Bots. J. Agric. Appl. Sci. (2013) 9 (Issue 2) 75-81

BOJAAS

ORIGINAL RESEARCH

Measuring transaction costs in marketing cattle in Southern Botswana: A case study

Mahabile, M*
Department of Economics, Education and Extension, Botswana College of Agriculture, P/Bag 0027, Gaborone, Botswana

MM; conceived idea, designed study, collected data, analysed data and prepared manuscript

ABSTRACT

This study attempted to identify factors responsible for transaction costs that private and communal livestock farmers in the southern region of Botswana face. Sample survey data were used to estimate the parameters of a regression model. The equation postulated in the model was estimated with Ordinary Least Squares (OLS). Results obtained suggest that herd size, farmer age, wage (liquidity), and short term credit are determinants of transaction costs incurred by respondents. Secure tenure was also suggested as a determinant of transaction costs that could motivate farmers to increase supply of cattle to the abattoir. Respondents with private farms were found to have better access to the market and tended to incur less transaction costs when they market their livestock. It is suggested that government should (a) vigorously pursue the infrastructural development in Botswana as promulgated in the Agricultural Policy, (b) uphold private property rights to land where they already exist; (c) privatise open access grazing to individual owner-operators who have the resources (money) to do so and who will be required to keep an acceptable herd size and could be motivated to increase supply of cattle to the Botswana Meat commission (BMC), (d) where privatisation to individuals is not feasible, government should encourage users to convert the grazing into common property by subsidising (transaction) costs of defining user groups and the boundaries of their resources, and of enforcing rules limiting individual use and misuse of common property, (e) financial institutions be encouraged to offer short term credit for those farmers who need it and (f) the government should pursue converting the traditional marketing cooperatives into the New Generation Cooperatives (NGC) so as to reduce each producer's transaction costs.

Keywords Communal areas; marketing; livestock; Transaction costs; private farmers

Corresponding author: Email: mmahabil@bca.bw; Tel 3650410

*Post-humus

Publisher: Botswana College of Agriculture, Gaborone, Botswana

INTRODUCTION

This study was prompted by an outcry of poor supply of cattle to the BMC (Jefferis, 2007). The poor supply in cattle contributed to losses amounting to millions of pula in profits for several consecutive years (Botswana Meat Commission, 2000). Producers claimed, among other factors, that producer prices were not attractive enough and that transaction costs to the abattoir were prohibitive (Fidzani, 1993; Mahabile, 2008). Consequently, producers resorted to supplying their cattle to local butchers and middlemen who paid them at the point of delivery.

The livestock sector in Botswana is characterized by two distinct systems of keeping cattle namely; the communal grazing or cattle post system and private grazing or ranching. While the former is an open access resource that accounts for 87% of cattle and 98% of farmers, the latter is characterised by secure and exclusive land rights and accounts for 13% of the national herd and five percent of the land area (Mahabile *et al*., 2008; Ministry of Finance and Development Planning, 2003; Statistics Botswana, 2012). An open access resource means that users have unrestricted use to the resource. Local Land Boards do not enforce limitations on maximum stocking rates in communal areas (Carl Bro International, 1982). In addition, water rights assigned to farmers in communal areas do not impose any restrictions on the volume of water used or the number of livestock kept by stock owners (Mahabile *et al*., 2005). High stocking rates in communal areas have been linked to high soil erosion, land degradation, low off-take rate and a general decline in Botswana's national herd from three million in the early 1980's to about 2.2 million in the 2008 (Ministry of Agriculture, 1991; Statistics Botswana, 2012).

Beef producers in Botswana have a number of marketing outlets where they can sell cattle; these include direct sales to the BMC, sales to the BMC through Cooperatives or middlemen and sales to the butchers, traders and other farmers. Farmers can choose to sell all, a proportion, or none of their cattle through any of these outlets for one reason or another. Factors affecting selection of marketing channel(s) have never been satisfactorily evaluated. Transaction costs associated with alternative marketing channels are important (Hobbs, 1997) in that they can constrain the marketing channel chosen by producers.

Livestock, especially cattle are a major source of income, employment, meat and milk and provide a store of wealth (Ministry of Finance and Development Planning, 1996) especially in rural areas. Exports of beef account for most of the foreign exchange earned from agriculture because arable farming is severely constrained by erratic and unreliable rainfall (Behnke, 1987; Ministry of Agriculture, 1991*).* Cattle offer a hedge against inflation and can be readily converted into cash in times of need (Mahabile*, et al.,* 2008). The livestock sector therefore remains Botswana's largest contributor to agricultural exports (Statistics Botswana, 2012).

The theory of transaction costs and its measurement

The concept of transaction costs in Transaction Cost Economics (TCE) is said to date back to Coase (1937) who first discussed the concept of transaction costs. Others, such as Williamson (1996) and North (1995) refined this concept to become an important research topic of the New Institutional Economics (NIE). There is no universal definition of transaction costs. According to Coase (1993); Hobbs (1997) and Degla (2012), transaction costs are the costs that are associated with the use of the market and/or price mechanisms. They are composed of costs related to negotiating goods transactions, price search, costs of enforcement and the control of agreed contracts. Other costs include administration costs (Coarse, 1993) which other researchers such as Williamson (1990) term "bureaucracy costs" and are the costs associated with the internal running of an organization. These costs are incurred if one chooses to use a local market like a butcher instead of the central market such as the Botswana Meat Commission at Lobatse. Using a central market will consequently reduce transaction costs.

It is observed that in NIE, markets are imperfect due to the existence of transaction costs. The result is that producers face different effective prices (North, 1995). Consequently, farmers end up using resources differently and could eventually refrain from market transactions if their equilibria for production of commodities (for example, beef) fall within their price band. Alternatively they could choose to use a contract (with a local butcher) in order to achieve transactions at a lower cost than through a market. Productivity gains can be achieved by reducing transaction costs; thus allowing better growth. In many developing countries such as Botswana, markets fail because of high transaction costs associated with these markets such that it is more profitable for producers to carry a transaction through other institutional arrangements other than that of the market (Hobbs, 1997). Transaction costs are distinctly different from production costs because production costs are only incurred during the production of a good.

In beef sales, especially to the BMC, transportation and communication costs are an integral part of transaction costs. The poor roads and unreliable conditions of trucks are likely to lead to frequent breakdown of trucks and this creates uncertainties of whether all the cattle would reach the abattoir in good condition. This situation has been observed by Shiimi *et al* (2010) in north-central Namibia. Cattle reaching BMC in poor body condition fetch lower prizes or are condemned and this is assumed to be an opportunity cost of such an event occurring. Producers incur high costs, creating a wide variation in producer prices either from BMC abattoir or local traders. A recent study in Botswana (Nkhori 2004) identified herd size and access to market information as factors positively influencing sales to BMC in Mahalapye area. In that study, delayed payment, grade uncertainty and increase in distance to market were also found to be negatively associated with selling cattle to BMC.

When producers are faced with high transaction costs they may not get the benefits of trade. Hobbs (1997) argues that high transaction costs prohibit farmers to participate in the market. In most cases this phenomena is experienced mostly by resource-limited farmers. Makhura, (2001) found that the size of a household influences transaction costs, with larger families tending to increase transaction costs. Land tenure status was also found to influence transaction costs. There is little known research (Nkhori 2004; Mmopelwa and Seleka 2011) for livestock marketing concerns in Botswana. Therefore the objective of this study was to identify factors responsible for transaction costs incurred by private and communal livestock farmers in the Southern Region of Botswana when marketing their livestock to BMC.

METHODOLOGY

Study site

The data was gathered in a stratified random sample survey of 96 livestock owners in the Southern Region of Botswana during 1999/2000 to elicit information about livestock marketing. The Southern Region is representative of most other cattle-farming regions in terms of terrain, rainfall patterns and population characteristics (Ministry of Agriculture, 1980). It has a good mix of communal and private grazing land. Four representative villages of Sekoma, Samane, Keng and Maokane were selected for this study. Rainfall in this region is typically low, averaging about 430 mm *per* annum (Vossen 1990) The study area comprised of two strata, one for communal farmers and the other for private farmers to account for variation in land tenure arrangements. Households with cattle were identified and listed, and a simple random sample was drawn from each list. A total of 65 communal farmers and 31 private farmers were interviewed using a pre-tested structured questionnaire. All sampled farmers were participating in cattle marketing during the period the study was conducted. Before enrolling them in the study, consent was verbally sought from the farmers. Although a larger sample (n=150) was drawn, several of the selected farmers were not willing to participate in the survey and some had left the study area. Additional cases were not selected owing to the high cost of travelling long distances between farmers, especially those on private ranches. Roads to some of the private farms were not in good condition.

Data Collection

Interviews were conducted over a period of nine months with the assistance of four enumerators who speak both Setswana (local language) and English. Questions were addressed to the household head in all cases. In cases where the head of the household was not found, another visit to the farmer was arranged.

Data analysis

The data was captured in a computerised database, and analysed using the Statistical Packages for Social Science version 10 (SPSS, 1999). Estimate of mean herd size, herd composition, off-take, calving and mortality rates compared favourably with national and regional statistics obtained from the Ministry of Agriculture, (2000), Central Statistics Office (2005) and the Botswana Meat Commission (2000). Independent t-tests were calculated to check for significant differences between group means of private and communal farmers (SPSS, 1999; Gujarati, 1995; Koutsoyannis, 1977). Land tenure status was measured as a dummy variable scoring one for private farmers and zero for communal farmers. Zero-order correlation coefficients were also computed to assess the degree of linear association between pairs of variables relevant to the objective of the study. Variables that were strongly correlated were subjected to Principal Components Analysis (PCA) or the one not significant was removed to reduce multicollinearity between explanatory variables included in the regression model. The model was estimated using Ordinary Least Squares (OLS) following studies by Hobbs, (1997) and Degla, (2012).

Conceptual model

An econometric model was estimated to test the hypothesis relative to determinants of transaction costs generated in the marketing of livestock in Botswana. The model follows that of Mburu, *et al.,* (2003) and Degla, (2012). The OLS regression model was postulated as follows:

$$Y = \beta_0 + \sum_{i=1}^{k} \beta i Xi + \sum_{j=1}^{p} \beta j Xj + u$$

Where Y is the dependent variable, Xi represent variables representing demographic characteristics of farmers and Xj are other exogenous variables assumed to be determinants of transaction costs.

The general specification of the model therefore is: $Y(transcost) = \beta_0 + \beta_1 age + \beta_2 edu + \beta_3 married + \beta_4 wage + \beta_5 sex + \beta_6 family + \beta_7 tenure + \beta_8 exp + \beta_9 shcred + \beta_{10} inboreval + \beta_{11} herd + u$

where the endogenous variable (transcost) represent transaction costs *per* livestock unit and the exogenous variables are age, education, experience, marital status, wage, family size, land tenure status. Herd, shcred and lnboreval are separate measures representing herd size, short term credit and logarithm of borehole value respectively. The coefficient βo represent the intercept while $\beta_1, \ldots \beta_{11}$ are coefficients of regression that are to be estimated and u is the disturbance term (Table 1).

The sign of the coefficient of each of the exogenous variables listed in the model could either be positive or negative depending on the influence on the level of transaction costs (Degla, 2012). It can therefore be hypothesised that each of the variables education, tenure, short term credit and logarithm of value of the borehole stated in the model above will be positively associated with the transaction costs; hence the positive (+) sign. The other variables such as age, marital status, experience and sex are expected to have a negative influence and therefore a designation of a negative (-) sign (Table 1).

It was further assumed that transaction costs include the opportunity cost of total time that the farmer takes to gather information about when quotas would be offered, negotiate with the transporter on when cattle are to be transported to the market (if hired transport is used), arrange with the Veterinary Officer and Police officials for registration and inspection of cattle before loading them to the abattoir respectively. It also includes other related expenses such as costs of trekking cattle to the nearest cattle loading facility.

The study was undertaken after a research permit was granted by the Office of President (OP).

RESULTS

Demographic characteristics

Table 2 summarises important attributes of sampled farmers and their households. The group means and their t-values of the variables are stated below. No significant differences were detected between the average age, gender and family size among the farmers.

Herd productivity and investments made by private and communal farmers presented in Table 2 show that average herd size is substantially larger on private farms, as is annual transaction costs *per* livestock unit (LU). The regression results presented in Table 3 show estimates of the regression model.

DISCUSSION

Most livestock farms are managed by older, married men who reside on-farm with their (large) rural families, and who regard livestock farming as their main occupation. These findings are consistent with results from earlier studies in Botswana by Mahabile (2006); Fidzani (1993) and Panin and Mahabile (1997). Despite similarities in demographic trends among farms, private and communal farmers in the present study differed on some important household attributes. Private farmers have much greater and significant stock of human capital in terms of formal education and farming experience. In addition, private farmers have much larger cash inflows from wage remittances and livestock sales, and are therefore more liquid than communal farmers. These results probably suggest the importance of private property ownership in farming.

Table 1.Description and signs of the variables

Variable	Description	Expected sign
Endogenous variable		
Transcost	Transaction cost per livestock unit	
Exogenous variable		
AGE	Age of household head in years	-
EDU	Years of formal schooling completed by the household head	+
EXPER	Number of years in farming	-
MARRIED	A dummy variable scoring one for married heads and a zero otherwise	-
WAGE	Amount earned by the household head in pula	-
SEX	A dummy variable scoring one for male and zero otherwise	-
FAMILY	Size of household	-
TENURE	A dummy variable scoring one if land is privately owned and zero if it is open access communal resource	+
SCHRED	Short term credit acquired by the household	+
LNBOREVALI	Natural log of one plus the present value of investment in boreholes measured in pula	+
HERD	Herd size	+

. Therefore, government should vigorously support farm infrastructural development in all the regions of Botswana as promulgated in Agricultural Policy of 1991 as well as private property rights.

Contrary to Barnes *et al.,* (2008)*,* both the calving and off-take (i.e. sales plus slaughter) rates are much higher on private farms than amongst communal farmers. This is consistent with findings reported by Behnke (1987); Scoones (1992) and the Central Statistics Office (2005). In the present study mortality rate is lower on private farms where farmers practise de-worming, vaccination, supplementary feeding and dipping against tick-borne diseases (Table 2). Communal farmers tend to have fewer calves and bulls *per* cow than do private farmers. This mismanagement in reproduction results in low conception rate and calving. Decisions about stocking rates and investment (in operating inputs and improvements to land and herds) are adversely affected by insecure property rights to open access grazing (Mahabile 2006). For instance, farmers in communal grazing may be reluctant to invest in a quality bull as it may serve cows of other farmers in the neighbourhood than his or hers. Unable to internalise benefits, maximise profits, or raise loan to finance fixed investments, communal farmers tend to keep cattle as a store of wealth rather than as a commercial enterprise (Jarvis, 1980).

The observed adjusted R^2 value implies that 88% of the variation in transaction costs could be explained by the specified exogenous variables in the model. This compares well with other studies such as Hayes *et al*, (1997) and Matangul *et al*, (2001) and confirms the goodness of fit of this model. . The signs of the exogenous variables are as expected and compares well with those of Degla, (2012). The regression coefficients estimated for age, gender, marital status, education and experience are negative, suggesting an inverse relationship with transaction costs. The results of the present study suggest that as farmers get old, their transaction costs reduce and vice versa. This is consistent with similar studies such as Degla (2012). The older the farmer, the higher the probability of selling more because older farmers have larger herds, accumulated over many years (Nkhori 2004) and this has the effect of spreading transportation and other handling costs over many animals. In addition, since older farmers are relatively more experienced, they are more likely to have established contacts with buyers (Mmopelwa and Seleka 2011) and are able to obtain market information, thus reducing transaction costs. Shiimi *et al* (2010) suggested that the use of ITC could dramatically increase the ability to share information, and in Botswana, BMC is already sharing information about cattle pricing with farmers through cellphone and internet technology. This could be extended to social media technology such as Facebook to reach young beef farmers.

As expected, liquidity as proxied by wage was negative suggesting that farmers with liquidity are more networked and are likely to make proper arrangements for marketing and therefore are in a better position to pay for transaction costs. Farmers with liquidity have access to transport, telecommunication facilities than those without. Therefore government should create conditions for cheaper marketing channels for livestock farmers. Herd size in the present study appears to be a major determinant of transaction costs. In contrast, households with large herds are able to sell to BMC in large quantities (Nkhori 2004; Mmopelwa and Seleka 2011), thus spreading fixed transaction cost over larger revenue (Nkhori 2004). Due to the lack of ability to spread fixed costs of transacting with BMC, farmers with small herds usually assemble their few animals with cattle agencies and/or cooperatives to sell to

BMC (Nkhori 2004). This calls for the resuscitation of traditional cattle cooperatives and transforming them into New Generation Cooperatives in order to reduce transaction cost of mostly 90% of cattle farmers who reside in rural areas. The regression coefficient for tenure suggests that private farmers have better access to the market and therefore incur less transaction costs as opposed to their counter parts. Therefore government should consider revising land tenure for livestock farmers or revisit and implement the Agricultural Policy of 1991.

Table 2. Descriptive statistics for demographic characteristics and productivity indicators of stockowners in the southern region of Botswana, 2000 (n=96)

Variable	Communal Famers (n=65)	Private Farmers (n=31)	t-value
Average age (years)	52(32)	55(36)	1.37
Gender (% male)	95(2.55)	94(1.44)	0.40
Average size of household (No)	7(19.54)	6(19.44)	1.12
Married (%)	63(10)	97(30)	4.62**
Average years of schooling (years)	2(9.50)	10(14.66)	8.32**
Average years of farming (Years)	20(30.34)	31(70.23)	4.85**
Average monthly wage income (Pula[1])	715(2.62)	2308(2.49)	2.74**
Average herd size (LU)	30(7.31)	262(2.94)	2.59*
Calving rate (%)	35(10.10)	66(33.49)	7.75**
Off-take rate (%)	12(7.78)	20(6.65)	2.46*
Mortality rate (%)	5(4.72)	2(2.91)	2.15*
Supplementary feed cattle (%)	63(7.37)	80(16.25)	2.91**
Vaccinate (%)	38(6.19)	87(14.22)	5.74**
Annual transaction costs per LU (Pula/LU)	51(8.50)	620(2.20)	1.67*

* = P < 0.05; ** = P < 0.01;. LU = Livestock unit defined as a mature animal with live weight of 500 kg.
Estimates in parenthesis represent the coefficient of variation. [1] Pula = US$ 7.50 (2012 prices).

Table 3. Estimates of regression model for transaction costs of stockowners in Southern Region of Botswana

Equation	**Coefficient**	**Beta value**	**t- value**
Predictors			
Constant	76177		1.768**
Age	-16394	-0.137	-2.457**
Gender	-21597	-0.043	-0.856
Married	-14480	-0.41	-0.707
Family size	3767	0.065	1.223
Average years of schooling	-2604	-0.064	-0.860
Average years of farming	-5441	-0.029	-0.574
Average monthly wage income	-6.00	-0.113	-2.046**
Average herd size	761	1.165	17.865***
Tenure	-81163	-0.278	-3.409***
Short term credit	-2.81	-0.224	-3.704***
Log bore value	2623	0.108	1.499
Dependent variable	**Transaction costs**		
R^2	90		
Adjusted R^2	88		

***= P< 0.001. ** = P< 0.01.

Results on short term credit also suggest that credit is expected to enable farmers to increase their access to the market and therefore reduce their transaction costs. Therefore financial institutions should be encouraged to offer short term credit to those farmers who need it. The regression coefficient estimated for the logarithm of value of borehole in this study implies that availability of a fixed resource such as a borehole has no effect on transaction costs. However a recent study (Mmopelwa and Seleka 2011) found out that a farmer who owns a borehole is expected to sell more cattle to finance the costs associated with running and maintaining the borehole. Selling more cattle may reduce transaction cost due to spreading transport and handling cost over many animals.

CONCLUSIONS

Results of the regression analysis suggest that herd size, age, wage, and short term credit are determinants of transaction costs. Secure tenure is also a determinant of transaction costs. Respondents with private farms have better access to the market and tend to incur less transaction costs when they market their livestock.

It is recommended that government should (a) vigorously pursue the infrastructural development in all the regions of Botswana as promulgated in the Agricultural Policy, (b) uphold private property rights to land where they already exist; (c) privatise open access grazing to individual owner-operators who have the financial resources (money) to do so and would hopefully keep acceptable herd sizes and (d) where privatisation to individuals is not feasible, government should encourage users to convert the resource into common property by subsidising (transaction) costs of defining user groups and the boundaries of their resources, and of negotiating and enforcing rules limiting individual use of common property, (e) financial institutions should be encouraged to offer short term credit to those farmers who need it and (f) the government should pursue converting the traditional marketing cooperatives into the new Generation Cooperatives (NGC) so as to reduce each producer's transaction costs).

Acknowledgements

The author is grateful to an anonymous reviewer for the useful comments and input made on this paper. The researcher also thanks the private and communal farmers of the Southern region of Botswana who provided this valuable data.

Conflict of interest None

REFERENCES

Barnes, J. F., Cannon, J., and Macgregor, J. (2008). Livestock production economics on communal land in Botswana. Effects of tenure, scale and subsidies. *Development Southern Africa,* 25: 327-345.

Behnke, R. (1987). Cattle accumulation and the commercialization of the traditional livestock industry. *Agricultural Systems*, 24:1-29.

Botswana Meat Commission (2000). Botswana Meat Commission Annual Report (2000). Gaborone, Botswana.

Bardhan, P. (1989). The New Institutional Economics and Development Theory. A brief critical assessment. World Development 17:1389-1395.

Carl Bro. International (1982). Livestock Management and Production in Botswana. Government Printer, Gaborone.

Central Statistics Office (1995). Botswana Agricultural Census Report. Government Printer, Gaborone, Botswana.

Central Statistics Office (2005). Botswana Annual Agricultural Survey Report. Government Printer, Gaborone, Botswana.

Statistics Botswana (2012). Annual Agricultural Survey Report 2007 and 2008 Government Printer, Gaborone, Botswana.

Coase R.H. (1937). The nature of the firm. *Economica* 4 386-405.

Coase R.H. (1993). Das Problem der sozialen Kosten. In *Ökonomische Analyse des Rechts*, eds. H.-D. Assman, C. Kirchner, and E. Schanze, pp. 129-183. Tübingen.

Degla, P.K. (2012). Transaction costs in the Trading system of cashew nuts in the north of Benin. A field study. *American Journal of Economics and Sociology*, 71:277-297.

Fidzani, H. (1993). Understanding Cattle Off-take Rates in Botswana. Unpublished Ph.D. (Economics) thesis, Boston University, U.S.A.

Hayes, J., Roth, M., and Zepedu, L. (1997). Tenure security, investment and productivity in Gambian agriculture: A Generalized Probit Analysis. *American Journal of Agricultural Economics*, 79:369-382.

Hobbs, J.E (1997). Measuring the Importance of Transaction Costs in Cattle Marketing. *American Journal of Agricultural Economics*, 79:1083-1095.

Jarvis, L.S (1980). Cattle as a store of wealth in Swaziland: Comment. *American Journal of Agricultural Economics,* 62:606-613.

Jefferis, K. (2007). Price responsiveness of cattle supply in Botswana. U.S. Agency for International Development/Southern Africa. USAID Contract No. 690-M. 00-04-00309-00 (GS 10F-0277P). USAID/Southern Africa.

Mahabile, M. (2008). The effect of land policy on cattle productivity in Botswana: An application of Principal Component Analysis. *Botswana Journal of Agriculture and Applied Sciences*. 4: 110-118.

Mahabile, M. (2006). Determinants of herd productivity in Botswana. A focus on land tenure and policy. PhD thesis, Department of Agricultural Economics, Pietermaritzburg: University of Kwazulu Natal.

Mahabile, M., Lyne. M.C. and Panin. A. (2005). An empirical analysis of factors affecting productivity

of livestock farmers in Southern Botswana. *Agrekon*, 44: 99-117.

Makhura, M. (2001). Overcoming transactions barriers to market participation of small holder farmers in the Northern Province of South Africa. Unpublished Ph. D. thesis, University of Pretoria.

Matangul, P.M., Lyne, M.C. and Ortman, G.F. (2001). Transaction costs and crop marketing in the communal areas of Impendle and Swayimana, Kwazulu-Natal. *Development Southern Africa,* 18: 346-363.

Mburu, J., Birner, R. and Zeller, M. (2003). Relative importance and determinants of land owners's transaction costs in collaborative wild life management in Kenya. An empirical analysis . *Ecological Economics* 45: 59-73.

Ministry of Agriculture (1980). Agro-Pastoral production and communal use. A socio- economic study of the Bangwaketse. Government Printer, Gaborone, Botswana.

Ministry of Agriculture (1989). Agriculture Sector Assessment. A Strategy for the Future Development of Agriculture in Botswana. Government Printer, Gaborone, Botswana.

Ministry of Agriculture (1991). Botswana's Agricultural Policy. Critical Sectoral Issues and Future Strategy for Development. Government Printer, Gaborone, Botswana.

Ministry of Agriculture (2000). Southern region veterinary report (2000). Gaborone, Botswana.

Ministry of Finance and Development Planning (1996). Financial and Economic Review of the Livestock Sector in Botswana. Government Printer, Gaborone, Botswana.

Ministry of Finance and Development Planning (1998-2003). National Development Plan 8. Government Printer, Gaborone, Botswana.

Mmopelwa, D. and Seleka, T. B. (2011) Factors underlying communal beef cattle marketing decisions in Botswana. The role of public and private transfer. BIDPA Working Paper # 30. ISBN 99912-65-37-6. Gaborone, Botswana

Nkhori (2004) The impact of transaction costs on the choice of cattle markets in Mahalapye District, Botswana. Msc Agric Dissertation. University of Pretoria, South Africa

North, D.C. (1995). The New Institutional Economics and Third World Development, eds. J. Harris, J. Hunter and C.M. Lewis. London: Routledge.

Panin, A. and Mahabile, M. (1997). Profitability and household income contribution of small ruminants to small-scale farmers in Botswana: *Small Ruminant Research*, 25:9-15.

Scoones, I. (1992). The economic value of livestock in the communal areas of Southern Zimbabwe. *Agricultural Systems*, 39:339-359.

Shiimi, T. Taljaard, P. R. and Jordaan, H. (2010) Transaction cost and cattle farmers' choice of marketing channels in north-central Namibia. Paper presented at the joint 3rd African Association of Agricultural Economists (AAAE) and 48th Agricultural Economists Association of South Africa (AEASA) Conference, Cape Town, South Africa, September 19-23rd 2010

SPSS (1999). Statistical Packages for Social Science. SPSS, Inc., Chicago, IL.

Williamson, O.E (1991). Comparative Economic Organisation: The analysis of discrete structural alternatives. *Administration Science Quarterly* 36: 269-296.

Williamson, O.E (1996). The mechanism of Governance. New York: Oxford University Press.

Vossen, P. (1990) Rainfall and agricultural production in Botswana. *Afrika Focus* 6:141-155