THE IMPACT OF SUSTAINABLE LIVESTOCK ON SUSTAINABLE DEVELOPMENT IN RWANDA

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ABSTRACT

Sustainable Livestock includes reference to financial, environmental, ethical, and social product quality issues. Keys to Sustainable Livestock production includes preplanning, knowledge of one's goals, understanding marketing options and the ability to review and adapt plans as needed. Sustainable Livestock presents several benefits to animals, human health and environment.

The present research aims to analyze the impact of Sustainable Livestock on Sustainable Development in Rwanda. Using Qualitative and Quantitative Methods, the research analyzed the current situation of Livestock through its evolution, targeting the role it plays in implementation of Millennium Development Goals which are the real mirror of development established by the United Nation. The Research found that Livestock in Rwanda tends to be Sustainable and presents three major strengths: (i) The Government intervention through the Decentralization policy, the New Land policy, the Review of Laws related to Animal Health, Strengthening of the veterinary profession through their Association (ARMV) and the Investment policy framework which is in existence, including Livestock in Government's Programs (EDPRS II, Vision 2020, PSTA III, One- Cow- Per-Poor-Family, and LIPS) and by Cooperating with Private Sector; (ii) The potentiality to access regional and international markets (Hong Kong); and (iii) The favorable Climate to animal husbandry.

Being Sustainable, Livestock in Rwanda contributes to eradicate extreme poverty and hunger by providing nutrition, generating income and jobs; allow affording education; promote gender equality and empower women; reduce child mortality and maintain maternal health allowing affording health care and nutrition; combat diseases by generating income used for equipment; sustains environment comparing to traditional livestock; and ensure global partnership especially in local and global commercialization of Livestock Products.

Keywords: Development, Livestock, Millennium Development Goals (MDGs), Sustainable Development, Sustainable Livestock.

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1. Introduction

Sustainability was first defined in 1987 by a United Nations Commission that characterized Sustainable Development as the Development that meets the needs of the present without compromising the ability of future generations to meet their own needs. Sustainable Livestock is the act of farming using principles of ecology focusing on the relationships between organisms and their environment. Thus, Sustainable Livestock consists of an integrated system of animal production practices having a site specific application that will: (i) Satisfy human food needs; (ii) Enhance environmental quality and the natural resource; (iii) Make the most efficient use of non- renewable and on-farm resources and integrate, where appropriate, natural biological cycles and controls; (iv) Sustain the economic viability of farm operations; (v) Enhance the quality of life for farmers and society as a whole.

Rwanda has few natural resources and minimal industry. Livestock contributes 12% of the GDP. Livestock in Rwanda presents three major opportunities: Livestock populations showing growing trends; Exports opportunities (live animals are the 7th export products in Rwanda; 3.1 million $ in 2010; raw and tanned hides & skins are 13th and 14th, 1.8 million $); and Increase incomes and improve living standards of the Rwandan population. Rwanda, through different Policies and Programs, targets a number of objectives in Livestock area: Maintaining domestic market; Increasing small stock meat market share; Becoming globally competitive; Developing export opportunities; and Increasing incomes of small-scale producers, improving livelihoods of the poorest. These leading to the establishment of a small animals industry: from a subsistence activity to an income-generating activity and export strength by 2017. Strategies to achieve those objectives are: Genetic improvement, Animal nutrition and Animal health (Bizimana, Usengumukiza, Kalisa & Rwirahira, 2012).

In the following sections, the research will first analyze the current situation of Livestock in Rwanda, the key Rwanda's actions toward Sustainable Livestock, and because the research target the role of Sustainable Livestock on Sustainable Development, the section will continue analyzing indicators of Sustainable Development as determined by United Nations. These activities will lead to the assessment of the real contribution of Sustainable Livestock to the achievement of Millennium Development Goals. The research will end by the Conclusion and Recommendations for improving Livestock.

2. Current Situation of Livestock in Rwanda

The government has acknowledged livestock as an important part in achieving food security for Rwanda, especially in terms of the protein requirements and also its potential role in poverty alleviation. Livestock is seen as a key pillar for economic growth, poverty reduction as described in the EDPRS. Genetic improvement is the major of the many contributing factors to increased livestock productivity and production.

2.1. Honeybees

From 1991 by the MoU of Association for promotion of Integrated Development in Rwanda(ARDI), the introduction of modern beekeeping was intensified. In 2002 beekeeping was selected as a not land liked production system, with active promotion by government as provider of employment. A number of beekeeping collection centers (HCC) was built, which were eventually converted into beekeeping cooperatives by the RCA (Rwanda Cooperative Agency). A number of NGO's became active in the beekeeping sector: ARDI, SERUKA, ADEPE, REDDO, and SNV.

The beekeepers in Rwanda can be divided in 3 categories: Semi-professional, Side-line production system, farmers and Hobbyists. In Rwanda there are 3 distinct different "breeds" or ecotypes of the African honeybee: Nyungwe lowland forest type; Virunga highland forest type; Akagera African savannah type (SNV, 2009).

2.2. Aquaculture

Rwanda Development Board 2012 affirms that about 8% of the entire country is covered by water: Lakes occupy about 128,000 Ha, Rivers occupy about 7,260 Ha and Water in wetlands and Valleys occupy about 77,000 Ha. Therefore, this makes Rwanda a good investment destination for fish and Aquaculture. The national fish production is estimated at 13,000 tons of which capture fisheries contribute 9,000 tons and aquaculture 4,000 tons. Rwanda is currently by far a net importer of fish from neighboring Uganda and Tanzania. Rwanda's imports since 2007 up to date is 60,000MT of fish Rwanda produced 19,475 MT (2012). By 2020, Rwandan projection is 155,000MT of Fish Nationally. Rwanda increased from 9,117MT to 19,475MT since 2007 to 2012. However, it is important to note that Rwanda also re-exports most of the

imported fish to the DRC. Fisheries and Aquaculture sectors provide about 200,000 jobs. There are currently around 800 ha of fishponds in Rwanda. Aquaculture in Rwanda mainly concerns *Tilapia nilotica*. Rwanda's Fish market demand consists of almost 90% of Tilapia, 5% of Sambaza and 5% of others like Cat fish. Fish farming has the possibility to be integrated with small animal production (rabbits, poultry, pigs, and goats/sheep) and using the effluent to irrigate vegetable plots, thus serving as source of fertilization and a water storage buffer in case irrigation water finishes (FAO, 2008).

2.3. Rabbits

The colonists and missionaries introduced rabbits into Rwanda. Schools with school rabbits played a role in the promotion. They provided school children with rabbits to take up rabbit production at home. Most rabbits kept in Rwanda are of a California-New Zealand often crossbred type. Rabbits are currently mainly distributed by NGO's working with poor families, AIDS orphans, and women groups. All fishponds seen in Rwanda have rabbit hutches over them for the pond fertilization (MINAGRI, 2004).

2.4. Poultry

The poultry sector in Rwanda can be divided in 3 systems: The commercial poultry system, the semi-commercial poultry system and the scavenging village poultry production system. The government has a parent stock/hatchery/pullet POL production facility (Rubirizi) which produces layer and broiler chicks. Since 1994 there have been many programs to restock the family-farming sector with poultry (MINAGRI, 2012 a). Poultry contribute to alleviate poverty by producing eatable and commercial eggs, meat and chicken, and generating jobs (Saadullah et al. 2001).

2.5. Pigs

Pig production in Rwanda is a relatively recent introduction. As in most African countries with pig production missionaries played an important role in the introduction of European pig breeds and in some instances still do. There are 2 categories of pig farmers in Rwanda: Small-scale village pig production, using local breed; and Semi-intensive pig production, using improved breeds. The traditional pig breed in Rwanda is a small-sized hardy animal with low

productivity but also low exigencies, which fits perfectly in an environment with a low level of resources and management capacity and crossbreeding taking place in the past but it is hard to assess how much and where there are still pure traditional pigs (MINAGRI, 2012 b).

2.6. Small Ruminants

Goats are important animals, especially for poor families and in the areas with little grazing land. There are three main types of small ruminant production systems: Extensive grazing system in the East and North with predominantly local breeds of fat tail hair sheep and small East-African type goats; Semi-intensive system, with tethered grazing and stall feeding, using local breeds, mainly goats, in the central, eastern and southern parts; and Pockets of introduced dairy goats with an intensive production system of stall-feeding and milking. In 2010 there were estimated 2.970.780 goats and 798.836 sheep in the country (Kanani, 2013).

2.7. Cattle

Cattle have played, play and will continue to play an important role in the life of Rwandans. Cattle population in Rwanda has been divided in 4 principal cattle keeping farming systems with different developmental needs and possible future breeding objectives: The grazing herds with Ankole animals and their crosses in the East; The grazing dairy herds with high-grade dairy animals in the lowlands in the Centre and the Gishwati highlands; The zero-grazed herd, largely linked to the Girinka program; and The pure breed Inyambo/Ankole herds.

The Government and individuals made great efforts to import pure or improved dairy breeds. In recent years, many initiatives were undertaken by the Government and the development partners as well as private investors and a cattle restocking has reached a satisfactory level. In 2008, the cattle population was composed of 77% of local breeds, 17% of crossbreeds and 6% of pure breeds as shown in the following table:

Table 1: Cattle population by breed and per province by end 2008

Province	Local breed	Crosses	Pure	breed Total	% Total
East	376 566	61 823	27 694	466 083	39%
West	123 615	43 014	15 322	335 462	28%

North	138 142	22 870	7 794	181 951	15%
South	260 170	61 777	13 514	168 806	14%
Kigali City	22 984	9 086	10 523	42 593	4%
Grand Total	921 477	198 571	74 847	1 194 895	100%

Source: MINAGRI (2009)

3. Rwanda towards Sustainable Livestock

3.1. Establishment of RARDA for managing Livestock

Livestock activities are managed by the Rwanda Animal Resources Development Authority (RARDA), an autonomous body supported by the Government through MINAGRI. RARDA is responsible for all the activities related to animal production and animal health. RARDA has deployed its staff in the provinces, districts and sectors. For a long time, the processing of dairy products has been in the hands of the breeders themselves (traditional processing of butter, ghee, curd and skimmed milk). But in recent years, plants supported and financed by the State have taken over before the private sector became half-heartedly interested in the field. Industrial processing concerned mainly making pasteurized curd, sometimes fresh pasteurized milk, yoghurt and cheese. RARDA has established the National Veterinary Laboratory and the National Centre for Artificial Insemination.

3.2. Government's Programs for Sustainable Livestock

In Rwanda a number of key Programs have been put in place (Vision 2020, the Economic Development and Poverty Reduction Strategy (EDPRS II)), Agricultural Development Policy (PSTA II), "One- Cow- Per- Poor- Family" Program, and Livestock Infrastructure Support Program (LISP).

Vision 2020, EDPRS II, and PSTA II

The main goal of Vision 2020 (GoR, 2012), EDPRS II (GoR, 2013), and PSTA II (MINAGRI, 2012) is the transformation from subsistence to a productive, high value, market-oriented agriculture and Livestock that acts as a catalyst for further economic development in

processing, trade and releasing people from the agricultural and livestock sector into other sectors of the economy. Key products for this policy are milk, meat, fish, eggs, hides and skins and honey. In this context, the Ministry of Agriculture proposed an agricultural and livestock policy, which consists of four main objectives: (i) The modernization and transformation of Agriculture and Livestock; (ii) The development of important commodities; (iii) Competitiveness of the products on the market; (iv) High entrepreneurship capacity of the farmers. The vision aims to replace subsistence farming by a fully, commercialized agricultural sector by 2020. The result should lead to both poverty reduction and achieving food security; farmers should increase their income in an environmentally sustainable way.

One- Cow- Per- Poor- Family Program (Girinka)

The Girinka (One- Cow- per- Poor- Family) Program initiated by President Paul Kagame in 2006, targeted 257,000 very poor households each of which were slated to be given one cow, as a way of improving their welfare. It was initiated and incorporated within the National Social Protection Programs following surveys conducted by the MINECOFIN and MINAGRI which indicated that 40% of Rwanda's population was hard hit by food and nutritional insecurity. The program is intended to fight malnutrition, through the consumption of milk, increase household incomes through the sale of surplus milk and improvement in the crop yields per unit area as a result of applying organic manure from the cow dung. When the program started, the government had a target of donating 257,000 heifers poor to families by 2015. The target was however raised to 350,000 households by 2017 (RAB, 2006).

The Livestock Infrastructure Support Programme (LISP)

Launched in 2012, the specific objective of LISP is to build the necessary infrastructure and services that will contribute to the development of a sustainable and profitable livestock production and marketing and overall improvement of the livestock industry in Rwanda.

LISP focuses on rural infrastructure, especially: (i) water supply for livestock farmers; (ii) feeder roads to improve access for livestock farms; (iii) milk collection centers (MCCs) to increase the milk handling capacity and safety, improved marketing and slaughtering facilities for livestock.

LISP's Achievements: (i) Construction of 35 milk collection centers constructed in 20 Districts. All Milk collection centers are well equipped. (ii) Capacity building of dairy farmers

MCC cooperatives: 10,746 farmers have been trained on milk handling, hygiene and sanitation, veterinary service provision, artificial insemination service provision, management skills, milk collection and recording skills. (iii) Livestock Watering System Development: The total livestock farms area (acreage) targeted is 6,467 ha; beneficiaries are 967 farms. (iv) Contribution to Mukamira Dairy*:* "Mukamira Dairy Ltd" is a Public Private Partnership (PPP) initiative created in 2010 by 12 local dairy farmers' cooperatives and the Government of Rwanda (ADF, 2010).

3.3. Strategic Options for Genetic Improvement

According to MINAGRI, 2012, the Government of Rwanda is conscious that Sustainable Livestock will be achieved when improved genetic species will be adopted replacing traditional ones. Government's strategies to improve genetic species: (i) *Strategic options for Bees genetic improvement*: Start performance testing of colonies to select superior ones; Study the 3 sub-populations before crossing or introduction foreign queens; Multiply the superior colonies in 3 regional centres and make available to other beekeepers; Train honey harvesters into beekeepers and teach techniques to produce new queens in hives. (ii) *Strategic options for Aquaculture genetic improvement*: Build Rwasave's capacity to deal with individual selection of superior fish ('geniteurs'); Build capacity in hatcheries to do mass selection in parent stock and off spring; Do provenance trials in Rwasave to assess products of genetic selection from other countries under Rwandan conditions; Create capacity among fish farmers for performance recording to be used for genetic evaluation. (iii) *Strategic options for Rabbits genetic improvement*: Establish a number of breeding centres with superior genetics; Train rabbit keepers in selection for certain and against other traits; Establish registration system of superior purebred rabbits. (iv) *Strategic options for Poultry genetic improvement*: Study village chickens' performance and identify superior sub-populations; Train farmers on village based selection in existing poultry for certain traits; Establish parent stock farms with suitable breeds for improvement of semi commercial poultry keepers; Improve quality control of imported commercial chickens. (v) *Strategic options for Pigs genetic improvement*: Establish pig AI with semen from superior commercial boar lines; Organize the sector into specializations: gilt production based on high fertility and mothering capacity, terminal boar production based on growth and meat/carcass quality. (vi) *Strategic*

options for Small Ruminants genetic improvement: Break the negative selection through establishment of community breeding groups; Establish a productivity and production monitoring system in a sample of the village flocks; Establish breed standards and flock books for the various pure subpopulations in the country; Establish an identification, registration and performance testing system for purebred animals. (vii) *Strategic options for Cattle genetic improvement*: For dairy production start with F1 Holstein-Ankole (cross) and then follow criss=cross Zebu type (Boran/Sahiwal) * Taurine type (Holstein/Jersey); Establish herd books for >75% pure Holsteins, select bull mothers, inseminate with import semen; Reconsider to change import of proven breeding bulls for import mix of test bull semen from proven bulls; Beef production start with local cross and criss-cross Taurine (Limousin/Simmental * Zebu Boran/Sahiwal): F1's heifers of Boran/Sahiwal cross for Girinka.

4. Rwanda's Achievements in Livestock Productions

4.1. *Livestock populations*

According to MINAGRI 2012, the recovery of the animal stock following the drastic drop of the mid 90s is a great achievement. In the populations of small animals were: Poultry (4 081 000 heads); Goats (2 971 000); Rabbits (844 700); Pigs (706 000); Sheep (799 000).

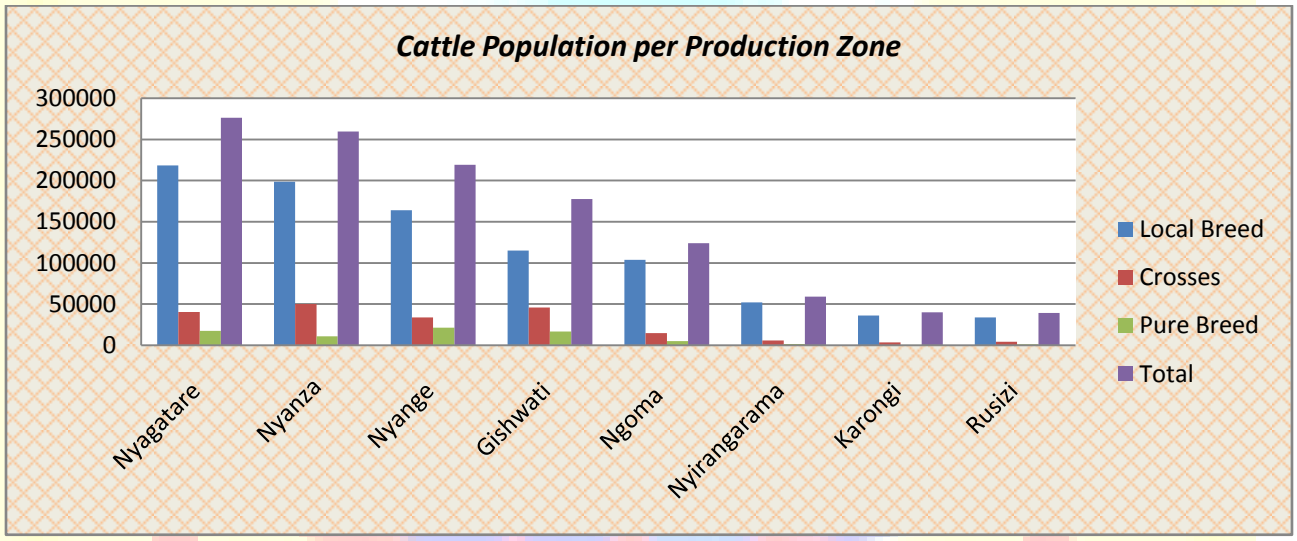
From 2005 to 2010, they have increased by: Sheep 15.8%; Goats 78.5%; Pigs 35.4%; Poultry 93%; Rabbits 97.8%. About Cattle, statistics of 2008 show that cattle population was 1194895 cows distributed in Production Zones as shown by the following table and figure:

Table 2: Cattle Population per Production Zone by end 2008

	Local Breed		Crosses		Pure Breed		Total	
Cattle per Production Zone	Absolute number	%	Absolute number	%	Absolute number	%	Absolute number	%
Nyagatare	218 309	24%	40 419	20%	17 543	23%	276 271	23%
Nyanza	198 438	22%	50 138	25%	10 986	15%	259 562	22%

Nyange	163 812	18%	33 682	17%	21 538	29%	219 032	18%
Gishwati	115 003	12%	45 884	23%	16 783	22%	177 670	15%
Ngoma	103 873	11%	14 802	7%	5 188	7%	123 863	10%
Nyirangarama	52 118	6%	5 643	3%	1 400	2%	59 161	5%
Karongi	36 188	4%	3 586	2%	396	1%	40 170	3%
Rusizi	33 736	4%	4 417	2%	1 013	1%	39 166	3%
Grand Total	921 477	100%	198 571	100%	74 847	100%	1194895	100%

Figure 1: Cattle Population per Zone



The figure shows that the main concentration of cattle population is around the main traditional dairy farming areas: Nyagatare, Gishwati, Nyanza and Nyange. A dairy farming area is an area with high concentration of milk production. In this area there is spirit of milk production. The graph shows a high concentration of Local breed comparing to Cross breed which is greater than Pure breed.

Table 3: Animal products (tons), 2000–2010

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Milk	57,853	63,484	97,981	112,453	121,417	135,141	152,511	189,827	257,480	334,727	401,672
Meat	25,608	35,748	39,126	43,589	48,681	49,861	52,226	54,780	69,637	65,863	79,035
Fish	6,996	7,308	7,612	8,144	8,126	8,180	9,267	9,655	12,594	14,104	16,924
Eggs	920	1,015	2,432	3,402	2,452	2,452	1,536	1,620	2,327	3,268	3,921
Honey	762	760	819	908	1,029	1,671	1,676	1,084	1,654	2,684	3,221

	Production 2012 (tons)	2017 targets (tons)
Milk	503,130	730,133
Meat	86,830	410,808
Fish	19,345	112,000
Eggs	6,324	11,718
Honey	3,785	8,685

Source (MINAGRI, 2012)

Table 4: Exported Livestock Products, May 2009 to April 2010 (RwF million)

Bovine cattle (live)	3,384
Goats (live)	2,782
Raw milk	1,004
Beef meat	839
Pig (live)	621
Poultry (live)	561
fishery products	447
Eggs	446
Sheep (live)	425
hides and skins	5,327

Source: Rutamu (2010)

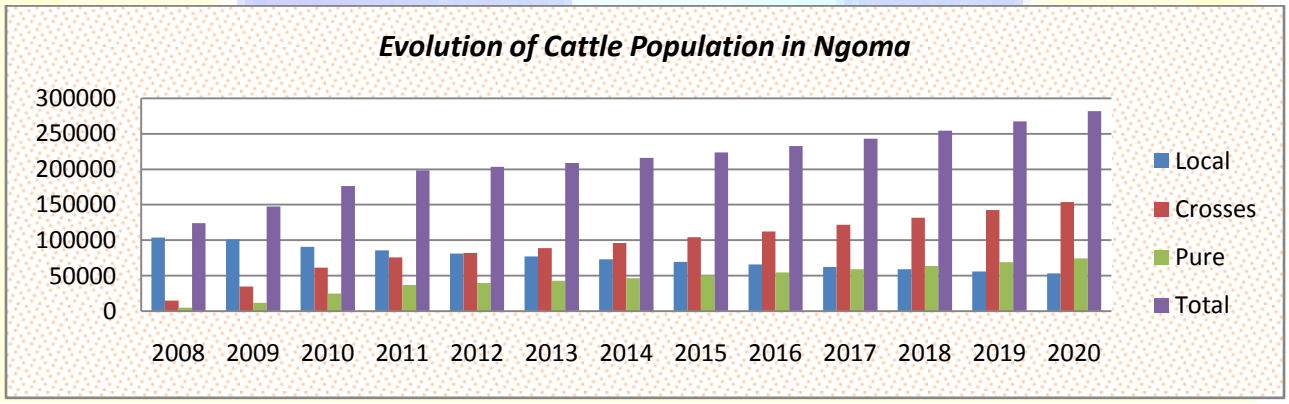
The main destinations of exports are neighboring countries (mainly Kenya) and Hong Kong for hides and skins (FAO, 2011).

4.2. Evolution of Milk production in Rwanda

According to MINAGRI 2009 setting up milk chain master plan aiming the progression in milk production by 2020 and MINAGRI 2013 establishing a National Dairy Strategy, the Government of Rwanda put several efforts in milk production, collection, processing and marketing. The table 2 shows the cattle population in eight major milk production zones. Those production zones are in two categories: Four Traditional Farming areas (Nyagatare, Gishwati, Nyanza and Nyange) and four new zones (Ngoma, Nyirangarama, Karingi and Rusizi) created by the Government in order to improve milk production. The present research section aiming to outline the results of Government's efforts in improving milk production will focus on new production zones by taking a sample of Ngoma and Nyirangarama. This will lead to note the results of Rwanda's Efforts to improve milk production through the creation of those new production zones.

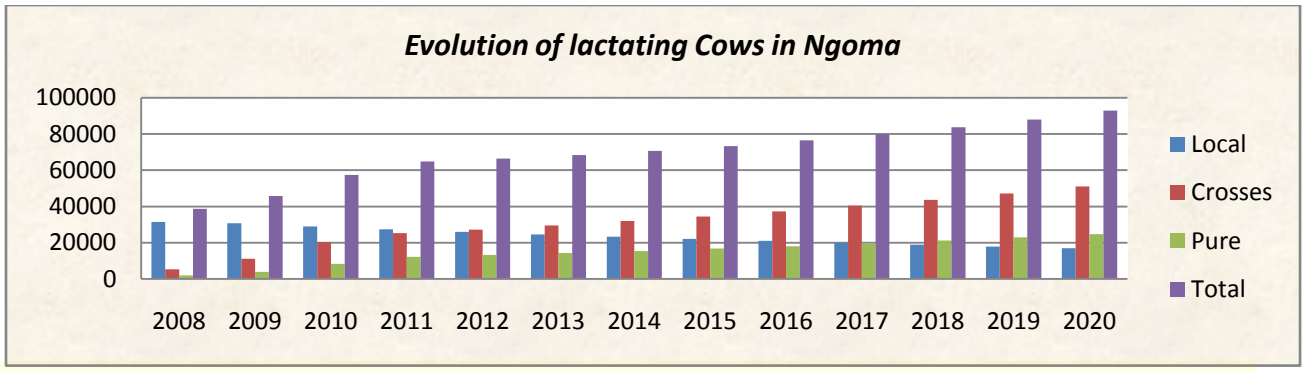
Ngoma Dairy Farming Area

Figure 2: Evolution of Cattle Population in Production Zone of Ngoma



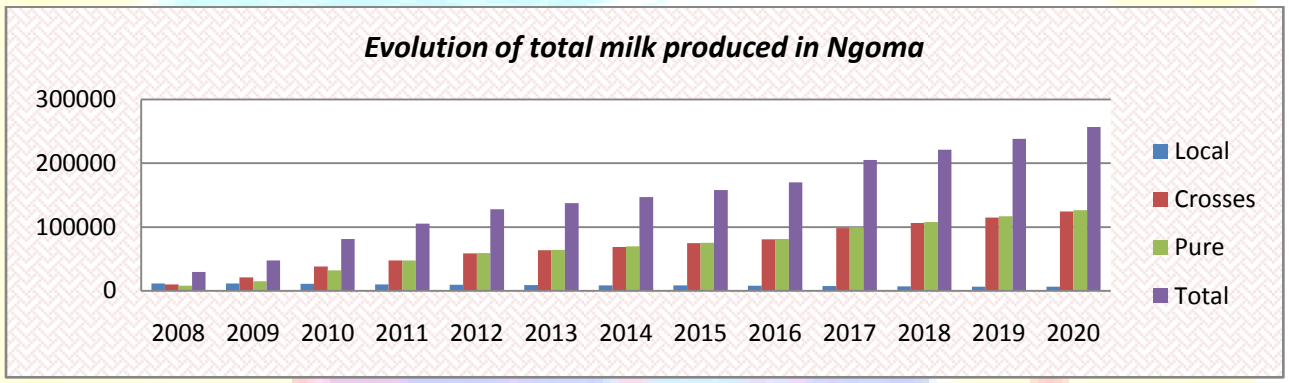
The figure shows that from 2008 to 2020, there is a remarquable increase of Crosses Breed parallele with decrease of Local Breed. The Pure Breed increase at a normal rhythm.

Figure 3: Evolution of Lactating Cows in Production Zone of Ngoma



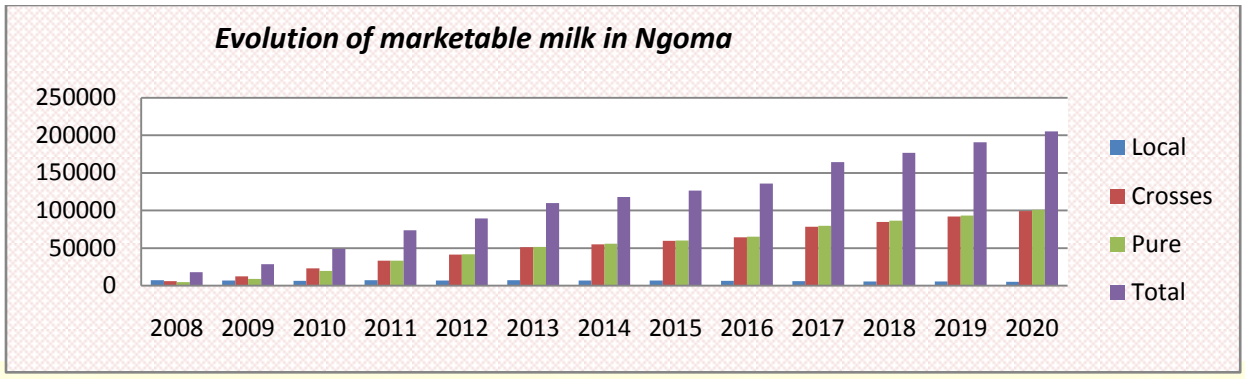
The figure shows that Crosses Breed lactating cows increase significantly parallel to the decrease of Local Breed. Pure Breed increases at a normal rhythm.

Figure 4: Evolution of Total Milk Produced in Production Zone of Ngoma



The figure shows the considerable progression in milk production in Rwanda. Another note on the figure is that despite Crosses Breed augment highly in number than Pure Breed as shown by the previous figure, the two Breeds produce equal quantity of milk at the same interval of time. This leads to note that Pure Breed produce more milk than Crosses Breed. Local breed are less milk productive.

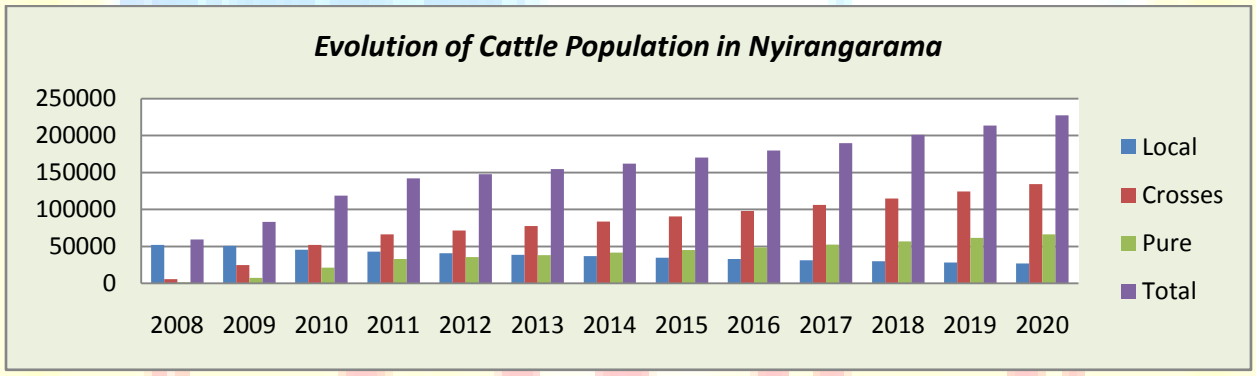
Figure 5: Evolution of Marketable Milk Produced in Production Zone of Ngoma



The figure shows that milk marketable increase considerably. It shows also that Crosses Breed produce equal marketable milk as Pure Breed. But Local Breed produces very little milk.

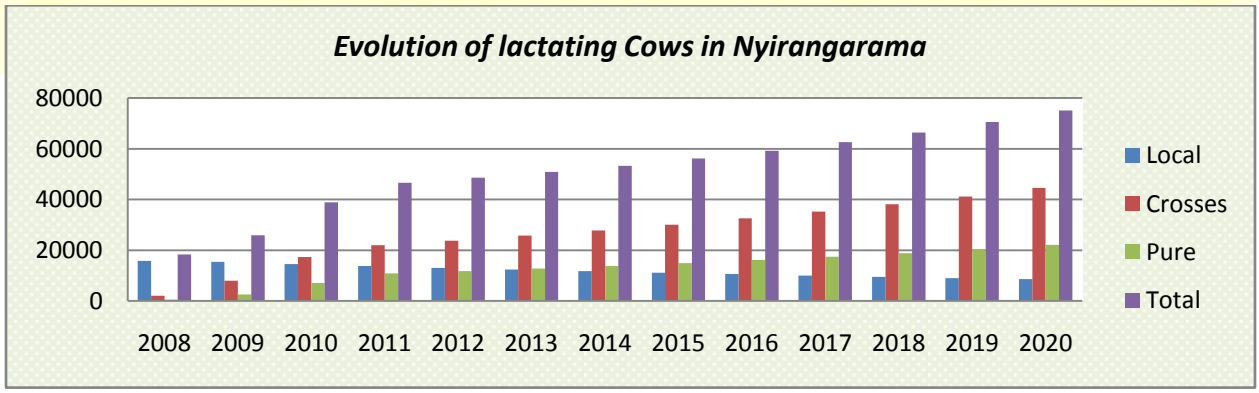
Nyirangarama Dairy Farming Area

Figure 6: Evolution of Cattle Population in Production Zone of Nyirangarama



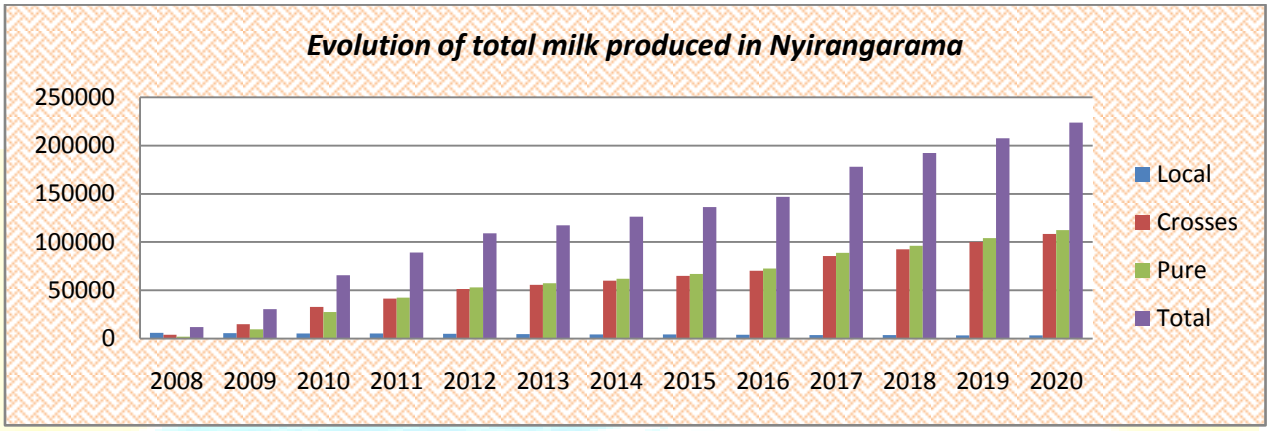
The figure above shows considerable increase of Crosses Breed parallel with decrease of Local Breed while the Pure Breed increases at normal rhythm.

Figure 7: Evolution of Lactating Cows in Production Zone of Nyirangarama



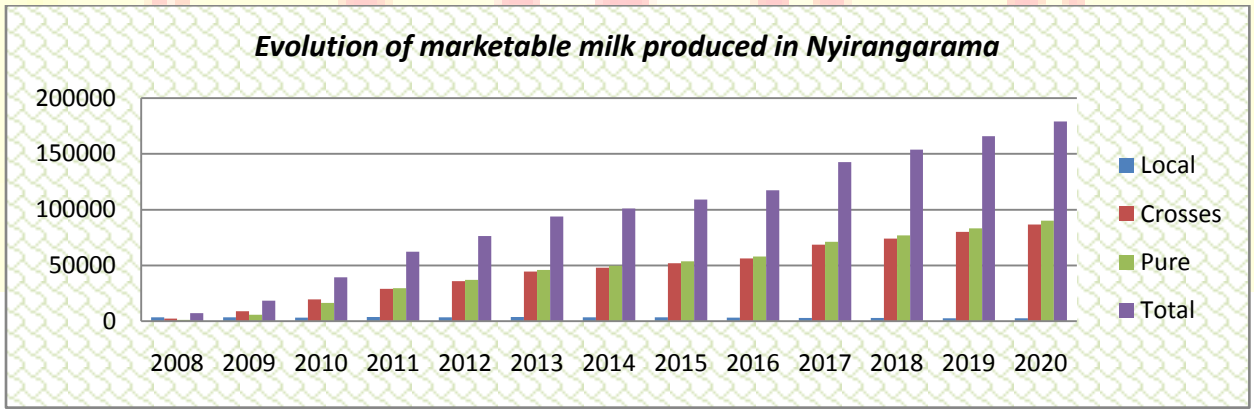
The figure shows that Crosses Breed Lactating Cows increase considerably. Pure Breed increase normally while Local Breed decrease.

Figure 8: Evolution of Total Milk Produced in Production Zone of Nyirangarama



The figure shows that Crosses Breed and Pure Breed Lactating Cows produce equal milk and the milk production increase. Local Breed produces very little milk and decrease in quantity produced. In this Production zone, like in Ngoma, despite Crosses Breed increase in quantity than Pure Breed, they produce the same quantity of milk. This figure shows that Pure Breed tend to produce more milk than Crosses.

Figure 9: Evolution of Marketable Milk Produced in Production Zone of Nyirangarama



The figure shows that marketable milk production increase considerably. It shows also that Pure Breed tends to produce more milk than Crosses. Local Breed produces very little marketable milk.

5. The Contribution of Sustainable Livestock to the achievement of MDGs

In September 2000, at the United Nations Millennium Summit, world leaders agreed to a set Eight Millennium Development Goals (MDGs) that aimed to make substantial progress in solving the problems of poverty, hunger, disease, illiteracy, environmental degradation and discrimination against women. Those eight MDGs which are mirror for sustainable development are: Eradicate extreme poverty and hunger; Achieve universal primary education; Promote gender equality and empower women; Reduce child mortality; Improve maternal health; Combat HIV/AIDS, malaria and other diseases; Ensure environmental sustainability; Develop a global partnership for development (UN, 2010).The present Section of the research consists of analysis of the contribution of Livestock Sub Sector to the achievement of those MGDs.

Table 5: The Role of Sustainable Livestock on Achievement of MGDs

Millennium Development Goals	The contribution of Sustainable Livestock (Experience of Rwanda)
Goal 1: Eradicate extreme poverty and hunger	Livestock contributes 12% of the GDP. Sustainable Livestock allows: Increased the per capita state income, More food, Improved social status, More savings, Afford medicine, More clothes, More livestock products (to consume), Afford education, Better furniture, Improvements to house funded, Better access to land (ownership), More cash savings, Provided female employment, Improved knowledge, Other goods (savings), promoting sustainable improvements to the livelihoods of the poor. Through commercialization of livestock products such as milk, eggs, meat, fish, farmers get income. This income is used for modern equipment and satisfaction of different needs. Income generated can serve as reinvestment in several activities generating new incomes. Money generated by livestock products is saved in banks and it allows farmers getting loans used in different development activities (Ashley, Holden & Bezeely, 1999). Livestock generate jobs: traders, milk bars, milk shops and kiosks, The larger enterprises of the formal processing and marketing sector generate a mean of 12.5 full-time jobs

	per 1,000 litres of milk handled on a daily basis, jobs in milk processing plants and marketing (Rutamu, 2010).
Goal 2: Achieve universal primary education	Income generated by livestock allows farmers financing education for children. Educational Institutions involved in livestock sector: National University of Rwanda, Institut Supérieur d'Agronomie et d'Elévage-BUSOGO, Kigali Institute of Science and Technology, Umutara Polytechnic.
Goal 3: Promote gender equality and empower women	The agriculture and livestock sector is worked mainly by women at 86%. 30% of the country's households are female-headed. Women contribute immensely to the agriculture and livestock value chain by providing labor. Women now occupy a privileged position in policy and development programs in the country in general and in the development of the dairy cattle in particular. In the context of ensuring women's access to information on production techniques, MINAGRI and its partners have paid special attention to women's participation in technical training to small farmers as well as to the community to ensure sustainability. Women associations have been trained and supported on new methods of cultivation and grazing, which could enable them increase, the yields. As part of enabling women to access to factors of production, women and their associations have received particular attention in the distribution of livestock in the program "One cow To Every Poor Family" and in granting of bank loans (MINAGRI, 2010).
Goal 4: Reduce child mortality	Child mortality is due to several elements among which there are malnutrition, lack of appropriate equipment and rare access to health care services. Milk, Butter, Cheese, Cream, Yoghourts, Milk desserts, Meat, Fish, Eggs provided by livestock maintain health and ensure good nutrition. Income generated by livestock products allows farmers access to equipment and health care services.
Goal 5: Improve maternal health	Maternal Health request good nutrition, appropriate equipment and access to health care services. As mentioned on Goal 4, Livestock brings appropriate solution.

Goal 6: Combat HIV/AIDS, malaria and other diseases	Income generated by Livestock allows farmers to afford equipment that protect against diseases. Fertilizer from livestock allows increase of production of agriculture that provides vegetables, fruits, banana and other products important on health. Milk and dairy products are well known for their high calcium content. They equally contain high quality proteins, vitamins, mineral salts and trace elements. All those nutrients play important roles in the functioning of the human organism and maintain health once the farmer is attacked by HIV/ AIDS or any other disease.
Goal 7: Ensure environmental sustainability	Biogas provides a renewable and environmentally friendly process that supports sustainable agriculture and livestock. It is one of the simplest sources of renewable energy and can be derived from sewage; liquid manure from hens, cattle and pigs; and organic waste from agriculture or food processing. Additionally, the by-products of the 'digesters' provide organic waste of superior quality (Arthur and Baidoo, 2011). Grazing allows Ecosystem and Landscape Maintenance, soil fertilization. Grazing systems are usually geared to the production of multiple outputs, including meat, milk, blood, hides and skins, dung fuel, transportation, flexible household capital reserves and risk management, although ranching systems are generally geared more narrowly towards meat production. Many of these outputs are untraded and markets fail to capture even their direct use values, let alone the broader environmental benefits (Mearns, 1996). Livestock production play an instrumental role, for example, in supporting sustainable rangeland management, preserving wildlife and other forms of biodiversity, enhancing soil fertility and nutrient cycling, and in directly promoting the amenity value of particular landscapes to other users. Most sustainable agriculture and livestock projects and initiatives seek both to reduce soil erosion and to make improvements to soil physical structure, organic matter content, water holding capacity and nutrient balances.

Goal 8: Develop a global partnership for development	USAID funded the Rwanda Dairy Competitiveness Program 2007- 2012; African Development Bank finances livestock programs such as LISP; Many neighboring countries, many of the lenders were very eager to engage in financing the Livestock sector; A number of NGOs and donors are supporting the dairy subsector; The East African Diary Development (EADD) project, funded by the Bill and Melinda Gates Foundation, focused on livestock development in 3 Districts Gatsibo, Nyagatare and Rwamagana. SNV Netherlands has had a sustained presence in the dairy industry in Rwanda for several years. The Global partnership through Livestock is also developed by the importation- Exportation of Livestock Products (Rwanda exports to neighboring countries and Hong Kong).

Conclusion

Livestock linked to Agriculture is at the heart of Rwanda's economy. Livestock is seen as a key pillar for economic growth, poverty reduction. In order to reach Sustainable Livestock and Agriculture, through the Ministry of Agriculture, the Government of Rwanda proposed policies, which consists of four main objectives: (i) The modernization and transformation of Livestock and Agriculture; (ii) The development of important commodities; (iii) Competitiveness of the products on the market; (iv) High entrepreneurship capacity of the farmers.

To achieve those goals, the Government of Rwanda intends to encourage increased participation of the private sector in transfer of technology to farmers, after the initial transfer by the public sector. It insists that the government will assist the private sector by improving the investment climate, so that Rwandan produces become competitive in regional and world markets. The Agriculture and Livestock establishments in the private sector in Rwanda have 23 principal activities. The top principal activities include raising and breeding of cattle (10.6%), raising of poultry (9.7%), plant propagation (9.0%), production of milk (7.4%), growing of beverage crops and post-harvest crop activities each (7.1%), seed processing (6.5%), growing of cereals except (rice) and growing of leguminous crops each (4.5%). Large establishments account for 35.5%, micro establishments accounts 27.5%, whereas small and medium

establishments accounts for 19.0% and 18.0% respectively. The Government of Rwanda intends to encourage surplus production of farm produces by subsidizing the acquisition of key inputs by farmers.

To improve the quality of production, the Government of Rwanda aspires for significant improvements in quality and standards. It recognizes that the private sector will drive the economy and the State's responsibility will be to initiate, pilot, co-ordinate and monitor efforts. The Government of Rwanda is conscious that, there is no doubt, Sustainable Livestock leads to the success of Millennium Development Goals and thus it contributes to Sustainable Development.

Recommendations

- ✓ To the Government

To promote value addition of livestock products at farm, processing and marketing levels; To continue Working with other agencies to encourage the private sector to participate in national, regional and international trade shows; To Develop and Support farmer training.

- ✓ To Private Sector

To work with Livestock farmers and especially with farmers' co-operatives and associations to mobilize, finance and build their capacities towards enhancing their capabilities to increase production in quantity and quality.

- ✓ To Farmers and Farmers' Cooperatives

To increase their participation in implementation of new approaches and technologies leading to increase production and fit the target of making livestock sector a sure way of achieving sustainable development of members and the country in general.

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