J Hum Ecol, 57(3): 108-117 (2017)
DOI:10.31901/24566608.2017/57.03.02

Identification of Entrepreneurial Characteristics of Emerging Smallholder Dairy Farmers: A Case Study of Groblersdal and Matatiele Local Municipalities, South Africa

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KEYWORDS Entrepreneurship. Dairy Cattle. Food Security. Indigenous Knowledge Systems

ABSTRACT This case study evaluated the entrepreneurial characteristics of smallholder dairy farmers in Groblersdal and Matatiele local municipalities. The main findings were: gender disparity in dairy cattle ownership for commercialization; farmers' limited entrepreneur knowledge and skills on commercial dairy farming; maintenance of farming practices using indigenous knowledge systems (IKS); dairy cattle were mainly kept for household subsistence; cultural significance of beef cattle; production of animal manure for agriculture; and use of medicinal herbs for animal health. The key challenges facing farmers included: cattle theft, illnesses and death of exotic dairy cattle, due to lack of adaptation to arid environments. The study recommends training in basic management, improving market access and developing entrepreneurial attributes of the farmers, particularly women; documentation and interface of indigenous knowledge on animal health practices.

INTRODUCTION

Dairy production is an integral part of livestock sector and together with beef production employs at least 1.3 billion people providing for the livelihoods of 600 million poor smallholder farmers in developing countries (Thornton 2010). The South African dairy industry has over 4,000 milk producers employing 60,000 farm workers (Department of Agriculture, Forestry and Fisheries (DAFF) 2012). There are about 1.4 million dairy cattle in South Africa (Meissner 2013). Ntshephe (2011) estimated that smallholder farmers owned forty percent of the national herd. However, many smallholder farmers practice subsistence dairy farming without contribution to their local economies or creating employment opportunities. Some of the reasons may be inadequacies in marketing and management skills (Ntshephe 2011), low standard and lack of diversity in the products and sociocultural values and less exploitation of opportunities presented by Indigenous Knowledge Systems (IKS). More so, agricultural production, including dairy production has been decreasing due to climate change, disputes in land ownership (Masood et al. 2012), cultural issues and cattle ownership.

The dynamics of cattle ownership are intensely connected to social, cultural and economic factors. The social responsibilities of males include keeping cattle for reputation purposes- men use cattle as bride price, to resolve disputes and at ceremonial gatherings (Musemwa et al. 2008). The cultural factors are surrounded by various issues including that women can acquire and own small livestock such as chickens and goats, but cattle may be limited to men because women are viewed as helpers to male head of household (Njuki et al. 2013). The economic factors include the production of milk and meat by livestock but women are not directly involved in the selling (Njuki et al. 2013). The implications of this on livelihoods is that a household does not reach its full potential as far as income generation is concerned because the women are not directly involved in the ownership of the livestock, therefore, they have to depend upon the decisions and sales made by the husband. Economic factors include all aspects relating to income generation and profit making. A dairy cow can be viewed as an asset base which gives economic products and creates employment opportunities. These are driving forces behind successful livestock entrepreneurship.

Matatiele local municipality experiences high rates of unemployment and unequal distribution of income hence, small-scale entrepre-

neurship can be a means of combating the predicament of unemployment and alleviating poverty in the municipality. This is because the municipality's economic development is geared towards creating opportunities for employment and sustainable livelihoods (Integrated Development Plan (IDP) 2014/2015).

There is scarce literature on entrepreneurial attributes. Most literature focuses more on smallholder dairy production, start-up capital and marketing constraints. Grobler et al. (2008) highlighted that smallholder dairy farming is not booming in South Africa because only ten percent of the communal and emerging farmers indicated that they keep cattle for milking despite the need for increased milk production in South Africa's communal areas. Saadullah (2001) identified shortage of feed and fodder, unsuitable breeds of cattle available, poor management practices, veterinary health care and the lack of marketing facilities as the principal constraints of dairy production. These studies did not investigate entrepreneurial attributes which are required for successful commercialization of smallholder livestock production. In order to realize the entrepreneurship potential of the emerging smallholder dairy farmers there is need to assess their entrepreneurship attributes. This will help to determine whether they can be competitive in the dairy sector at both production and marketing levels. Many research studies have also concentrated on market factors and as a result there is limited research on the entrepreneurial attributes of emerging smallholder dairy farmers and their potential to progress to commercial farming.

This study is important especially in South Africa as the government through the National Development Plan has committed to graduate smallholder farmers to commercial farmers by 2030. However, other studies have reported failure of several dairy farming enterprises due to various factors such overlooking the entrepreneurial attributes of the farmers, underestimating the effect of farmer's reactive nature rather than proactiveness and there is a need to differentiate between survival-oriented poverty alleviation (PA) micro-enterprises and business growth (BG). Therefore, the purpose of this paper is to determine whether dairy emerging dairy farmers in Matatiele and Groblersdal Municipalities in Eastern Cape and Mpumalanga Provinces respectively were taking smallholder dairy farming as a business of maximizing profits, hence showing a potential to progress to commercial dairy cattle farming. The objectives included assessing the entrepreneurial attributes of smallholder dairy farmers, to investigate the perceived socio-economic and socio-cultural value of dairy cattle, and to determine access to resources by smallholder dairy farmers.

METHODOLOGY

A case study approach was conducted in Matatiele local municipality and Groblersdal to explore and identify the characteristics of dairy smallholder farmers. Matatiele consists of 3 small towns namely Cedarville, Maluti and Matatiele located on the northern part of the Eastern Cape Province. The municipality has a population of 203 843 people. Maluti and Matatiele are the only two towns that were considered. The two towns are populated with Xhosa and Sotho speaking people who are settled in the rural areas and townships. Maluti and Matatiele are predominantly rural with remote settlements (IDP 2014/2015). Groblersdal is a small town in Mpumalanga Province. The farms of the emerging farmers are in a rural settlement but close to infrastructure such as road networks and a central business district. It is relatively not as dry as Matatiele. Groblersdal is dominated by crop production supported by a good water supply from a local dam. The population is smaller compared to Matatiele and the area is dominated by Sepedi speaking people.

A case study approach offers the opportunity for the researcher to focus on a specific interesting case rather than an all-encompassing statistical survey (Shuttleworth 2008). Various rural appraisal tools such as transect walks, face to face interviews, focus group discussions, and Likert scale were used. The Likert scale was used to assess the smallholder dairy farmer's entrepreneurship potential. The Likert scale had 25 questions and the scoring was based on the level of agreement or disagreement; 1-strongly disagree, 2-disagree, 3-somewhat agree, 4- agree, 5-strongly agree. A purposive sample of emerging farmers was selected in both provinces. These were farmers who benefitted from developmental projects; the farmers had graduated from small scale (subsistence) farming and they were individual emerging farmers who owned more than ten dairy cattle. Department of Agri-

culture and the research institutions around the respective areas were consulted and they provided the list of the successful farmers.

Data was analysed using descriptive statistics. The questionnaires were coded and data was entered into the SPSS 23 software. Frequency tables were generated to describe categorical data. Correlations were carried out to test the association between socio-cultural and socio-economic factors and the association of entrepreneurial attributes. Linear regression was also carried out to determine relationships between variables. Focus groups and transect walks were subjected to content analysis to identify themes, trends and patterns. A basic profit and loss accounting system was used to calculate profitability of the farmers' dairy enterprises.

RESULTS AND DISCUSSION

Respondents' Demographic Information

Table 1 shows the demographic information of the respondents. Dairy farming among emerging farmers was male dominated (56%) by farmers between the ages 30 and 60 years. Focus group discussions revealed that married women had limited decision-making powers in the selling of milk and milk products.

Forty-eight percent were married while thirty-six percent were single with sixteen percent being widowed. This trend shows the importance of dairy farming as a source of income to stabilise food security and economic status of single headed households. Other interesting characteristics were that only sixteen percent of the farmers had no formal education, the high literacy levels of these farmers provides an opportunity for adoption of new technologies, ability to analyze and make informed decisions as suggested by Ngongoni et al. (2006) who emphasized the importance of education in technology adoption. Although forty percent of the farmers reported to be unemployed but sixty percent of them diversified their farming with different livelihood options. The diversified livelihoods of these farmers reduced their exposure to vulnerability and risks that could negatively affect the prosperity of their enterprise.

Cultural Meaning of Cattle Ownership

The farmers own fifty-eight percent of dairy cattle whilst beef cattle account for forty-two

Table 1: Respondents' demographic information (N=25)

Item		*Gender*		*Total*
		Male	*Female*	
Age	Below 35	67%	33%	12%
	Between 30 to 60	64%	36%	56%
	Greater than 60	88%	13%	32%
Marital Status	Single	56%	44%	36%
	Married	92%	8%	48%
	Widowed	50%	50%	16%
Are You the Household Head?	Yes	76%	24%	84%
	No	50%	50%	16%
Level of Education	No formal education	50%	50%	16%
	Primary	60%	40%	20%
	Secondary	71%	29%	28%
	Tertiary	89%	11%	36%
Who Owns Dairy Cattle?	Male	91%	9%	44%
	Female	20%	80%	20%
	Both	78%	22%	36%
Who Makes Decisions with Regards to Selling of Milk and Milk Products?	Male	88%	13%	32%
	Female	33%	67%	24%
	Both	75%	25%	32%
	Not applicable	100%	0%	12%
Employment Status	Employed full time	100%	0%	8%
	Employed part-time	43%	57%	28%
	Unemployed	80%	20%	40%
	Self-employed	83%	17%	24%
Number of People in Your Household	1 to 6	69%	31%	64%
	7 to 12	75%	25%	32%
	Above 12	100%	0%	4%

percent only. The farmers focused on dairy farming more than the beef production. The farmers understudy showed a clear understanding of the different purposes of owning these types of cattle. The focus group discussions revealed that the different values were associated with the purpose of the types of cattle owned. The dairy cattle were strictly for milk production for household consumption and to generate livelihoods through selling milk and milk products. The dairy cattle were regarded as of high economic value as compared to the beef cattle: *'we only slaughter dairy cattle if it is old and can no longer produce milk'*. On the contrary, the beef cattle carried more of the socio-economic wealth such as: *payment of lobola purposes, to appease ancestors and for draft power.* As mentioned by Musemwa et al. (2008), in some communities in South Africa cattle are still being viewed as symbols of prestige and reputation. In this study the farmers were in agreement that cattle regardless of the type carried a sense of prestige and wealth status. However, the dairy cattle were viewed as the economic wealth as compared to the beef cattle. According to the focus group discussions the beef cattle served as dual purpose which was kept for beef but mostly to satisfy the social activities.

The focus group discussion revealed that the cattle also had a significant role to play in agricultural production. In this study, sixty percent reported to use cow dung as fertilizer while ninety-two percent do not use dairy cattle for draft power and ninety-six percent of the farmers confirmed that they use beef cattle for draft power. Use of dairy cattle for draft power significantly reduces milk yield (Saadullah 2001). Reduction of milk yield negatively affects entrepreneurship as it reduces potential income. However, the farmers in this study showed that they were fully aware of the negative impacts of using dairy cattle for draft power.

Socio-economic Value of Dairy Cattle

In the study area it was found that dairy cows produce on an average 4 litres of milk per day (see Box 1). This is lower than the average milk yield per cow in South Africa reported by Kawambwa et al. (2014).

The respondents highlighted in focus group discussions that adults consumed milk once a day while children consumed about three times a day. Adults usually consume milk with tea at breakfast whilst children drink milk in the morning before school, in the afternoon after school and at supper time. In this study the amount of milk used for household consumption was reasonable as it did not compromise the nutrition security of the household members and or the enterprise. Luoga et al. (2014) warns that at times more focus on selling while the household is usually deprived or limiting the household consumption. In this study the farmers prioritised selling for income generation but they believed in the principle of feeding themselves and families first while selling. The dairy farming was making a contribution to the household nutrition security.

Box 1: Household milk consumption and proportions of milk sold

Average 6 dairy cattle = yielding 24 litres of milk (1- 3L for Household Consumption)

96% of the respondents used the milk for household consumption:

Estimated 1to 3L of milk consumed per household by an average household size of 6 people.

Majority (88%) of the farmers sold milk whilst fifty-two percent produced fermented milk and only twelve percent produced cream. The average price of milk was R10 per litre and the average price of fermented milk was R7 per litre. It should be mentioned though that the prices were not fixed as they at times negotiated. Cream was produced for household consumption only; it was used as butter spread.

About fifty-two percent of the farmers sold their milk from home whilst only eight percent targeted schools and nurseries. These findings were confirmed by Sikwela (2013) many smallholder farmers in South Africa do not often find their way into the markets therefore, they end up selling from their homes.

Income Generation Contribution to Household Livelihoods

The focus group discussions and the entrepreneurial scale revealed that fifty-six percent of the farmers were not doing book keeping and were not cost benefit conscious. Nevertheless, it was believed that the lowest profit both in

Matatiele and Groblersdal was estimated to be R691 on average per month from milk sales. Seventy-two percent of the respondents used the dairy generated income to contribute towards household expenses, school fees, buying feed, repaying loans and meeting health expenses. These findings are in agreement with Chinogaramombe et al. (2008) who reported that income from milk sales was used to cover family costs, to procure feed and other contingencies. The ability to cover household expenses and other contingencies can motivate the farmer to participate more in dairy farming and enlarge their dairy enterprise.

Table 2: Employment opportunities

	Frequency	*Percent*	*Valid percent*
Workers from the Community			
Yes	21	84.0	84%
No	1	4.0	4%
Not applicable	3	12.0	12%
Total	25	100.0	100%
Family Members			
Yes	1	4.0	4%
No	24	96.0	96%
Total	25	100.0	100%

Employment Opportunities

About eighty-four percent of smallholder farmers employed one or three employees, only twenty percent of the workers were skilled. Table 2 shows that only four percent employees were family members and eighty-four percent were local community members. The responsibilities of the employees were mainly cattle husbandry - to feed, milk, clean the sheds, to manage the calves regarding their weaning and suckling times and herding the cattle. The monthly wage of the employees ranged between R780-R1500 per month. These findings are in agreement with Ngongoni et al. (2006) who found that in Zimbabwe, most of the smallholder dairy farmers had hired labour; the use of family members was not prevalent. This shows that dairy enterprises have the potential to create job opportunities positively contributing to poverty reduction.

Table 3: Scores of entrepreneurial attributes

Entrepreneurial attributes	*Scores*	*Explanations*
Vision	Good = 63%	• The emerging smallholder dairy farmers had a vision to deliver milk to businesses around them such as schools and prisons. • They wanted to have milk tanks and water tanks, access to resources that will help them to grow.
Marketing Strategies	Poor=39%	• Marketed door to door or consumers would come to the house and buy – this type of marketing results in limited sales due to lack of exposure to a formal profitable market. • The farmers were also planning to come together as a group as they realized that individually they did not have enough yield to meet demand. • Some of the farmers had already started speaking to potential clients.
Basic Management Skills	Poor=25%	• The farmers did not keep records for their enterprises. • They had limited training in dairy management.
Interpersonal Skills	Satisfactory=54%	• The emerging smallholder dairy farmers had good relations with each other within the community. • They reported that they formed a dairy farmer's support group which holds monthly meetings to discuss progress and challenges. • Most of the respondents highlighted that they engage with other dairy cattle farmers in the community and the price of milk is usually determined through these interactions.
Cost Benefit Consciousness	Poor= 20%	• They lacked a systematic way of tracking costs and benefits. • Prices of milk and products were negotiated; they were not related to production costs. • Their profit and loss calculations were based on estimations which compromised viability of dairy enterprises.

Entrepreneurship Skills

In this study the farmers were found to have better vision and interpersonal skills whilst they lacked the basic management skills, marketing strategies and cost benefit consciousness. Good entrepreneurship skills form part of necessary economic development that can transform smallholder farmers (Mcelwee 2006) from just being cattle rearers, to becoming entrepreneurs who actively participate in the economy of the country, improving their household livelihoods, enhancing food security and breaking the cycle of poverty. However, in SSA smallholder dairy farmers are still incapacitated by lack of entrepreneurial skills (DAFF 2012). Table 3 presents the attributes of the small-scale farmers their strengths and weaknesses thereof.

The farmers had plans and goals for progression into commercial dairy farming. Yet, their marketing strategies were limiting their potential. In this study there was a positive relationship between marketing strategies and market access of the farmers. Correlations showed that the emerging farmers were conscious of market factors which determine milk sales and income generation. As mentioned by Food and Agriculture Organization of the United Nations (FAO) (2010) gaining market access involves the smallholder farmer's competitiveness in milk production and is largely influenced by production costs and the capacity of the dairy value chain targeted by the farmer. It could be said the ability of the dairy farmers and the extent of their participation was influenced by the type of market accessible to them. Another shortfall identified was due to lack of keeping records. Table 4 shows that the farmers did not keep any dairy enterprise-related records.

Basic management skills are important in entrepreneurship because they help the farmer to have a holistic view of how operations interlink with decision making, financial accountability and production for profitability. The farmers scored satisfactorily (54%) on interpersonal skills. Interpersonal skills are important in entrepreneurship because entrepreneurship requires interaction and the relationship amongst these farmers provides an opportunity for pooling of resources in order to grow. More so, the findings showed that the farmers scored lowest on cost and benefit consciousness (20%). This may be due to the fact that a lot of the emerging farmers did not keep financial records.

The Potential of Dairy Small-scale Enterprise to Generate Profit

The findings further showed that only thirty-two percent of the farmers were making profit whilst sixty-eight percent was running on loss. However, these figures were calculated from estimation given by the farmers since they did not keep proper financial records. This negatively impacts the progression of these emerging farmers into commercialization because it is difficult to sustain a loss making enterprise. Further losses are likely to be realized due to lack of systematic way of tracking costs and benefits. Some farmers were able to provide financial information which was used to estimate profitability of the dairy enterprises (Table 5). The results show that average profit per month is R691. Their major costs were dairy meal and yellow maize. The cost of producing one litre was calculated to be R8.50 which means the farmers were making seventeen percent profit margin. However, these costs were estimates, there may be other costs which were not accounted for such as transporting milk of those farmers who do door to door deliveries.

Observations and focus group discussion showed that farmers had limited entrepreneur knowledge and skills on commercial dairy farming. They indicated the need to be capacitated in these skills to improve their income generation.

Smallholder Farmer's Access to Technology

The transect walks showed that only eight percent of emerging farmers were using modern

Table 4: Frequencies of records kept by the farmers

	Do you keep records?	*Do you keep financial records?*	*Do you keep records for milk yield?*	*Do you keep milk quality records?*	*Do you keep cattle health records?*	*Do you keep calving times records?*
Yes	40%	44%	32%	40%	36%	44%
No	60%	56%	68%	60%	64%	56%
Total	100%	100%	100%	100%	100%	100%

Table 5: Estimation of profitability among smallholder dairy farmers

Price of milk per litre	R10.00		
Number of cows milked	6		
Number of milking times per day	1		
Average milk per cow per day (L)	4		
Total milk yield per day	24		
Total milk sales per day	240		
Income per month (20 days)	R4 800		
Income			
Gross Income 6 cows X 4 litres per cow milked once X 20 days per month			**R4800**
Variable Costs			
Labour		R780	
Feed			
Yellow maize		R900	
Dairy meal		R1445	
Lucerne		R42	
Saltlick		R244	
Round bail		R129	
Animal Health			
Veterinary consultation		R208	
Medication		R361	
Total Variable Costs			R4109
Profit			**R691**
Cost of producing 1 litre of milk = R4 109/ (6 cows X 4 litres per cow X 20 days per month)		R8.56	
Profit Margin		17%	

techniques such as milking machines. The majority of the farmers (92%) milked by hand. The farmers were aware of the benefits of milking machines but could not afford to procure them. Unfortunately, hand milking limits the number of milking times and the amount of yield especially for farmers with large dairy herds.

The farmers had limited holding and refrigeration facilities for the storage of their milk. Their storage facilities included aluminum buckets and small refrigerators. As a result, the farmers were unable to store large volumes of milk; this forced them to sell the milk in the shortest possible time before it spoiled. However, it was not always possible to sell all the milk, sometimes they ended up giving neighbors. The high spoiling rate of milk reduced quality and price of milk. This is undesirable under commercial enterprises as it reduces potential income.

Ninety-six percent confirmed that they used IKS to inform their practices especially for animal health and feeding systems. Most of the farmers confirmed that they gave their cows herbs which they believed to contain medicinal properties. However, there was no documentation on IKS practices in animal health particularly which herbs, how much of the herbs or when the herbs are given to the cows. This is not different from smallholder farmers in India (Kumar et al. 2010). Unfortunately, there commercial or formal markets do not recognize the IKS; therefore this system was limiting their potential to participate in formal markets. On the other hand it is argued that IKS is what has sustained them to this point due to limited availability and accessibility to better resources.

The farmers practiced zero grazing for their dairy cattle. This method of feeding system requires the farmers to purchase large volumes of feed. Unfortunately, the farmers cannot afford to buy the required amount of feed. The farmers end up incorporating IKS in their feeding systems through on-farm made supplements. However, the farmers reported that they are still unable to meet the dietary requirements of the dairy cow. This has negative implications on entrepreneurship as a dairy enterprise progresses to commercialization there is need for provision of reliable and adequate modern health and feeding systems. Furthermore, the dairy cattle must be healthy and well-fed for optimum milk production and to satisfy the market requirements.

Challenges Affecting Dairy Smallholder Farmers

The focus group discussions revealed that the farmers were facing the following challeng-

es; cattle theft, illnesses and death of dairy cattle due to lack of adaptation, water shortages, scarce or limited financial resources, limited training, high cost of feed and lack of pasture due to veld fires. Many farmers complained about cattle theft which has restricted the size of their herds.

The farmers further mentioned that exotic breeds were more susceptible to illnesses and death due to lack of adaptability. The indigenous breeds were more adaptable and less affected by the diseases. However, the farmers were not satisfied with the milk yield potential of indigenous breeds which they reported to be low. Garwe et al. (2001) confirmed low milk yields in indigenous breeds. The farmers reported that water was a major problem and some of the farmers had to install water tanks. Water shortage was particularly high in Matatiele because it is generally a dry place. This poses great concern on the welfare of the dairy cattle as they do not thrive in areas where water is scarce.

The emerging farmers were also constrained by the limited training they received. They reported that they did not have adequate training on how to run a dairy enterprise and this in turn limited their potential to grow their enterprises. All the farmers complained about lack of financial resources. Dairy farming is capital intensive and most of the farmers could not afford to expand and progress to commercial dairy farming.

The Feasibility of Smallholder Dairy Enterprise

Table 6 presents the positive socio-economic considerations showed that there is a potential for the farmers to migrate to commercial farming. However, the socio-economic negative considerations must first be addressed. Possible interventions include training the farmers in basic management, improving market access and developing entrepreneurial attributes of the farmers.

CONCLUSION

The study was conducted in Matatiele local municipality and Groblersdal to explore and identify the characteristics of dairy smallholder farmers. The following were the main findings of the study: dairy farming among emerging farmers in the study area was dominated by male farmers who were over 60 years old; dairy farming was an economic activity facing a number of challenges for the progression towards commer-

Table 6: Contributions to effective growth and less effective growth of smallholder dairy enterprise

Negative	*Positive*
• Low number of milking cow	• Contributes to household nutrition status
• Milk yield lower than the South African expected standard	• Contributes to livelihood
• Prices not fixed	• Contributes to agriculture – cow dung used as manure
• Market channels limited	• Contributes to local job creation
• Limited financial resources which hinder procurement of equipment and services	• Ownership of dairy cattle provides a starting point for intervention strategies
• Limited training in basic management skills which negatively affects keeping of enterprise related records	• Experience in dairy farming which can be improved by training
• Ownership of a few exotic breeds which lack adaptability and indigenous breeds which have low milk yield	• They possess IKS which can be integrated into commercialization
• Prevalence of cattle illnesses, deaths and stock theft which reduce size of dairy herds	• Water shortages which compromise the diet of the cow and milk yield
	• The good relations among the farmers can be used to build farmer support groups
• Limited financial resources which hinder procurement of equipment and services	
• Outbreak of veld fires and adverse weather conditions which reduce pastures	
• Lacked most entrepreneurial attributes which are necessary for progression into commercial farming	
• The farmers lacked value addition in their value chain. They were limited to selling raw milk and fermented milk	

cialization. The farmers depended on their IKS to maintain their farming practices; the dairy cattle were strictly for milk production for household consumption and to generate livelihoods through selling milk and milk products and were therefore regarded as of high economic value as compared to the beef cattle; beef cattle were of cultural value such as: *payment of lobola purposes, to appease ancestors and for draft power*; the cattle also contributed animal manure for agriculture. Farmers had limited entrepreneur knowledge and skills on commercial dairy farming; farmers used medicinal herbs for animal health by incorporating on-farm made supplements in their feeding systems. This is in spite of the fact that there were no written documentation on indigenous knowledge animal health practices. The challenges facing farmers included; cattle theft, illnesses and death of dairy cattle, especially exotic cattle breeds, due to lack of adaptation in arid environments, water shortages, limited financial resources, limited training, high cost of feed and lack of pasture due to veld fires; the milk yield potential of indigenous breeds were reported to be low.

RECOMMENDATIONS

Possible interventions include training the farmers in basic management, improving market access and developing entrepreneurial attributes of the farmers; documentation of indigenous knowledge on animal health practices among small-holder dairy farmers in order to interface with modern veterinary practices for improved animal health. Women participation should be promoted by addressing the cultural barriers that limit their land and cattle ownership for commercialisation.

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