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Analysis of factors influencing cattle off-take rate and marketing in Ndiyona constituency of Kavango region, Namibia

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This paper presents an estimate of the cattle off-take rates in Ndiyona constituency of the Kavango region, north eastern communal area of Namibia and identifies marketing channels and strategies used by small-scale livestock farmers. The study used Ordinary Least Squares (OLS) to identify factors influencing cattle off-take rates. The results showed that cattle off-take rate of 6.14 percent for Ndiyona constituency that is below the official off-take rates for the rest of the country (20%), above the estimated cattle off-take rate for the northern communal areas (2%). The study concludes that type of farming and the quarantine marketing channel contribute negatively to cattle marketing in Ndiyona constituency, hence relatively lower off-take rates, while number of cattle owned by the farmers has positive impacts on cattle marketing.

Key words: marketing channel, livestock off-take, market information, smallholder farmers.

INTRODUCTION

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Worldwide it is estimated that 600 million people keep livestock, out of which 75% of these people live in rural areas (Kruger and Lammerts-Imbuwa, 2008). This implies that livestock is an important part of agricultural development. The increase in incomes, the increase in number of consumers, their purchasing power and technological advancement dictating the need to expand market opportunities for smallholder livestock producers in communal areas (Bahta and Bauer, 2007). The increasing demand for livestock products should not be seen as challenge only, but rather as opportunities to the reduction of poverty among rural households in areas with good potential in livestock production (Kruger and Lammerts-Imbuwa, 2008).

Cattle farming in Namibia are the main agricultural production sector in the country of which the value of production is annually estimated at N$900 million, and of which approximately 44.4% is being weaner exports. In 2006, the total number of cattle was estimated to be 2.3 million (Meat Board of Namibia, 2007). Livestock play a vital role in the livelihoods of many people living in Namibia by providing economic and nutritional benefits (Teweldemedhin and Conroy, 2010). Although Namibian agriculture contributed only about 6% of the country's gross domestic product (GDP) for the past five years, about 70% of the Namibian population in subsistence sector depends on agricultural activities for livelihood (Bureau of African Affairs (BAA), 2009). BAA (2009) stated that cattle production is predominant in the central and northern regions of Namibia with subsistence farming confined to the communal lands of the country's populous north, where cattle herds are prevalent. Kruger and Lammerts-Imbuwa (2008) states that more than 60% of the cattle in Namibia are found in the communal areas, of

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which 44% are found in the Northern Communal Areas (NCA).

Cattle owners in the NCAs of Namibia are able to sell their animals to the informal or indigenous market, or they can sell to the government-owned parastatal Meat Corporation of Nambia Ltd (MeatCo) (De Bruyn et al., 2001). Kruger and Lammerts-Imbuwa (2008) argue that the off-take rate of cattle through formal markets in NCAs, remain low at 2% compared to about an estimated 20% off-take for the rest of the country. Cattle owners in the NCA avoided using formals markets for variety of reasons; such as due to high transaction costs involved in the marketing of cattle, loss of condition (that is, weight and grading in the quarantine camps due to insufficient feed causing low prices (Kirsten, 2002) as well as due to long distances producers have to transport animals to quarantine camps (NOLIDEP, 2002). There are no studies carried out in Ndiyona constituency on cattle marketing and channels used by small scale farmers.

This study aims to identify factors that determine the cattle off-take rate in Ndiyona constituency of Kavango region, in NCA of Namibia. The research hypotheses that the cattle off-take rate for Ndiyona constituency is lower that of the areas south of the veterinary cordon fence.

Negassa and Jabbar (2008) defines off-take rate is usually defined as a percentage of sale or slaughter at the end or during a production cycle to the initial stock. Negassa and Jabbar (2008) noted that in smallholder mixed farming and pastoral systems, animals are kept for multiple functions and sale or other forms of disposal are not a common phenomenon, rather sales are sporadic based on immediate cash needs. In literature different methods are used in calculating off-take rates for smallholder mixed farming and pastoral systems (Sutter, 1987; Negassa and Jabbar, 2008). Sutter (1987) calculated cattle off-take as the total number of animal's sold, slaughtered plus ceremonial exchange transaction over a given period divided by total herd size. Negassa and Jabbar (2008) calculated off-take rate as net commercial off-take rate which is given as the sales minus purchases made by the households as a percentage of the average stock. That is:

$$\text{Net commercial off-take rate} = \frac{Sales - Purchase}{0.5(Openings\ Stock + Ending\ Stock)} \times 100$$

The net commercial off-take rate could be negative for net buyers, zero for those whose sales and purchases are equal and those who are not engaged in market and positive for net seller (Negassa and Jabbar, 2008). This study calculated cattle off-take rates as the number of animals marketed as a percentage of total animals kept.

Montshwe (2006) argued that the reasons for keeping cattle differs between communities and largely determine the strategies, interventions, demand and supply and development of opportunities. Montshwe (2006) revealed that the role of cattle in a traditional system is still under rated. According to Musemwa et al. (2008) rural households depend on cattle for their milk, meat, hides, horns and income. In addition cattle provide dung for manure, fuel and floor seal; draught power for crop cultivation and transport in communal areas and are a source of employment, collateral and insurance against natural calamities (Musemwa et al., 2008, Montshwe, 2006). In their study, Musemwa et al. (2008) added that cattle are an inflation free form of banking for resource-poor farmers and can provide cash when sold to meet family financial needs such as school fees, medical bills, village taxes, household bill, etc. Similarly, the study by Duvel (2002) identified the main reasons for keeping cattle in Northern Namibia, these include as a source of income, source of milk, draught and social status.

Within rural communities, cattle owners do not sell very often sell cattle mainly during festive seasons and the beginning of the school year (Nkosi and Kirsten, 1993). According to Nkosi and Kirsten (1993) and Duvel (2002), there is a clear preference or tendency among cattle farmers to sell their cattle when they are old. Cattle farmers prefer selling older cattle because the younger ones (females) are used for breeding purposes. Nkosi and Kirsten (1993) emphasized that the reasons for selling differs between regions, farmers and are also determined by institutions responsible for enhancing and promoting livestock. Therefore, to understand the off-take of small-scale farmers it is important to clearly understand the reasons why farmers sell, and also why they prefer certain marketing channels.Cattle producers in communal areas use a number of channels to market or sell their livestock. Each marketing channel has its own advantages, disadvantages and constraints (Nkosi and Kirsten, 1993). Schmitz et al. (2003), notes that marketing channels available to small-scale producers are still limited. Montshwe (2006) made the obvious point that, in rural areas, market outlets are not diversified at household level. Market outlets are available to cattle producers in developing areas includes private sales, auctions, butcheries, abattoirs, and speculators. Moreover, small-scale cattle farmers are faced with a number of challenges. Bahta and Bauer (2007) identified lack of market access, poor access to market information, poor infrastructure in rural areas, and low level of tacit knowledge. Musemwa et al. (2008) argued that cattle farmers in the communal areas fail to attract buyers in their communities due lack of marketable numbers and poor conditions of livestock. Furthermore, Musemwa et al. (2008) stated that group marketing, decentralization of cattle information centres and the involvement of small-scale farmers in the dissemination of information plays a vital role in improving farmers' access to formal markets.

MATERIALS AND METHODS

Study area

The study was conducted in Ndiyona constituency situated in north-

Table 1. Independent variables and their expected signs.

Variable	Sign
Age	±
Household member as dependents	±
Employment status	±
Short courses attended (market information)	+
Type of farming	±
Reasons for keeping cattle	
Household consumption	±
Draft power	-
Ownership	-
Reasons for selling	
Pay school fees	±
Private sales	+
Quarantines	±

eastern communal area of Namibia about 100 km from Rundu, the regional administrative town in, Kavango region. Population census of 2001 showed that Kavango region has a population of about 202,694 inhabitants and Ndiyona population is about 19,595 people. Farmers in Ndiyona constituency mainly rear cattle under communal land production system and also practice mixed farming (crops and livestock). In Ndiyona constituency, farming contributes about 58% of household income.

Sampling

The study applied the Rapid Rural Appraisal (RRA) techniques to identify important population characteristics. A random sampling method was used to select 15 villages; Nyangana, Mukekete, Ndiyona, Shipando, Shikoro, Rucara, Katere, Sharughanda, Kashira, Makena, Shamvura, Shinyungwe, Mbwata, Livuyu, and Korokoko. The local extension technicians/ officers and farmers association's officials were used to select about 7 farmers actively participating in livestock marketing activities from each village. A semi-structured interview was conducted with 105 farmers at their farms/villages.

Data collection and analysis

Data were collected using questionnaires that were administered through face-to-face interview by the researcher and local agricultural extension officers. The following data was collected; total number of cattle sold per time, age of the farmer, dependent household member, employment status, short courses attendance, type of farming, reasons for keeping cattle (household consumption, draft power, cattle owned by the farmer), reasons for selling (boast household consumption, paying school fees) and marketing channel used (private sales). The study used a multiple linear regression model to identify factors that influence number of cattle sold per time. Descriptive statistics were used to summarize the patterns in the sample response and to identify farmers' choice of marketing channels. The study employed an Ordinary Least Squares (OLS) to model linearity relationship between the dependent and independent variables and it is assumed that the both the dependent and independent variables are independent of the error term. The functional form was specified as follows:

$$TNCS = \alpha + \beta_1 Age + \beta_2 HHDM + \beta_3 EMPS + \beta_4 SCA + \beta_5 TOFA + \beta_6 RFFC + \beta_7 RFS + \beta_8 MCU$$

Where, TNCS is the total number of cattle sold, Age of the farmer, HHDM is the dependent household member, EMPS is employment status, farming experience, SCA is short courses added, TOFA is type of farming, RFKC is reasons for keeping cattle (household consumption, draft power, cattle owned by the farmer), RFS is reason for selling boast household consumption, paying school fees), MCU is for marketing channel used (private sales). The α value illustrates the independence of the variables holding the explanatory variables constant, while β measures the short-run response of the same percentage factor increase across all individual variables in the model.
These variables and their expected signs are summarized in Table 1.
As indicated previously, livestock insurance adoption in Ndiyona constituency is not well established, therefore, the following factors are considered and their expected relationship or impact (Table 1):

1. Age: It is expected that older farmers are likely not to sell cattle because they hold on cattle for prestige and again they are likely to sell if their household size is big or increases.
2. Household member as dependent: It is expected to have positive or negative relationship with cattle off-take, because farmers with a large household will sell to meet the demand for their household need and the opposite is true.
3. Employment status: It is expected to have positive or negative relationship with cattle off-take, because farmers with alternative employment (as source of income) will sell less or not sell at all to meet the demand for their household need and the opposite is true.
4. Short courses attended (market information): It is expected to have positive relationship with cattle off-take, because farmers with relevant market information (when to sell, where to sell and prices) will sell to ensure good returns on their cattle.
5. Type of farming: It is expected to have a positive or negative relationship with cattle off-take, because farmers practicing mixed farming (crop and livestock) will sell or not sell if crop harvests are bad and the opposite is true.
6. Household consumption: It is expected to have positive or

Table 2. Summary description of gender in cattle farming in Ndiyona constituency.

	Gender	Communal farmers		
		Frequency	Percent	Valid percent
Valid	Male	76	72.4	72.4
	Female	29	27.6	27.6
	Total	**105**	**100.0**	**100.0**

Table 3. Summary statistics of reasons for selling cattle.

	Reasons	Communal farmers		
		Frequency	Percent	Valid percent
Valid	Pay school fees	42	40	40
	Cash for household	44	41.9	41.9
	Loan repayment	13	12.4	12.4
	Drought precaution	6	5.7	5.7
	Total	**105**	**100**	**100**

negative relationship with cattle off-take, because farmers with a large household are likely to sell to meet the demand for their household need and the opposite is true.
7. Draft power: It is expected to have negative relationship with cattle off-take, because farmers will prefer to keep cattle stock to aid with ploughing and draft in water collection.
8. Head size: *It* is expected to have negative relationship with cattle off-take, because farmers owns few or a large cattle stock individually tend not to sell and the opposite is true.
9. Pay school fees: It is expected to have positive or negative relationship with cattle off-take, because farmers with a large household will sell to meet the demand for school fee needs and the opposite is true.
10. Informal market usage sale: It is expected to have positive with cattle off-take, because farmers will sell if they sell privately than Meat Corporation of Namibia (Meatco) because they anticipate a higher price.
11. Quarantine ownership and access: It is expected to have positive or negative association with cattle off-take, because if farmers are the owners and have sufficient access, they are likely to sell and have desire to meet the demand for their household need and the opposite is true.

RESULTS

Table 2 shows the demographic statistics of Ndiyona constituency, and it shows that 72.4% of small-scale farmers are male and 27.6% are female farmers. This implies that cattle farming are dominated by male farmers in the constituency.

The study indicates that 82% of respondents prefer to sell their cattle to meet their household income needs (including paying of school fees), and to less extent for drought preparedness (about 5.7%) and little over 12% indicated the need for selling cattle to meet their loan obligations (Table 3).

Using the formula explained in background section, the off-take rate for Ndiyona constituency is 6.14%. This off-take rate is therefore higher than the official off-take rate for the Namibian Northern Communal Area (NCA) (2%) as given by MeatCo, but nonetheless it is below the off-take rate for the rest of areas south of the veterinary cordon fence (20%). The reason for this high off-take rate could attribute to the fact that the official off-take rates provided by MeatCo does not account for cattle sold through the informal marketing channels.

Table 4 indicates the results from the regression analysis, where the determinant of cattle sold (cattle off-take) by farmers in Ndiyona constituency is considered to be the dependent variable. It depicts that factors that are significant at 1% level variables explain about 50% of the total variation. The model shows that small-scale farmers can sell about 6.942 heads of cattle (significant at 1%. without any influence resulting from the selected variables.

DISCUSSION

As expected, an increase in mixed farming reduced small scale farmer's participation in cattle marketing. This is because farmers can sell crops or goats to generate cash, thereby decreasing the reliance on marketing of cattle. The results show that a unit increase in cattle owned will increase participation of farmers in marketing, therefore, large herds generate a higher marketable surplus than small herds. This is consistent with the study findings by Montshwe (2006) in South Africa and Nkhori (2004) in Botswana. In addition, an increase in small-scale farmers using quarantine as their marketing channel reduced participation in cattle marketing. This could be due to the fact that quarantined marketing channel is associated with slow speed of payments and high risk factor of animals being condemned on the basis

Table 4. Ordinary least square (OLS) estimates of independent variables for market off-take.

Independent variable*	Coefficients (Standard error)	t-Values
Type of farming	-2.895 (0.870)	0.001
Reasons for keeping cattle		
Ownership	0.024 (0.006)	0.000
Reasons for selling		
Quarantines	-0.571 (0.258)	
Intercept	6.942 (1.842)	0.030
R^2	50.1	0.000
Adjusted R^2	0.432 (1.034)	
Prob. (F-statistic)	0.000	
Number of observation	100	

*Reporting the significant variables only at 1% level.

of health status, thereby discouraging the participation of small-scale farmers in cattle marketing. This can also be attributed to high transaction costs and duration of keeping cattle for 21 days as supported by Duvel (2002). An important but often ignored factor influencing the ability of small scale farmer to market cattle on a regular basis is the distribution of cattle among households. According to the NOLIDEP (2002) project report, the assumption requires a minimum of 20 heads of cattle. The average head size for Ndiyona constituency is 24 heads of cattle. However, this average conceals the fact that a relatively large percentage of households do not won any cattle at all in the constituency. Montshwe (2006) made the obvious point that, in rural areas, market outlets are not diversified at household level. Kirsten (1993) private sales take various forms, the most prominent of which are bartering and cash sales. Musemwa et al. (2008) added that group marketing can assist farmers to enjoy economies of scale when using this channel, for it is not economical to sell one or two animals as transport costs will not be justified

In this study in 2002, Duvel identified that reasons for keeping cattle in Northern Namibia include source of cash for regular household support, source of cash for specific purposes, paying of tribal authority fines, source of milk, paying lobola, loaning cattle others, draft and transport, slaughtering for ceremonial feasts, investment, status and recognition, and generation of income (commercial).

Conclusion

Livestock sector in Namibia has a tremendous potential to contribute to much needed income growth in rural areas. Small-scale cattle sector in northern Namibia has not achieved its full potential due various factors including, amongst others, poor infrastructure, low off-take rates, insufficient training and markets information, traditional reasons, inadequate of institutional support, poor markets access, high transaction costs and so on. Many of the challenges fall beyond the scope of direct intervention by small-scale cattle farmers themselves and require interventions from both the industry role players (private sector) and the Namibian government. The study showed that small-scale farmers use different marketing channels that are probably attributable to their geographic location, accessibility and economic viability. The interesting observation from the study is that, although small-scale farmers keep cattle for different reasons, a relatively large percentage of small-scale farmers keep cattle as a source of income (sales). The off-take rate for Ndiyona constituency is generally low at 6.14% if compared to 20% value of the areas south of the veterinary cordon fence; however, it is above the official off-take rate for the NCA. Moreover an important but often ignored factor influencing the ability of small-scale farmer to market cattle on a regular basis is the distribution of cattle among households.

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