

by the Central Statistics Agency (CSA). 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 CSA producer price surveys, a monetary value expressed in Ethiopian birr – 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 Ethiopia is a reliable method for estimating agricultural GDP, but the production coefficients used by MOFED to estimate livestock output were potentially outdated. We evaluated and adjusted these production coefficients in light of current research and survey evidence. Using 2008-09 as a basis for comparison, the revised coefficients yielded a recalculated total gross value for 12 categories of ruminant livestock production that was an increase of about 46% over the gross value of the same production categories using MOFED's estimation techniques. While these recalculations represented a significant increase in output estimates, they resulted from an up-dating of old productivity coefficients and, to a lesser extent, a revised estimate of the size of the national herd. These adjustments refine but in no way question the basic methods employed by MOFED in the calculation of agricultural GDP.

**Table 1 shows the gross value of livestock product output as originally calculated by MOFED and as recalculated according to revised production coefficients and livestock population estimates recommended in this study.**

**Table 1: Estimated Gross Value of Ruminant Livestock Production 2008- 09, billion Ethiopian birr (ETHB)**

Product or Service	MOFED ESTIMATE	REVISED ESTIMATE
Cattle offtake	6.302	8.103
Sheep offtake	1.643	2.254
Goat offtake	1.563	2.255
Camel offtake	0.145	0.145
<b>Total estimated offtake</b>	<b>9.653</b>	<b>12.757</b>
<b>MOFED total offtake</b>	<b>9.653</b>	
Cattle milk	8.483	10.899
Cattle milk for butter	4.533	5.824
Goat milk	1.352	6.436
Camel milk	1.978	3.346
Butter residue	3.125	4.015
<b>Total estimated milk products</b>	<b>19.471</b>	<b>30.520</b>
MOFED total	19.634	
Sheep wool	0.003	0.005
Dung for fuel	1.966	3.429
Change in stocks	1.384	1.384
<b>TOTAL RUMINANT PRODUCT OUTPUT</b>	<b>32.64</b>	<b>48.095</b>
Percentage change		47%
Animal draught power	0	21.500
<b>TOTAL RUMINANT PRODUCTION</b>		<b>69.595</b>
Percentage change		113%

**Livestock Services not captured in conventional national accounts**

About 80% of Ethiopian farmers use animal traction to plough their fields. Both the mean area cultivated by a farm household and their yields per hectare are positively correlated with cattle ownership and ploughing, in comparison to hand cultivation. Despite these contributions to

agricultural output, no attempt is currently made by MOFED to impute the monetary value of animal traction for Ethiopian agriculture. Based on the average cost of renting ploughing services, the value of the animal draught power input into arable production is about a quarter (26.4%) of the value of annual crop production. Nearly a third (31%) of the total gross value of livestock output is represented by the value of animal draught power as an input into crop cultivation, an estimated 21.500 billion EB in 2008-09 (Table1).

Although the proportional contribution of livestock and crops will fluctuate from year to year; if we include the value of ploughing services, livestock provided 45% of agricultural output in 2008-09 (Table 1). Previous MOFED estimates placed livestock's contribution at about 25% of total agricultural GDP. The gap between these two estimates suggests that the significance of livestock relative to crop production has been considerably misrepresented by past calculations of agricultural sector GDP. Even if technical considerations exclude ploughing services from GDP estimates, the quantification and expression of this value in monetary terms underlines the need to rethink the role and relative importance of crops and livestock in Ethiopian agriculture.

The problem of incorporating the value of oxen ploughing into estimates of agricultural GDP is symptomatic of a wider methodological obstacle to the full appreciation of the economic importance of livestock in developing economies. In principle, the 'production approach' employed by MOFED to calculate agricultural GDP can adequately capture the great bulk of material production in the form of goods from Ethiopian livestock, irrespective of whether this produce is sold or immediately consumed by rural households. But if Ethiopian farmers and herders provide for themselves with home produced goods, they also in large measure service themselves. The most important services provided by livestock include the supply of animal power (for traction, transport and haulage), and livestock as a source of financial services (as providers of credit, as a form of self-insurance and as a means of sharing or pooling risk). According to international conventions, the value of this self-servicing is not separately itemized in national accounts and therefore cannot be identified as part of the economic benefits that livestock provide, which compromises the usefulness of these accounts for understanding the actual contribution of livestock to the economy. Table 2 provides an overview of the value of the different livestock services that are not attributed to livestock in GDP estimates.

The credit benefits of livestock derive from the ability of livestock owners to dispose of their animals for particular purposes at a time that they choose –their ability to 'cash in' on the value of their animals as needed. This flexibility gives livestock owners ready access to money without the need to borrow, and confers an additional financial benefit beyond the sale, slaughter or transfer value of their livestock. This additional financial benefit can be estimated as the opportunity cost of rural credit – what it would otherwise cost a livestock owner in rural areas to obtain funds comparable to those produced by liquidating a part of the herd. Employing this estimation, the additional finance value of a livestock holding is equivalent to the interest that the owners would be required to pay to obtain loans equal to the value of their livestock offtake. Rural interest rates are highly variable, but if we assume that inflation-adjusted interest rates on rural credit in Ethiopia are currently running at about 100% per annum, then the financial value of livestock offtake is identical to the annual value of offtake – in 2008-09, for example, about a 12.8 billion EB, financial benefit on top of 12.8 billion EB in direct offtake value.

Part of the insurance or security value of livestock comes from the ability of owners to liquidate their own herds in an emergency. In this instance, the level of security provided to a particular individual depends on the value of that individual's assets, so livestock ownership functions as a kind of self-insurance. The value of this form of asset-based insurance can be calculated as the annual cost that herd owners would need to pay to purchase insurance coverage equal to the capital value of their herd. Insurance coverage in rural Ethiopia costs about 10% of the value of the cover provided. At this level of premium payments, the self-insurance

value of Ethiopian livestock in 2008-09 was about 8.6 billion EB or 10% of the capital value of the national herd.

For pastoralists in Ethiopia, the insurance value of livestock derives not only from their ability to liquidate their individual herds, but also from their ability to call upon assistance from fellow pastoralists in time of need. These collective insurance schemes are based on the gifting and loaning of livestock within pastoral communities, with large herd owners donating some of their animals and less well-off pastoralists drawing support in the form of livestock received as gifts or on loan. Recent research suggests that about 10.5% of pastoral animals in Ethiopia are involved in livestock sharing networks of this kind. Assuming that the total capital value of pastoral livestock in Ethiopia is 34.779 billion EB, the collective insurance value of pastoral herds can be estimated as 10.5% of this value or 3.652 billion EB in 2008-09.

According to internationally agreed conventions, national accounts do not separately itemize the value of transport services that producers supply for themselves. Although many rural households in Ethiopia use their own working animals to meet their transport and haulage needs, conventional national accounting ignores much of the benefit that households derive from animal power. In Ethiopia national-level economic data on the use of animal power does not exist. If one recent field study is any indication of the national situation, equine power may have produced as much as EB 19 billion in value added to the national economy in 2010. Even if it incorporates a large degree of error, the scale of this estimate suggests the need for a national survey of the contribution of animal power to the Ethiopian economy.

**Reassessment of the national importance of livestock sector exports**

The bulk of Ethiopian livestock's contribution to the economy is not identified in conventional national accounts as coming from livestock. These distortions are particularly acute for highland livestock production systems in which animal energy for transport and dung for fuel are under-estimated but nonetheless as important as conventional milk and meat production. Ethiopian pastoralists are, on the other hand, specialized producers of meat, milk and live animals for sale. Provided their animals get into the computations at all, it might be hoped that the output of pastoral herds would be adequately represented in national accounts. This is not the case.

Pastoral output underpins almost all of Ethiopia's live animal and meat exports. Combined with hides, skins and leather exports (which are sourced primarily from highland animals) live animal and meat exports probably constitute about a fifth of all of Ethiopia's exports. Approximately half of these livestock sector exports are not recorded and not recognized by the National Bank of Ethiopia because they are produced by the cross border trade in live animals, which the government deems to be illegal and does not recognize.

The value of official livestock and meat exports has fluctuated widely over the decades, while official exports of hides, skins and leather have been both more stable and more valuable. For example, in the twenty-one year period from 1984 to 2004, hides and skins provided on average 90% of official livestock sector exports, livestock provided 6% and meat 4%. For a time in

Type of Benefit	Agricultural GDP	Services not in current GDP estimates
Value added livestock products (meat, milk, etc)	MOFED: 32.232 re-estimated: 47.687	
Traction power for ploughing		21.500
Benefit from financing		12.800
Benefit from self-insurance		8.600
Benefit from risk pooling/stock sharing		3.650
Transport and haulage by equines		18.959
Sub-totals	47.687	65.590
<b>Total economic benefits</b>	<b>113.196</b>	

Total economic benefits of livestock goods and services, now estimated at more than 113 billion EB, are more than three and a half times greater than the MOFED's original estimate of the value added from livestock in 2008-09. Of the roughly 80 billion EB increase in benefits, about 1.5 billion EB are derived from recalculating the value of livestock products, and the remaining 65 billion come from broadening the estimation to include livestock services.

the 1990s, hides, skins and leather were Ethiopia's second largest export earner after coffee.

The current situation is depicted in Table 3 which gives the US dollar value and percentage export share of Ethiopia's major exports from 2002-03 to 2008-09.

**Table 3: National Bank of Ethiopia estimates of the value in million US dollars and percentage of export share for major exports, 2002-2009**

Commodity	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09
Coffee	165.26 34.2%	223.45 37.2%	335.37 39.6%	354.3 35.4%	424.2 35.8%	524.5 35.8%	375.9 26.0%
Leather, hides and skins	52.22 10.8%	43.59 7.3%	63.73 8.0%	75.0 7.5%	89.6 7.6%	99.2 6.8%	75.3 5.2%
Pulses	19.97 4.1%	22.58 3.8%	35.47 4.2%	37.0 3.7%	70.3 5.9%	143.6 9.8%	90.7 6.3%
Oilseeds	46.09 9.5%	82.66 13.8%	102.29 14.8%	211.4 21.1%	187.4 15.8%	218.8 14.9%	356.1 24.6%
Fruit and veg.	9.58 2.0%	12.72 2.1%	16.07 1.9%	13.2 1.3%	16.2 1.4%	12.8 0.9%	12.1 0.8%
Meat	2.42 0.5%	7.66 1.3%	14.59 1.7%	18.5 1.9%	15.5 1.3%	20.9 1.4%	26.6 1.8%
Live animals	0.481 0.1%	1.91 0.3%	12.82 1.5%	27.6 2.8%	36.8 3.1%	40.9 2.8%	52.7 3.6%
Chat	58.02 12.0%	88.02 14.7%	99.96 11.8%	89.1 8.9%	92.8 7.8%	108.3 7.4%	138.7 9.6%
Gold	42.08 8.7%	48.71 8.1%	52.50 7.0%	64.7 6.5%	97.0 8.2%	78.8 5.4%	97.8 6.8%
Flower	-	2.3 0.4%	7.8 0.9%	21.8 2.2%	63.6 5.4%	111.8 7.6%	130.7 9.0%
Others	86.66 18.0%	66.7 11.1%	73.0 8.6%	87.8 8.8%	91.8 7.7%	106.3 7.2%	91.3 6.3%
<b>Total</b>	<b>482.78 100%</b>	<b>600.45 100%</b>	<b>817.74 100%</b>	<b>1000.3 100%</b>	<b>1185.1 100%</b>	<b>1465.7 100%</b>	<b>1447.9 100%</b>
Livestock/ products share	11.4%	8.9%	11.2	12.2	12.0	11.0	10.6