



## The Contribution of Livestock to the Sudan Economy

A recent report by IGAD (Intergovernmental Authority on Development) demonstrates the centrality of livestock to the Sudanese economy (IGAD LPI Working Paper No. 01 – 12, *The Contribution of Livestock to the Sudanese Economy*).

The most commonly quoted measure of the importance of an economic sector or industry is the size of its contribution to the a nation's national gross domestic product (GDP). From this perspective, Sudan's official national accounts reveal the very significant contribution made by livestock to the country's domestic economy. Using official statistics compiled before the independence of South Sudan, livestock has in recent years consistently provided more than 60% of the estimated value added to the agricultural sector, and is a substantially more important contributor to agricultural GDP than crop farming.

With the advent of oil production and exports in the late 1990s, the relative contribution of the agricultural sector to GDP has declined, but at no time in the last decade has the contribution of petroleum to GDP come close to equalling the contribution of agriculture, of which livestock provides the biggest part. Livestock is by value the largest subsector of Sudan's domestic economy, larger even than petroleum.

While not as large as its domestic economic contribution, livestock's share of exports is considerable, and it is growing – up from less than 10% in the 1960s to just under 50% today. It would appear that the era in which crops dominated the agricultural export scene is past. Taking a balanced view of their combined domestic and export significance, official figures suggest that the livestock and crop subsectors are now relatively evenly balanced in their contribution to the Sudanese economy.

This report refers to statistics on the Republic of Sudan prior to the independence of South Sudan, and therefore covers what has become both North and South Sudan.

### The estimation of agricultural GDP in Sudan

The Ministry of Animal Resources and Fisheries (MARF) provides most of the official data on livestock production and trade and the Sudan Central Bureau of Statistics (SCBS) prepares the official national accounts estimates.

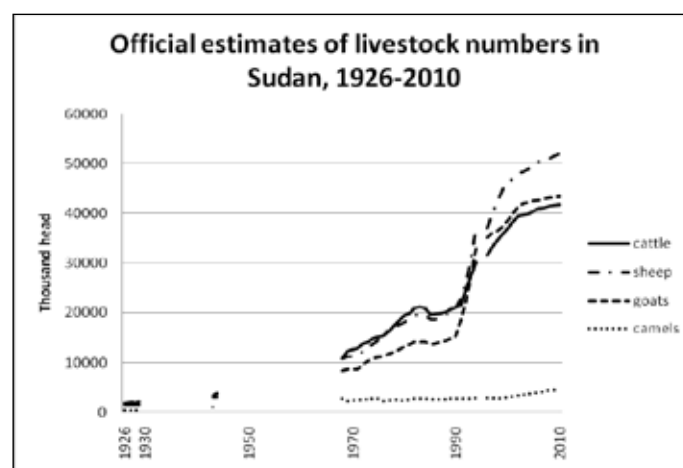
Sudan follows the production approach to estimating GDP, in which the goods and services produced by all categories of

economic activity are summarized to arrive at total GDP. For livestock this approach involves four stages. First, national livestock populations are estimated. Second, production coefficients are applied to the livestock population estimates to generate estimates of the total output of goods such as meat, milk, butter, dung for fuel etc. Third, based on market surveys, a monetary value expressed in Sudanese pounds – the gross value of output – is ascribed to the total output of each kind of livestock product. Finally, input costs (intermediate costs) are deducted from the gross value of output to derive value added.

The production approach followed by Sudan is a reliable method for estimating agricultural GDP. The problem in Sudan is that the accuracy of the entire calculation rests on an estimate of the size of the country's livestock population, and there has been no attempt to count the national herd since 1975.

Figure 1 presents official estimates of the numbers of livestock in Sudan from the early 20th century to the present. The numbers in Figure 1 have been generated by a variety of estimation procedures: the subjective estimates of experienced senior veterinary officers in the colonial period, an aerial survey in 1975, constant assumed rates of growth, and since the late 1980s, a herd growth and output model. Except during an extreme drought in the mid-1980s, all these estimation techniques depict an ever larger national herd, with remarkably high rates of growth in the 1990s.

Figure 1



Official estimates of the size of Sudan's livestock populations are currently produced by MARF based on a herd growth model. The growth parameters in this model are reasonable and conform, in general, to those in the scientific literature reviewed for this study. However, there are theoretical reasons to doubt the suitability of the model, which depicts reasonably stable rates of herd growth irrespective of the effects of livestock numbers on resource availability, or the impact of fluctuating weather, security and market conditions. Unfortunately, the small number of state-level livestock surveys that have been conducted since the last national census point in no consistent direction and do little to clarify the national situation.

Preparations are underway in the Ministry of Animal Resources and Fisheries to undertake a new livestock census. In the meantime, this report will use the official livestock population estimates to calculate the contribution of livestock to agricultural GDP. There is no reason to suppose that these figures are particularly accurate, but they are official and there is insufficient available evidence to adjust or amend the official figures to make them more reliable.

A truly compelling case for the national economic importance of livestock depends on a new national livestock census. The magnitude of this problem is indicated by the results from recent livestock enumerations in two other IGAD countries, Kenya and Uganda. Like Sudan, both of these countries had neglected to census their livestock for over three decades. When they did count their livestock – Kenya in 2009 and Uganda in 2008 – the results were unexpected. In both countries some livestock populations were officially underestimated by half or more.

**Table 1: Census adjustments to livestock population estimates in Kenya and Uganda**

	Kenya 2008 as % of 2009	Uganda 2007 as % of 2008
Cattle	77	63
Goats	52	66
Sheep	58	50
Camels	38	-
Pigs	-	67
Poultry	93	71
Donkeys	43	-

In the absence of livestock population figures based on the actual counting of animals, the estimates of livestock value added for Sudan contained in this report could be off by as much as 50%.

### The contribution of livestock to the domestic economy

Based on the official livestock population estimates produced by MARF, our estimates of the contribution of livestock to

national agricultural sector GDP – 33.843 billion Sudanese pounds (SDG) in 2009 (or about \$14.550 billion USD at 2009 exchange rates) - are broadly similar to the official 2009 estimates by SCBS – 28.670 billion SDG (about \$12.326 billion USD) (Table 1). The difference between these two estimates is 5.173 billion SDG, or a re-estimated increase of only 18% over the official figure in 2009. Whereas the official figures for 2009 estimated a percentage contribution of the agricultural sector of just over 33% to total GDP, our revised estimates would now place that contribution at just over 36%. When compared with the imprecision caused by uncertainties regarding the size of the national herd, these are negligible differences, and constitute an endorsement of SCBS's official estimates, subject to the reservations about data availability stated above.

**Table 2: Official and re-estimated value of livestock production in 2009, Sudanese pounds (SDG)**

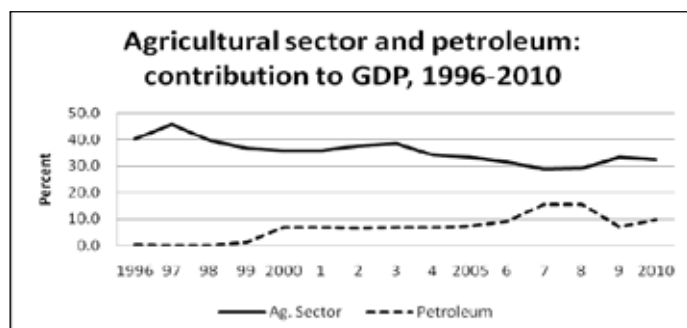
Product	CBS, value 000 SDG	This study, value 000 SDG
Cattle milk, tons	-	11,107,444
Camel milk, tons	-	3,247,597
Sheep milk, tons	-	1,418,960
Goat milk, tons	-	4,316,061
Subtotal milk offtake tons	14,454,142	20,090,062
Cattle offtake, head	6,498,866	6,726,973
Camel offtake, head	535,355	740,721
Sheep offtake, head	3,002,693	2,686,531
Goat offtake, head	1,661,388	1,081,750
Poultry meat, tons	302,746	302,746
Subtotal animal offtake	12,001,048	11,538,721
Eggs, dozens	287310	287310
Fish, tons	728861	728861
Manure for fertilizer	-	-
Change in stocks	1198176	1198176
TOTAL PRODUCT OUTPUT	28,669,537	33,843,130

In addition to their contribution to agricultural sector GDP, livestock supply power for farming and transport. They also supply their owners with financial services – by providing a substitute for credit and by serving as a form of insurance, as well as giving their owners a way of spreading risk. These financial and transport services provide Sudanese livestock owners with benefits worth a further 8.409 billion SDG. Following conventional and internationally recognized accounting methods, most of the direct use benefits provided by livestock services are either excluded from national accounts or cannot be attributed to livestock. Combining both recognized GDP benefits with the value of livestock services that are not included in GDP, livestock in Sudan provide their owners with total direct economic benefits of at least 42.252 billion SDG, or about \$18.13 billion US dollars

at 2009 exchange rates. This is a conservative estimate. In common with the other IGAD states, there is insufficient data to fully quantify the contribution of animal power to Sudan's economy, despite the recognized significance of work animals in crop production and transport. Adequately documented, these additional uses would further enlarge the existing estimate of the economic significance of livestock. Even with this data missing, official GDP estimates capture only about 68% of the documented value of livestock goods and services.

Sudan's agricultural sector GDP includes crop, livestock, fisheries and forest production. Using official SCBS statistics, livestock has provided more than 60% of the estimated value added to this sector in recent years, and is a larger contributor to agricultural sector GDP than crop agriculture. Figure 2 provides the historical background to the current situation. The period covered in Figure 2 begins in the late 1990s before petroleum was exported from Sudan. At this time agriculture was clearly the most important sector in the Sudanese economy, providing just under half of national GDP. With the rise of oil exports, the relative importance of agriculture has declined, but petroleum has never matched the contribution of agriculture to GDP, and livestock has consistently been the biggest contributor to the agricultural sector.

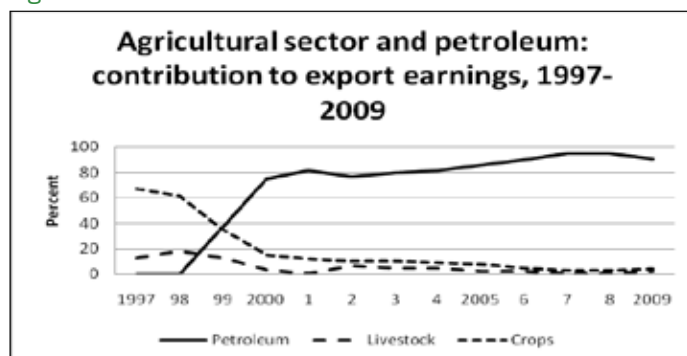
Figure 2



### The export of livestock and livestock products

Figure 3 compares the value of official livestock exports to the export value of petroleum and crops, beginning in 1997, the year before petroleum exportation began. Figure 3 graphically displays the dominant role of petroleum in Sudan's exports in the last decade, despite the continuing importance of crop and livestock production in the domestic economy.

Figure 3



It would also appear that the upsurge in oil exports has masked a fundamental shift in the relative importance of crop and livestock exports. In the 1960s and early 1970s approximately 97-98% of all of Sudan's export earnings came from agriculture, and by far the bulk of these agricultural earnings came from crop rather than livestock production. For example, in the decade from 1957 to 1966, only 6.58% of all agricultural exports came from livestock, and in 1971 and 1972 the livestock contribution was 3.55% and 5.46%, respectively.

Since that time, however, there has been a gradual shift. In the late 1990s before oil exports began, crops and livestock combined provided roughly 80% of Sudan's exports, and crop exports were still more valuable than livestock and livestock products, but by a narrower margin. In the most recent year for which there are records, 2009, livestock exports made up nearly half of all agricultural exports – 47% of the total. Export levels fluctuate and 2009 was an unusually good year for livestock. Nonetheless, in the thirteen year period since 1997, livestock and livestock products have on average provided 27% of the value of Sudan's agricultural exports – despite occasional RVF (Rift Valley Fever) embargos and the disruption to livestock trade caused by the Darfur conflict. The shifting composition of agricultural exports, away from crops and in favour of livestock, calls into question the presumption that the cropping subsector is the dominant provider of Sudan's agricultural export earnings. The current situation is, in fact, relatively evenly balanced between crop and livestock exports.

We could not find adequate evidence on the extent of the unofficial cross-border trade in live animals from Sudan to neighbouring countries, or from neighbouring countries into Sudan, and cannot even hazard a guess as to the magnitude of this trade. Adequately documented, these unrecorded sales of livestock would further enlarge the existing estimate of the export significance of livestock.

### Livestock in North and South Sudan

According to the calculations undertaken in this study, more than 70% of Sudan's livestock value added comes from northern states and about 73% of the capital value of livestock is in the North (Tables 3 and 4). The concentration of livestock and livestock output in northern Sudan suggests that, at least in the North, the independence of southern Sudan is unlikely to diminish the economic significance of livestock.

**Table 3: The capital value of Sudan livestock in 2009, Sudanese pounds (SDG)**

Livestock species	2009 population northern states	2009 population southern states	Assumed mean value/head SDG at 75% of sale price	Capital value of stocks – northern states	Capital value of stocks – southern states
Cattle	29,210,477	12,352,525	809	23,631,275,890	9,993,192,725
Sheep	38,743,585	12,811,421	145	5,617,819,825	1,857,656,045
Goats	30,332,270	12,937,730	75	2,274,920,250	970,329,750
Camels	4,520,999	0	768	3,472,127,232	0
Total	-	-	-	34.996 billion SDG	12.821 billion SDG

**Table 4: Gross value of livestock production in 2009, Sudanese pounds (SDG)**

Product	Northern states	Southern states	Sudan total
Cattle milk	9,123,015,552	1,984,428,576	11,107,444,120
Camel milk	3,247,597,056	0	3,247,597,056
Sheep milk	1,066,348,320	352,611,232	1,418,959,552
Goat milk	3,025,559,008	1,290,502,336	4,316,061,344
Subtotal milk	16,462,519,936	3,627,542,144	20,090,062,080
Cattle offtake	4,727,715,702	1,999,256,171	6,726,971,873
Camel offtake	740,720,640	0	740,720,640
Sheep offtake	2,018,928,224	667,603,212	2,686,531,436
Goat offtake	758,306,700	323,443,200	1,081,749,900
Poultry meat, tons	n.a.	n.a.	302,746,300
Subtotal animal offtake	8,245,671,266	2,990,302,583	11,538,720,149
Eggs	n.a.	n.a.	287,309,800
Fish	n.a.	n.a.	728,861,300
Manure for fertilizer	n.a.	n.a.	
Change in stocks	n.a.	n.a.	1,198,176,400
TOTAL OUTPUT	24,708,191,202	6,617,844,727	33,843,129,729

The estimates in Tables 3 and 4 are indicative only. Because little field research on livestock production has been conducted in rural areas of Sudan in the last couple decades, these estimates rely in large measure on studies on Sudanese livestock production that are a quarter of a century old. Moreover, the official producer prices used in these calculations are based on market surveys in northern Sudan, despite the likelihood that prices in southern Sudan are substantially different from those in the north.

Even at the crude level of precision that is now possible, the magnitude of the difference between livestock output in northern and southern Sudan is notable.

### Policy Recommendations

- It is essential that a livestock census or large scale sample survey be undertaken as soon as possible in both north and south Sudan. Until a reasonably complete national census or large-scale livestock survey has been conducted, there can be no compelling answer to the question of the economic value of Sudanese livestock and livestock products.
- With technical support from interested international and

national research institutes and universities, MARF and SCBS should undertake a national survey of the value of animal power to the economy in northern Sudan and of the role of animal power in sustaining both rural and urban livelihoods. This survey should include all forms of animal traction, transport and haulage by all species of working animals – cattle, equines and camels – in rural and urban areas and in all economic sectors – agriculture, manufacturing and services. As well as the commercial provision of animal power, the survey should assess the monetary value of the services that working animals directly provide for their owners.

- In Ethiopia, over half of livestock exports are unofficial, but at least the magnitude of the unofficial trade can be roughly estimated from academic and project-based studies. The same is not true for either northern or southern Sudan, where we know that unofficial cross-border live animal trading exists but there is insufficient evidence to estimate the importance or size of trade flows. As a regional organization committed to regional trade, IGAD should support investigations of unofficial livestock trading from both northern and southern Sudan. Some idea of the extent of this trade is essential to formulating policies to support regional economic integration.
- Despite data shortcomings mentioned above, it is clear that livestock are the largest subsector of the Sudanese domestic economy and are a growing contributor to exports. The great bulk of all livestock production – possibly 90% of the total, though no one really knows the actual figure – comes from small holders and migratory producers. To a remarkable extent, the Sudanese economy is based on a combination of mobile and sedentary pastoral and agro-pastoral production by farming and herding households in almost every region and state. It is essential that Sudanese policy makers recognize the centrality of pastoralism to their economy and take practical steps to support the livestock sector.

*Note: Data sources that substantiate the calculations in this briefing paper are given in the original report: The Contribution of Livestock to the Sudanese Economy (IGAD LPI Working Paper No. 01 – 11) 2012, by Roy Behnke and Hala Mohamed Osman*

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