



## Characterization of Management Practices in Cattle Production by Smallholder Farmers in Zaka District, Masvingo, Zimbabwe

Marlon CHAWARIKA<sup>1\*</sup>, Robert KAMUTAMBUKO<sup>2</sup>, Tongai BONYONGWE<sup>3</sup>, James CHITAKE<sup>4</sup>,  
Accadius TIGERE<sup>5</sup>

<sup>1,3,4,5</sup> Grasslands Research Institute, P. Bag 3701, Marondera, ZIMBABWE

<sup>2</sup> Makoholi Research Institute, P. Bag 9182, Masvingo, ZIMBABWE

<sup>1</sup><https://orcid.org/0009-0008-2564-8467>, <sup>2</sup><https://orcid.org/0009-0005-9933-0257>, <sup>3</sup><https://orcid.org/0009-0001-6526-7107>

<sup>4</sup><https://orcid.org/0009-0004-7699-3448>, <sup>5</sup><https://orcid.org/0009-0007-9656-1417>

\*Corresponding author: marlonchavarika@gmail.com

### Research Article

### ABSTRACT

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The overall objective of the study was to characterize the management practices of cattle production by the smallholders of livestock in Zaka community. A total of 150 farmers owning cattle were randomly selected and interviewed using semi-structured questionnaire in three wards of the district. The mean age of household heads was 52.3 years. The main uses of cattle comprised of draught power, milk and meat, these were ranked first, second and third, respectively. It was observed that all farmers depended on the range lands for nutrition with supplementation of maize stover and only 3.3% used commercial feed. Uncontrolled breeding was practiced by all farmers with no selection of breeding animals. Tick borne diseases were the most prevalent in the area. The major constraint was disease prevalence, followed by nutrition, third was capital, fourth was market, fifth was predation and followed by housing, theft and mortality. The study revealed that the farmers in Zaka communal area are using improper methods in nutrition and breeding and also in health management. Further studies are proposed on optimization of available feed resources in Zaka district to improve cattle nutrition. Technical support on proper animal health and breeding strategies is also recommended in Zaka communal area.

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## INTRODUCTION



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Zimbabwe has an estimate of 5.7 million heads of cattle (Zimstat, 2025) with 64% of the animals found in communal areas. In Zaka communal area, cattle are important in smallholder farming systems because they contribute significantly to crop production through provision of draught power and manure, while also serving cultural and economic functions (Chawatama et al., 2005). The smallholder cattle production systems in Zimbabwe face numerous challenges including inadequate nutrition, poor breeding practices, disease prevalence, and limited access to veterinary services (Ndebele et al., 2007). This results in lower cattle productivity in communal areas compared to commercial farming systems, with constraints varying across different agro-ecological zones.

Masikati (2010) highlighted the importance of understanding local management practices and production constraints to develop appropriate interventions for improving cattle productivity, however, limited information exists on specific management practices and constraints in Zaka district, which is located in a semi-arid region with low and erratic rainfall patterns. The objective of this study was to characterise cattle management practices in terms of nutrition, breeding, and health management, and to identify opportunities and constraints to cattle production among smallholder farmers in Zaka district, Zimbabwe. Understanding these factors is crucial for developing targeted interventions to improve cattle productivity and enhance food security in Zaka district.

Understanding the importance of good animal husbandry practices forms the basis of profitable livestock production in communal areas such as Zaka District. If the breeding goals are set appropriately, desirable characteristics such as high birth weights, (Gobvu et al., 2023) better weaning weights as well as better carcass quality are going to be realized by the farmers. These traits of economic importance will contribute to better financial welfare of smallholder livestock producers (Demir and Gültekin 2024). Nutrition management also play a pivotal role on improving productivity in livestock production. Different feed ingredients and feeding regimes exist in smallholder farming systems but they lack scientific validation and commercialization (Moorey and Biase 2020). It is therefore, important to characterize these management practices and identify researchable gaps that need to be addressed in the communal setup.

## **MATERIAL AND METHOD**

### **Ethical Statement**

The research was approved by the Grasslands Research Institute Ethics Committee on 28 July 2025 for non-animal experiments/human research ethics. The ethics approval number is GRI2024005.

### **Study Site**

The research was carried out in Zaka district of Masvingo Province which is in the south-eastern part of Zimbabwe and it is 86 km from Masvingo city centre. The district falls in a semi-arid, mountainous area under Agro ecological zone V with erratic annual rainfall averaging 600 – 800 mm (Sharara et al., 2022). The annual temperatures are usually high ranging from 28 °C to 35 °C (Sharara et al., 2022). The type of vegetation is largely acacia adapted to dry conditions with trees including msasa (*Brachystegia spiciformis*), mnondo (*Julbernardia globiflora*) and muunze (*Brachystegia tamarindoids*) found on high ground such as mountains. The principal grasses are of *Aristida*, *Eragrostis* and *Hyparrhenia* species. The soils are generally poor, commonly known as deep Khalahari sands.

### **Sampling Procedure**

Hierarchical sampling was used as the sampling units were hierarchical in nature with the ward being the largest followed by village and then household. Stratified random sampling was used where the district was put in three strata which are northern part, central and the southern parts. The three strata were selected because the northern part is more productive and receives more rainfall compared to the central part and the southern part has the least production and receives the least rainfall and experiences the hottest temperatures. In each stratum, one ward was selected and five villages were randomly selected in each ward and ten households were randomly selected in each village (Mafunga, 2014). One hundred and fifty questionnaires were administered based on cattle ownership and willingness of farmers to participate. The interviews were carried out at the farmers' households. The household heads were interviewed but, in the case, where the household heads are not available, a knowledgeable member of the household provided the required information.

### **Data Collection**

A pretested questionnaire was used to collect data from the households of farmers owning cattle. The data collected include the household demographics which include gender, age, farming experience, income levels and educational background. Information on herd characteristics such as size, composition (bulls, heifers and cows), other species kept as well as crop production (types, uses) were captured. Cattle management practices (nutrition, breeding practices and programs, animal health including mortality, tick control, access to veterinary services, and vaccination programs). Information on opportunities and constraints was also captured in the questionnaire.

### **Statistical Analysis**

The data collected was analyzed using IBM Statistical Package for Social Science version 22. Descriptive statistics were used to describe household demographics. Chi-square tests were used to determine associations between education level and management practices.

## **RESULTS AND DISCUSSION**

### **Household Demographics**

The mean age of the household heads was 52.3 years with a minimum age of 28 years and maximum of 91 years. The average household number was six members per household and this is comparable to Ngongoni et al. (2006) also found that the mean average of smallholder households is eighty to twelve. Most of the households were headed by males (76% of respondents) and the remainder of 24% were female headed. Results are comparable to Mutisi et al. (1994), Mapiye et al. (2006) and Ngongoni et al. (2006), who reported the overall mean age of 50, 51 and 49 years in Chinamhora communal area, Nharira-Lanchashire and eight smallholder dairy schemes in Zimbabwe, respectively. The more family members at household, the more diverse livestock kept in Zaka district. This indicates some level of specialization on partaking livestock management duties. For example, males tend to concentrate with large framed animals such as cattle and donkeys while females are responsible for poultry and other small stocks like sheep and goats. Ngongoni et al. (2006) also noted that family size matters in terms of labor investment at small holder dairy farms. Households with educated family members exhibited better cattle management skills such as the ability to dip and deworm the cattle. This is in agreement with Ngongoni et al. (2006) who found that most of the farmers were retired professionals who had the basic knowledge on general animal management principles.

The level of education of the respondents showed that 18% attained tertiary education, 34% attained at least secondary education and 48% of the interviewed remained at primary level. The results obtained from the research go in tandem with those obtained by Ncube et al. (2015) in Bulilimamangwe area which is in the South-West of Zimbabwe near Botswana border where majority (69.2% of respondents) of the farmer had primary education. It is assumed that with this education base cattle production may thrive in the area. Education is paramount in agricultural development as it enables the farmers to plan informed decisions which best suits their socio-economic situations (Mapiye et al., 2009; Musemwa et al., 2010). Bidi et al. (2015) also found that in Mangwe District, 70% of the respondents in the research had only obtained primary education as their highest level of education. Formal education allows adoption of better management practices as a result of extension services so that farmers are able to understand the basics principles in cattle production since they are less complex.

### **Livestock Species Kept**

Farmers in Zaka communal area were found to keep a variety of livestock species including cattle, chickens, donkeys, goats and sheep (Figure 1). Cattle and indigenous chicken were also found at every household followed by goats. Sheep, turkeys, donkeys, pig, guinea fowls and lastly rabbits were the livestock species that were also kept by Zaka communal farmers. Ngongoni et al. (2006) also suggested that the ecology in dryer parts of the country favors cattle and goat production compared to sheep. However, the research did not take into account of farmers that had no cattle so other species kept by farmer without cattle were not taken into consideration. Solomon et al. (2007) reported that keeping a number of livestock species reflects diversification strategy in response to food security during drought periods.

### Utility of Cattle in Zaka District

Draught power was the main utility of cattle in Zaka District as shown in Figure 2 since cattle husbandry has a strong connection with cropping activities. The results obtained from the research goes in tandem with those found by Maburutse et al. (2012) in Simbe communal area where 96% of the interviewed farmers use cattle for draught power. Similar results were also obtained by Chawatama et al. 1998 in their study of draught animals in communal areas.

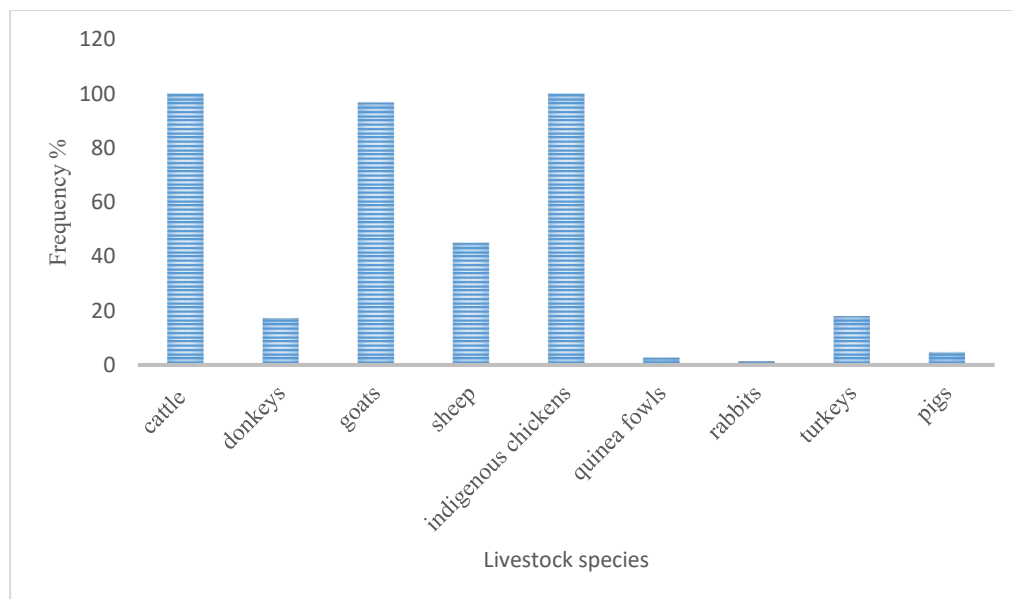


Figure 1. Livestock species kept in Zaka district

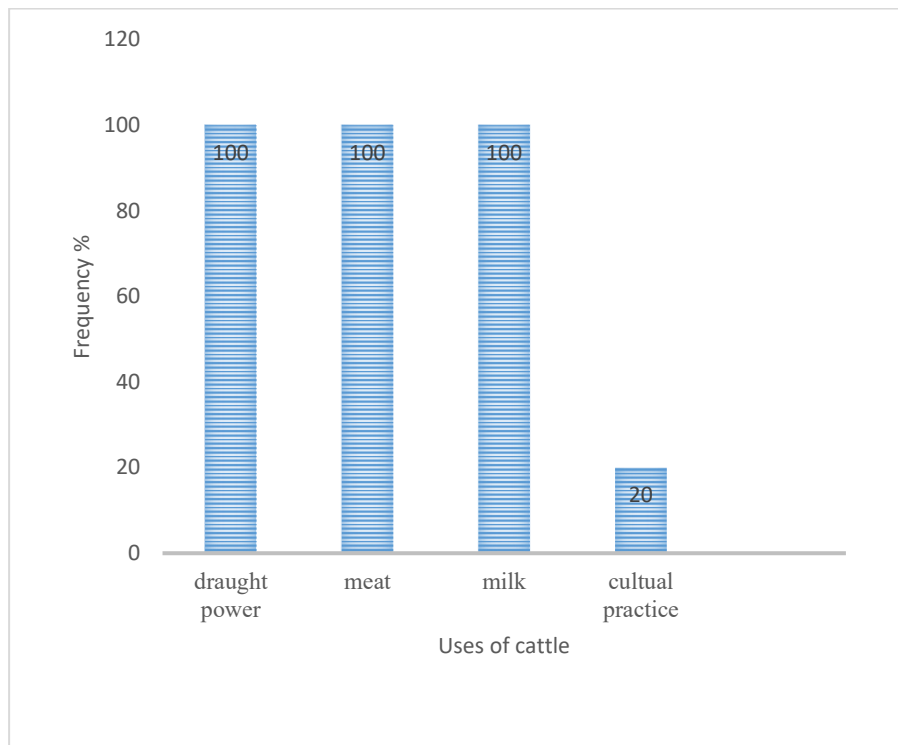


Figure 2. Utility of cattle in Zaka district

Farmers in communal areas are more of cattle keepers than beef producers because they do not keep cattle specifically for meat but meat is obtained when the animal has completed its production cycle. All the farmers interviewed responded that they use the cattle for meat.

### Poor Feeding and Water Practices in Zaka District

All interviewed households confirmed that they relied on the natural rangeland for grazing cattle with supplementation from maize stover and only 3.3% of the respondents relied on commercial feed. Ndebele et al. (2007) also obtained the same results in Gwayi communal area where 90% of the respondents used natural rangelands for grazing throughout the year with little to no supplementation. Use of crop residues especially maize stover as a feed supplement was noted in Zaka communal area. The results go in tandem with the findings of Maburutse et al. 2012. Crop residues are usually fed to animals in the dry season and they have low nutritional value. This shows the strong relationship between crop and livestock enterprises in communal areas as observed by Masikati (2010). Most farmers (66% of the respondents) in the study area depend on rivers for water of their cattle followed by dams and ponds (22% of the respondents) and the remaining 12% depended on borehole water.

There was no association between gender of household head and the nutrition management practices by farmers in Zaka District ( $P>0.05$ ) in Table 1. This can be

attributed to lack of training on best animal nutrition management. However, Masikati (2010) noted that both males and females in communal areas were reluctant in feeding their animals and rely mainly on the natural veld. There was association between age of household and type of supplementation ( $P < 0.05$ ) (Table 1). As farmers' age increases, management experience is gained and they supplement animals with better feed such as treated crop residues and commercial feed (Ndebele et al., 2007).

Table 1. Association between sex, age of household, level of education, ward and nutrition management

Management	$\chi^2$	P value
Sex vs nutrition		
Supplementation	3.19	0.074
Type of feed for supplementation	1.63	0.201
Provision of water	0.32	0.573
Age vs nutrition		
Supplementation	36.75	0.773
Type of supplementation	65.80	0.018
Provision of water	49.33	0.304
Level of education vs nutrition		
Supplementation	1.95	0.376
Type of supplementation	37.82	0.000
Provision of water	4.59	0.101
Ward vs nutrition		
Supplementation	2.01	0.365
Type of supplementation	4.07	0.131
Provision of water	2.01	0.365

not significant ( $P > 0.05$ ); significant ( $P < 0.05$ )

### Poor Breeding Management Practices in Zaka District

All of the interviewed farmers reported that they do not follow any breeding plan. Cattle in communal areas mix freely in the surrounding since there are no fences or infrastructure which facilitate controlled breeding (Ndebele et al., 2007). Khombe (1998) also found that uncontrolled breeding in communal areas result in inferior progeny due to inbreeding and breeding of bulls with undesirable traits usually short stature. About 99.3% of the farmers did not select males for breeding purposes even though they castrate small animals (98% of the interviewed households). From the interviewed households 53.3% did not own bulls. Khombe and Tawonezvi (1995) noted that during the breeding season farmers without bulls had the advantage of having their cows mated with the available bulls. Communal famers in Zaka District confirmed that their cows and heifers were bred between September and February and this is in contrast with the findings of Ndebele et al. (2007) where the females are bulled between March and July when they are in good condition in Gwayi district. Cows that

had problems in calving and those that failed to conceive were retained in the herd since the farmers did not have a culling program. These results are similar with those found by Ndebele et al. (2007) where farmers in Gwayi did not cull less productive cows.

There was no association between gender and breeding management ( $P > 0.05$ ) (Table 2). This can be as a result of absence of infrastructure suitable for controlled in communal areas as suggested by Ndebele et al. (2007). There was association between age of household herd ( $P < 0.00$ ) and selection of males for breeding and criteria for selecting males for castration (Table 2). Musemwa et al. (2010) reported that old ages dominate the agricultural sector and are more experienced. Communal farmers select breeding animals based on physical characteristics and older people are more experienced in undertaking this selection method. There was no association between level of education and breeding management ( $P > 0.05$ ) in table 2. This can be as a result of lack of infrastructure and finance to cater for breeding programs in communal areas (Mashoko et al., 2007). There was association between ward and calving interval ( $P < 0.00$ ) (Table 2). This could be as a result of the differences in climatic conditions of the selected wards. There was unlimited water supply in ward 3 hence the calving interval is shorter compared to other two wards. Chimonyo et al. (2000) reported that poor nutrition, shortage of bulls and absence of systematic weaning are the causes of a long calving interval.

### **Poor Health Management Practices in Zaka District**

The most common diseases that were mentioned by the farmers in Zaka District were blackleg, lumpy skin, heartwater, gall sickness, contagious abortion and foot and mouth (Figure 3). Farmers reported that calves were the most vulnerable to most of the diseases but in some tick-borne related diseases they have age related immunity (Chawatama et al., 2005). The findings confirm to Ngongoni et al. (2006) who found that 81% of smallholder dairy farmers in Zimbabwe indicated haphazard and un-systematic vaccination and deworming programs exposing animals to diseases. The veterinary extension provided treatment and vaccinations against important diseases, such as anthrax, foot and mouth disease, contagious abortion and black-leg in all the areas. Over 50% of the farmers in the district treated minor diseases using ethno-veterinary medicine whilst those who had attained tertiary education used conventional medicine. Veterinary extension personnel urged farmers to dip their cattle weekly during the rainy season and once every fortnight during the dry season. The majority of the households in the communal used communal plunge dips to control ticks. There were times when the cattle spent several weeks without being dipped because either water or acaricides were in short supply as also found by Ndebele et al. (2007). This was also observed by Francis and Sibanda (2001) in Nharira-Lancashire during participatory action research with smallholder dairy farmers of

Zimbabwe. Farmers indicated heavy tick manifestation and high incidence of tick-borne diseases as main cause of cattle mortality.

Table 2. Association between sex, age of household, level of education, ward and breeding management

<b>Management</b>	<b><math>\chi^2</math></b>	<b>P value</b>
<b>Sex vs breeding</b>		
Selection of males for breeding	0.32	0.573
Criteria used select males for castration	0.15	0.702
Calving interval of cows	0.07	0.795
<b>Age vs breeding</b>		
Selection of males for breeding	150.00	0.000
Criteria used select males for castration	83.67	0.000
Calving interval of cows	51.73	0.228
<b>Level of education vs breeding</b>		
Selection of males for breeding	1.95	0.376
Calving interval	4.57	0.102
Criteria used select males for castration	0.77	0.679
<b>Ward vs breeding</b>		
Selection of males for breeding	2.01	0.365
Calving interval	38.22	0.000
Criteria used select males for castration	2.04	0.360

not significant ( $P>0.05$ ); - significant ( $P<0.05$ )

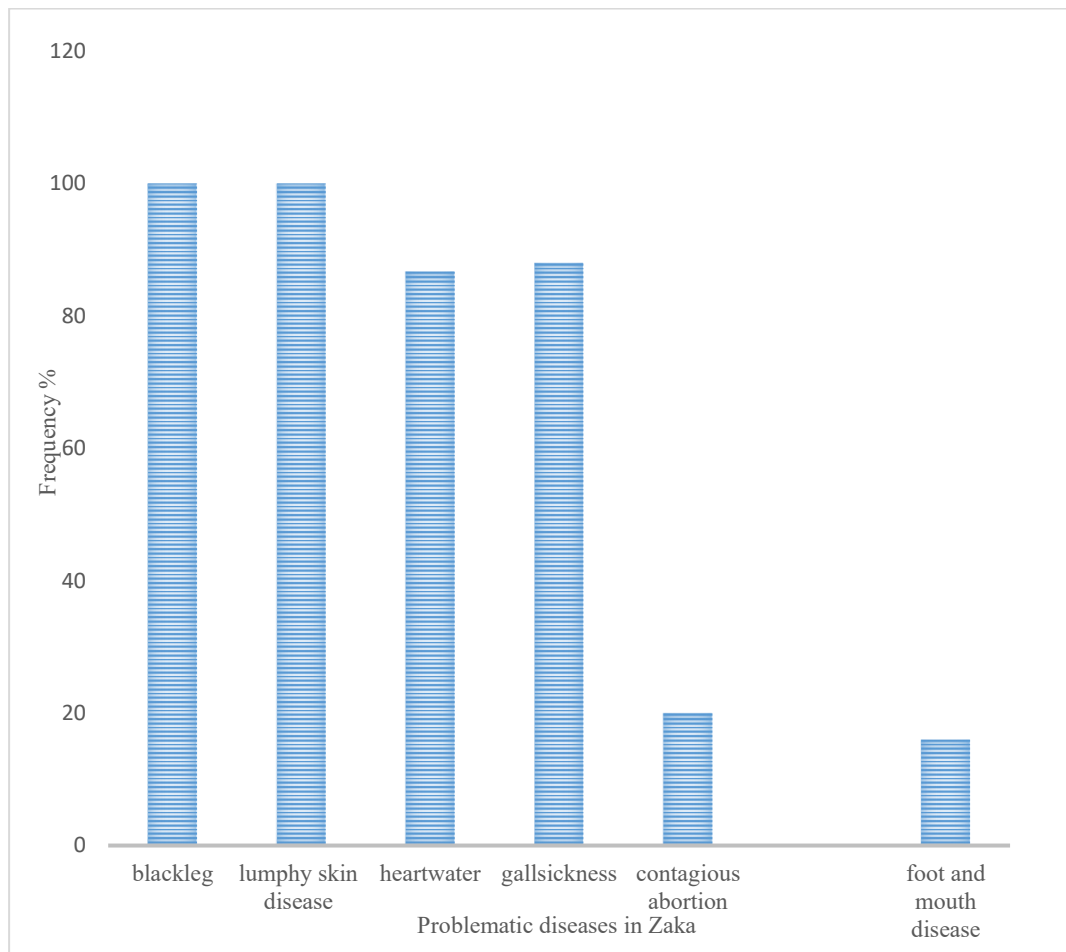


Figure 3. Problematic disease in Zaka district

There was no association ( $P>0.05$ ) between gender and health management observed in this study (Table 3). This may be as a result of strong social network in communal areas where both males and females control ticks at the communal dip tank assisted by the veterinary technician. Both males and females had little intervention in animal health management as it is usually taken by the district veterinary department. Similar findings were obtained by Bidi et al. (2015) in Mangwe district where they also found that the veterinary department took care of all animal health issues in the communal areas. There was association ( $P<0.05$ ) between age of household and health management (Table 3). Musemwa et al. (2010) found that the agricultural activities in communal areas are dominated by older people who have experience from commercial farmers. As age increases so does their farming experience and farmers in communal have more knowledge in the use of ethno veterinary medicines. This is in contrast with the findings of Simela et al. (2006) in South Africa where they found that the young ages are more educated and use scientific methods in treating animals. There was no association ( $P>0.05$ ) between level of education and health management practised (Table 3). This could be due to the unavailability of resources to implement the knowledge. Ndebele et al. (2007) also commented on the lack of infrastructure in

communal areas to implement proper management skills such as dozing. Geographical positioning also has an effect on cattle managements reported by previous studies (Masikati, 2010) which is in contrast to this study where no association in ward and health management was observed ( $P>0.05$ ).

Table 3. Association between sex, age of household, level of education and, ward and health management

Management	$\chi^2$	P value
Sex vs health		
Type of treatment offered	0.32	0.853
Dozing of animals	0.32	0.573
Dipping using knapsack	2.67	0.102
Weighing of animal prior to treatment	2.95	0.086
Dipping in summer	0.15	0.702
Dipping in winter	0.75	0.386
Age vs health		
Type of treatment offered	123.90	0.015
Dozing	74.50	0.005
Dipping in summer	90.48	0.000
Dipping in winter	61.32	0.053
dipping using knapsack	68.35	0.014
Level of education vs health		
Type of treatment offered	6.84	0.144
Dozing	1.95	0.376
Weighing of animal prior to treatment	30.48	0.000
Dipping in summer	5.94	0.051
Dipping in winter	3.94	0.140
Dipping using knapsack	2.18	0.336
Ward vs health		
Type of treatment offered	10.75	0.030
Dozing	2.01	0.365
Weighing of animal prior to treatment	38.22	0.000
Dipping in summer	2.04	0.360
Dipping in winter	4.05	0.132
Dipping using knapsack	0.26	0.876

not significant ( $P>0.05$ ); significant ( $P<0.05$ )

### Constraints to Cattle Production in Zaka District

From this study, the constraints faced by farmers include lack of capital, feed, housing, theft, predation, market, diseases and mortality (Figure 4). Farmers face financial problems to implement good management practices such as breeding programmes. Mashoko et al. (2007) also found that capital is one of the constraints that hinder productivity in small holder farmers. Farmers in Zaka reported that lack of finances also affected their eagerness to venture into activities such as pen fattening and buying

new breeding bulls. Since the cattle mainly depend on rangeland for nutrition, therefore, feeding is one of the main challenges that farmers in Zaka experienced. All farmers ranked feeding as the second constraint and disease prevalence was the first. Masikati (2010) reported that the natural veld in communal areas that are degraded and invaded by undesirable species such as giant rats-tail grass (*Sprobolus pyramidalis*). Ngongoni et al. (2007) also found that there is limited forage availability in communal areas affecting calving interval since the cows experienced a prolonged postpartum anestrous and the results are low productivity. Farmers also reported that high prevalence of diseases and parasites in the district even though the veterinary department are involved in control of diseases the resources are not adequate. Mavedzenge et al. (2006) also found that the main constraints in communal areas were high prevalence of diseases and parasites. Other constraints included predation (1.3% of the respondents) which was experienced in mountainous ward of Zaka district due to stray hyenas which attack calves at night. Farmers overcame the problem by constructing strong calf houses and use of fire at night. Farmers in Zaka also complained of unavailability of proper cattle market to sell their cattle. These farmers do not necessarily keep cattle for sale (Bidi et al., 2015) so they are erratic cattle sellers. Other challenges reported were housing and theft which were rare cases in the district because of strict police force which ensure minimum incidence of stock theft.

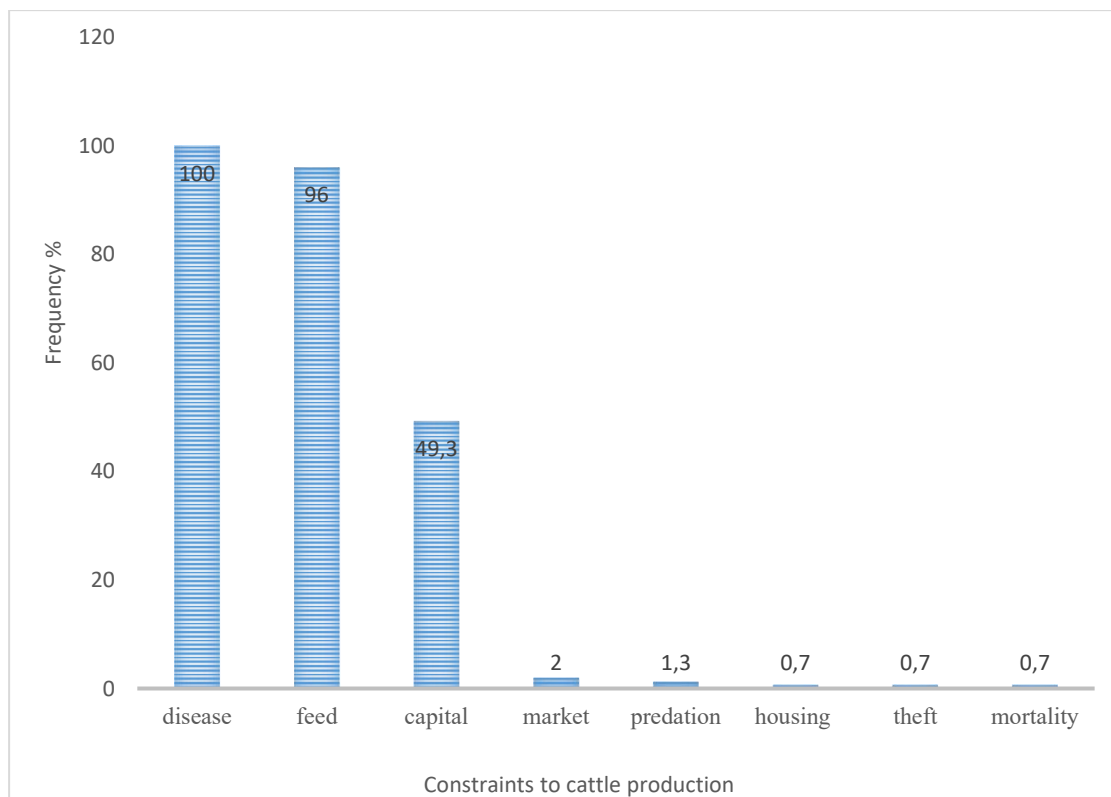


Figure 4. Constraints to cattle production in Zaka

## **CONCLUSION and RECOMMENDATION**

Farmers in Zaka district managed their cattle using improper methods in nutrition and breeding and also in health management. Farmers supplemented cattle using crop residues usually maize stover. Uncontrolled breeding was practiced and no record keeping was practiced by farmers. Both traditional and conventional methods were used on health care of cattle in Zaka. The main constraints were diseases, feed and capital. Further study is proposed on available feed resources in Zaka district so as to improve nutrition and also on available ethno-veterinary medicines so that farmers can access cheaper medicines. Technical support on proper breeding strategies is also recommended in Zaka communal area.

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## **Conflict of interest**

The authors have declared that there are no competing interests.

## **Authors contribution**

MC conceptualized the idea and wrote the paper, TB and JC collected the data, RK analyzed the data and development of figures, AT supervised the project and did the editing.

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