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2050



Integrated snapshot

UGANDA

Beef cattle and
poultry meat sectors



The Republic of Uganda



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2050**

Integrated snapshot: Uganda

Beef cattle and poultry meat

Introduction

Uganda's population is anticipated to grow from about 39 million in 2015 to over 100 million in 2050, with the share of urban population increasing from 16 to around 32 percent over the same period. GDP per capita is expected to multiply from around USD 700 in 2015 to close to USD 2 000 in 2050 (Fig. 1).

A larger, increasingly affluent and urbanized population will demand more and more high-quality foods, including meat, milk and other livestock products. This growing demand will provide incentives for livestock farms and farmers to expand their livestock assets and increase production and productivity and tap into the growing market for animal source foods.

The anticipated change in livestock systems will have far-reaching effects on society: not only will they provide food to the growing population but will also impact on public health, people's livelihoods and the environment. This brief presents evidence of the impact of the Uganda beef cattle and poultry (chicken) sectors in particular on three societal dimensions, including livelihoods, the environment and public health.

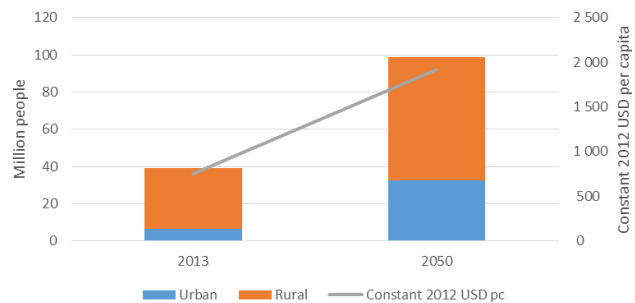


Figure 1. Population and income growth projections for Uganda (Source: National Accounts, UN Population Fund, SSP Public Database, VI.1 <https://tntcat.iiasa.ac.at/SpDb>)

Beef cattle production systems in Uganda

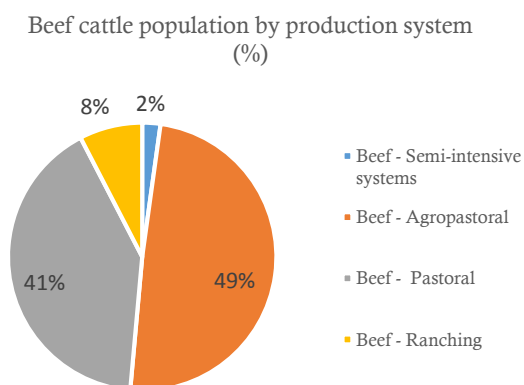


Figure 2. Cattle population distribution by production system (Source: stakeholder consultation)

Cattle is the most important livestock sub-sector in Uganda. It contributes over the 40 percent to the value added of livestock and around 7 percent of agriculture (UBOS, 2017). As already indicated, this brief focuses on the production of cattle for beef purposes. Cattle in agropastoral systems are near to half of the population, closely followed by the pastoral system (over 40 percent of the population). Semi-intensive systems and ranching maintain a light slice of the beef cattle population (around 10 percent) (Table 1). Figure 2 presents the distribution of animals by production system and Figure 3 the distribution by region. Agropastoral production systems is clearly predominant in all the parts of country with the exception of the North East region, where pastoralism is by far the predominant production system. In Central and Western Uganda, ranching is the second largest production system by head of cattle numbers, although very distant from agro-pastoral system. The highest concentration of beef cattle head by square kilometre are found in the pastoral areas in Karamoja region.

Table 1. Uganda cattle production systems

Beef animal population: 6.7 million beef cattle	
Ranching	In this system, farmers keep large number of animals (500 – 3 000 per holding/ranch) in perimeter fencing, paddocked structures and grazing fields. They keep a mixture of indigenous, cross and exotic beef animals and make substantial investment in animal health, production and management, the primary purpose of this system is production and marketing of beef cattle and a few breeding cattle with milk being a by-product. This system is predominant in the Southwest and the Central 2 sub-regions.
Pastoral	Under this system, farmers move cattle from place to place in search of pastures and water during particular periods of the year corresponding to scarcity of pasture and water. They keep indigenous breeds, the predominant ones being Zebu with herd size ranging from few to 100 heads. Main products include beef, milk, blood, hides, manure and horns. This system is dominant in the Northeastern sub-region (Karamoja).
Agro Pastoral	Farmers graze largely indigenous cattle in both private and public pastures and also feed them on crops by-products. Cattle produce beef and milk, hides, manure and horns and also provide draught power. Investments in improved husbandry practices, including animal health range from none to minimal. This system is present in the Eastern, Central 2, Western, North and West Nile Sub-regions.
Semi-intensive	Farmers keep cattle, mainly cross-bred cattle, confined in kraals, paddocks and cattle barns/stalls and feed them with compound feed. They also make significant investments in animal health, such as in vaccination and deworming. Cattle produce milk and beef. This system is mainly found in Central 1 and 2 and the Southwest sub-regions.

Source: ASL2050 FAO (2017) Africa Sustainable Livestock (ASL) 2050 Livestock production systems spotlight. Cattle and poultry sectors in Uganda. FAO. Kampala

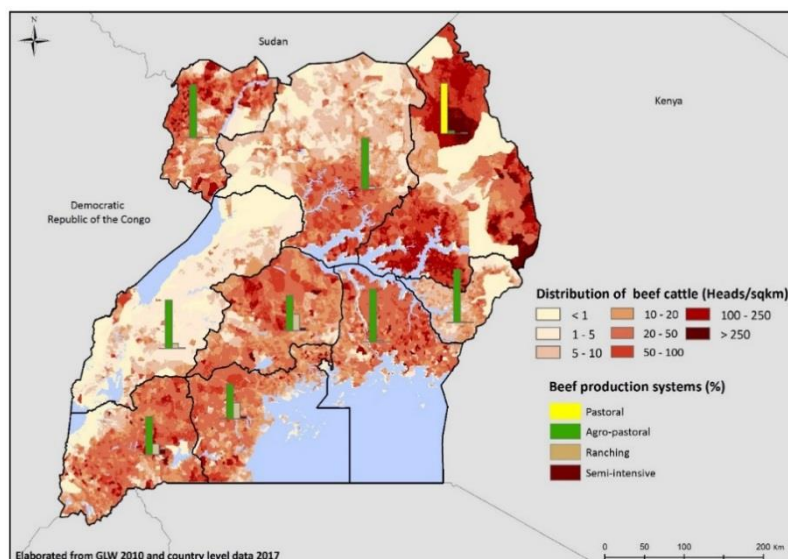


Figure 3. Map of beef cattle production systems in Uganda. Source: GLW and stakeholder consultation.

Poultry production systems in Uganda

Meat poultry population by production system (%)

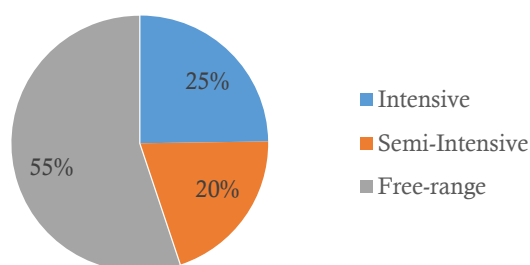


Figure 9. Poultry population distribution by production system
(Source: ASL 2050 stakeholder consultation)

around lakes of Kyoga and Victoria.

Poultry production is well spread activity around the country. The estimated population is 37.4 million birds, majorly indigenous, with a high concentration in the Eastern and Central regions.

Indigenous chicken represents the great majority of poultry population (85 percent). Poultry meat production systems in Uganda includes free-range; semi-intensive and intensive systems. Figure 9 presents the distribution of chicken by production system and Table 6 and Figure 10 the existing meat production systems and geographical distribution, respectively. The higher chicken concentration is found in Eastern Uganda and

Table 6. Poultry meat production systems

Bird population: 37.4 Million	
Free Range	Farmers keep flocks from a few to a dozen indigenous chickens, which are left to roam around and scavenge for food. Birds are dual purpose, producing both eggs and meat. Live birds are well valued in the market because of consumers preferring their organoleptic characteristics over those of exotic breeds. This system is present across the country, both in rural and urban areas, and particularly pervasive in the West Nile and Southwest sub-regions. The birds on average are sold with up to 1.7 kg dressed weight.
Semi-Intensive	Farmers in semi-intensive poultry systems keep flocks of hundreds of birds and are commercially oriented, producing either meat or eggs for the market. They keep birds in permanent structures in deep litter systems and feed them with compound feeds. Semi-intensive poultry farms are mainly located in peri-urban areas, and predominantly in the East Central and Central 2 sub-regions.
Intensive	In intensive systems, farmers keep thousands of exotic birds of one species, producing either meat or eggs for the market. Housing structures are permanent and feeding is by deep litter system, with maize being the main feed. This system is dominant in Central 1 and 2 and East Central sub-regions, with farms mainly located peri-urban areas.

Source: ASL2050 FAO (2017) Africa Sustainable Livestock (ASL) 2050 Livestock production systems spotlight Cattle and poultry sectors in Uganda. FAO. Kampala.

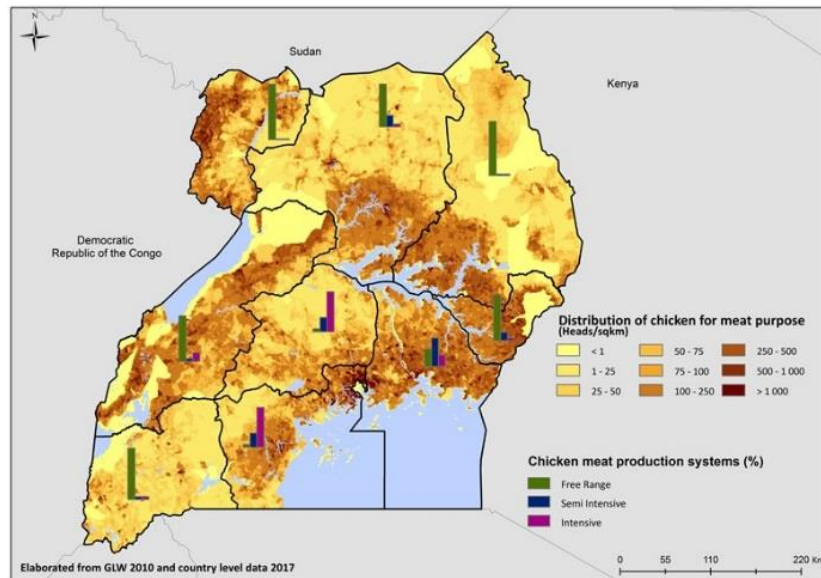


Figure 10. Map of poultry production systems in Uganda, Source: GLW and stakeholder consultation.

Cattle systems and livelihoods

About a quarter of the total Ugandan population keep cattle for beef purposes in Uganda. Cattle farming provides income, food, draft power, insurance and savings, social capital and other goods and services. In addition, a multitude of people are employed along the livestock value chain, such as abattoir workers, traders, veterinarians, breeders, wholesalers and retailers of veterinary pharmaceuticals.

Table 2. Income from beef cattle-keeping households by production system in Uganda in UGX. Livestock and cattle contribution (Source: Rural Livelihoods Information System (RuLIS) (FAO, forthcoming); Livestock income calculated using the Uganda National Panel Survey (UNPS) 2013/14 (UBOS, 2014))

	Total income	Livestock income	Cattle income	Share livestock	Share cattle
Agro-pastoral	3 364 021	794 236	612 467	19%	12%
Semi-intensive	21 100 000	14 900 000	12 500 000	55%	45%
Pastoral	6 238 473	2 356 277	2 008 803	29%	19%
All beef producers	4 861 388	1 745 014	1 473 135	23%	15%

Table 2 shows the different income for households keeping cattle in the different production systems. Differences in income by production system are significant.

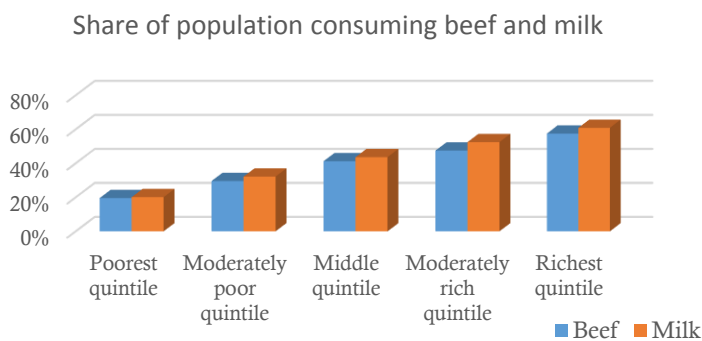


Figure 4. Population consuming beef and milk (Uganda National Panel Survey 2013/14, UBOS)

Income is higher in semi-intensive systems and the share coming from livestock and cattle is the highest. Income sources show that cattle is a major source of income particularly for the semi-intensive production systems. In addition to income, cattle also provide meat and milk to the population, which are a significant source of nutrients/protein for

households keeping cows, even if they have limited economic capacity. *Figure 4* shows that better off households consume more beef and milk than households in the lower income quintiles.

Poultry systems and livelihoods

Over 40 percent of the population in Uganda lives in a household keeping chicken. It amounts almost to 17 million people. From those, a great majority (80 percent) keeps birds in free-range system. The remaining households are divided between the growth of chicken in semi-intensive systems (16 percent) and intensive (4 percent).

Table 7. Income sources (%) for poultry-keeping households (Source: Income from other activities calculated from Rural Livelihoods Information System (RuLIS) (FAO, forthcoming). Livestock income calculated using the Uganda National Panel Survey (UNPS) 2013/14 (UBOS, 2014))

	Total income	Livestock income	Poultry income	Share livestock	Share poultry
Free-range	3 565 115	451 423	68 301	18%	7%
Semi-intensive	5 088 261	1 117 075	215 861	22%	11%
Intensive	9 340 753	4 310 788	1 642 000	27%	18%
Total	4 036 667	717 842	159 814	19%	8%

Table 7 shows that intensive poultry-keeping households are obtaining a higher share of their income from livestock and poultry. Poultry also provide meat and eggs to the population, a source of nutrients for households keeping poultry, even if they have limited economic capacity.

Key Facts

Livestock and livelihoods: Emerging challenges

- *As Uganda grows and develops, most households will become net buyers of animal source foods, particularly of semi-processed and processed livestock products.*
- *As Uganda grows and develops, the most efficient farmers are expected to expand their livestock operations, increasingly sell livestock products to the market, and improve their livelihoods.*
- *As Uganda grows and develops, for a large share of farmers will become irrational to raise animals – as cheap proteins will be available on the market. They will exit the livestock sector and look for alternative sources of employment*
- *As Uganda grows and develops, the livestock sector will intensify and be more concentrated.*
- *As Uganda grows and develops, jobs will be created along the livestock value chains, providing some, but not necessarily many opportunities for employment*
- *As population increases, land will become scarce and there will be an increased peri-urban poultry production systems*

Cattle production systems and the environment

Cattle production systems impact on the natural environment: livestock depend on land and water availability, and at the same time emits polluting materials.

The cattle sector in Uganda is a user of land and water, though a big part of these would hardly be used for other purposes. *Figure 5* presents the water footprints per production system. The green water footprint represents rainwater and accounts for most of the consumption. Blue and grey water measure withdrawal from ground and surface water, and water pollution respectively.

Intensive systems are more efficient in terms of water use. Blue water is used scarcely and pollution (grey water) is almost non-existing. In the grazing systems use of green water is the highest. However, the opportunity cost of the used water is much lower in pastoral systems.

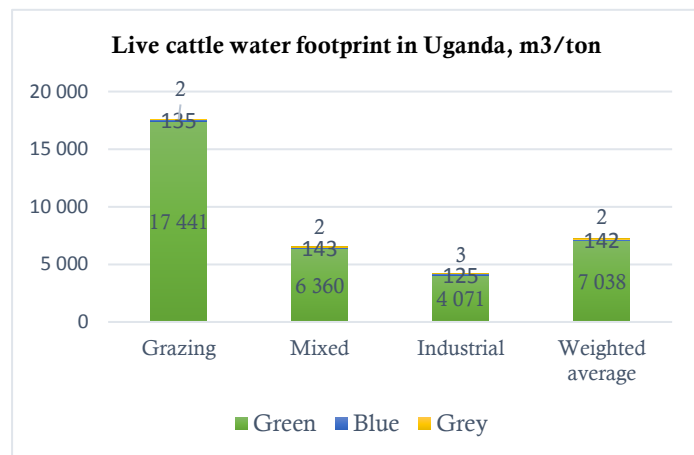


Figure 5. Live cattle water footprint (green, blue and grey), m³ per ton (Source: Mekonnen and Hoekstra, 2010)

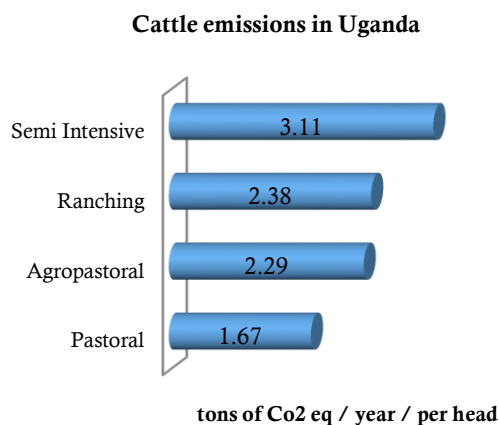


Figure 6. Total GHG emissions per head in CO₂ equivalent (Source: GLEAM)

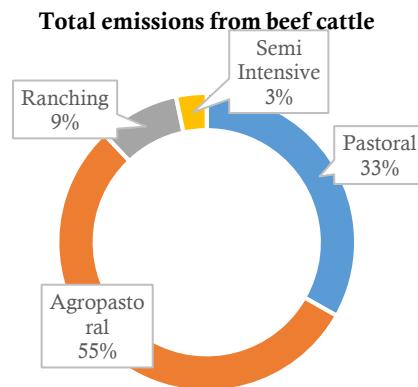


Figure 7. Total emissions from beef cattle by production system, Mt. CO₂ equivalent

Cattle also contribute to greenhouse gas emissions. Emissions in semi-intensive systems are higher on a per animal basis but lower per unit of outputs produced (Fig. 6 and 7).

Land and grassland degradation are a major concern in Uganda, where in some regions bare ground increased to over 200 percent in less than 3 decades and pastoral systems suffer from less resilience to drought and are forced to mobility (Byenkya et al. 2014).

In addition, extensive and intensive livestock production systems affect biodiversity and grassland status, both positively and negatively. For example, extensive systems are part of biodiversity but overgrazing can reduce natural habitats and cause soil degradation (of particular concern in the cattle corridor). But continuous faecal material dropping by grazing livestock can also make more fertile grasslands.

Poultry systems and the environment

The poultry sector in Uganda uses mainly green water, which represents rainwater and accounts for most of the consumption. *Figure 11* presents as well blue and grey water pollution, which are marginal. Blue water is the surface and groundwater. Grey water accounts the water pollution. Water pollution might be due (e.g.) to faecal contamination of water.

Poultry production also contributes to greenhouse gas emissions. Emission per animal are higher in intensive systems and significantly lower in extensive and semi-intensive systems (*Fig. 12* and *13*).

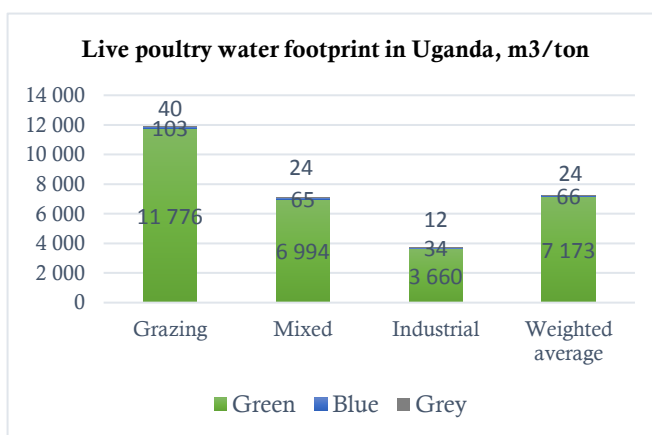


Figure 11. Live poultry water footprint (green, blue and grey), m3 per ton (Source: Mekonnen and Hoekstra, 2010)

Poultry GHg emissions in Uganda

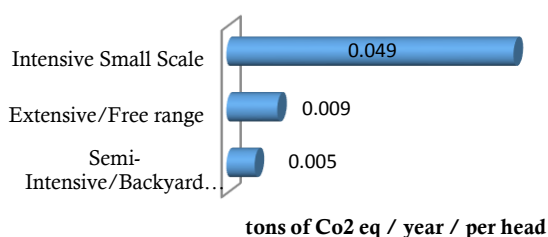


Figure 12. Total GHG emissions per head in CO₂ equivalent (Source: GLEAM)

Total emissions from the poultry sector (meat)

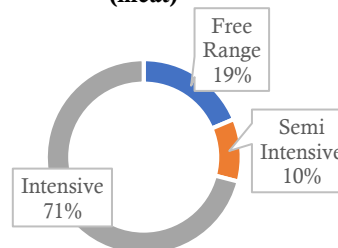


Fig 13. Total emission from the poultry sector by production system, MT CO₂ equivalent

Key Facts

Livestock and the environment: future challenges

- As Uganda grows and develops, the livestock sector will intensify and be more concentrated.
- As Uganda grows and develops, demand for cattle production inputs, such as feed and water, will increase.
- As Uganda grows and develops, green-house emissions per unit of beef and milk will reduce.
- As Uganda grows and develops, soil and water pollution from livestock will be more concentrated, making waste management a growing challenge.

Animal and human health: the impact of zoonoses in cattle

Cattle production can also have negative impact on public health, particularly in relation to zoonotic diseases that jump the animal-human species barrier. There are several zoonotic diseases that can easily spread from animals to humans at either of the stages in beef cattle value chain. *Figure 8* shows the estimated prevalence of two main beef production related zoonoses Brucellosis and Bovine tuberculosis through an expert elicitation protocol in 2017. Prevalence in Bovine Tb is

available by production system. Pastoral systems show the higher prevalence rates for Bovine Tuberculosis, this is consistent with the level of disease control under the various systems.

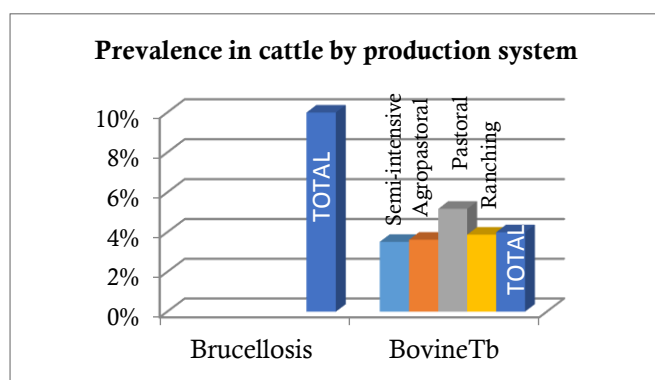


Figure 8. Prevalence rates by cattle production systems for selected zoonoses in Uganda (Source: ASL 2050 Expert Elicitation)

Table 3 presents prevalence and fatality rates for animals and humans for the two selected zoonoses, and tables 4 and 5 the estimated costs of Brucellosis and Bovine TB, respectively. For Brucellosis, the costs in human health exceed by far the costs of animal losses.

Table 3. Prevalence and fatality rates in cattle (Source: ASL 2050 Expert Elicitation Protocol)

	Cattle population	Cattle keepers	Consumers
Brucellosis			
Prevalence (cases/total pop)	10%	5.50%	2.40%
Fatality rate (deaths/cases)	7%	0.65%	1%
Bovine Tuberculosis			
Prevalence (cases/total po)	4%	0.10%	0.10%
Fatality rate (deaths/cases)	22%	8%	6%

Table 4. Cost of Brucellosis in animals and humans (Source: ASL 2050 Expert Elicitation Protocol)

Value of animals lost due to the disease	66.2	Animal losses as % cattle value added	11.07%
Value of production lost due to the disease	75.9	Animal losses as % MAALF budget.	33.94%
TOTAL animal losses (million USD PPP)	142.1	Total social cost (as % of Ugandan GDP)	0.85%
Livestock keepers	262.5	Total social cost (as % MoH budget) ²	57.80%
Consumers	378.5		
Total social cost (million USD PPP)	641		
Total (million USD PPP)	783		

Table 5. Cost of Bovine Tuberculosis in animals and humans (Source: ASL 2050 Expert Elicitation Protocol)

Value of animals lost due to the disease	132.5	Animal losses as % cattle value added	11.06%
Value of production lost due to the disease	9.6	Animal losses as % MAALF budget.	33.91%
TOTAL animal losses (million USD PPP)	142.1	Total social cost (as % of Ugandan GDP)	0.14%
Livestock keepers	46.8	Total social cost (as % MoH budget) ²	9.45%
Consumers	58		
Total social cost (million USD PPP)	104.8		
Total (million USD PPP)	246.8		

Animal and human health: the impact of zoonoses in poultry

Poultry production impact on public health positively through better nutrition and income availability and negatively through zoonotic diseases that jump the animal-human species barrier. Figure 14 shows the variance of prevalence by production system estimated through an expert elicitation protocol, for two selected zoonoses in Uganda: Salmonellosis and HPAI. There is

higher prevalence for Salmonellosis in intensive systems and prevalence lowers as the systems are more extensive. On the contrary, HPAI registered the highest prevalence in free-range systems and no cases were recorded in intensive production systems.

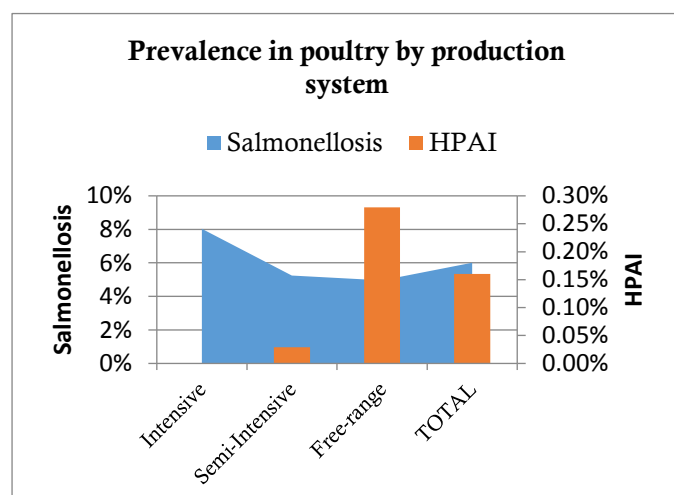


Table 8 presents prevalence and fatality rates for animals and humans for Salmonellosis and HPAI, and tables 9 and 10 the estimated costs of the Salmonellosis and HPAI, respectively, in Uganda. Salmonellosis social costs are much higher than the costs of HPAI in animals. In particular, livestock keepers are bearing with the major part of costs of the disease. HPAI, on the contrary, affected only animals for the moment.

Figure 14. Prevalence rates by poultry production systems for Salmonellosis and HPAI in Uganda (Source: ASL 2050 Expert Elicitation)

Table 8. Prevalence and fatality rates for Salmonellosis and HPAI in Uganda (Source: ASL 2050 Expert Elicitation Protocol)

	Cattle pop.	Cattle keepers	Consumers
Highly Pathogenic Avian Influenza			
Prevalence (cases/total pop)	0.16%	NA	NA
Fatality rate (deaths/cases)	65%	NA	NA
Salmonellosis			
Prevalence (cases/total pop)	6%	0.10%	0.07%
Fatality rate (deaths/cases)	40%	4%	1.54%

Table 9. Cost of Salmonellosis in animals and humans in Uganda (Source: ASL 2050 Expert Elicitation Protocol)

Value of animals lost due to the disease	7.9	<i>Animal losses as % poultry GDP</i>	1.32%
Value of production lost due to the disease	2.8	<i>Animal losses as % MA/IF budget.</i>	2.56%
TOTAL animal losses (million USD PPP)	10.7	<i>Total social cost (as % of Ugandan GDP)</i>	0.12%
Livestock keepers	87	<i>Total social cost (as % MoH budget)</i>	8.36%
Consumers	5.7		
Total social cost (million USD PPP)	92.7		
Total (million USD PPP)	103.4		

Table 10. Cost of HPAI in Uganda (Source: ASL 2050 Expert Elicitation Protocol)

Value of animals lost due to the disease	0.5	<i>Animal losses as % poultry GDP</i>	0.06%
Value of production lost due to the disease	0.03	<i>Animal losses as % MA/IF budget.</i>	0.12%
TOTAL animal losses (million USD PPP)	0.53	<i>Total social cost (as % of Ugandan GDP)</i>	N/A
Livestock keepers	N/A	<i>Total social cost (as % MoH budget)</i>	N/A
Consumers	N/A		
Total social cost (million USD PPP)	N/A		
Total (million USD PPP)	0.53		

Animal and human health: Emerging challenges

- *As Uganda grows and develops, the livestock sector will intensify and be more concentrated.*
- *As Uganda grows and develops, livestock systems will continue being affected by zoonotic diseases*
- *As Uganda livestock production intensifies, any outbreak of zoonotic diseases is likely to have large negative impact on production and productivity.*
- *As Uganda livestock production intensifies, there is risk of misuse of antibiotics, leading to antimicrobial resistance, as indicated during the EEP, up to 60 percent of the cattle farmers use antibiotics on farms.*

Conclusions

The livestock sector in Uganda continues to support a substantial proportion of the population supporting the livelihoods, supporting the national economy, providing food and nutrition, draught power, etc. However, livestock production is increasingly affecting the environment in terms of biodiversity loss, loss of soil cover, through overgrazing and is directly and indirectly affecting the public health through the increasing cases of zoonotic diseases such as brucellosis, rift valley fever or tuberculosis among others.

Both cattle and poultry sectors have been anticipated to undergo serious transformation in the coming decades by both the national planning authority under the Vision 2040 and FAO projections, in terms of both production and consumption. In particular, the consumption is anticipated to more than treble by 2050. Already, the country is implementing a series of agricultural/livestock production promotion programmes like the implementation of the market oriented and environmentally friendly beef industry project, the revitalization of the agricultural extension systems through recruitment of staff in districts, the operation wealth creation under the national agricultural advisory services programme, among others. These programmes are poised to uplift the production and will in turn improve the sector and peoples livelihoods.

Available evidence suggests that coming changes in livestock production systems provide both opportunities and challenges to society. For example, intensification can result in higher incomes for farmers, increased availability of animal source foods, lower emission per unit of produce and more efficient response to emerging diseases. However, these changes come coupled with many challenges: the benefit of productivity and income increase will affect relatively fewer farmers, many will be forced to exit the livestock sector and will look for other employment opportunities. Emissions per animal will be lower but will be more concentrated; waste management will become increasingly a challenge and inappropriate use of antibiotics could lead to antimicrobial resistance in humans. Novel human-animal-ecosystem dynamics will likely create new public health threats. Some, such as emerging zoonotic diseases, may have pandemic potential, add to existing food safety hazards and proliferation of antimicrobial resistance pathogens. However, the longer-term future of Ugandan livestock, and of the cattle and poultry sectors in particular, is still in the making and can be shaped by informed decisions taken today. To this aim, the Ministry of Agriculture Animal Industry and Fisheries, Ministry of Health, Ministry of Water and Environment not only are currently implementing policies to address current pressures and constraints, but have also joined forces with the Africa Sustainable Livestock 2050 Project to articulate alternative long-term (2050) livestock scenarios for Uganda and formulate policies that support transformational pathways, which are sustainable from an environmental and livelihoods perspective and safeguard the health of humans and animals.

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