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## **The Impact of Cattle/Beef Prices on Incomes and Poverty in Botswana**

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## Introduction

The raising of cattle/beef prices to commercial/competitive levels (understood to mean, at a minimum, regional export parity) has been established as a necessary component of promoting the restructuring of the cattle sector and ensuring its viability, after many years of decline. This in itself would have benefits in terms of promoting economic growth and diversification, and strengthening the rural economy, which in most of Botswana has little other source of sustainable income. Reform of the cattle sector is also seen as having a potentially beneficial impact on poverty, by increasing the returns to an activity that is an important income source to some poor households. The purpose of this note is to explore the poverty-alleviation impact of the 40% increase in BMC cattle prices in early 2006 (and, by implication, the likely impact of any further price increases as regional export parity is achieved).

## The channels through which beef and cattle prices impact on poverty

Cattle & beef prices have an impact on poverty through a number of channels:

- raising the price paid for cattle increases the income earned by farmers from cattle sales; to the extent that costs are largely fixed (or change less than revenues), then any price increase has a positive impact on farmers' incomes;
- raising prices, or changing the structure of prices, may also induce a restructuring of the cattle sector, through a change in production methods (e.g. a shift towards weaner production, higher offtake rates, improved quality, etc.) which would further improve the returns from cattle farming; and
- higher employment and wage levels in the cattle sector.

All of the above will have a positive impact on incomes and living standards. However, this will be countered by a third channel:

- raising beef prices will reduce the living standards of households that are net beef purchasers, which would include most urban households.

In this note we explore these three channels using available data from national statistics on household composition, income levels, expenditure patterns and cattle ownership. Most of the data is derived from the 2002/03 Household Income and Expenditure Survey (HIES).

## Household Income Levels

In examining the above channels of impact we can start by considering the distribution of households across settlement types (cities/towns, urban villages<sup>1</sup> and rural areas), and income levels of households in these different settlement types. Table 1 below summarises information on household income levels across different types of settlement in Botswana.

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<sup>1</sup> An urban village is a settlement that is located on tribal land and has not been officially designated an urban area, but is of significant size (population over 5 000) and with less than 25% of its population engaged in agriculture.

**Table 1: Income Levels and Settlement Types (2002/03)**

Settlement type	Cities/ Towns	Urban villages	Rural areas	National
Total no. of households	109,556	121,321	163,395	394,272
% of households	27.8%	30.8%	41.4%	
Total household income (P/month)				
Mean	3,961	2,445	1,379	2,425
Lower 10	504	347	240	358
Median	1,949	1,334	743	1,344
Lower 90	9,635	5,520	3,105	7,030

Source: Central Statistics Office, Household Income and Expenditure Survey

The main points from the above table are that:

- (i) the majority of households reside in urban and urban village settlements; and
- (ii) there are clear differences in income levels across settlement types, with urban households enjoying average income levels between two and three times that of rural households (in other words, rural households are much poorer than urban and urban village households).

While no updated poverty figures have been published from the 2002/03 HIES, poverty rates have been calculated for various other studies. One set of calculations (carried out for a study on the Economic Impact of HIV/AIDS) shows clearly that poverty rates are much higher in rural than in urban areas.

**Table 2: Poverty Rates by Region**

Region	Poverty Headcount Rate (%)
Gaborone	0.07
Francistown	0.15
Other Cities & Towns	0.15
Rural South-East	0.33
Rural North-East	0.42
Rural North-West	0.46
Rural South-West	0.53
National	0.33

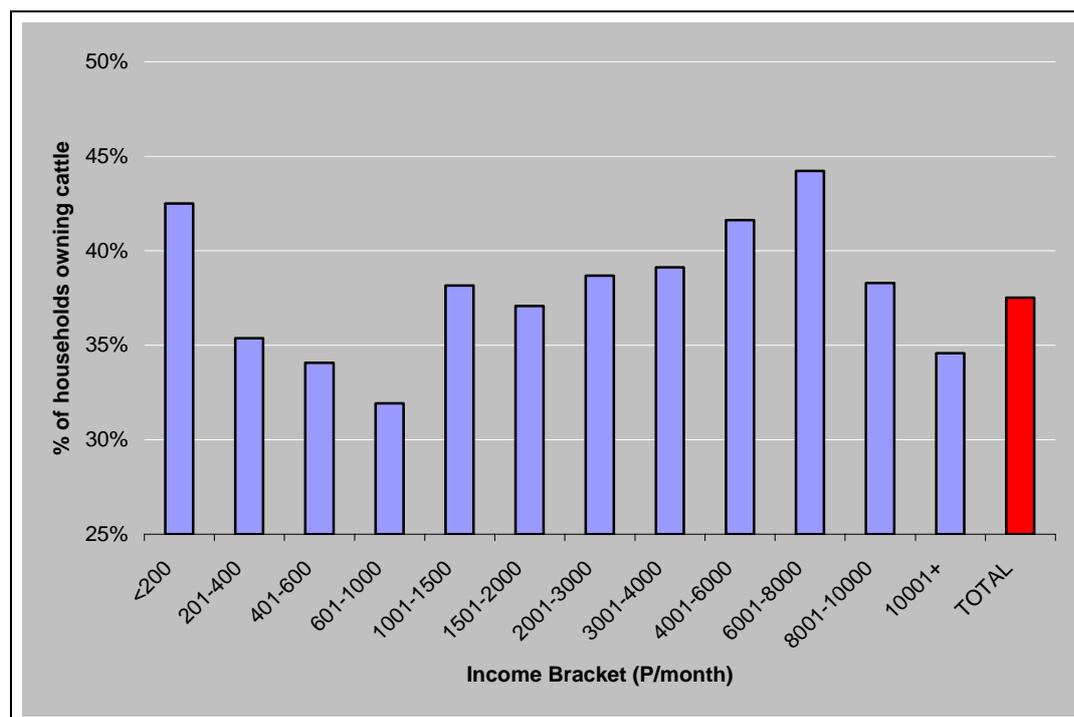
Source: analysis based on HIES 2002/03 data

### **Cattle Ownership by Income Level and Type of Farm (Land Tenure)**

The HIES also provides information on cattle ownership and income levels, which is summarised in Chart 1. The key results are:

- (i) there appears to be a positive relationship between income levels and cattle ownership across a wide range of incomes (i.e., cattle ownership rises with income across household income levels from P600 to P8000 a month);
- (ii) however, relative to this overall trend there is higher cattle ownership amongst very low income households, and lower cattle ownership amongst very high income households; and
- (iii) the majority of households do not own any cattle (62%).

**Figure 1: Cattle Ownership by Income Level (2002/03)**



Data on cattle ownership derived from agricultural surveys indicate that approximately 92% of the 2 million cattle estimated for 2003 are raised on “traditional” farms (i.e. on tribal land) and the remainder on “commercial” farms (i.e. on freehold land). However the traditional/commercial distinction is vague, as many of the farmers on tribal land have a fully commercial outlook (as opposed to holding cattle largely for cultural/traditional reasons, which is more common among smaller farmers, although even they have a commercial motivation as well). The data also show that almost half of the national herd (around 48%) is on farms with less than 50 cattle in total, and that 21% of the herd is on farms with 20 cattle or less.

### The Importance of Income from Cattle

The HIES data on cattle ownership by income bracket, along with information on cattle prices, enables us to estimate the contribution that income from cattle makes to overall income levels, shown in Table 3 below.

**Table 3: Proportion of income derived from cattle ownership, by income level**

Income bracket	<200	201-400	401-600	601-1000	1001-1500	1501-2000	2001-3000	3001-4000	4001-6000	6001-8000	8001-10000	10001+
All households	26%	9%	6%	3%	3%	2%	2%	1%	1%	1%	1%	1%
Cattle-owning households	62%	25%	18%	10%	7%	5%	4%	3%	3%	2%	3%	2%

Source: HIES and own calculations

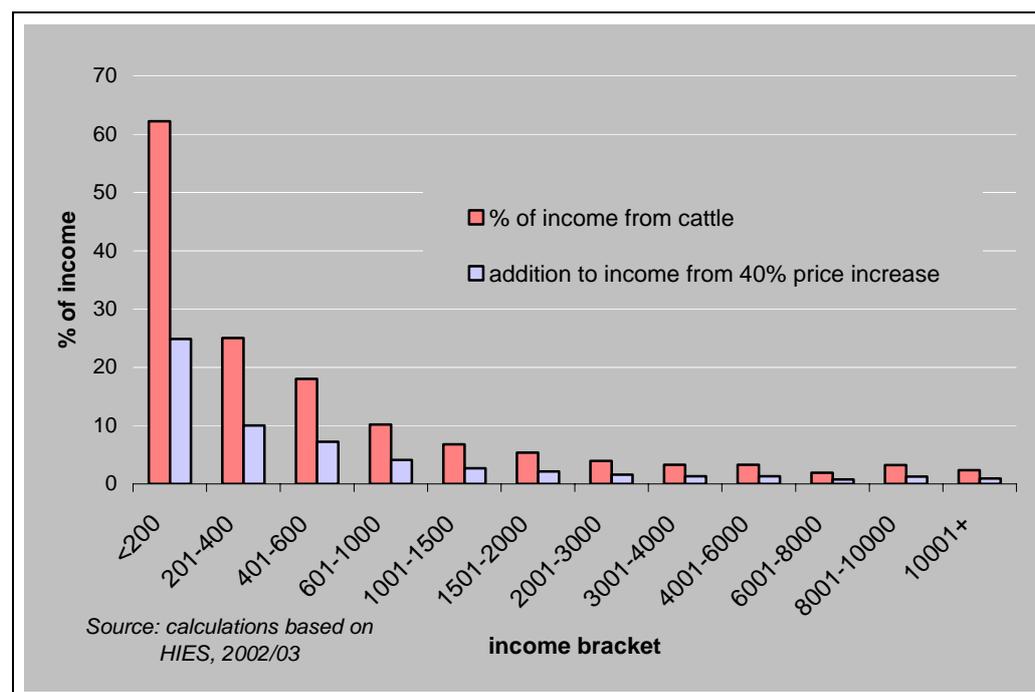
The key results are that:

- (i) the proportion of income that is derived from cattle is inversely related to income levels, i.e. income from cattle provides a greater proportion of total income for poorer households; and

- (ii) among cattle-owning households, income from cattle provides a significant proportion of income (10% or more) for households with incomes below P1000 a month.

The importance of income from cattle to the poorer cattle owning households clearly illustrates the impact of cattle pricing on the income of those households. An increase in cattle prices therefore has a potentially major impact on income levels. The estimated impact of the 40% increase in cattle prices on the income of cattle owning households is shown in Chart 2.

**Figure 2: The impact of income from cattle sales on the overall income of cattle-owning households, by income bracket**



### Impact of Beef Prices Rises on Real Income

While an increase in cattle prices can have an important positive impact on the income of cattle owning households, especially those in lower income brackets, the resulting increase in beef prices has a negative impact on the real income of beef consuming households. Data from the CSO's Consumer Price Index (CPI) consumption basket is shown in Table 4.

**Table 4: Expenditure on beef products as percentage of total consumer expenditure (2002/03)**

Cities/towns				Urban Village	Rural	National
Low income	Medium income	High income	All			
2.57	1.01	0.66	1.57	1.96	1.51	1.69

Key conclusions are that:

- (i) beef is an important consumption item, accounting for nearly 1.7% of total consumer expenditure nationally;
- (ii) in relative terms, expenditure on beef is more important in low income households; and

- (iii) expenditure on beef is more important in urban areas and urban villages than in rural areas (this may be due to importance of own consumption, which may not be accurately measured).

However, while beef is an important consumption item, it has been declining in relative terms; expenditure on beef fell by nearly 60% (as proportion of total spending) between the 1993/94 HIES and the 2002/03 HIES<sup>2</sup>.

Focusing on consumption alone, it is clear that any rise in beef prices would have a negative impact on real incomes. We can estimate that the 40% rise in prices in early 2006 reduced real incomes of urban poor by an estimated 1%, and overall incomes by 0.7%<sup>3</sup>.

### **The Overall Impact**

On the basis of the above, we can conclude that:

- (i) for cattle owning households, the (positive) income effect of higher cattle prices outweighs the (negative) expenditure effect of higher beef prices;
- (ii) for non-cattle-owning households, only the expenditure effect is relevant, and the impact on living standards is unambiguously negative;
- (iii) given that only a minority of households own cattle, a greater number of households experience a negative effect on incomes and living standards than those experiencing a positive impact;
- (iv) there is redistribution of income from non-cattle owning to cattle-owning households;
- (v) on the assumption that the majority of cattle are owned by rural households<sup>4</sup>, there is redistribution from urban areas to rural areas (the urban village impact is uncertain), which is positive as poverty levels are higher in rural areas;
- (vi) poorer cattle-owning households experience a greater positive impact on their incomes from higher cattle prices (compared to households as a whole), but poorer urban households experience a greater negative impact due to higher beef prices.

### **Poverty Impact and Second Round Effects**

The above analysis considers only the first round effects of higher beef and cattle prices. While we can estimate the income impacts on different groups (cattle and non-cattle-owning households, different income categories etc.), further analysis would be needed to evaluate the overall balance of impacts on incomes, and to evaluate the impact on poverty rates. Such analysis could be done with access to the source data from the HIES, which would enable the different impacts to be analysed at a household level, and calculations of the income impact relative to the relevant household-specific poverty datum line, and hence on overall poverty rates.

The above discussion only considers first round effects on incomes from cattle-rearing and expenditure on beef consumption. However, relative price changes, especially of this magnitude would be expected to have further effects, which in the long term are likely to be more important. These include:

- higher cattle prices stimulating investment in the cattle sector, resulting in expansion of production, employment creation and higher wages;

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<sup>2</sup> In 1993/94, beef products accounted for 3.8% of consumer spending

<sup>3</sup> On the basis of readily available data it is not possible to estimate the impact on poverty rates.

<sup>4</sup> Data on cattle ownership is not published by location of household, and while it would seem reasonable to assume that most cattle owning households are located in rural areas, there is undoubtedly significant cattle ownership by urban households, so this conclusion is tenuous.

- the stimulation of additional activities in the cattle sector, such as feedlots;
- higher incomes stimulating and additional economic activity in the rural areas (e.g., retail trade, construction, transport);
- a changed pricing structure favouring higher quality cattle/beef, which would in turn favour investment in improved breeding, better herd and range management etc.; and
- changed consumption patterns, resulting in further reductions in beef consumption and substitution by other meats (especially chicken), a trend that was apparent even before the 2006 price rises, releasing beef for export.

By all accounts the 40% cattle price rise in 2006 is insufficient to stimulate structural change in the sector and bring about changed production structures and expansion of the industry. For these objectives to be realised, further price increases – with true export parity – are required. To date, therefore, the dominant effects of the price increase are likely to result from the first round effects detailed above.

If further price increases do result, and structural change in the industry does occur, the overall result is likely to be beneficial, especially in the rural areas where poverty is deepest and the need for additional economic activity deepest. Nevertheless, the linkages involved in these processes are complex and the results cannot be predicted a priori; for instance, non-cattle owning households in the rural areas face higher prices for beef, but also would have enhanced employment opportunities.

In principle these linkages can be modelled, for instance through the use of a CGE model which can accommodate intersectoral linkages and various different types of labour and households, and can simulate poverty impacts. If the issue of cattle prices, incomes and poverty is to be analysed in more depth, this would be the most appropriate methodology to use. To date such an exercise has not been carried out in Botswana, although some pointers can be obtained from a similar exercise carried out for the 2006 BIDPA study on the livestock sector<sup>5</sup>. This study incorporated a CGE-based analysis of price changes in the beef industry, although the focus was on a reduction in the price of beef due to changes taking place in the European Union, the main export market for Botswana's beef. The study modelled a 30% reduction in export beef prices, which resulted in the following impacts:

### Impact of 30% reduction in Beef Export Prices

Variable	Change
Cattle prices	-16%
Domestic meat prices	-6%
Cattle – traditional sector output	-24%
Cattle – commercial (freehold) sector output	-26%
Employment – traditional cattle farms	-18%
Wages – farm workers	-12%
<i>Disposable incomes</i>	
Urban households wage income	+1%
Rural households wage income	0%
Rural households self-employment income	-5%

Source: BIDPA Livestock Sector Study

To a degree, this exercise modelled almost the opposite scenario (30% reduction in beef export prices) to the recent policy change (40% increase in cattle prices). Such models are,

<sup>5</sup> BIDPA (2006) Consultancy on the Viability and Long-Term Development Strategy for the Livestock (Beef) Sub-Sector in Botswana

however, non-linear so the assumption of “equal and opposite” effects need not necessarily apply. Nonetheless, the above results do model an extensive range of economic linkages in various markets, with prices, incomes and output all adjusting to the changed conditions. The results are in keeping with expectations, and to the extent that a significant price increase would have a comparable opposite effect, are a useful guide. What the above results show is that both commercial and traditional farmers are highly sensitive to price changes, especially in respect of output – which suggests that a price increase will be effective in boosting cattle sector output. The results also show that employment and wages in the sector is sensitive to prices, and suggest that a price increase would lead to a significant increase in both rural employment and incomes. While this exercise did not calculate a poverty impact, the implication is that a cattle price increase would lead to a clear reduction in rural poverty, through increased wages, incomes, economic activity and employment. While this result may not hold over the country as a whole, the rural impact is important, given that poverty is more extensive and deeper in the rural areas. A further CGE modelling exercise to specifically focus on the poverty impacts of a cattle price increases would be worthwhile, to substantiate the country-wide effects.