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Food and Agriculture Organization of the United Nations

SUPPORT TO IGAD COUNTRIES (KENYA, SOMALIA, SUDAN AND UGANDA) TO DEVELOP ANIMAL FEED INVENTORY AND BALANCE SHEET

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TABLE OF CONTENTS

ACRONYMS

AFBS:	Animal Feed Balance sheet
ASAL:	Arid and Semi-Arid Land
CP:	Crude Protein
DM:	Dry Matter
FAO:	Food and Agriculture Organization of the United Nations
GDP:	Gross Domestic Product
IGAD:	Intergovernmental Authority on Development
KNBS:	Kenya National Bureau of Statistics
ME:	Metabolizable Energy
MJ:	Mega Jewels
MT:	Metric Tonnes
PET:	Pictorial Evaluation Livestock and Forage Tool
PLEWS:	Predictive Livestock Early Warning System
SCS:	Southern Central Somaliland
SUNA:	Sudan News Agency
TLU:	Tropical Livestock Unit
TMR:	Total Mixed Ration
UGX:	Uganda Shilling
USD:	United States Dollar

BACKGROUND

Livestock's share of total agricultural output is nearly 40 per cent in developed countries and 20 per cent in developing ones, supporting the livelihoods of at least 1.3 billion people worldwide[1]. The vigorous growth of the sector and its ability to reach into many different areas of the economy and society presents a major opportunity for many countries on their path towards economic development. Despite the great potential for the livestock sector to transform millions of livelihoods, its growth is greatly constrained by many factors, with the most significant of all the bottlenecks being feed and fodder.

Overgrazing of rangelands, the subsequent erosion and shrinking of the natural rangelands and resource base principally driven by human and livestock population growth, combined with effects of climate change, feed and water scarcity are the main reasons for pastoral destitution in the IGAD region. Therefore, animal feed resources need to be considered in the broader perspective and not just during emergency as is the case now in many African countries, including Sudan, Somalia, Uganda and Kenya. The East Africa Animal Feed Action Plan formulated in 2019 by FAO and IGAD requires that countries have appropriate feed assessment and balance tools and the capacity to use them, so that they can establish feed inventory and feed balance and periodically update them. Using this information, the countries would be able to assess feed needs, feed resource availability and feed gaps, and to identify approaches to fill the feed gaps. This will make feed interventions in the countries effective in the immediate, medium and long term as well as help to build the livestock sector on sound foundation.

This project aimed to produce feed inventory and balance sheet for different sub-national entities of Kenya, Somalia, Sudan and Uganda. Information on feed balance enables effective management of natural resources, including animal feeds during emergency and normal periods, and contributes to development of the livestock sector on sound footings. Operationally, FAO and IGAD are helping to introduce new feed assessment and balance tools and build capacity to use them in the four countries listed above, so that they can establish feed inventory and feed balance and periodically update them.

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[1] FAO. 2018

REPUBLIC OF KENYA

Human population and value of livestock to Kenya's economy

Kenya has 47 counties covering an estimated area of 602,664 Km^2 with a human population of about 47.5 million[2]. The livestock sub-sector contributes about 10 percent to the Gross Domestic Product (GDP), accounts for over 30 per cent of the farm-gate value of agricultural commodities and employs over 50 per cent of the agricultural labour force. Therefore, the importance of livestock in Kenya's economy cannot be overstated[3].

Agro-ecological zones

The country is classified into different agro-ecological zones depending on the average annual rainfall. About 80 per cent of the country is arid or semi-arid (ASAL), hence can majorly support livestock production. The ASALs are low rainfall areas that constitute about 30 per cent of the human population while the non-ASALs are densely populated hosting the remaining 70 per cent.

Animal feed requirements in Kenya

Total land area of Kenya supports an estimated livestock population of 73.1 million, which is equivalent to 24.07 million TLUs. The total annual feed requirements for the national herd in terms of DM (tonnes), ME (MJ) and CP (kg) (at 10^3) is 55,289, 631,370 and 5,580, respectively. The ASAL region posted the highest feed demand at 73.3 per cent of the total annual feed requirement as DM while the non-ASAL region posted 27 per cent.

[2] KNBS, 2019: Census report

[3] ICPALD 2013: The Contribution of Livestock to the Economies of Kenya, Ethiopia, Uganda and Sudan

Kenya has the potential to produce 45,500,000 tonnes of dry matter embedded with 120,112,760 MJ and 1,182,006 kg of ME and CP, respectively. The ASAL region contributed 63, 0.18 and 0.3 per cent to feed availability and use as DM, ME and CP, respectively, on potential basis. On actual basis, the country produced a total of 24,442,000 tonnes, 80,535,450,000 (MJ) and 701,681,000 (kg) as DM, ME and CP, respectively. The ASAL region contributed 60 per cent of the total DM while non-ASAL region contributed the highest amount of ME and CP at 99 per cent. The ASAL were mainly limited in ME and CP levels since they mainly rely on grazing biomass as the major feed resource.

The country relies mainly on roughage crops for feed availability. On potential basis, grazing biomass contributed higher percentage as DM, ME and CP at 50, 49, and 66 percent, respectively, while acacia and prosopis had lowest percentage of DM, ME and CP at 2, 2 and 1 per cent, respectively. On actual basis, roughage crops contribute higher percentage of DM at 50, while grazing biomass, concentrates and acacia and prosopis contribute 46, 3, and 1 per cent respectively.

Kenya experienced annual feed gaps as occasioned by alternative feed uses, wastages and losses that occurred during feed resources production, harvesting, conservation and utilisation stages. The annual feed gap was estimated at 46.3 per cent of the total annual feed production potential as DM. The ASAL region recorded the highest feed gap contributing 67.6 per cent of the National feed gap.

The overall feed balance for the country on potential basis was negative with DM, ME and CP at -17.7, -36.6 and -33.9 per cent, respectively. However, the ASAL region posted feed balance was higher than the national feed balance by 19.5 per cent. On actual basis, the overall feed balance for the country was negative with DM, ME and CP at -56, -57.6 and -60.8 per cent, respectively. On DM basis, the ASAL region contributed 84 per cent of the national actual feed balance, while the non-ASAL contributed 16 per cent.

The 2022 assessment on potential and actual feed availability presented significant implications for sustainable livestock production. It indicated available feed resources in the country could sustainably support 19.9 and 10.7 million TLUs on potential and actual basis respectively, against a total of 24.07 million TLUs (2019 ruminant population census). The assessment showed that the total land capacity on actual feed availability and use basis could support 44.5 per cent of the livestock population. Similarly, the 2019 census livestock population was exerting 2.4 times more land pressure on natural feed resources than the land could support on actual basis for sustainable livestock production.

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REPUBLIC OF UGANDA

Value of livestock to Uganda's economy

The livestock has contributed about 4 per cent to total gross domestic product (GDP) and 16 per cent to the agricultural sector's GDP in 2019/20. In 2019, Uganda had about 14.8 million cattle, 16.9 million goats, 43.1 million poultry, 4.4 million pigs and 4.7 million sheep. The demand for livestock products has increased in tandem with livestock numbers[4].

Animal feed requirements in Uganda

The potential animal feed basket in 2022 was estimated at 121.173 million MT on dry matter basis and the northern farming systems zone accounted for the bulk of the feed (29.95 per cent). 77.86 per cent of the feed was accounted for by crop source roughages, 13.08 per cent by crop source concentrates, and 9.07 per cent by grazing biomass. The actual feed basket was estimated at 48.287 million MT (39.85 per cent of potential). Similar to the potential the northern farming systems zone (28.19 per cent) and crop source roughages (63.68 per cent) accounted for bulk of the feed by zone and feed category, respectively. Concentrates and grazing biomass accounted for 19.75 per cent and 16.58 per cent, respectively.

The general potential feed use efficiency was highest for west Nile farmlands zone (61.74 per cent) followed by northern moist farmlands zone (58.28 per cent) and the least efficiency was registered in the western highlands zone (24.27 per cent). In relation to wastage, the waste ratio in UGX was highest for western rangelands zone at 0.15 for every MT of potentially available feed. Never the less, the northern farming systems zone experienced the highest feed losses by value of UGX 1. 094

[4] EPRC 2021: How Gaps in traceability systems affect Uganda's livestock sector transformation

trillion followed by western rangelands zone at UGX 0.839 trillion, while the least wastage was recorded in south-western highlands zone at UGX 30.113 billion by December, 2022.

The ruminant livestock feed demand totalled 23,855 and116.34 MT and cattle accounted for bulk of the required feed (79.39 per cent). By zone, the highest demand was registered for the northern moist farmland's systems zone accounting for 39.03 per cent of all feed demanded. The least demand was for southern western highlands zone (1.17 per cent of the national feed requirement).

The feed balance sheet indicated that Uganda feed balance was positive for DM (24.512 million MT), ME (113.587 billion MJ) and CP (568.264 million MT). In regard to zones, the northern moist farmlands zone experienced deficits of 6.89 million MT, 93.333 billion MJ and 1.127 billion kg in DM, ME and CP, respectively. Other ME deficits were recorded in the west Nile farmlands zone (11.204 billion MJ) and western highlands zone (1.769 billion MJ) while other CP deficits were registered in eastern highlands zone (258.628 million kg), West Nile farmlands zone (137.189 million kg), western rangelands zone (42.087 million kg), and South-Western highlands zone (36.94 million kg).

Annual feed consumption demand for pigs under intensive production systems amounted to 747,723.1 MT out of the 1,463,674.1 MT required by all monogastrics (51.1 per cent). Maize grain accounted for 334,305 MT (approximately 76.1 per cent) of the 439,509.1 MT of whole grain cereal consumed by monogastrics. The consumption accounted for approximately 185,725.01 MT of maize flour that had been available for the human food value chain with 26,744 MT of maize bran as a processing byproduct available for livestock feeding.

The assessment shows that Uganda has substantial feed resources that can sustain the national herd and flock with a balance for export trade to other countries in deficit. However, strategic technological and enabling environment interventions are required for sustainable feed management, distribution and utilisation to stimulate agro-industrialisation, self-sufficiency and trade. Critical investment areas will include; investment in agro-processing, value addition and trade targeting zones with comparative advantage, efficient feeding technologies for the zones in feed deficits, establishing emergency animal feed bulking, processing and distribution centres, and regular animal feed security assessments.

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REPUBLIC OF SUDAN

Livestock population and value to Sudan's economy

In 2009, Sudan official sources estimated cattle numbers at 41.653 million, sheep 51.555 million, goats 43.270 million and camels 4.521 million. In addition, there were also 7.515 million donkeys and 784 thousand horses[5]. The export of livestock and meat represent an important source of hard currency for Sudan's state treasury. Via the official Sudan News Agency (SUNA), the Ministry of Animal Resources said that, revenues from livestock and fisheries exports amounted to USD 83,752,814 during the period from January to April 2022. The great bulk of live sheep and goats that are officially exported go to Saudi Arabia following quarantine, with additional informal or unrecorded cross-border live animal trade conducted with Chad, Libya and Egypt[6].

Animal feed requirements in Sudan

The assessment was conducted in the 18 States of Sudan using 2020 growing season data. The states were grouped into five regions according to their geographical locations. However, each state was treated as a separate entity as differences exist even in agro-ecological zones where some states stretch across more than one ecological zone while others do not. These regions included: i) Central, consisting of four states (Blue Nile, Gezira, Sennar and White Nile); ii) Eastern Region (Gedarif, Kassala, and Red Sea); iii) Central West, comprising the three states of Greater Kordofan (North, South and West Kordofan); iv) Northern Region, including

[5] https://www.oatext.com/livestock-in-the-republic-of-the-sudan-policies-production-problems-and-possibilities.php

[6] https://www.dabangasudan.org/en/all-news/article/ministry-sudan-livestock exports-top-83-mln-in-q1-2022

Khartoum, Northern, and River Nile; and v) the Western Region, comprising the five states of Greater Darfur (North, South, West, East and Central Darfur).

The Republic of Sudan's total land area supports an estimated livestock population of 117 million, which is equivalent to 40.2 million TLUs. The total annual feed requirements for the national herd in terms of DM (tonnes), ME (MJ) and CP (kg) (at 10^6) was 99.9, 959,334 and 10,010, respectively.

Potential feed availability was 6,913,988,285.6 tonnes of dry matter embedded with 1,531,790,177,066.5 MJ and 27,145,320,098 kg of ME and CP, respectively. On actual basis, the country recorded a total of 5,549,150,225.0 tonnes, 1,042,984,239,915.7 (MJ) and 16,205,392,965.2 (kg) as DM, ME and CP, respectively. The Eastern region presented the highest production of feed resources, whereas Northern region recorded the lowest with 5,431,846,187 and 2,771,683 tonnes, respectively.

Roughages from grazing biomass contributed the highest proportion to the national basket with 62 per cent followed by crop roughages and concentrates with 33 and 5 per cent, respectively. The results showed that the Northern region had roughages from crops residues contributing highest to the feed basket with 59 per cent followed closely by grazing biomass with 38 per cent.

The Country experienced annual feed resources wastage that occurred during feed resources production, harvesting, conservation and utilisation stages. National feed resources wastage recorded was 23,843,200.5 tonnes on dry matter basis and the average monetised wastage was approximated at USD 35 billion.

The national feed balance on potential basis was positive on dry matter basis. On actual basis, the country recorded a positive feed balance of 68 and 40 per cent on DM and CP bases, whereas the results showed a negative feed balance of 5 per cent on ME basis.

Feed consumed for monogastric (local birds, layers and broilers) was computed using excel models. There was feed food computation for cereals like maize, finger millet, rice and sorghum. Work on drafting final monogastric report was going on in March, 2023 when these data were compiled.

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FEDERAL REPUBLIC OF SOMALIA

Livestock to Somalia economy

Somali has over 55 million of livestock herd and contributes 40% of national GDP. It is divided into three entities namely; Puntland, Somaliland and Southern Central Somalia (SCS). Somalia's livestock trade contributes to almost 80 percent of the country's foreign currency earnings, with much of the livestock exported to countries in the Arabian Peninsula, such as Saudi Arabia, Yemen, Oman, and the United Arab Emirates[7].

Status of animal feed in Somalia

The national annual livestock feed requirement on dry matter in 2022 for SCS was 21,600,638 tonnes against total actual feed availability in DM of 13,791,625.3 tonnes.

The land potential for sustainable livestock is overstretched in the country. In the Southern Central Somalia (SCS), the number of tropical livestock units that can be sustainably maintained is less than the existing TLUs. Percentage of deficit ranges between negative 11 to negative 77.

The country presented a negative feed balance on DM, ME and CP bases. On actual feed availability, the SCS recorded a negative feed balance of 36, 37 and 29 per cent on DM, ME and CP, respectively.

Poultry farming is widely practiced in Somali particularly in rural and peri-urban areas. Poultry production systems in Somalia are scavenging/ free-range and small-scale commercial intensive farming systems. In SCS, the assessment showed that sorghum whole grain contributed the highest proportion of grains fed to local birds followed by maize and rice. On the other hand, maize contributed the highest proportion in annual feed ingredient for commercial birds.

At the time of this report, compiling of data and incorporating of inputs given during validation workshop was ongoing to produce the final report for all the three entities.

[7] FAO, 2018

RECOMMENDATIONS

- Capacity building of technical staff on early warning tools; Animal Feed Balance sheet (AFBS), Pictorial Evaluation Livestock and Forage Tool (PET) and Predictive Livestock Early Warning System (PLEWS).
- Support institutionalisation of Feed Inventory and Feed Balance tools within ministries and government programmes and other relative institutions such as Universities and Research Centres, so that it is generated and updated regularly.
- Coordinate efforts with research and related institutions to develop reliable conversion factors for all potential forage crops.
- Expand the annually carried rangelands rehabilitation activities and incorporate the pastoralists in the process of rehabilitation and management of the rehabilitated rangelands.
- Consider establishing in-situ fodder conservation through establishment of range reserves and feed reserves in regions with surplus feed. Engage communities for ownership of the initiative.
- Promote the use of urea-molasses multi-nutrient blocks in the rangelands, near the water points, especially when the quality of grazing pasture decreases in dry periods.
- Promote development and adoption of high yielding pasture and fodder varieties for increased forage production.
- Adoption of production technologies that help to increase quantity and quality of biomass, such as alley cropping and intercropping legumes with grasses.
- Mechanization of farm operations to increase efficiency thereby reduce feed wastage and losses.
- Develop innovative ways of processing, fortification, densification, packaging, storage and marketing of feeds for example, making Total Mixed Ration (TMR) blocks.
- Promote development of Livestock and Agriculture sector statistics to cover aspects of productivity, feeding systems, increasing scope of crops and livestock targeted for data collection, harmonising reporting centres and developing capacity in quality data collection, analysis and reporting.

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