = TR-TC ---(1)

            GM= Gross Margin

TR= Total Revenue

TC=Total Cost

➕ GM% = (GM÷TR)*100 ---(2)

GM% = Gross Margin in percentage

2.4.2. Econometric Model Specification

Multiple linear regression models are specified as Y=f (feeding, access to credit, and disease, and land, education of the entrepreneur, price, and herd size).The econometric model specification of milk yield was estimating by:

$$y = \beta_1 X_1 + \beta_2 X_2 + \ldots\ldots + \beta_k X_k + \varepsilon$$ --- (3)

Where Y_i = milk yield to the market

β = a vector of estimated coefficient of the explanatory variables

X= a vector of explanatory variables

ε_i = disturbance term

Before fitting significant variables into the model for analysis, it is crucial to test multicolliniarity problem among continuous variables and check associations among discrete variables, which seriously affects the parameter estimates. As Gujarati (2008) pointed out multicolliniarity refers to a condition where it becomes complex to recognize the separate effect of independent variables on the dependent variable because there exists strong relationship among them. There are two measures, which recommended testing the existence of multicolliniarity. These are Variance Inflation Factor (VIF) for a continuous variables and Contingency Coefficients (CC) for dummy variables association.

Dependent variable

Milk yield: It is a continuous variable that represents the dependent variable; the actual yield of milk by individual entrepreneur to the market, which is measured in liters.

Independent (Explanatory) variables:

Feeding of animal: It is dummy variable that taking value of one if the feed is concentration and zero otherwise.

Disease of animal: this is dummy variable taking value of one if the cow is presence of disease and zero otherwise.

Price of milk: This is a continuous variable and is calculated in birr per litre. This variable is expected to influence market positively.

Access to market information: It is measured as a dummy variable taking value of one if the producer had access to market information and zero otherwise.

Educational status of the entrepreneur: This is a dummy variable with a value of one if an entrepreneur is literate and zero if not. Education plays a vital role in the adoption of innovations/new technologies. Literate milk producers are expected to be early adopters.

Access to credit: Access to credit is measured as a dummy variable taking a value of one if the entrepreneur has access to credit and zero otherwise.

Labour type: it is a dummy variable with a value of one if a labour is skilled and zero if not.

Land owned: This is a dummy variable with the value of one if the entrepreneur has own land and zero otherwise.

Herd size: This is a continuous variable that refers to the numbers of cows in the dairy farms. It proposed to influence yield of milk positively.

3.   RESULTS AND DISCUSSIONS

Thirty seven questionnaires were printed and distributed to the entrepreneurs, and all were filled and returned correctly. It also presets the results of descriptive and econometric analysis of the study. The descriptive analysis has been different marginal analyses formulas were applied to evaluate the marketing margin.

3.1.   Gross Margin Analysis

Gross margin refers to the total income derived from an entrepreneur income less the variable costs incurred in the entrepreneur productivity. It enables producers to evaluate their existing productivity performance, and for those who are contemplating investing in a new farm, it provides a guide to estimating the viability of the contemplated investment. Results of the gross margin analysis for the entire small scale dairy farm interviewed in selected areas of Aysaeta.   The gross revenue included the value of milk sold and that consumed by the individual. On average, the value of milk in the small scale dairy farm was 12 ETB. Consequently, the gross margin in the diary farm was lower, with a monthly return over variable costs of 3996 ETB.

The percentage of gross margin (gross margin divided by the total revenues) was low on average, but the entrepreneurs work hardly. This means that a higher proportion of revenues in dairy farm were available for covering fixed costs of land, labour, capital, and for a farmer's profit.

Table 3.1 Result of gross margin

Revenue	*Milk yield*
Milk sales (ETB)	5100*12=61200
Value of milk consumed at home	983*12=11796
Total revenue	72996
Variable Expenses (ETB)	
Transporting milk	5000
Fodder	10000
Veterinary & insemination expenses	3000
Labor	25000
Maintenance and repair	5000
Consumables	7000
Electricity and water	2000
Concentrates	12000
Total variable expenses	69000
Gross margin	3996
Gross margin in percentage/ %	*5.47*

Source: survey result, 2017

3.2. Econometric Results

Econometric analysis was employed to identify factors that affect small scale dairy farms in the selected areas.

Table 3.2 Result of linear regression

Independent variables	Coef.	Std. Err.	t	P>|t|
Disease of cows	-4457.598	694.1495	-6.42	0.000 ***
Feeding of cows	-1773.117	771.7201	-2.30	0.029 **
Price of milk	797.4781	362.2633	2.20	0.036**
Access to credit	-865.6182	688.3222	-1.26	0.218
Land owned	2254.885	720.4297	3.13	0.004***
Herd size	63.00641	62.66101	1.01	0.323
Cons	-1748.473	4355.299	-0.40	0.691

R-square= 0.7741   significant at* $p<0.05$; ** $p<0.01$; *** $p<0.001$

Source: survey result, 2017

The overall goodness of fit the regression model is measured by the coefficient of determination (R-square = 0.7741). It tells what proportion of the variation in the dependent variable, or regress and, is explained by the explanatory variable. R-squared lies between 0 and 1, the closer it is to 1, and the better is the fit (Maddala, 1983).

Accordingly, 77% variation in the volume of milk yield is well explained by the explanatory / independent variables and the model is good for prediction purpose. Some variables like;

Disease of diary cows: There is enough evidence to suggest that disease affecting the

productivity of small scale dairy farms. It is statistically significant at 1% level of significance. Diseases reduces production and productivity of entrepreneurs output. The regression result shows that cow disease has a negative effect on production and productivity of milk yield. Small scale dairy farm owners faced with herds diseases have a lower welfare as compared to owners who are not faced with such disease or shock. Therefore, the disease affects the productivity of the entrepreneurs productivity negatively by (-4457.598) and diseases pose a major threat to dairy cattle production in the study area.

Feeding of the dairy cattle: feeding was affecting the productivity of small scale dairy owners negatively and significant at 5%.The present study indicated that majority of dairy owners reported non availability of fodder round the areas followed by high cost on feeding and low storage of feed and inadequate knowledge about feeding as the major feed and feeding related constraints in dairy farming were there.

Price of milk: The coefficient of price of milk in 2017 which indicate a hopeful relation to the amount of milk yield sold or supplied to market. Entrepreneurs checked the price of milk for their best advantage and significance at 5%. The positive and major relationship between the variables indicates that as the price of milk at market rises, the amount of milk sold at the market also rises, which in return increases magnitude or volume of milk sold per owner per year. The model also confirms that a unit price increase in the milk market directs to the dairy farm owner to raise yearly milk sales by 12 Ethiopian currency litres per cows. This result similar with study of Niraj K. etal (2014), on determinants marketable supply of milk found a significant positive relationship between milk sold and current price.

Access to credit: Access to credit Small holdings need credit for both consumption and investment purposes. In theory it is believed that the access to credit enables the entrepreneurs to minimize their financial constraints and helps to purchase herd, feed, improved artificial insemination and other inputs. The other possible explanation is that credit gives the entrepreneurs an opportunity to be involved in income generating activities so that derived revenue increases financial capacity and purchasing power of the entrepreneurs.

Land owned: Land holdings of the entrepreneurs are closely linked to the good welfare status. It was indicated that positive advantage to the entrepreneurs and significant at 1%. Land holding size, which is measured by land size per adult equivalent, has positive and statistically significant effect on the entrepreneur's welfare. The owners with large farm size have higher welfare, which is a proxy by consumption expenditure per adult equivalent than the owners with small farm size. Land relations are extremely complicated

and this complexity has contributed significantly to the actual producers.

Herd size: Number of livestock in tropical livestock unit was one of the determinants for small scale dairy owners, but statistically not significant, as hypothesized the livestock owned by the entrepreneurs has positive relation. The logic behind is that livestock rearing helps the small scale dairy farm owners in many ways such as income from sale of products, insurance against drought, emergency cash requirements, tenancy for share cropping, household nutrition, fuel for cooking, manure for crops, drought power for farming, store of value e.t.c. Livestock ownership increases the wealth of the entrepreneurs and raises the income earning potential. The finding is supported by Upton M, and Jotter (2004) research project.

3.3.   Challenges and Opportunities small scale dairy farms productivity

some of the wide-ranging Challenges issues that confront marginal-small scale dairy farms as agriculturalists are: imperfect markets for inputs/product leading to smaller value realizations; absence of access to credit markets or imperfect credit markets leading to sub-optimal investment decisions or input applications; poor human resource base; smaller access to suitable extension services restricting suitable decisions regarding husbandry practices and technological know-how; poorer access to 'public goods' such as public irrigation, command area development, electricity grids; greater negative externalities from poor quality land and water management, etc" Hazell, Peter (2011).

In spite of above challenges, there are many technological and institutional innovations which can enable marginal and small farmers to raise agricultural productivity and increase incomes through diversification and high value agriculture: favorable agro-ecology of the area to produce milk is a good opportunity to boost production and increase demand in the area. The infrastructural development such as mobile telephone and wireless telephone are also the other advantages to improve the production and marketing system in the area. And also the government policies support small scale dairy farms production as means of increasing household food security. The existence of NGOs like World Vision Ethiopia is another opportunity to increase productivity and benefit producers.

In addition, fruit production also avail ample opportunities compared to other alternative investments in rural areas particularly. It requires less labor and capital, management and technical skill in which rural communities have comparative advantages. The increasing price of fruit products within and abroad the country also provide real and sustainable business opportunity for the rural poor.

4.   CONCLUSION AND RECOMMENDATIONS

The study was conducted with the objective of understanding the entrepreneur's challenges and opportunity in the productivity of small scale dairy farms in the districts of Aysaeta, Afar region, Ethiopia with specific focus on milk yield. Milk has been identified in the districts as a major cash income generating commodity. Milk in the districts is important market oriented commodity. Regarding, the kind of activities that face labor shortage was in the harvesting of milk and the management of herds in the districts. Labor was not able to specialize as the business owners of small scale dairy in the districts, in particular and generally in the region (Afar). From the discussion, it may be concluded that the presence of small dairy farms in study area is more or less traditional and most of the farms owners believe that dairy farming is a profitable enterprise and can be more profitable if government gives support on feed cost, health service, credit , marketing information and training. In order to protect, promote and develop the small scale dairy farms, the following recommendations need some due consideration by all the stake holders:

- Good quality semen should be preserved centrally and distribute to the AI centres for further use as and when required basis.
- Veterinary care and services to the small farm owners should be strengthened.
- Regular short term training programme on different management of dairying should be arranged for the farm owners and short term institutional loan or credit should be given to actual farm owners and to be checked regularly.
- The small-scale dairy farmers should strive to establish co-operative unions through which they could establish milk collecting centers and also provide the inputs such as supplementary feeds, drugs, extension services at affordable costs to its members.
- In order to maintain productivity in the dairy farm and straightforward appreciative, adopting new technology and all rounded information which in turn enlarges their eagerness to produce more and in so doing raises milk marketable supply, Woreda agriculture office and other dairy development partners should give credence to practical supported small scale dairy training.

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