

CHAPTER 8

Improving Animal Production and Products for Sustainable Food Security in Emerging Countries of Sub-Saharan Africa

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Abstract

Livestock production is important for the economic well-being of man and by extension of a nation and region. The animal production and products production in sub-Saharan Africa are very low when compared with those of advanced countries with well-developed strategies for enhanced animal production techniques. Thus, this paper attempts to compare the livestock primary and processed products of some selected countries in the sub-Sahara Africa with those of countries from Europe and America. While it was concluded that the production of livestock vis-à-vis primary and processed products in the sub-Sahara are generally low, some ways to improve production to sustain food security in countries of sub-Saharan Africa are highlighted.

Keywords: Livestock production, sub-Sahara, primary and processed products, food security.

Introduction

Livestock production vis-à-vis primary and processed animal products production is on the increase in the world. This might not be unconnected with the significance of animal agriculture to the existence of man and its contribution to the economic growth of individuals and nations is huge (FAO, 1999; Agbede, 2018). Also, the population of livestock, especially, cattle, sheep, goat and poultry in Nigeria is large (Agbede, 2018) and by extension may be higher in sub-Saharan African countries put together than found in regions of most developed countries. But the derivable primary products and processed products are lower than found in most advanced countries like the United States of America, Canada, France and Germany to mention but a few (Agbede, 2019). This thus suggests that the production capacity of our indigenous animals is low and this could be attributed to many factors which are not limited to poor genetic makeup of the indigenous animals, poor feed quality, disease and poor animal production techniques which are often adopted in most countries of the sub-Sahara.

Africa is home essentially to the black race and could be conveniently sub-divided into North Africa, South Africa, Central Africa, West Africa, East Africa and sub-Sahara Africa. The Sub-Sahara is the area of the African continent that lies south of Sahara (Figure 1). It encompasses the area from the Cape Verde Islands in the west to the Indian Ocean Islands in the east and from the Sahel in the north to the Cape of Good Hope in the south. It is a region of the African

continent that has undergone tremendous transformation over the years. This region of fifty countries spanning several climatic zones, whose peoples are endowed with diverse languages,



Figure 1: Geographical location of Sub- Sahara Africa
Source: Google Map

offers opportunities for animal production and by extension, economic emancipation and or better livelihood of the people in the region. Despite the huge natural endowments of this region, the region is plagued with dismal economic performance owing essentially to the poor macroeconomic management and inclement policies which do not permit ease of engaging in large scale animal production. Similarly, the region is home to many policies that are a major impediment to livestock production. As a result, smallholders and subsistent animal agriculture predominate the region. This, coupled with increased desertification, climate change, insecurity, inclement political atmosphere and adoption of poor food/animal protein production systems suggest that it will be a herculean task for people living in the sub-Sahara to meet the food needs of her citizens. Inadequacy of proteinous foods of animal origin will lead to increase in disease morbidity (kwashiorkor, marasmus etc.) and dwindling food security which could lead to starvation and hunger with concomitant increase in low Intelligent Quotient (IQ) among pre-school and school children. These are the reasons for poverty and death in the region.

In Nigeria, a large percentage of animal agriculture is subsistent in nature while a small percent are peri-urban and intensive in nature. For instance, majority of women who are involved in livestock production rear food animals such as local domestic chickens, sheep and goats under subsistent farming for their consumption and sales, the proceeds of which they use to pay school fees for their children and wards and also for settlement of hospital bills (Alokan, 2008; Agbede, 2018). In the northern part, the rearing of cattle, sheep and goats predominate among the Fulani herdsmen who take herding as their major source of occupation from which they earn their living. This is also the situation in Central Africa.

The industrial or intensive livestock production, which is supposed to increase animal protein production using high power technology at a sustainable level is limited to the rich few who have enough resource to fund such endeavours with resilience to absorb the shock (Agbede, 2018). This is one part of a systematic effort to produce the highest output at the lowest cost by relying on economies of scale, modern machinery and global trade. However, the number of farmers who are into industrial animal agriculture is quite limited in sub-Saharan Africa with exception of South Africa. Even at that, the derivable animal products from our indigenous animals are low.

An animal product is any material derived from the body of animal and this could include meat, milk, skin, eggs and butter (Unklesbay, 1992). For citizens of the sub-Saharan Africa to enjoy the full benefit from animal agriculture that will reposition her production capacity in terms of improved primary and processed animal products production, to the extent of alleviating the challenges of food insecurity vis-à-vis making livestock enterprise profitable, the need to totally embrace modern technology that will guarantee sustainable large scale production is perhaps now more compelling, especially with the current poor state of the economy in the region. Achieving this will enhance food and nutrition security (animal protein) as this will no doubt contribute to prevention and conflict mitigation by building and enhancing social cohesion, addressing root causes or drivers of conflict and support peace-building efforts that can reinforce food security (FAOSTAT, 2016).

Livestock Primary Products Production Capacity in Sub-Saharan Africa

Primary products of animal origin are products harvested from livestock other than the muscle meat. In general, the primary products derivable from our indigenous livestock are limited. Some of the derivable primary products are eggs, meat (from cattle, goat, sheep, rabbit, pigs, chickens) and milk. However, official values of these products are not available in most countries of sub-Saharan Africa and hence values that are presented for discussion in this paper are obtained from either FAO estimate, FAO data based on imputation methodology, unofficial or aggregate values.

Table 1 shows that while egg, hen in shell increased from 9,162 tons in 2014 in Niger to 10,000 tons in 2017, it decreased in value for the same period of time in Nigeria and Senegal. However, for the same period of time, Nigeria consistently produced more eggs, and meat (cattle, goat, chicken and pig) than Niger and Senegal. This could be due to some factors such as better education, ability to control disease etc. This may suggest that in West Africa generally, the need to improve on the quality of livestock for enhanced animal product production is compelling.

Also, comparing three representative countries in Central Africa, Table 2 shows that Kenya consistently produced the highest eggs, hen in shell, beef, chicken, goat meat and pork than Burundi and Zambia between 2014 and 2017. This suggests that Kenya production capacity though when compared with those of USA, France and Germany is low, can boast of better primary livestock products that can be of benefit to her citizens than most countries in Central Africa.

In Table 3, it can be inferred that the production capacity of livestock primary products with respect to eggs, hen in shell, and meat is highest in South Africa than most countries South of

Sahara. This could be due to the fact that most livestock production issues bedevilling profitable livestock production are under control in South Africa. However, in all primary products under discussion, the values reported from Canada, France, Germany and United States of America (Table 4) are consistently higher than those obtained in West, East and South of sub-Saharan Africa countries. This can only be attributed to the fact that these countries have well organized economies and their animals are products of conscious research and development (R&D).

Table 1. Livestock Primary Products of Some Countries in West Africa (Tons)

Country	Products	2014	2015	2016	2017
Niger	Eggs, hen in shell	9162	9766	9927	10000
	Meat, Cattle	154439	151264	144563	143745
	Meat, Chicken	17513	17671	18033	18622
	Meat, Goat	16618	24947	25651	38277
	Meat, Pig	1491	1495	1493	1500
Nigeria	Eggs, hen in shell	660000	489288	504657	510000
	Meat, Cattle	381080	384396	370324	370324
	Meat, Chicken	196583	204674	209149	201493
	Meat, Goat	244575	250699	243082	247966
	Meat, Pig	252585	266494	274746	278051
Senegal	Eggs, hen in shell	27217	26000	25000	26000
	Meat, Cattle	18	06	13	16
	Meat, Chicken	65895	67775	71687	76622
	Meat, Goat	17675	18402	16558	16961
	Meat, Pig	14882	15901	14926	15036

Source: FAOSTAT (2018)

Livestock Processed Dairy Products Production Capacity

There is no doubt that there are many processed products that can be obtained from our livestock. This include but not limited to dairy products (yoghurt, butter, cheese, condensed milk, ghee, skimmed milk, powdered milk etc.), meat products (raw meat, corn beef, sausages, barbecue, hot dog etc.), egg products (powdered whole egg, egg yolk, egg white) and honey products to mention a few.

Table 2. Livestock Primary Products of Some Countries in Central Africa (Tons)

Country	Products	2014	2015	2016	2017
Burundi	Eggs, hen in shell	3161	2846	2400	2800
	Meat, Cattle	10237	19972	19733	14523
	Meat, Chicken	6480	6390	6300	6300
	Meat, Goat	3784	12025	11802	13039
	Meat, Pig	7387	8956	9024	8850
Kenya	Eggs, hen in shell	71325	77406	88132	79389
	Meat, Cattle	442571	487176	528990	588693
	Meat, Chicken	25643	30236	31887	35090
	Meat, Goat	68190	68016	50468	63663
	Meat, Pig	17877	26001	10768	12953
Zambia	Eggs, hen in shell	49539	49845	51379	51700
	Meat, Cattle	208000	161000	159400	209300
	Meat, Chicken	46135	46386	48348	48911
	Meat, Goat	9526	10049	9905	10086
	Meat, Pig	27730	26600	26850	31621

Source: FAOSTAT (2018)

Table 3. Livestock Primary Products of Some Countries in Southern Africa (Tons)

Country	Products	2014	2015	2016	2017
Botswana	Eggs, hen in shell	4500	3200	3800	4000
	Meat, Cattle	25000	28000	30000	34000
	Meat, Chicken	3882	3200	4000	4600
	Meat, Goat	5100	4000	4200	4800
	Meat, Pig	1423	600	575	577
Nambia	Eggs, hen in shell	3398	2871	2929	2851
	Meat, Cattle	4280	4313	4766	4911
	Meat, Chicken	39431	35280	34242	33283
	Meat, Goat	3317	3578	3839	3613
	Meat, Pig	5964	5839	5986	6235
South Africa	Eggs, hen in shell	453000	523086	477934	432682
	Meat, Cattle	1000659	1072800	1089690	1014050
	Meat, Chicken	1717181	1727000	1678000	1658000
	Meat, Goat	10700	10814	10985	11160
	Meat, Pig	234463	237387	240210	235300

Source: FAOSTAT (2018)

Table 4. Livestock Primary Products of Some Countries in Europe and America (Tons)

Country	Products	2014	2015	2016	2017
Canada	Eggs, hen in shell	474680	498000	531000	550000
	Meat, Cattle	1100340	1094884	931848	880039
	Meat, Chicken	1099257	1137070	1178778	1235834
	Meat, Pig	1962760	2063622	2085896	2141807
France	Eggs, hen in shell	956379	970000	960000	955000
	Meat, Cattle	1410854	1447906	1458284	1423404
	Meat, Chicken	1141610	1160040	1134626	1102774
	Meat, Goat	12077	12172	11590	11498
	Meat, Pig	2120315	2148452	2185430	2136276
Germany	Eggs, hen in shell	786500	801100	818300	826200
	Meat, Cattle	1142603	1132340	1155483	1137008
	Meat, Chicken	1027100	1027400	1011500	1009565
	Meat, Goat	438	440	416	418
	Meat, Pig	5527769	5570490	5589639	5505572
USA	Eggs, hen in shell	5974000	5756587	6046956	6258795
	Meat, Cattle	11698116	10777601	11470607	11907239
	Meat, Chicken	17729278	18402753	18708465	19140744
	Meat, Goat	9346	8708	8513	8811
	Meat, Pig	10368227	11120748	11320285	11611177

Source: FAOSTAT (2018)

Dairy products such as butter, cheese, skimmed, condensed, evaporated, butter and ghee are the most common in the world. Thus, Table 5 shows some processed dairy products that were obtained as reported by FAOSTAT (2018) from countries like Niger, Nigeria, Senegal and Togo between year 2010 and 2014. It was clear from the table that the dairy processed products increased from year 2010 to 2014 for all the countries under discussion with exception of

skimmed cow milk and butter and ghee which decreased in year 2011 in Niger but increased in years 2012 to 2014 while butter, yoghurt and ghee production were constant through the year 2010 to 2014 in Togo. Comparing the values obtained from Niger, Nigeria, Senegal and Togo with those of Canada and USA, France and Germany for the dairy processed products, the values were consistently low. This corroborates the earlier reports by Alokun (2008) and Agbede (2017, 2018) that our indigenous livestock are of low genetic quality and that the derivable products from them are very low.

Also, comparing the processed dairy products in Table 6 as depicted for Burundi, Ethiopia, Kenya and Zambia from Central Africa, it was evident that Ethiopia and Kenya produced more skimmed milk than Niger, Nigeria, Senegal, Togo, Burundi and Zambia. However, Canada, France, Germany and USA, which produced skimmed milk in million tonnages, had higher values than Kenya and Ethiopia. In general, Canada, France, Germany and USA produced much more of dairy products than countries in West and Central sub-Saharan Africa.

Table 5. Some Processed Dairy Products in selected countries in West Africa (Tons)

Country	Item	2010	2011	2012	2013	2014
Niger	Butter, cow milk	13391	13037	13825	14122	15354
	Cheese of goat milk	28855	30009	31209	31752	33275
	Cheese, sheep milk	24740	25548	26442	27200	27927
	Milk, skimmed cow	254434	247707	262672	268315	291719
	Butter and Ghee	13391	13037	13825	14122	15354
	Cheese (All Kinds)	53595	55557	57651	58952	61202
Nigeria	Butter, cow milk	11209	12724	12796	12894	13231
	Cheese, skimmed cow milk	8972	10187	10244	10323	10593
	Milk, skimmed cow	208480	236662	238003	239823	246100
	Butter and Ghee	11209	12724	12796	12894	13231
	Cheese (All Kinds)	8972	10187	10244	10323	10593
Senegal	Butter, cow milk	683	690	811	800	856
	Milk, skimmed cow	7787	7870	9249	9129	9767
	Butter and Ghee	683	690	811	800	856
Togo	Butter, cow milk	15	15	15	15	15
	Yoghurt	2340	2340	2340	2340	2340
	Butter and Ghee	15	15	15	15	15

Source: FAOSTAT (2018)

In addition, of the selected four countries in south sub-Saharan Africa viz: Botswana, Namibia, South Africa and Swaziland only South Africa (Table 7) to a little extent has comparable production values of butter, ghee, skimmed milk, whole condensed milk and cheese with those of advanced countries (Tables 8 and 9). This further confirms that sub-Saharan African countries are less efficient in the production of processed livestock products and at sustainable level.

Table 6. Some Processed Dairy Products in selected countries of Central Africa (Tons)

Country	Item	2010	2011	2012	2013	2014
Burundi	Ghee, butteroil of cow milk	152	220	161	206	303
	Milk, skimmed cow	2894	4172	3063	3920	5754
	Butter and Ghee	152	220	161	206	303
Ethiopia	Butter, cow milk	1950	2000	2000	2000	2000
	Cheese, whole cow milk	5850	6000	6000	6000	6000
	Ghee, butteroil of cow milk	15600	16000	16000	16000	16000
	Milk, skimmed cow	333450	342000	342000	342000	342000
	Butter and Ghee	17550	18000	18000	18000	18000
	Cheese (All Kinds)	5850	6000	6000	6000	6000
Kenya	Butter, cow milk	14150	14630	15500	15000	15000
	Milk, skimmed cow	594653	606765	638115	616075	616075
	Milk, skimmed dried	2500	2500	2500	2500	2500
	Milk, whole evaporated	165	165	165	165	165
	Butter and Ghee	14700	15180	16050	15550	15550
	Cheese (All Kinds)	320	320	320	320	320
	Evaporate & Condensed Milk	790	915	915	915	915
	Skim Milk & Buttermilk, Dry	2500	2500	2500	2500	2500
Zambia	Butter, cow milk	298	313	298	298	303
	Cheese, whole cow milk	1063	1028	1063	1065	1083
	Milk, skimmed cow	6731	7070	6733	6742	6856
	Tallow	19	24	24	24	24
	Butter and Ghee	298	313	298	298	303
	Cheese (All Kinds)	1063	1028	1063	1065	1083

Source: FAOSTAT (2018)

Table 7. Some Processed Dairy Products in selected countries of South Africa (Tonnes)

Country	Item	2010	2011	2012	2013	2014
Botswana	Butter, cow milk	1081	1081	1081	1081	1081
	Milk, skimmed cow	24700	24700	24700	24700	24700
	Tallow	6000	1800	3000	4440	4440
	Butter and Ghee	1081	1081	1081	1081	1081
	Cheese (All Kinds)	3346	2626	2065	1890	1890
Namibia	Butter, cow milk	650	650	480	480	480
	Cheese, whole cow milk	370	370	375	375	375
	Milk, skimmed cow	13300	13300	11400	11400	13300
	Tallow	1800	1560	2700	2520	2520
	Butter and Ghee	650	650	480	480	480
	Cheese (All Kinds)	370	370	375	375	375
South Africa	Butter, cow milk	17159	16536	17429	18750	18750
	Ghee, butteroil of cow milk	500	500	500	1250	500
	Milk, skimmed cow	337049	325974	341849	377334	377334
	Milk, skimmed dried	4554	4604	5193	5377	5377
	Milk, skimmed evaporated	1650	1650	1650	1650	1650

	Milk, whole condensed	10729	10623	11014	11364	11364
	Milk, whole dried	8865	9427	9929	10352	10352
	Butter and Ghee	17659	17036	17929	20000	19250
	Cheese (All Kinds)	78099	82727	87537	88789	88789
	Evaporate & Condensed Milk	26029	25923	26314	55014	26664
Swaziland	Butter, cow milk	169	170	172	202	192
	Milk, skimmed cow	4014	4038	4085	4797	4571
	Butter and Ghee	169	170	172	202	192

Source: FAOSTAT (2018)

Table 8. Some Processed Dairy Products in selected countries of North America (Tons)

Country	Item	2011	2012	2013	2014
Canada	Butter, cow milk	86560	97950	92990	87230
	Milk, dry buttermilk	2350	5460	10180	10180
	Milk, skimmed condensed	1600	1600	1600	1600
	Milk, skimmed cow	2910240	3261330	3200700	3200700
	Milk, skimmed dried	75970	84590	73860	73860
	Milk, skimmed evaporated	11600	11600	11600	11600
	Milk, whole condensed	9000	9000	9000	9000
	Milk, whole dried	4250	6250	7250	7250
	Milk, whole evaporated	27000	27000	27000	27000
	Butter and Ghee	86560	97950	92990	87230
	Cheese (All Kinds)	404150	406840	407260	407260
	Evaporate & Condensed Milk	49200	49200	49200	49200
	Evaporate & Condensed Milk	447400	472300	430900	430900
USA	Butter, cow milk	820890	843473	844832	841565
	Milk, skimmed condensed	731850	752462	753575	773393
	Milk, skimmed cow	14400000	15126450	15360450	15400000
	Milk, skimmed dried	882000	973000	956400	956400
	Milk, skimmed evaporated	8594	9481	9247	12635
	Butter and Ghee	824890	843473	848932	845665
	Cheese (All Kinds)	5161820	5297922	5398684	5584857
	Evaporate & Condensed Milk	1076389	1094953	1103134	1040937

Source: FAOSTAT (2018)

Table 9. Some Processed Dairy Products in selected countries of Europe (Tons)

Country	Item	2011	2012	2013	2014
France	Butter, cow milk	384900	388900	405300	405300
	Milk, dry buttermilk	26442	19570	23150	23150
	Milk, skimmed cow	10487610	10636410	10906296	10900000
	Milk, skimmed dried	250000	250000	250000	250000
	Milk, whole condensed	9998	11515	11037	11037
	Milk, whole dried	214146	211670	190261	190261
	Milk, whole evaporated	98600	97980	97980	97980
	Butter and Ghee	384900	388900	405300	405300

	Cheese (All Kinds)	1930788	1891650	1900440	1886044
	Evaporate & Condensed Milk	116998	117595	117117	117117
Germany	Butter, cow milk	424846	447509	424339	441109
	Milk, skimmed condensed				
	Milk, skimmed cow	12380000	13182000	13137000	13100000
	Milk, skimmed dried	300200	309100	316500	316500
	Milk, skimmed evaporated	34700	32100	29000	29000
	Milk, whole dried	86000	84200	83800	83800
	Milk, whole evaporated	350700	379200	340300	340300
	Butter and Ghee	424846	447509	424339	441109
	Cheese (All Kinds)	2171240	2232700	2725517	2740582
	Evaporate & Condensed Milk	447400	472300	430900	430900

Source: FAOSTAT (2018)

How to Guarantee Sustainable Animal Production and Products for Sustainable Food Security in the Sub-Sahara

One sector whose activities should be paramount to the leaderships in sub-Saharan Africa is Agriculture, particularly livestock production, which has the capacity to stem food insecurity and consequently reduce to large extent disease morbidity in the region. Thus, evolving viable strategies that will enhance livestock production vis-à-vis primary and processed products in order to sustain the economy in the region will be *sine qua non* to better living of its citizenry and reduction in food insecurity. Listed below are some of the strategies that can be adopted to enhance livestock production in sub-Sahara Africa.

- i. The world is a competitive place. Therefore, understanding a local area's comparative advantage is very important. Comparative advantage is the condition that enables a local area to operate relatively more efficiently and effectively, resulting in benefits accruing to that local area. Among nations and within the ecological zones within each country in sub-Saharan Africa, this should be considered. Specifically, the herdsmen should be organized and made to settle down in ranches where there are avalanche of grasses and shrubs while pig production should be restricted to sub-regions where the population of Christians predominates.
- ii. The curricula of the Institutes and Universities within the region should be overhauled to accommodate new production methods and practical approach that will change the orientation of the students and would-be farmers to better production techniques. Thus, the curricula must be improved upon from its present state to accommodate enormous practical and modern agriculture based on the use of results derived from technological studies. It is expected that this will change the production capacity in the region.
- iii. Farming must transform from subsistence to agribusiness. For instance, livestock farmers in the region must see livestock agriculture as a business where appropriate agribusiness models for smallholder and commercial farmers must thrive. For instance, animal production diversity in form of engagement in large scale, smallholder and cluster animal rearing must be encouraged.
- iv. In addition, the current set of farmers in the region must be trained on the adoption of innovations that are available in livestock agriculture. This is because most of these

farmers do not have any formal training in livestock management. Thus, the region through the relevant organs of the government should be empowered to train farmers in modern livestock agriculture. Essentially, training manuals should be prepared in local languages to facilitate fast comprehension.

- v. Youths and graduates should be encouraged in livestock production activities, be it primary production, processing and marketing of livestock products. A large number of University, Polytechnic and Colleges of Education graduates are roaming the streets searching for unavailable white collar jobs in the region. These people can be engaged in different aspects of livestock production such as: production, processing/value addition and marketing of animals if they are properly organized, trained and provided with incentives by their respective Federal Governments. Thus, the Ministry of Agriculture or Government approved agency should be saddled with the responsibility of organizing the youths in each country in the region, train them and provide enabling working conditions for them to farm. The enabling condition should include: helping them to secure loan from any lending agency such as the Central Bank, Commercial banks, Investment and Merchant Banks, African Development Bank, etc. or government should provide soft loan, land if need be, supervision and marketing facilities for their products etc. Governments in the region should take advantage of the collateral support of some international organizations for animal production in their country and philanthropic organization and individuals could be contacted for assistance.
- vi. Provision of relatively cheap feed for the poultry, pig, snail, ruminants and rabbit is imperative for sustained livestock production in the region. The government in partnership with organized private sector (Public Private Partnership; PPP) or Heavy Investors should be encouraged to set up high capacity feed production outlets in their respective countries.
- vii. Value addition to livestock products: The livestock processing unit such as broiler, pork, egg powder, dairy and sausage plants and abattoir should be set up by the government in partnership with organized private sector (Public Private Partnership; PPP) in the region. Also, on the part of the youths, a sizeable number should be trained on how to convert the livestock primary products to quality products through processing and by so doing some cottage industries will spring up. This in no doubt will have positive impact on the region's economy vis-à-vis food security.
- viii. Parent stock: The government of each country within the region and where possible countries with similar policy or ecological zones should form concerted production link that will facilitate the setting up of breeder/parent stock farms and hatcheries to supply viable chicks, piglets and pups. This should be left for the organized private sector and Heavy Investors (HIs).
- ix. In addition, technology that is indigenous to the region and centered on improving the efficiency of smallholders' farmers vis-à-vis enhancement of livestock sustainable production should be identified and developed as this will be impact-oriented. Also, regional government and respective Federal Government of each country should establish breeding institutes that would help in training breeders with a view to developing our local breeds that are genetically fit for our environment. Thus, disease resistant and heat tolerant breeds should be the focus of the breeders.
- x. Marketing facilities: Livestock products marketing is very important as it determines the interest of every participant within the value chain. Developing a thriving livestock

- industry that will be a major contributor to the region's Gross Domestic Product, which will capture a reasonable percentage of the huge meat, dairy, egg, beef, dairy, egg and broiler market, will require determination by the government and leveraging on support from all sources both local and international.
- xi. Extension services: Most research breakthroughs from the Research Institutes are not accessible to livestock farmers. Consequently, the extension units of every government within the region should be well equipped to channel major research findings to the farmers in the region.
 - xii. Agricultural practices like Climate-smart agriculture (CSA), e-agriculture etc. should be highly canvassed to mitigate the problem of climate change and or natural disaster in the region.
 - xiii. Credit facilities: The government of each respective country within the region should make credit facilities accessible to the livestock farmers. Such credit facilities should attract low interest and not attached to strong stringent measures.
 - xiv. The role of the Veterinarian in ensuring that healthy animals and wholesome meat/animal products are produced within the production line is very important. Consequently, the Veterinarians must be given roles within the primary production and processed products production chain at ensuring that consumers get the best animal products relatively devoid of disease.

Conclusion

Strategies to improve livestock production vis-à-vis primary and processed products in the sub-Saharan Africa is a major task that must be urgently addressed. This should be all inclusive using appropriate production models and policies. Each country within the region should set up target for 10 years and work towards it. The adoption of some of the earlier suggested strategies for better livestock production would help to reposition livestock enterprises in such a way that food insecurity will be mitigated with resultant increase in employment of significant proportion of our youths, women and retirees in primary production, value addition and involvement in marketing of livestock products. Furthermore, increase in livestock products production in the region will help to abate food and nutritional insecurity as it will lead to a drastic reduction in the people exposed to kwashiorkor, starvation and hidden hunger and infant mortality and morbidity and improve Intelligent Quotient (IQ) of the children in the region. Also, improved immunity against the current COVID-19 pandemic and other viral diseases can further be enhanced among the citizens of the region with increase access to livestock products. There is also a compelling need for the regional government to provide enabling environment that will facilitate the interest of Heavy Investors and organized private sector in livestock production chains.

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