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## BACKGROUND PAPER

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# African Livestock Transformation

Author:  
Jimmy Smith, ILRI

*Co-convener:*  
Simplice Nouala, AU-IBAR

## EXECUTIVE SUMMARY

We propose the transformation of African livestock can be achieved through a “sustainable intensification” strategy, by making the investments and policy changes which will transform smallholder family farms from traditional to improved systems that are market-oriented, profitable and sustainable, and make large commercial specialized systems (including the monogastric industrial systems) substantially more profitable and also sustainable. These investments, policy changes and actions will result in meeting the SDGs related to livestock development, especially poverty eradication and achieving food and nutritional security, while addressing climate change and protecting the environment and public health.

The African Livestock Futures study (Herrero, et al., 2014) demonstrates that Africa is the continent where “sustainable intensification” of agriculture and livestock systems could yield the most significant benefits for food security, incomes, trade, smallholder competitiveness, and ecosystems services. Due to the present low yields of crops and livestock, there is large scope for increasing productivity. Sustainable intensification includes the increased provision of services, inputs, appropriate institutional support and markets; which are essential to transform livestock operations and industries to become more commercial.

Most African governments have at least the following livestock development objectives which drive their investment interventions and policy change initiatives:

- Reducing poverty
- Achieving food and nutritional security
- Contributing to economic growth (GDP)
- Contributing to exports and foreign exchange earnings
- Contributing to environmental sustainability
- Contributing to climatic resilience
- Protecting human health from zoonotic diseases

Livestock in Africa has the potential to contribute to achieving these objectives and the SDGs.

Based on these development objectives, as well as some additional ones depending upon the circumstances in individual African countries, the scenario analysis of the African Livestock Futures study identifies four key commodity livestock value chains for the transformation of African livestock by 2050. The value chains having the most long-run potential to contribute to achieving these development objectives and the SDGs involve investing in both ruminant and monogastric livestock systems: red meat and milk (from cattle, sheep, goats, and camels); poultry or chicken meat and eggs; pork; and specialized dairy (from cattle, goats and camels) (Herrero et al., 2014) to strengthen and transform production and the value chains.

Various combinations of some or all of the three standard types of livestock technology interventions – improved genetics, health and feed (the combinations dependent upon the biophysical, agro-ecological, and market conditions facing livestock) – were found to be able to achieve higher animal productivity and incomes, and thus to lead to achievement of most government development objectives and lead to achievement of the Sustainable Development Goals.

In summary, the priority technology interventions for investment in the four commodity groups for livestock transformation were found to be:

- Cattle and goat dairy breeding improvement interventions, combining artificial insemination (AI) using exotic semen with estrus synchronization in the dairy sheds and in peri-urban areas
- Improvements in productivity of all local breeds of ruminant animals (cattle, sheep, goats, and camels) kept for meat and milk through investments in animal health to reduce young and adult stock mortality, and by making critical vaccinations and parasite control available in all livestock systems and production zones
- Public investments in rehabilitating range and pasture lands to improve feeding and animal management to complement genetic and health improvements
- Importation and dissemination of improved semi-scavenging poultry breeds and exotic pig breeds by the private sector and/or through public-private partnerships (PPPs), combined with improved private animal health services to provide critical vaccines, while the extension services promote improved feeding in all zones
- Increasing the number of specialized commercial production units and thus animal numbers for all four commodity value chains in all the production zones, wherever conducive agro-ecological and market conditions prevail, and employing appropriate genetic, health and feed technologies

Furthermore, realizing the potential of the technological interventions will require complementary policy changes:

- Promotion of substantial private investment in livestock product transformation, by incentivizing processing that leads to value addition.
- Promotion of investments in additional flour and oil mills by the private sector for additional feeds from agro-industrial by-products through policy protection against flour and oil imports and incentives on land leasing rates and/or taxes
- To attract and ensure adequate private investment in value-adding processing plants, as well as feed production and mills, credit availability and the investment licensing process needs to be simplified and made more transparent (especially to reduce bureaucracy)
- Promotion of the establishment of a forage seed industry, as well as production of improved forage and fodder, and trade in feed through policy and land-use law changes
- Promotion and enforcement of outsourcing contracts for forage and forage seed production
- Policy measures to rationalize public and private sector roles in the provision of veterinary services, leading to transition to private provision of clinical services wherever feasible

- Promotion of feed-use efficiency through the removal of the VAT and duty on feed mill ingredients, combined with the introduction of quality control enforcement
- Promotion of exports to more remunerative markets through the introduction of a practical and affordable system of animal ID and traceability, as well as programs to ensure food safety and animal health through monitoring of abattoirs and disease surveillance

It is important to note that attracting and enabling very substantial levels of private investment in post-production transformation and processing in the livestock sector will be required to achieve transformation of the livestock sectors in Africa. Thus, the investment promotion and business establishment process (including securing land and getting licensed to produce) must be dramatically improved (far less bureaucracy in setting up all types and aspects of businesses). The policy environment will also need to be made far more attractive for private investment (including through incentives such as subsidized land leasing rates, low interest loans, tax holidays, etc.) due to high risks related to investing in what is essentially an infant industry.

Moreover, based on the African Livestock Future study results, we recommend that the incentives be focused on smallholder farms and small-scale post-harvest agro-industries since economies of scale result in lower costs enjoyed by largescale operations and there is little justification for such incentives as subsidized land leasing rates, low interest loans, tax holidays, etc. (Herrero et al., 2014).

The analytical results (rates of return on investment) demonstrate the investment interventions proposed (both individual and combined technologies and policies) could lead to transformation of family farms from traditional to improved systems that are market-oriented, and increase the output from specialized commercial and industrial scale production operations dramatically.

Lastly, African livestock sectors sit at the intersection of three major global concerns related to public goods issues: equity and growth; health and nutrition; and climate natural resource use (FAO 2009). Livestock sector dynamics impact heavily on each of these issues and, moreover, they are intricately interlinked so that changes in one may affect the others and lead to trade-offs.

While the livestock sector in Africa provides high value food and many other economic and social functions which are so essential to Africa, this rapid growth in demand is happening amidst concerns, not only about resource scarcity and climate change, but also about the need for more equitable development, the urgency of poverty reduction through agricultural development, and public health risks associated with agricultural intensification. Sustainable intensification will be the key to elicit the required production response in most regions of Africa and this also means sustainable in terms of health, environment and equity.

As well, there is need to strengthen institutional capacity at national, regional, and continental levels to strengthen effective planning and implementation of strategies and plans which can drive the transformation and sustained growth of the sector. Pursuing and achieving this capacity building of both farmers and institutions within the CAADP results framework (Comprehensive African Agricultural Development Program), would enhance the ability of the livestock sector to significantly contribute through inclusive socio-economic growth which

could lead to achieving the multiple development objectives African governments face – thus simultaneously addressing poverty reduction, food security and nutrition, enhanced animal and human health, as well as contributing to national income growth, without negative effects on the environment and public health.

Strengthening systemic capacity will need to entail:

- Improved and inclusive and evidence based policy design and implementation capacity impacting poverty, food security, and health
- More effective and accountable planning to drive implementation of public policies and investment programs
- Improved coordination, partnership, and alliance within and across sectors and countries
- Increased public investment in agriculture achieving better value for money
- Enhanced knowledge support and skills development through improved science & technology, education and training, analytical capacity peer learning,

The public sector will need to create an ‘enabling business environment’ for the livestock sector to thrive in a socially desirable and acceptable way: it should ensure that medium-scale livestock farmers and commercial farms tap into the growing market for animal foods while generating employment opportunities for the poor, and especially youth, and supplying affordably priced animal-source foods in the market; and that small livestock producers sustainably maximize the contribution of animals to their livelihoods.

To achieve this end, the African Union through the Inter-African Bureau for Animal Resources (AU-IBAR) has coordinated the formulation of a livestock development strategy which can fast track policy reform in the sector, transformative technological change and productivity improvement, and the realization of its full potential, the 20-year Livestock Development Strategy for Africa (LiDeSA) (AU-IBAR, 2014), which also highlights the contribution of livestock to the Africa Accelerated Agricultural Growth and Transformation Agenda as highlighted in the Malabo declaration (Assembly/AU/ /Decl.1(XXIII)).

Finally, as supported by the Africa Livestock Futures analysis and results (Herrero, et al., 2014) and the Livestock development Strategy for Africa (AU-IBAR, 2014), investment in the priority technology and policy interventions proposed here are crucial to achieve success in transformation of the livestock sectors in African countries. Perhaps, more importantly, the results for all the targeted commodity sub- value chains show that investing in the proposed interventions would help transform family farms through the interventions from traditional to improved systems that are market-oriented and are “sustainably intensified”. Moreover, the livestock transformation proposed does not just impact on rural people. The anticipated transformation of the livestock sector also has the potential to impact positively on urban consumers through lower animal product prices, so it is crucial for achieving food and nutrition security at both the household, sectorial and national levels.

# 1. BACKGROUND

## Why focus on livestock transformation in Africa

Livestock are critical to rural incomes, nutrition and food security, and resilience in smallholder mixed crop/livestock and pastoral systems in much of Africa. In most African countries 60%-80% of rural households keep livestock as mobile and liquid assets, income generators, and for household food security and nutrition. As well, organic fertilizer (manure) and animal traction make indirect and critical contributions to crop production.

Rapid growth in demand for food of animal origin in Africa, stimulated by high population growth, gains in real per capita income and urbanization, represents a major opportunity to achieve poverty reduction and economic growth, and for making an overall contribution to achieving the Sustainable Development Goals.

In 2005/07, the average African citizen consumed about 11 kilos of meat per year and 35 litres of milk. This is projected to progressively increase in the next decades, up to 26 kilos and 64 litres by 2050, respectively (Alexandratos and Bruinsma, 2012). These projected increases in per capita consumption are notable, but it is more striking that by 2050 the population of Africa will be 2.2 billion, more than double from the 2005/07 level of 0.9 billion people. Moreover, although increases in production and per capita consumption have been encouraging in recent years, these consumption levels are still far lower than those recommended by FAO of 50 kg of meat, 200 liters of milk, and 300 eggs per capita needed for sustainable human growth and development (FAO, 2009).

Meanwhile, foresight analysis involving projections up to 2050 made by Herero et al., 2014 shows a similar pattern under a “business as usual” scenario, which is based on recent trends for the demand and supply sides. On the demand side, “business as usual” means continuing recent rates of population growth, gains in real per capita income and urbanization, and on the supply side continuing recent rates of investment and technological change, as well as continuing current policies maintained through 2050.

Under this “business as usual” scenario (BAU), African producers would not be able to satisfy the growing demand for livestock products. According to these BAU projections, we could expect the following:

- A 3 fold continent-wide increase in milk consumption to 2050 – with especially high growth in East Africa
- A 6-7 fold continent-wide increase in consumption of pork and poultry meat – with especially high growth in West Africa
- Overall, poultry consumption would exhibit the highest rates of growth throughout SSA
- The consumption of meat from pigs and chickens would exceed red meat consumption by 2030 in most sub-regions of SSA
- Smallholder mixed crop-livestock systems would remain the main producers of ruminant products to 2050
- The present low trade deficit (10%) would increase to 20% by 2050
- Imports of milk, as well as meat from monogastrics would double in relation to production

Under the business as usual scenario imports of milk and meat from pigs and poultry would have to double in relation to production, and even in ruminant meat, where Sub-Saharan Africa

has historically been almost self-sufficient, the imports would increase to an equivalent of 16% of local production. Furthermore, any negative deviation from this would make African livestock production largely uncompetitive, resulting in significant negative outcomes for producers, consumers and continental food security. This is not a “sustainable” scenario.

Herrero et al., meanwhile, estimate that Africa needs to achieve rates of annual growth in productivity in livestock of around 6% per year if it is to meet this rising demand through domestic production and that this can only be achieved under a scenario of “sustainable intensification”, with priority development goals being attained. Under such a scenario the relatively low trade deficit of around 10% could be maintained to 2050 (Herrero et al., 2014).

Under a “sustainable intensification” scenario, the projected rapid growth in the demand provides major opportunities for market-driven growth for private sector businesses, both those of smallholder farmers and largescale commercial producers.

In the “Sustainability Scenario” there is strong progress toward reducing fossil fuel dependency and with rapid technological changes that lower the environmental costs of growth. The world is reducing resource intensity and fossil fuel dependency. Low-income countries grow more rapidly, inequality between and within economies falls, technology spreads, and there is more action to reduce the environmental costs of growth. The Sustainable Development Goals are achieved by 2030, resulting in educated populations with access to safe water, improved sanitation and medical care. Rapid economic growth in low-income countries reduces the numbers of people living in poverty. The world has an open trade economy, with rapid technological change directed toward lower environmental costs, including clean energy technologies and land saving technologies. Consumption is oriented towards low material growth and energy intensity, with a relatively low level of consumption of animal products. Investments in education help cut population growth. Other factors that reduce vulnerability to climate and other global changes include, for example, the successful implementation of stringent policies to control air pollutants and rapid shifts toward universal access to clean and modern energy in the developing world (Herrero et al., 2014).

However, even under the sustainable intensification strategy smallholder African livestock keepers will only realize the potential benefits if their competitiveness is enhanced and policy makers ensure that the sector evolves in a socially desirable and acceptable way, thereby contributing to their food security, improved nutrition and poverty reduction, while also not generating negative effects on the environment and public health.

Thus, realistic goals for livestock transformation in Africa over the next 15 years of the Sustainable Development Goals period include:

- At least a doubling of livestock production or output, helping to ensure food security for the first time
- Halving of domestic livestock product prices, thus contributing to food security and poverty reduction
- Doubling the contribution of livestock products as inputs into domestic industrial sectors like retail food services, baking, etc.
- Doubling the exports of live animals and meat, as well as dairy, and other livestock products, including through regional trade, leading to a doubling of foreign exchange earnings

- The achievement of the relevant Sustainable Development Goals (SDGs) related to livestock

Given this framework of goals to contribute to the achievement of the SDGs, livestock development will play an ever increasing role in the economic development of African countries.

Beyond these direct impacts on the lives and incomes of rural people, livestock sector growth can contribute to job creation, including for young people, create downward pressure on animal-product prices and enhance the supply of agricultural inputs for industrial production. Increasing livestock production and efficiency is critical to the achievement of food and nutrition security at household, sectorial and national levels.

## **2. OTHER INITIATIVES WHICH THE TRANSFORMATION PROCESS CAN TAP INTO**

1. **The African Union through the Inter-African Bureau for Animal Resources (AU-IBAR)** has led the formulation of an African livestock development strategy which can fast track: policy reform in the sector; transformative technological change and productivity improvement; and the realization of the sector's full potential.

AU-IBAR's 20-year **Livestock Development Strategy for Africa (LiDeSA)** provides an opportunity to build consensus, mobilize stakeholders, and establish strong coordination and partnerships to drive the transformation of the sector in Africa. It also highlights the contribution of livestock to the **Africa Accelerated Agricultural Growth and Transformation Agenda** as highlighted in the **Malabo Declaration**.

2. In the **African Livestock Futures** study of Herrero, et al., 2014, policy recommendations are given for realizing the potential of livestock as an engine of economic growth, food security and environmental well-being in sub-Saharan Africa. Using a global partial equilibrium model (GLOBIOM), consumption, production, prices and trade projections are determined for different animal products (milk from cattle and small ruminants, meat from cattle, small ruminant and monogastrics (poultry and pork), and eggs) for each scenario. The impacts of increasing production on key environmental dimensions (use of nitrogen, land-use change, greenhouse gases) are estimated and the role of different farming systems (pastoralists, smallholder mixed crop-livestock systems and industrial systems) are examined in meeting the demand for livestock products. Africa, against selected regions of the world is compared and it is also discussed how the results impact different regions in sub-Saharan Africa (East, West, and Southern Africa and the Congo Basin).

The authors also discuss the implications of the findings for the competitiveness of the sector in global markets, for what roles smallholders and pastoralists may play in the future, and discuss the potential disease impacts of meeting livestock product demand. They conclude with policy recommendations for realizing the potential of livestock as an engine of economic growth, food security and environmental well-being in sub-Saharan Africa.

3. **The CAADP framework (Comprehensive African Agricultural Development Program)** for capacity building of both farmers and institutions within Africa is meant to enhance the ability of the livestock sector to significantly contribute through inclusive socio-economic



growth which can lead to achieving the multiple development objectives African governments face – thus simultaneously addressing poverty reduction, food security and nutrition, enhanced animal and human health, as well as contributing to national income growth, without negative effects on the environment and public health.

4. **The African Development Bank’s action plan on Feeding Africa, an Action Plan for African Agriculture Transformation:** <http://www.afdb.org/en/dakagri2015> .

5. **FAO’s (2009) State of Food and Agriculture: Livestock in the Balance.** Rome: Food and Agriculture Organization of the United Nations.

6. **AU-IBAR, the Inter-African Bureau for Animal Resources,** is leading the roll-out of a set of quantitative planning tools called the **Livestock Sector Investment and Policy Toolkit (LSIPT)** which is used to carry out sector analysis. This toolkit was developed by a group of international agencies<sup>1</sup> of the African Partnership for Livestock Development (ALive) under the aegis of AU-IBAR. It was first used in Zambia and Mali, and then in Ethiopia. LSIPT is used to create a livestock sector model and then carrying out a quantitative analysis of the present technical performance of the sector and the future economic contribution of potential interventions to households, commodity value chains, the livestock sub-sector, the agricultural sector, and the national economy. The result is a **Livestock Sector Analysis (LSA)** meant to raise the awareness of livestock sector development to contribute to national development, and influence pro-poor and environmentally sustainable investment in livestock development among governments, donors, and the private sector.

ILRI has been providing support to the Ethiopia Ministry of Agriculture (MOA) on livestock development planning, first through the development of dynamic herd and sector models and the LSA, and then by creating an **Ethiopia Livestock Master Plan (LMP)**, entailing 5-year “road maps” or the implementation plans for the Livestock State Ministry for the Ethiopia Growth and Transformation Plan II (GTP II) which is starting now. The Ethiopia LMP team will also be supporting the development of LSAs and LMPs in Tanzania, and plans are being discussed to develop LMPs for Uganda, Kenya, Rwanda, and Cameroon.

### 3. CHALLENGES

Although various African countries have some of the largest herds of livestock in the world, and African human populations in general depend greatly on livestock for their livelihoods, the potential of the sector has not been fully exploited in order to significantly contribute to economic and social well-being, reduce poverty, create wealth, strengthen food security and health, and accelerate economic growth.

The African Livestock Futures study demonstrates that Africa is the continent where “sustainable intensification” of agriculture and livestock systems could yield the most significant benefits for food security, incomes, trade, smallholder competitiveness, and ecosystems services. Due to the present low yields of crops and livestock, there is a large scope for increasing productivity at very high resource use efficiency gains. Sustainable intensification includes the increased provision of services, inputs, appropriate institutional support and markets; which are essential to transform livestock operations and industries to become more commercial (Herrero et al., 2014).

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<sup>1</sup> CIRAD (France), FAO, and the World Bank were the main contributors.

To achieve this transformation, various combinations of some or all of the three standard livestock technical constraints – improved genetics, health and feed – need to be addressed to achieve higher animal productivity and incomes, and to lead to achievement of the SDGs. The combinations depend upon the biophysical potential of the livestock, as well as the agro-ecological, and market conditions facing livestock in the production zones in the various African countries. Always, the enabling policy constraints also need to be addressed.

**Feed.** Lack of good quality animal feed is perhaps the most critical constraint to increasing livestock productivity in Africa. Rapidly increasing livestock populations have put severe constraints on the ability to adequately feed livestock in order to raise productivity per animal and unit of land (thus adding to “sustainable intensification”). Feed requirements exceed available resources in many production zones, except in lowland grazing zones during years when rainfall is equal or above the long-term average. Moreover, poor feeding has limited the ability of livestock to reach their genetic potential and hindered the impact of technology interventions, including artificial insemination and oestrus synchronization. With continued growth expected in livestock populations, unless sustainable intensification measures are taken the feed situation and animal product deficits, resulting in food insecurity and malnutrition existing in many African countries can be expected to further deteriorate.

**Animal health.** Despite vast improvements in the coverage and quality of animal health services in some countries in Africa, service provision remains less than satisfactory. Endemic diseases have limited livestock productivity and agricultural development. For instance, despite substantial international demand for Ethiopian meat and livestock products to the Gulf and within Africa, exports are often hindered by stringent animal health requirements. Their impact stems from direct losses due to mortality and indirect effects due to slow growth, low fertility and morbidity related reductions in productivity—particularly among young animals and reproductive females. These losses have significant economic, food security and livelihood impacts.

As well, recent liberalization of the veterinary profession and drug importation laws in many African countries, vet business viability remains a challenge. High operational and transport costs, and low public spending, have hindered private service delivery growth. The coverage of veterinary services reach less than half in most African countries, and the production of high quality essential vaccines is low, as are the quality, safety and efficacy of veterinary drugs and biological agents. The prevention and control of zoonotic—origin of over 60% of human diseases—and food-borne diseases are poorly addressed. The veterinary services generally do not provide frontline services, and inspection services are limited to export meat and poorly address primary livestock products.

To meet rising export standards and enhance the quality of animal health services, most African governments have embraced standards set by the World Organization for Animal Health (OIE) and the Performance of Veterinary Services (PVS) Pathway. The coverage of veterinary services has improved over recent years as governments have made progress towards meeting ambitious targets of providing animal health clinics to even the remote villages. Considerable efforts are also being made to improve the quarantine and inspection services to meet requirements set by trading partners, and standard quarantine facilities are under construction.

**Genetics.** Improving the genetic potential of livestock is one of the keys to achieving food and nutrition security, and better lives through livestock. Genetic gains can be obtained by crossbreeding local animals (generally hardy but low-yielding) with (high yielding) exotic

breeds or by improving local breeds through selection. Despite the abundance of livestock resources in Africa, and the depth of research and the quantity of available technologies, there have so far been few sustained attempts to improve indigenous breeds through crossbreeding or selection. Even in species crossbred for several decades, such as cattle and poultry, numbers do not often exceed 1% of the total national populations.

**Policy and institutional environment.** Despite the potential, the livestock sectors in many African countries are generally characterized by an absence of effective enabling policy and institutional environment, leading to sub-optimal levels of productivity, supply and competitiveness, and limited market orientation. A lack of policies and support facilitating private sector involvement in key areas of animal health, genetics and breeding, and land use for livestock-related value chains have constrained development of the sector, particularly access to land for the production of feeds and forages.

Many African governments have developed a full range of reasonable policies promoting animal health and protecting human health as a result of exposure to animal diseases through the enactment of sanitary and phyto-sanitary standards and regulations, better management, including feeding, animal breeding and genetics, better functioning of value chains, value addition through processing, and facilitating the involvement of farmers in improving forage production and feeding, essential for increasing livestock productivity, production, marketing, and trade, including regional trade. However, in many countries enactment or implementation of critical livestock related policies, regulations and laws are lagging. There has also been a lack of enforcement of standards and quality control of livestock products, including dairy, poultry, skins and hides, live animals etc., and of policies designed to promote food safety and disease surveillance, prevention and control.

#### **4. OPPORTUNITIES**

It is critical to note that both improved smallholder family and largescale commercial specialized systems (including the monogastric industrial systems) can play complementary roles in bringing about African livestock transformation. Largescale commercial specialized farms and processors can act as innovation leaders providing examples or demonstrations which act as “pull” factors for productivity improvement in smallholder systems. Investing in both these types of systems is necessary to achieve the SDGs, by making contributions to national income, poverty reduction, food and nutritional security, exports, environmental sustainability, and climate change adaptation and mitigation.

The analytical results of the African Livestock Futures study demonstrate that the investment interventions proposed (the combined technologies and policies) can transform family farms from traditional to improved systems that are market-oriented. Moreover, the specialized systems could also be improved through better genetics, feed and health services, as the number of production units is expanded to increase the number of animals in the systems (Herrero et al., 2014).

Attracting and enabling very substantial levels of private investment in post-production transformation and processing in the livestock sector will be essential for success. Thus, the investment environment in all African countries must be dramatically improved (far less bureaucracy in setting up all types and aspects of businesses), and the enabling policy environment will also need to be made far more attractive for private investment (including through various incentives). Moreover, based on the African Livestock Future study results,

we recommend that the incentives be focused on smallholder farms and small-scale post-harvest agro-industries since economies of scale result in lower costs enjoyed by largescale operations and there is little justification for such incentives as subsidized land leasing rates, low interest loans, tax holidays, etc. (Herrero et al., 2014).

The on-going rapid growth in demand in Africa provides major opportunities for market-driven growth of livestock that will benefit smallholder livestock keepers on the continent, but only if the competitiveness of the sector (focusing on private entrepreneurs, and especially smallholder farmers) is enhanced and policy makers ensure that the sector evolves in a socially desirable and acceptable way, thereby contributing to poverty reduction, food security, nutrition, and health, as well as to national income growth, while at the same time avoiding negative effects on the environment and public health.

## **5. SOME NOTABLE OPPORTUNITIES**

While the majority of milk will continue to be sold through informal local markets, thereby ensuring access by poor consumers, increased milk supply to processing industries and upgrading the capacity of milk processing companies in product development and processing to contribute to consumer nutritional security protection and health, as well as exports will require implementation of milk and dairy product quality schemes based on price incentives.

As well, many African countries have breeding policies which could substantially advance genetic improvement activities and raise productivity, but these breeding policies are not being implemented. Meanwhile, genetic improvement success has been reported in the poultry sectors in some African countries through introduction of exotic breeds and/or through crossbreeding of local or indigenous chicken breeds with exotics. It is becoming increasingly common for exotic chicken breeds to be reared on small and medium-scale family farms, and by large-scale market-oriented commercial producers in urban and peri-urban areas. Both crossbreds and purebred exotics are widely used to increase meat and egg production. Governmental and non-governmental organizations are increasingly realizing the potential of improved smallholder family poultry with crossbreds and purebred exotics to reduce poverty, and are distributing crossbreds and purebred exotic pullets and cockerels, and also fertile eggs to farmers, as well as teaching smallholders, including increasingly women and youth, to carry out household-level poultry breeding and or through multiplication centers.

To meet rising export goals, international standards have to be adhered to and the reach and quality of animal health services have to be enhanced. More and more African governments are embracing the standards set by the World Organization for Animal Health (OIE) and the Performance of Veterinary Services (PVS) Pathway to achieving international standards. The coverage of veterinary services has improved somewhat over recent years as governments have made progress towards meeting ambitious targets of providing better coverage of animal health clinics for rural people, and especially those living in areas remote from all-weather roads and urban markets, as well as migrating pastoral people. Considerable efforts are being made as well to improve the quarantine and inspection services to meet requirements set by international trading partners, and more international standard quarantine facilities are under construction in countries trying to increase exports.

These factors would all help produce more rapid growth in the volume and value of livestock exports. This could include increasing exports of value added products, like cut meat and leather, including finished leather goods. In response to rising demand for animal health

services, the importation and distribution of veterinary drugs and the establishment of private pharmacies would also have to be liberalized.

## **6. SUGGESTED ACTIONS / WAY FORWARD**

### **The vision of livestock transformation in Africa**

Taking the actions required to achieve the transformation of African livestock through the sustainable intensification strategy laid out here, by making the investments and policy changes needed, will transform family farms from traditional to improved systems that are market-oriented, profitable and sustainable. As well, large commercial specialized systems (including the monogastric industrial systems) will become substantially more profitable and sustainable. These investments, policy changes and actions will result in meeting the SDGs related to livestock development, especially poverty eradication and achieving food and nutritional security, while addressing climate change and protecting the environment and public health.

Moreover, this transformation of livestock will not just impact on rural people. The anticipated transformation of the livestock sector also will improve food availability and the incomes of urban consumers through lower animal product prices, as well as their food security and nutritional status, and is critical for achieving food and nutrition security at the household, sectorial and national levels as well.

### **The proposed Theory of Change**

Most African governments have at least the following livestock development objectives which drive their investment interventions and policy change initiatives:

- Reducing poverty
- Achieving food and nutritional security
- Contributing to economic growth (GDP)
- Contributing to exports and foreign exchange earnings
- Contributing to environmental sustainability
- Contributing to climatic resilience
- Protecting human health from zoonotic diseases

Livestock in Africa has the potential to contribute to achieving these objectives and the SDGs.

Based on these development objectives, as well as some additional ones depending upon the circumstances in individual African countries, the scenario analysis of the African Livestock Futures study identifies four key commodity livestock value chains for the transformation of African livestock by 2050. The value chains having the most long-term potential for contributing to these development objectives involve investing in, strengthening and transforming both ruminant and monogastric livestock systems: red meat and milk (from cattle, sheep, goats, and camels); poultry or chicken meat and eggs; pork; and specialized dairy. Two sub-value chains for each of these four value chains show substantial potential – improved smallholder family systems and large commercial specialized systems (including the monogastric industrial systems) – and thus warrant substantially increased investment to bring about livestock transformation. Thus, in total we recommend these eight (8) sub-value chains for the African Agriculture Transformation Agenda for livestock. The specific value chains to

be focus on in each country will depend upon and vary according to the agroecological and market conditions in the major livestock regions in each country. As well, there will be special opportunities in some countries, such as apiculture or aquaculture and fisheries.

We propose that the strategy for African livestock sector transformation thus needs to have a **dual track approach**: on the one hand, market-oriented or potentially market-oriented producers need to be supported, as increasing livestock production and productivity of emerging farmers will generate spill-over benefits to sector employment and consumers. On the other hand, poor or relatively poor smallholder livestock keepers need to be supported by building their capacity to make full use of their livestock assets, to ensure livestock is an effective way to sustain and improve their livelihoods in the short to medium term, while also improving their access to and use of resources which can help them transform their livestock production activities and the lives of their families.

## **7. THE WAY FORWARD – RECOMMENDED ACTIVITIES**

### **Specialized dairy development (with cows, goats, and camels)**

Doubling or even tripling cow and goat productivity in producing milk could be achieved through improved genetic potential made possible by combining artificial insemination (AI) using exotic semen with estrus synchronization. Simulation results show these known technologies could be readily employed after training of AI technicians (public or private) in the dairy sheds or livestock zones with appropriate agro-ecological conditions (lowland grazing areas) and in peri-urban milk sheds in all zones.

While this genetic improvement may not be achieved in the case of camels, in the case of all three milk-producing species there would be a need to combine better genetics that leads to higher yield potential with better feeding and health interventions to realize yield increases, as well as with improved market and investment policy, including land allocation for investment in dairy production and feed production, as well as dairy quality control and price incentives. Especially critical would be encouraging investment in milk processing, since an assured market is the best way to get dairy farmers to invest in productivity increasing technologies.

These dairy development interventions would transform family farms with cattle and goats which produce both meat and milk, as well as the pastoral systems with camels and goats to improved market-oriented systems. The specialized commercial-scale dairy systems could also be improved through better genetics, feed and health services as the units are expanded in number to increase the number of animals in the commercial systems.

The additional milk produced would substitute for imported milk products and could be used domestically for new or additional industrial uses (e.g. in the baking industry) or be exported as milk powder or UHT to raise foreign exchange earnings.

The critical policy actions needed for successful transformation of dairying include:

- Land lease policy makes land available to investors for forage seed and forage production, dairy farms, and dairy processing plants
- The private sector is provided credit and is incentivized to invest in milk processing plants, especially in UHT and powdered milk production, to overcome seasonal fluctuations in raw milk supply and dairy product demand

- To attract and ensure adequate private investment in dairy processing plants and feed production and mills, credit availability and the investment licensing process needs to be improved (especially to reduce bureaucracy)
- Quality based standards and pricing are introduced and enforced to encourage quality milk supply
- The private sector is incentivized to invest in providing AI and synchronization services
- Availability of more and better feed seed and forage production and marketing, and health services in all areas, whether breed improvement is implemented or not
- More effective extension services to support production, processing and marketing of quality milk
- Establishment of flour mills are incentivized to make more concentrate ingredients available
- Domestic production of cooking oil is promoted to replace importation of cooking oil and export of oil seeds is banned since this affects availability of concentrate feeds

### **Transforming traditional meat (and milk) systems through on-farm fattening for domestic markets and feedlot development for export**

The potential contribution of improving traditional red meat-milk production systems (cattle, sheep, goats, and camels) in most production zones throughout Africa through improved on-farm fattening, and specialized cattle and small ruminant feedlots (sheep and goats) to improve food security, red meat consumption and nutrition, economic growth, and export trade is very significant, given the size of the sub-sector in most African countries and the anticipated productivity improvements possible with existing and well-known technology interventions and policy improvements.

The proposed combined interventions for improving red meat/milk production on family farms and among pastoralists and agro-pastoralists is not expected to include genetic improvement through crossbreeding using AI and synchronization in most African countries. Breed improvement would rather be carried out through selection among local animals, combined with investments in animal health to reduce young and adult stock mortality (YASM), and by providing critical vaccinations and carrying out parasite control, and through improved feeding from either communal rangelands or other communal grazing areas, or from intensified backyard production of legumes, grasses, or fodder trees.

### **On-farm fattening and feedlot development for red meat/milk systems**

Developing on-farm fattening and largescale commercial feedlots will encourage livestock farmers to invest in technologies which will raise red meat (and milk) production in traditional red meat/milk systems, both in the mixed crop/livestock and pastoral systems.

The technologies needed to improve on-farm fattening include reducing young and adult stock mortality, parasite control, improved feeding, and implementation of a breeding recording scheme for breed improvement through selection. These known and proven technologies will then provide greater quality of local animals and meat, as well as quantity.

The strategy for improving fattening in the commercial feedlot operations is to increase the herd size, the number of fattening cycles, and the number of fattening units in order to achieve a higher total number of animals passing through the feedlots. Increased investment in slaughter houses for both domestic consumption and exports will be needed, including facilities, SPS quality and disease control and export infrastructure (quarantine stations, transport, trade routes with access to feed and water, etc.) will also be required.

Furthermore, to meet the Sustainable Development Goals through the intensification strategy, especially the goal to eliminate poverty, ruminant animal numbers cannot be reduced, as called for in the climate resilience strategies in some African countries. However, the annual growth rate in cattle population could be substantially reduced if the projected productivity increases are realized, leading to higher off-take rates. If this is not enough to ensure sustainability substantial incentives for farmers to reduce the number of cattle in their household herds may be required.

Although meeting the domestic demand for red meat for the rapidly growing population of Africa (as well as growing incomes) is not likely to be achieved, under the “sustainable intensification” strategy or scenario proposed in the African Livestock Futures study, even though existing deficits and high domestic prices for red meat would continue deficits would not grow or lead to even higher domestic prices for red meat. However, improvement of the traditional red meat/milk systems is unlikely to contribute to meeting the red meat export goals many African countries are setting, whether the trade is assumed to be international or regional. Without substantial investments as well in monogastrics, especially poultry, but pigs too, it would also be extremely difficult to meet national export goals set to earn foreign exchange (Herrero, et al., 2014).

To be successful, the red meat/milk interventions need to be supported by policy actions which meet the following conditions:

- Feed requirements for additional agro-industrial by-products inputs to produce balanced feeds are met for feedlots, through establishment by the private sector of additional flour and oil mills, while the availability of roughage/fodder such as crop residues is also increased
- A support strategy is developed and put in place by governments in collaboration with industry and farmer associations to enable access to sufficient production factors (including land, water and finance).
- To attract and enable adequate private investment in feedlots and slaughter houses, the policy and investment environment is improved (especially to reduce bureaucracy)
- The required policy changes are made to attract and ensure investment in private feedlots and slaughterhouses – land availability, reduction in taxes on feed ingredient, tax holidays, etc.
- Establishment of new feedlot operations takes into account the spatial distribution of industrial by-products such as sugar cane factories, beer breweries, agro-industrial processing plants, and milling industries.
- To facilitate and promote formal exports of live animals and meat, investments are made in export infrastructure for animal holding and quarantine,



- To increase formal exports, programs need to be established to ensure food safety and animal health through disease surveillance, monitoring of abattoirs, animal identification and traceability, etc.
- Linkages are established for viable stocker feeder programs where the young male stocks from grazing systems are channeled to feedlot operations, thus reducing the grazing pressure on rangelands.
- Productivity increasing health (focusing on public goods) and feed investments (in both range and pasture lands) for traditional red meat/milk systems are adequately funded and are implemented by government agencies in a timely manner

### **Monogastric poultry and pork development**

To meet projected total meat and egg consumption requirements in 2050, according to the African Livestock Futures results, it will be necessary to vastly expand commercial industrial scale broiler and layer units, as well as both small scale farm and industrial scale pig production using exotic breeds and/or semen, combined with better feeding and health, wherever conducive production and market conditions exist. The major change in the industrial systems will be increasing the number and size of specialized commercial scale broiler and layer units, as well as pig units.

It will be also be possible to transform traditional backyard family poultry that relies on indigenous scavenging chickens to become a market-oriented improved family poultry system with semi-scavenging crossbred chickens, which have far higher genetic potential for both eggs and meat, when combined with supplemental feeding and adequate health services. In the case of improving small scale family pig operations, the technologies are also analogous and well known and proven to work.

If the proposed poultry and pig intervention investments for family scale operations are carried out, the poultry and pig sub-sectors can move to improved family systems and the scale of the industrial layer and broiler and pig operations can also be greatly increased. The transformation of family scale systems can make substantial contributions to reducing poverty and malnutrition among rural and urban poor, as well as contribute to national income in the short-run.

With the success of the poultry and pig investment interventions, many African countries could meet their chicken and pork meat and chicken egg demand for their rapidly growing populations and could easily produce a very significant surplus of eggs for domestic industrial uses or exports. Surplus eggs could be processed into egg powder and used domestically for new or additional industrial uses (e.g. in the baking industry), or be exported as egg powder to raise foreign exchange earnings.

Besides improving the food security of both rural and urban people, the impacts of the investment interventions proposed could reduce poverty and, as well as make livestock an increasing contributor to national income growth (GDP), and also increase exports and foreign exchange earnings, while contributing to climatic sustainability.

The above benefits can only be realized if the following policy-related actions are taken:

- The feed constraint on poultry and pigs is resolved by increasing the acreage in maize and soybean, and ensuring imported nutritional additives are available with no or reasonable duty
- To attract and ensure adequate private investment in meat processing plants for both poultry and pork, as well as feed production and mills, credit availability and the investment licensing process needs to be improved (especially to reduce bureaucracy)
- During the early days in the development of the poultry sub-sector the private sector will need to be supported to invest adequately in day-old-chick (DOC) and pullet production and distribution, as well as egg processing to make egg powder
- An effective livestock extension system is put in place to train farmers in management of crossbreds in the improved family poultry and pig operations
- The family systems are linked with processors and retailers to ensure reliable market outlets for chicken meat and eggs, and pork
- Regulations are enacted to protect the small improved family poultry and pig farmers so that they will not be forced out of business by large specialized poultry and pig farms. Governments will need to balance the poverty reduction and food security benefits of the improved family sub-sector with the economic growth contribution of the large industrial poultry and pork production sub-sector.
- Protective trade policies are put in place to discourage cheap chicken and pork meat imports, thus encouraging domestic private investment in production and processing
- Research to monitor, maintain and ensure the quality of the imported breed lines takes place. Continuing research will also be needed to identify better yielding breeds including from among the locals
- Balanced policies to encourage investment in animal production and meat processing to meet both rapidly increasing domestic demand for meat, and exports. Otherwise, the exploding domestic demand could continue to raise domestic prices and constrain future exports.
- Investment in research to better understand demand for livestock products, including to inform promotional activities meant to change tastes and preferences

Related to protecting small scale family operations, there is no justification for providing private investors in the monogastric sector – both poultry and pork – with incentives (i.e. commercial industrial scale farms) since they have the cost advantages from economies of scale. Private investors in value addition (processing plants), and largescale feed input suppliers (forage seed and feed producers), however, will usually need adequate incentives when investing, especially in the early days of the development of these sub-sectors, to reduce risks (i.e., tax holidays, subsidized leasing rates for land, and priority in acquiring land)

### **Impacts on food security and trade**

If the proposed poultry intervention investments are carried out, the poultry sub-sector can move away from the traditional backyard family system to improved family poultry (with exotic breeds) and the scale of the specialized industrial layer and broiler operations could also be greatly increased. This transformation could make substantial contributions to reducing

poverty and malnutrition among rural and urban poor, as well as to increasing national income, while enabling an increase in exports of live ruminant animals and red meat.

Importantly, to many African governments the growth of the poultry sub-sector would enable the closing of national-level meat production-consumption gaps to achieve better food security and to mitigate climate change by lowering greenhouse gas (GHG) emissions. Lower GHG emission targets could be met by increasing the share of chicken meat consumption in total meat consumption, but only if chicken substitutes for red meat that comes from larger high emitting ruminants. To take advantage of the benefits of the potential poultry revolution, would thus require substantial investments in promotional activities to change tastes and preferences from beef, mutton, and goats, as well as local chicken meat and eggs, to exotic chicken meat and eggs, and to pork where local consumers are open to eating pork, such as in Tanzania.

Moreover, if the surplus chicken meat can substitute for domestic red meat consumption, this would also enable more meat exports (again of beef, mutton, and goat meat) to raise foreign exchange earnings, in accord with the meat export goals of many African countries.

### **Critical and complementary institutional strengthening activities**

As well, there is need to strengthen institutional capacity at national, regional, and continental levels to strengthen effective planning and implementation of strategies and plans which can drive the transformation and sustained growth of the sector. Pursuing and achieving this capacity building of both farmers and institutions within the CAADP results framework (Comprehensive African Agricultural Development Program), would enhance the ability of the livestock sector to significantly contribute through inclusive socio-economic growth which could lead to achieving the multiple development objectives African governments face – thus simultaneously addressing poverty reduction, food security and nutrition, enhanced animal and human health, as well as contributing to national income growth, without negative effects on the environment and public health.

### **Strengthening systemic capacity will need to entail:**

- Improved and inclusive and evidence based policy design and implementation capacity impacting poverty, food security, and health
- More effective and accountable planning to drive implementation of public policies and investment programs
- Improved coordination, partnership, and alliance within and across sectors and countries
- Increased public investment in agriculture achieving better value for money
- Enhanced knowledge support and skills development through improved science & technology, education and training, analytical capacity peer learning,

### **Thus, transforming and sustaining growth in the sector will need to entail:**

- Increased production through productivity increase
- Better functioning markets and increased intra and inter-regional trade
- Expanded local agro-industry and value addition
- Improved management and governance of natural resources for sustainable production over the longrun

## **Enhancing the role for the public sector**

The public sector will need to create an ‘enabling business environment’ for the livestock sector to thrive in a socially desirable and acceptable way: it should ensure that medium-scale livestock farmers and commercial farms tap into the growing market for animal foods while generating employment opportunities for the poor and supplying affordably priced animal-source foods in the market; and that small livestock producers sustainably maximize the contribution of animals to their livelihoods.

The public sector will need to not only supply key public goods – such as infrastructure and a system of animal health disease and control – but also facilitate innovation in the private sector by providing incentives – such as innovation grants, reduced taxes, loans below market interest rates, subsidized insurance schemes etc. – to private entrepreneurs and companies willing to enter the livestock value chains or expand their livestock businesses through **promoting socially desirable business models, by:**

- Limiting externalities associated with intensification. Such externalities can occur in food safety, zoonoses, in water quality, farm chemicals, managing the spread of GMOs throughout food chains, and preserving biological reserves against encroachment.
- Developing and implementing business models which target small livestock producers as clients;
- Developing and implementing business models which are inclusive of small and medium-scale livestock farmers and are labour intensive along the input and output value chains; and
- Developing and implementing business models for large commercial farms to generate major production and consumption linkages in the local economy, while at the same time creating employment opportunities on-farm and along the value chains.
- Promoting regional cooperation for the management of transboundary natural resources and the prevention and control of Transboundary Animal Diseases(TADs)
- Stimulating participation of grassroots farmers into value chain, and promote value addition and small scale processing
- Securing access to credit and other inputs and inputs services: financial and inputs markets is essential to assist livestock producers in adopting high level technology allowing high level of production. Small-scale producers in particular need affordable credit to access increasingly priced production inputs; (feed markets, insurance, credits etc.)
- Promoting affordable insurance schemes which protect small scale producers from major production risks, to encourage intensification

To this end, the African Union through the Inter-African Bureau for Animal Resources (AU-IBAR) has coordinated the formulation of a livestock development strategy which can fast track policy reform in the sector, promote transformative technological change and productivity improvement, and ensure the realization of its full potential.

The 20-year Livestock Development Strategy for Africa (LiDeSA) provides an opportunity to build consensus, mobilize stakeholders, and establish strong coordination and partnerships to

drive the transformation of the sector in Africa. It also highlights the contribution of livestock to the Africa Accelerated Agricultural Growth and Transformation Agenda as highlighted in the Malabo declaration (Assembly/AU/Decl.1(XXIII)).

## 8. ESTIMATED COSTS

The total investment costs required to carry out the African Agricultural Transformation Agenda for livestock will vary between countries depending on the importance of livestock in the country or region. Countries located in the higher potential agro-ecological zones, which should require priority attention (highlands, subhumid, and wetter parts of semi-arid zone), should invest more resources into sustained livestock sector development.

However the magnitude of resources required can be gauged from considering the estimated costs of the 2015–2020 Ethiopia Livestock Master Plan (LMP) (MoA Ethiopia and ILRI, 2015), which specifies both the public and private contributions (including the investment leveraging possible for both the public and private partners in the enterprise):

USD 347.4 million is required to implement this plan. The proportion of investment that comes from the public sector is 54% or USD 188.3 million. The proportion that comes from the private sector is 46% or USD 159.1 million.

Table 1: Total investment cost of Ethiopia Livestock Masterplan

Investment interventions	Total investment cost in USD in millions		
	Public	Private	Total
Specialized Dairy Development <sup>2</sup>	17.3	48.1	65.4
Red meat/milk and feedlot Development	151.2	15.2	166.4
Poultry Development	19.8	95.9	115.7
<b>Total</b>	<b>188.3</b>	<b>159.1</b>	<b>347.4</b>

<sup>2</sup> Investments to improve pasture productivity and reduce young and adult stock mortality are included in the investment of red meat/milk and feedlot systems

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