



REPUBLIC OF RWANDA

**Ministry of Agriculture and Animal Resources
(MINAGRI)**

**STRATEGIC &
INVESTMENT PLAN TO STRENGTHEN MEAT
INDUSTRY IN RWANDA**

FINAL REPORT

JULY, 2012

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ACRONYMS

APEL	Programme d'Appui au Petit Elevage
ARMV	Association Rwandaise des Médecins Vétérinaires
DRC	Democratic Republic of Congo
EAC	East African Community
EDPRS	Economic Development and Poverty Reduction Strategy
FAO	Food and Agriculture Organization of the United Nations
HACCP	Hazard Analysis Control of Critical Points
IMF	International Monetary Fund
ISAE	Higher Institute of Agriculture and Animal Husbandry
ISAR	Institut des Sciences Agronomiques du Rwanda
MDG	Millennium Development Goal
MINAGRI	Ministry of Agriculture and Animal Resources
MINECOFIN	Ministry of Finance and Economic Planning
NAEB	National Agricultural Export Development Board
NGO	Non-Governmental Organisation
PSTA	Plan Stratégique pour la Transformation de l'Agriculture/Strategic Plan for the Transformation of Agriculture
PPP	Public-Private Partnership
RAB	Rwanda Agriculture Board
RBS	Rwanda Bureau of Standards
RDB	Rwanda Development Board
RTV	Rwanda Television
RWF	Rwandan Francs
SME	Small and Medium Enterprises
SWOT	Strengths, Weaknesses, Opportunities and Threats
UN	United Nations

EXECUTIVE SUMMARY

Livestock currently contributes between 25 and 30% of the Agricultural GDP of developing countries and that is expected to rise to close to 50% over the next 20 years. 70% of the world's rural poor depend on livestock (mainly sheep, goats, pigs and poultry) as an important component of their livelihoods.

Livestock make a disproportionately higher contribution to income and welfare of the poorest smallholders, and particularly of women, and through them, children in such households. While meat consumption per capita in developed countries is around 80 kg per year, it hardly exceeds 32 Kg in Africa.

This deficit in animal protein consumption is still high in Rwanda where meat consumption exceeds more than 7.5 kilograms per year for all species. Nevertheless Rwanda is an African country with climatic advantages which make an ideal framework for agriculture, the major sector of its economy.

Despite government efforts, the livestock sector is still at a primary stage and supply of meat in quantity and quality remains a crucial problem.

Two main objectives are attempted through this study:

- **Developing** a plan to improve the quality and availability of meat and meat products in Rwanda
- **Developing** a sovereign meat market in Rwanda and profitable outside Rwanda

The main observations revealed through this strategic diagnosis are:

- The institutional framework is favorable to the development of animal husbandry in Rwanda
- The main limits are:
 - the poor animal nutrition,
 - the low control of disease situation,
 - the small size of the national herd,
 - the lack of slaughter facilities to meet food quality standards,
 - the lack of value-adding step (cutting and processing),
 - the low control of the quality Hygiene of meat marketed.

The development of the meat industry should allow the public authorities to meet five major challenges:

- Insuring meat security in Rwanda,
- Becoming a major asset in malnutrition and poverty fighting,
- Promoting the development of true and responsible meat industry processing,
- Developing Rwandan competitiveness in Livestock in Eastern Africa,
- Developing foreign exchange.

The vision for Rwandan meat industry for 2017 is:

«An industry pushing domestic consumption of quality meat, diversified, and taking advantage of business opportunities on value markets in East and Central Africa».

Three strategic priorities will achieve the vision which will increase the meat industry from the primary step to a real industry serving the social and economic development of Rwanda:

- Increasing of meat supply,
- Modernization and development of the industry infrastructure,
- Improvement of the access to domestic and foreign markets.

The operational plan over the period 2012 -2017 is based on seven components:

- Animal Health,
- Increasing meat production,
- Modernization of the supply chain,
- Development of cutting and processing industry,
- Control of sanitary quality,
- Modernization of the distribution channels,
- Promotion of meat and meat products.

A Monitoring Team will agree a framework for reporting and measuring progress, including the measurement of the following with regard to the Rwandan meat industry.

The overall budget to lift the meat industry of Rwanda to the rank of a performing meat industry, from 7.5 kg per capita to 15. 07 kg in 2017 should be around [8 539 000 000 RWF \(16 644 251 US \\$\)](#).

INTRODUCTION

Livestock currently contributes between 25 and 30% of the Agricultural GDP of developing countries and that is expected to rise to close to 50% over the next 20 years.

While the livestock industry is growing seven times faster than smallholder livestock systems in emerging economies like Brazil and China, African livestock is still largely in the hand of smallholders.

70% of the world's rural poor depend on livestock (mainly sheep, goats, pigs and poultry) as an important component of their livelihoods. Livestock make a disproportionately higher contribution to income and welfare of the poorest smallholders, and particularly of women, and through them, children in such households.

While meat consumption per capita in developed countries is around 80 kg per year, it hardly exceeds 32 Kg in Africa.

The advent of a meat industry would be an initial response to the fight against malnutrition and poverty in Africa. Finally, it would be one more step towards the food sovereignty of African countries.

1 CONTEXT AND OBJECTIVES OF THE STUDY

The implementation under the aegis of the UN and the IMF of Poverty reduction strategies (PRS) in 1999 intended to provide essential links between the actions of national authorities, the assistance of donors and the results required to achieve the Millennium Development Goals (MDGs) of the United Nations to halve poverty between 1990 and 2015. Rwanda, as many other African countries, included livestock development as key pillars of its PRS.

Any policy or strategy for Livestock development strategy should be inserted within the framework defined by the major orientations of the Rwandan Government: Vision 2020 and PSTA II.

1.1 Physical context

Rwanda is a landlocked country of 26 338 km². The population growth of Rwanda is estimated at 2.9% per year. The population of Rwanda is 8,162,715 inhabitants and it would increase to 15 million in 2020 and 20 million in 2030. Rwanda is characterized by the highest population density in Africa, about 310 inhabitants per km². Some areas reached a density greater than 1000 inhabitants/ km². The total cultivated land covering about 46% of the area of the country divided into small farms. Marshes occupy an estimated area of 165 000 ha including 112 000 ha of small wetlands (less than 200 ha) and 53 000 ha of large marshes.

The total harvest area is approximately 94 000 ha or 57% of the area of the marshes of Country and represents about 8% of the acreage.

The climate is tropical and temperate with an average temperature of 19 ° C and rainfall annually ranges between 900 and 1600 mm. The country has a small rainy season from September to November and a rainy season from February to May. The short dry season is between December and January and the long dry season from June to mid-September. Some parts of countries may suffer from prolonged drought affecting agricultural production and weakening the food security of populations that inhabit them.

1.2 Macroeconomic context

Despite this climatic advantage, Rwanda is one of the poorest countries in the world.

- The annual per capita income is 540 U.S. dollars.
- Over 60% of the population lived below the poverty line.
- Agriculture is a major source of foreign currency and livelihoods of people
- Still in its infancy, the secondary sector consists essentially in manufacturing and building and contributes 15% of GDP.
- The area tertiary sector is 47 % of GDP.
- GDP is approximately 3 277 RWF billions.

Today, Rwanda is at a crossroads in its evolution. The country has an overall planning framework to face the challenges of national Development and poverty reduction towards the year 2020. The vision 2020 which the government of Rwanda has undertaken identified key pillars:

- Good governance and a capable state;

- Infrastructure development;
- Human Resource Development and a knowledge-based economy;
- Private sector-led development;
- Regional and International integration;
- Productive high value and market oriented agriculture.

1.3 Objectives of the study

There are two kinds of objectives:

- The major objective are :
 - Developing a plan to improve the quality and availability of meat and meat products in Rwanda;
 - Developing a sovereign meat market in Rwanda and profitable outside Rwanda.
- The specific objectives are:
 - Improvement and availability of the meat producing animal species and types in all agro-ecological zones;
 - Exploring the needed infrastructure including the scientific methods for intensifying the proposed programmes aiming to increase the availability of meat and adapting them to suit Rwandan market' needs;
 - Promote adaptive research and extension recommendations in improved meat industry production systems for all categories of livestock, and the use of feeds/meat dedicated breeds/appropriate methods as ingredients' for improving the sub sector;
 - Propose the animal types and species in the short term for improving and increasing the availability in quality and quantity of meat in Rwanda.

1.4 Comprehension of the terms of references

Three axes determine the comprehension of the terms of references.

- Assessment of the meat sector maturity and its potentialities;
- Design conditions of meat industry emergence;
- Elaborate a strategic and investment plan to enforce domestic meat consumption and increase added value meat products export.

2 METHODOLOGICAL APPROACH

The proposed approach includes 3 steps:

- Strategic diagnosis: This step includes literature and field surveys (data collection phase of the sector at the national level with all stakeholders). Following the scanning of the sector, the strategic diagnosis will establish the SWOT of the meat industry in Rwanda.
- Elaboration of the seven-year recovery plan: The development of the seven-year recovery plan to revive the meat industry sector for the period 2012-2017 will start by defining the strategic vision. This is the consolidation of the action plans for areas as presented in the sections following the identification of areas. It will decline the axes according to these themes:
 - Activities and tasks to be undertaken;
 - Expected results;
 - Monitoring and Evaluation Indicators;
 - Resources Required;
 - Institution and / or lead agency to implement;
 - Actors involved direct and indirect;
 - Timeframe.
- Workshop and validation of the report. This step includes:
 - Writing and submission of the interim report;
 - Organizing a workshop about the interim report to collect relevant amendments and improve the document;
 - Providing the final report.

3 GLOBAL TRENDS OF MEAT INDUSTRY

3.1 World meat production

Global production of meat (all categories) amounted to 293.97 million tons, of which 176.74 million tons from developing countries and 117.23 million tons from developed countries. With 123.1 million tons, Asia is the largest producer. China alone accounts for 67% of the Asian production, or 82.13 million tons. Europe is the second producing-region (56.49 million tons of which 44.28 from EU₂₇).

North America is the third producing-region with respective productions of 42.45 million tons and 4.46 million tons for USA and Canada.

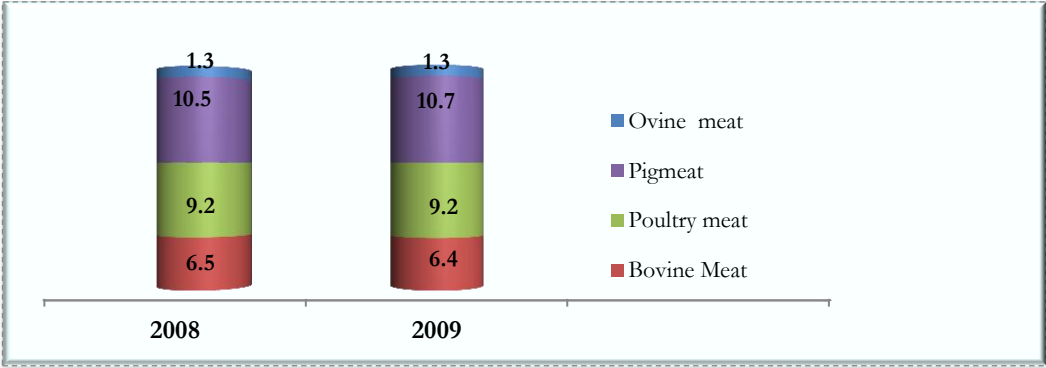
South America ranks fourth with 38.92 million tons of which 65% from Brazil (25.29 million tons).

With 14.13 million tons, Africa ranks fifth, accounting for 5% of the global production. The most important actors are South Africa (2.27 million tons), Nigeria (1.35 million tons), Egypt (1.25 million tons) and Algeria (609 000 tons).

Pig meat is the most produced (110 million t), followed by poultry meat (100.2 million t), bovine meat (65 million t) and sheep meat (13.1 million t).

The world production is dominated by Asia (123.1 million t), Europe (56.9 million t), North America (46.9 million t), and South America (38.9 million t). Africa (14.1 million t) is in fifth position, ahead of Central America (8.5 million t) and Oceania (5.9 million t).

Asia is also world leader of the production by meat type, in the exception of bovine meat which the leader is South America.



Graph 1 : World meat production, Source: FAO, 2010

3.2 World meat market

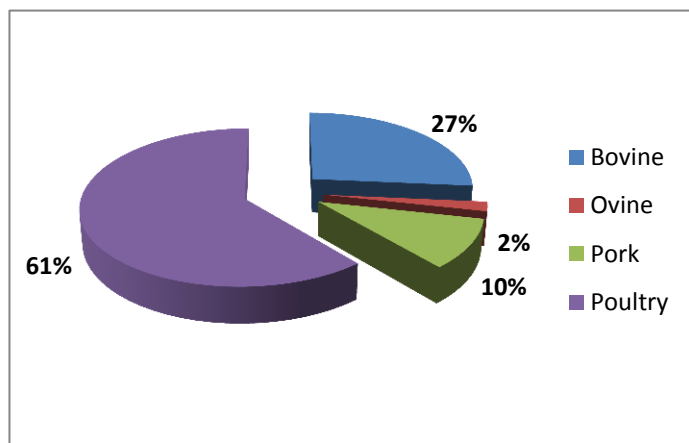
3.2.1 The international trade

3.2.1.1 Meat Importations

World meat imports were estimated at 25.813 million tons in 2011. Half of the imports were from Asia. The world's largest importers are China (3.3 million tons), Japan (2.99 million tons), Russia (2.09), EU 1.67 million tons) and USA (1.56 million tons).

The most imported meats are respectively poultry (11.288 million tons), beef (7.214 million tons) and swine (6.213 million tons).

The imports from Africa are estimated to 2.1 million t whereas the main African meat importers are Angola (364 000 t), Egypt (363 000 t) and South Africa (330 000 t).



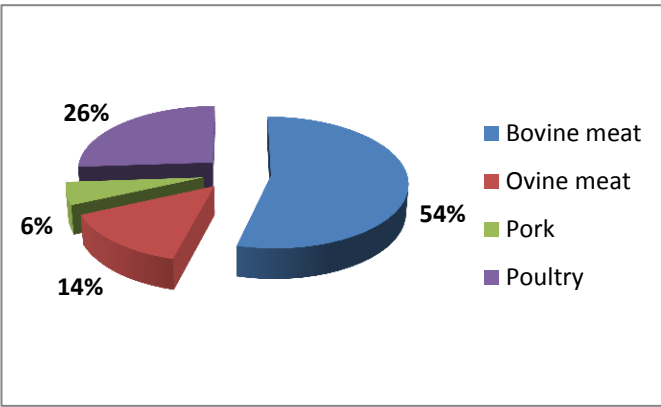
Graph 2 : Meat imports in Africa, Source: FAO, 2011

3.2.1.2 Meat Exports

The exports leaders of total meat are United States (6.8 million t), Brazil (6.2 million t) and the European Union (3.4 million t). Concerning the meat categories, the greatest exporters are:

- Bovine meat: Brazil (1 511 000 t), Australia (1 249 000 t), USA (1 162 000 t) and India (795 000 t). Within 5 years, Brazil exports are expected to reach 4 000 000 tons, widening the gap with the USA, but also with Australia, Argentina and Canada whose beef exports are expected to stagnate in the same period.
- Ovine meat: New Zealand (350 000 t), Australia (285 000 t) and India (65 000 t).
- Pork : USA (1 562 000 t), Canada (1 067 000 t), EU₂₇ (1 750 000 t) and Brazil (636000t).
- Poultry : Brazil (4 098 000 t), USA (3 661 000 t), China (1 143 000 t) and EU₂₇ (986 000 t).

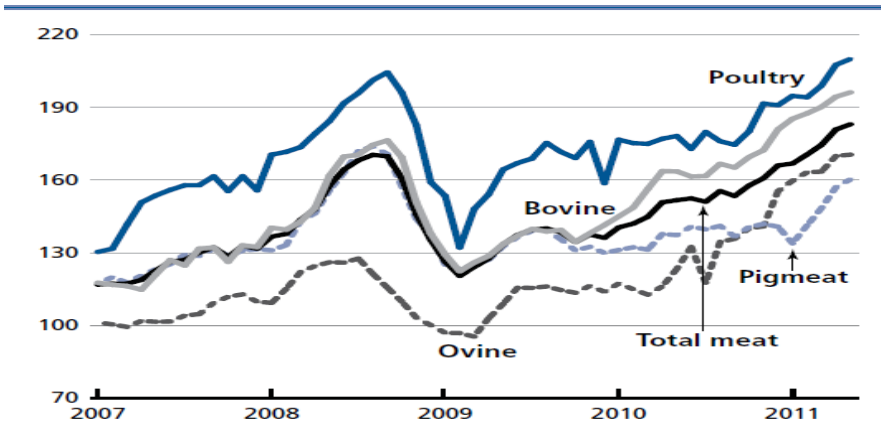
The exports from Africa are estimated to 168 000 t, which one third from South Africa (50 000 t). Other important players are Egypt and Sudan, exporting sheep meat towards the Middle –East.



Graph 3 : Meat exports from Africa, Source: FAO, 2011

3.2.2 Meat prices

The general context is market by the growing trends of meat over the years, in the exception of the end of 2008 and during 2009, as a consequence of the global economic crisis.

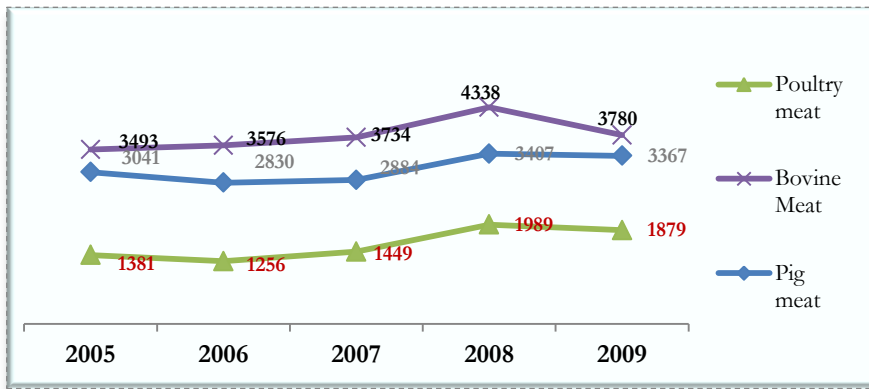


Graph 4: FAO international meat price indices (2002-2004=100), Source: FAO, 2011

Since the beginning of 2011, tight meat supplies push up prices to new record levels. In May 2011, the FAO meat price index hit a new high of 183 points. International prices of all meats have firmed since January, with particularly large gains recorded by pig meat. The price strength mainly reflects supply-driven factors, including adverse weather conditions in late 2010, herd rebuilding, animal diseases and rising input costs, which have virtually stalled global output growth.

Limited export availability in traditional supply countries combined with buoyant import demand are expected to maintain the upward trend of world meat prices in the short term. Meanwhile, high grain prices continue to constrain sector profitability.

Beef meat and pig meat are the most expensive on the international market.



Graph 5 : International meat prices, Source: FAO, 2010

3.2.3 Meat consumption

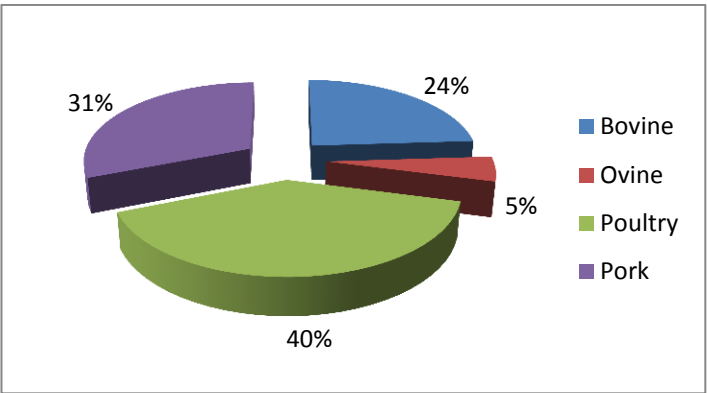
Meat consumption worldwide has increased rapidly in recent years, with the demand for livestock products expected to double in sub-Saharan Africa and South Asia. However the increase comes with harmful effects on the environment, public health and economy.

Meat production across the world has tripled over the last four decades and increased 20 per cent in just the last 10 years. Pork is the most widely consumed meat in the world, followed by poultry, beef, and mutton. The poultry production is the fastest growing meat sector. Industrial countries are consuming growing amounts of meat, nearly double the quantity than in developing countries.

World per capita meat consumption is 42 kg. This average however conceals disparities between the averages of developed countries and developing countries, 78 kg and 32 kg respectively.

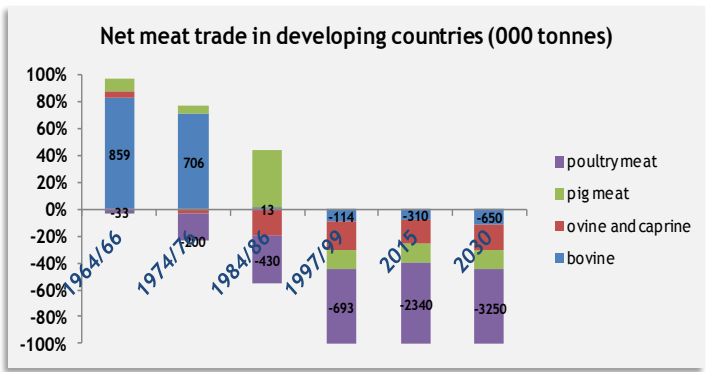
3.3 Production prospects in the medium term

Pork is the most currently produced meat worldwide (38% of total production). However due to environmental damage increasingly linked to large pig farming and the relative decline of production expected in Europe and North America, this trend will be reversed in favor of poultry meat which will account for 40% of total production by 2020.



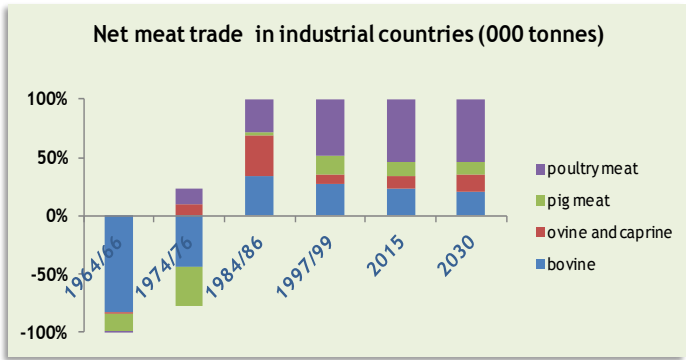
Graph 6 : Meat production forecasts by 2020, Source: FAO, 2010

Meat consumption in developing countries remains heavily depending on imports and should be accelerated in 2030.



Graph 7 : Net meat trade in developing countries (000 tonnes), Source: FAO, 2010

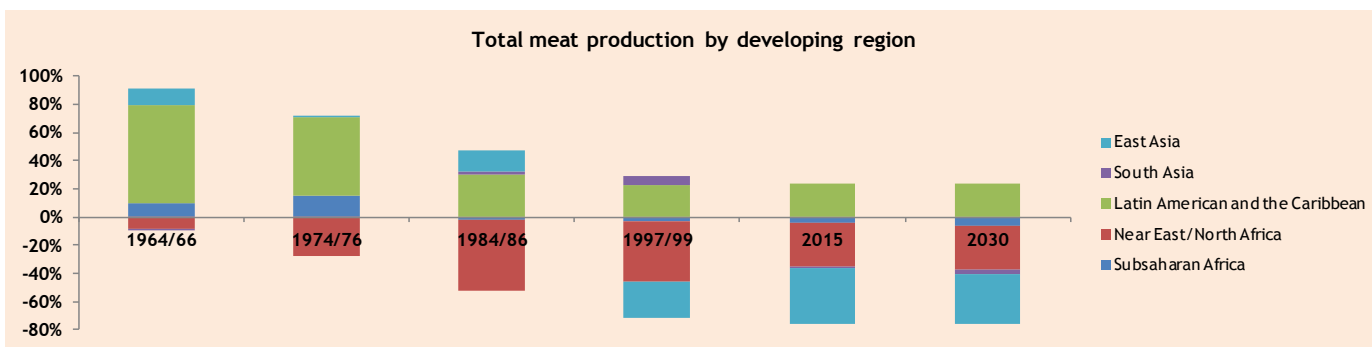
During the same period, industrial countries will strengthen their food security and will further establish their dominance on the meat world market.



Graph 8 : Net meat trade in industrial countries (000 tonnes), Source: FAO, 2010

Global productions of meat will double its 2008 level to reach about 500 million tons in 2050, while the forecasts for 2020 are 350 million tons. Another major change is accentuating the gap between the relative contributions of developed and developing countries in global production of meat. Currently 40% of global production of meat comes from industrialized countries (Europe, North America, Australia and New Zealand) and 60% of developing countries (DCs). These proportions should be 70: 30 and in 2020 and 80: 20 in 2050.

The increasing of meat production in developing countries will be driven mainly by China and Brazil. In Africa, production of meat will remain shy from 2015 to 2030.



Graph 9 : Total meat production by developing regions, Source: FAO, 2010

Sub-Saharan Africa will triple its production to reach 30 million tons by 2050, but its relative production in the overall meat production will still remain marginal compared to Asia and Latin America.

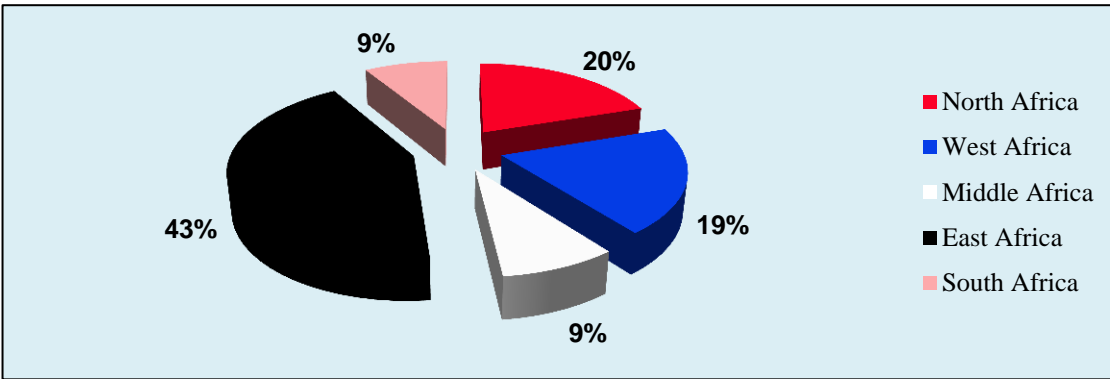
3.4 Current situation of livestock populations in Africa

3.4.1 Livestock populations and distribution

The total population of cattle in Africa is about 240 millions heads. The East African region is the first African supplier, accounting for 40% of the global population (104 millions heads). The cattle populations of the other regions are:

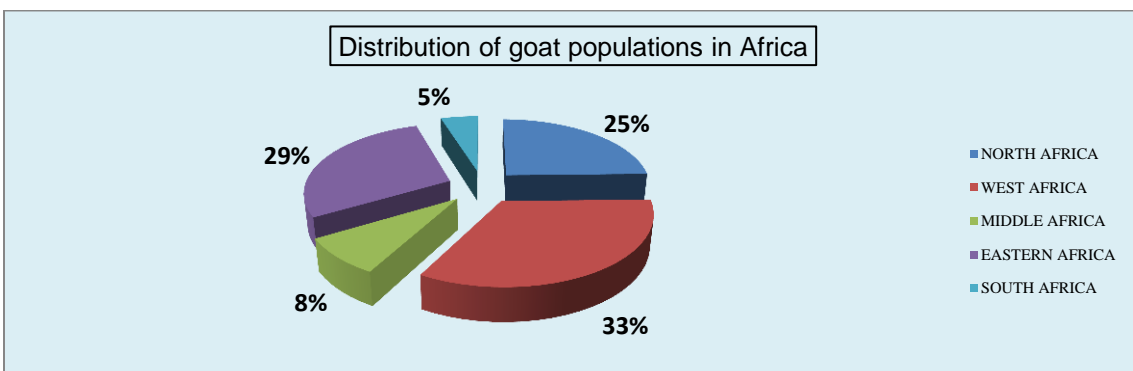
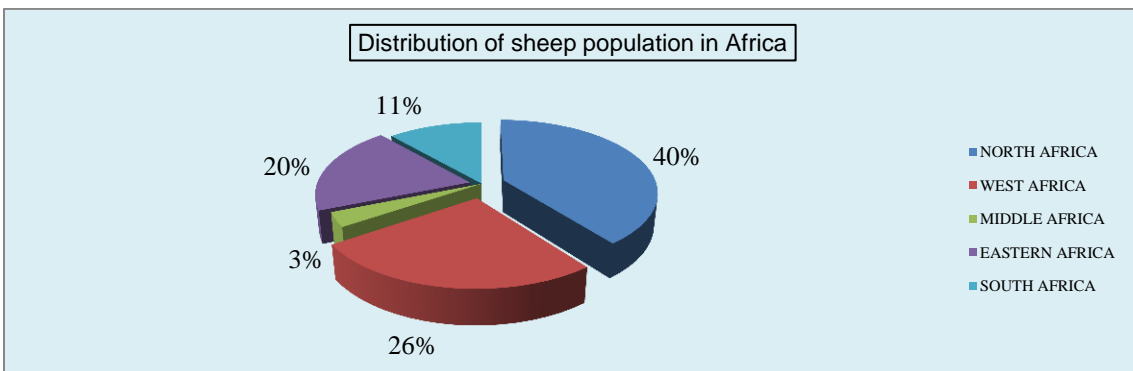
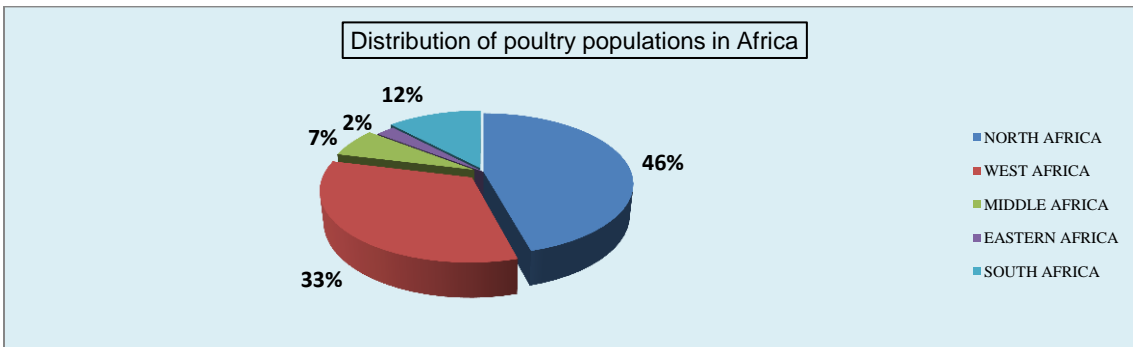
- North Africa (47 993 000 heads);
- West Africa (47 524 000);
- South Africa (21 117 800);
- Central Africa (21 025 000).

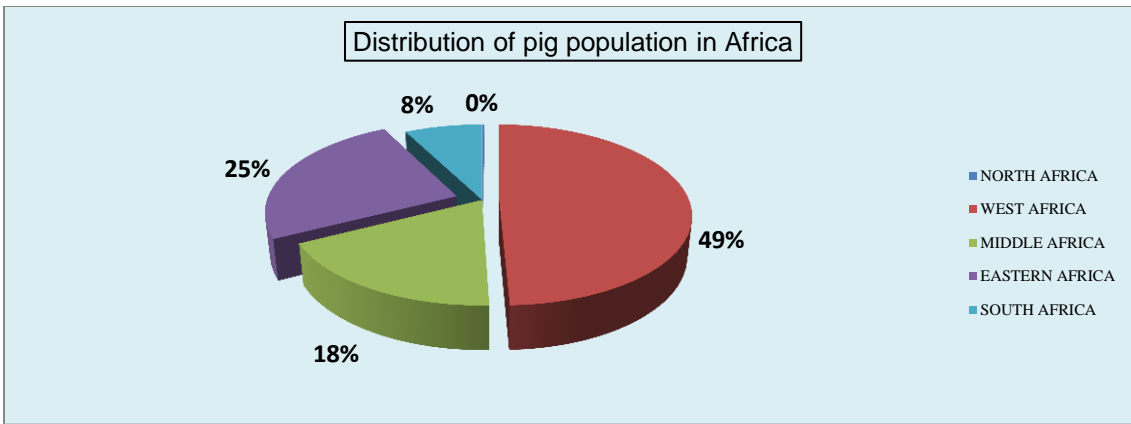
66% of cattle population of the East African region are from 3 countries: Ethiopia (38 500 000 heads), Tanzania (17 800 000), Kenya (12 000 000).



Graph. 10 : Cattle populations of Africa, Source: FAO, 2011

The East African region is also relatively well endowed with pigs (5 806 420 heads) and goats (66 724 000), ranking second for both in Africa, whereas the rank for sheep population (49 702 300) is third. The major weakness of the East African region is about poultry population (27 066 700), as evidenced by its last place in the African ranking.

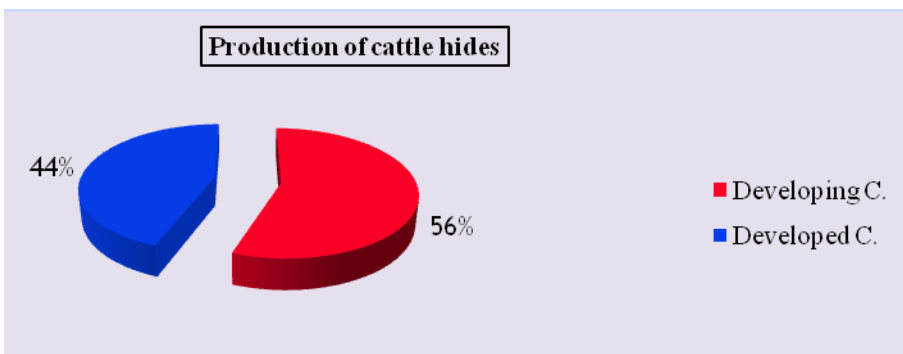




Graph. 11 : Distribution of livestock in Africa, Source: FAO, 2011

3.4.2 Livestock by-products: hides and skins

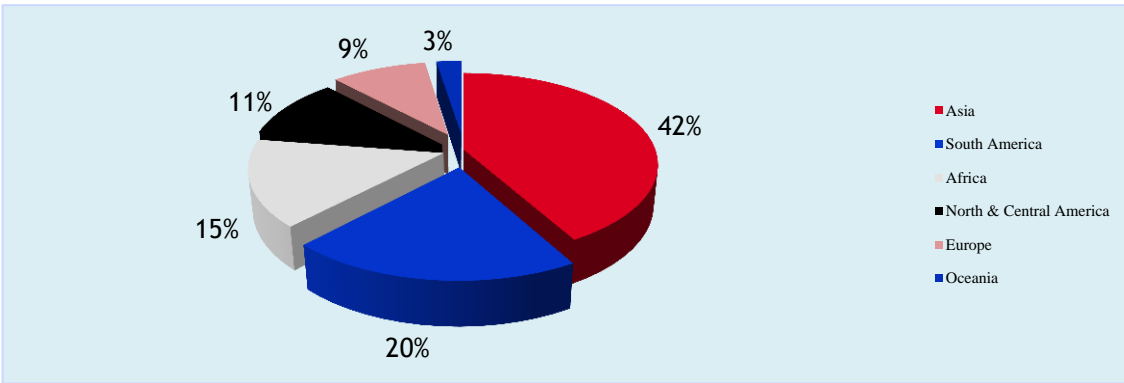
About by products, worldwide production (6 214 000 T) of Cattle hides is almost equally distributed between developing (3454 000 T) and developed (2 760 000 T) countries.



Graph. 12 : Production of cattle hides, Source: Nation Master 2010

The main producing regions of cattle hides are:

- Far East (1523 000 T);
- Latin America (1439 000 T);
- North America (995 000 T);
- Europe 9903 000 T).



Graph 13: Production of cattle hides by regions, Source: Nation Master 2010

The production per country is led by:

- China (792 000 T);
- USA (750 000 T);
- Brazil (664 000 T);
- India (492 000 T).

The major producers in Africa are South Africa, Tanzania and Sudan.

Worldwide exports of cattle hides (3655 million \$) are largely dominated by the developed countries which share 96% of the global market.

The production by regions is as follows:

- North America (1742.6 millions);
- European Union (1190 millions);
- Oceania (250.3 millions);
- ex USSR (207.9 millions);
- Asia (159.1 millions);
- Africa (61.8 millions);
- Latin America (43.3 millions).

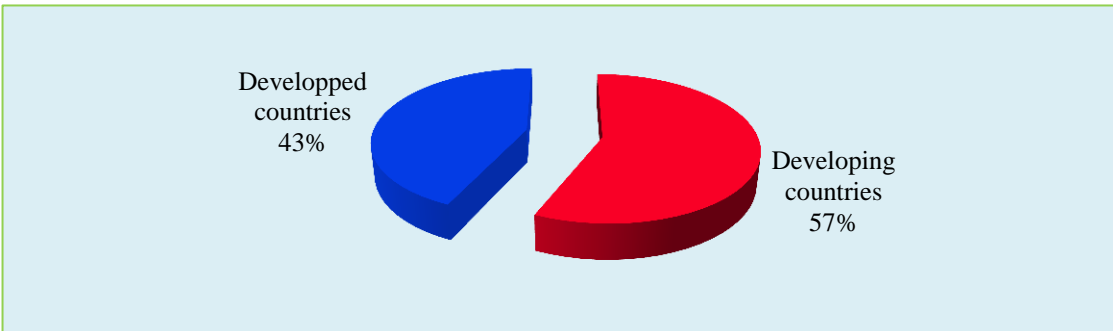
The major African leaders on the export market are:

- South Africa (23.8 millions);
- Ethiopia (11 millions);
- Somalia (6.5 millions);
- Tanzania (5.6 millions).

Production of sheep skins (410 000 T) is equally distributed between developed (177600 T) and developing countries (232600 T). The situation is completely different regarding goat skins, since 95% of the world production (257100 T) is from developing countries.

The main producers of sheep skins are:

- China (94000 T);
- EU (66700 T);
- Australia (32000 T);
- New Zealand (29100 T);
- Iran (13700 T);
- India (12000 T).



Graph 14: Worldwide production of sheep skins, Source: Nation Master 2010

The main producers of goat skins are:

- China (103600 T);
- India (48600 T);
- Pakistan (15900 T);
- Bangladesh (14200 T);
- Sudan (10900 T);
- Iran (5900 T).

4 DIAGNOSIS OF MEAT INDUSTRY IN RWANDA

4.1 Current situation

4.1.1 Livestock populations

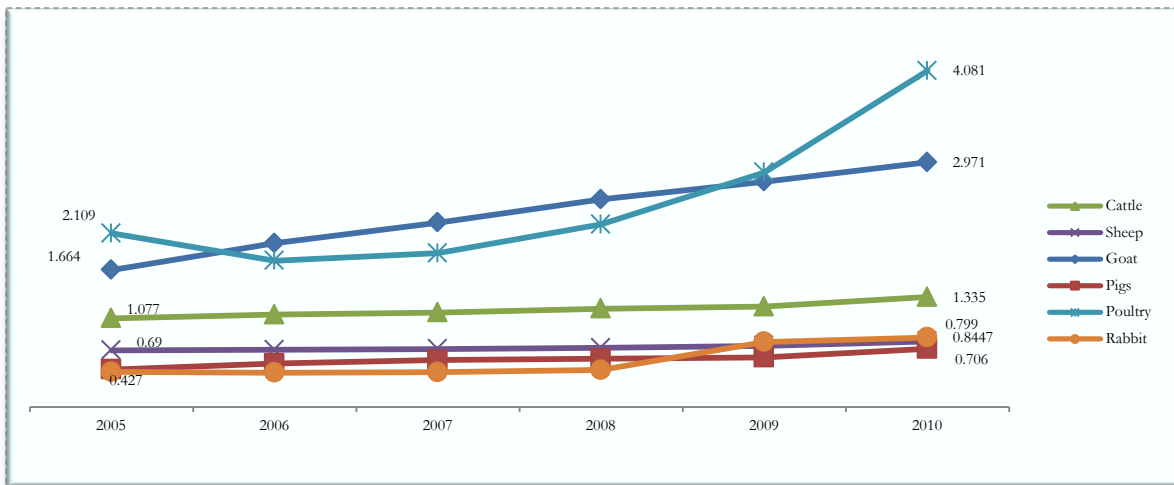
The recovery of the animal stock following the drastic drop of the mid 90s is a great achievement. The current populations of animals are:

- Cattle (1 335 000 heads);
- Poultry (4 081 000);
- Goats (2 971 000);
- Rabbits (844 700);
- Pigs (706 000);
- Sheep (799 000).

4.1.2 Livestock population's growth trends

Livestock population, which contributes 12% of the Rwandan GDP and 30% of the Agricultural GDP (Rwanda statistical yearbook, 2011), is in an increasing trend and the growth rates within the period 2005-2010 are:

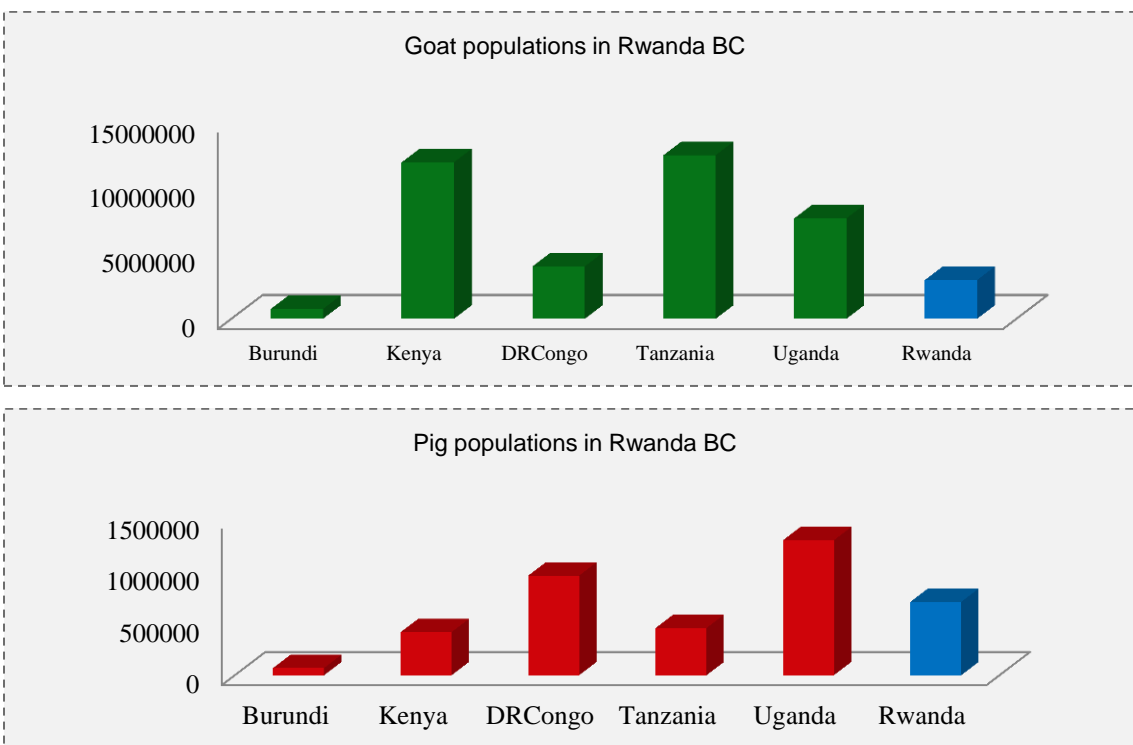
- Cattle : 23.9%;
- Sheep : 15.8%;
- Goats : 78.5%;
- Pigs : 35.4%;
- Poultry : 93%;
- Rabbits: 97.8%.



Graph 15: livestock populations in Rwanda, Source: MINAGRI, 2011

4.1.3 Comparison of Rwandan livestock populations with bordering countries

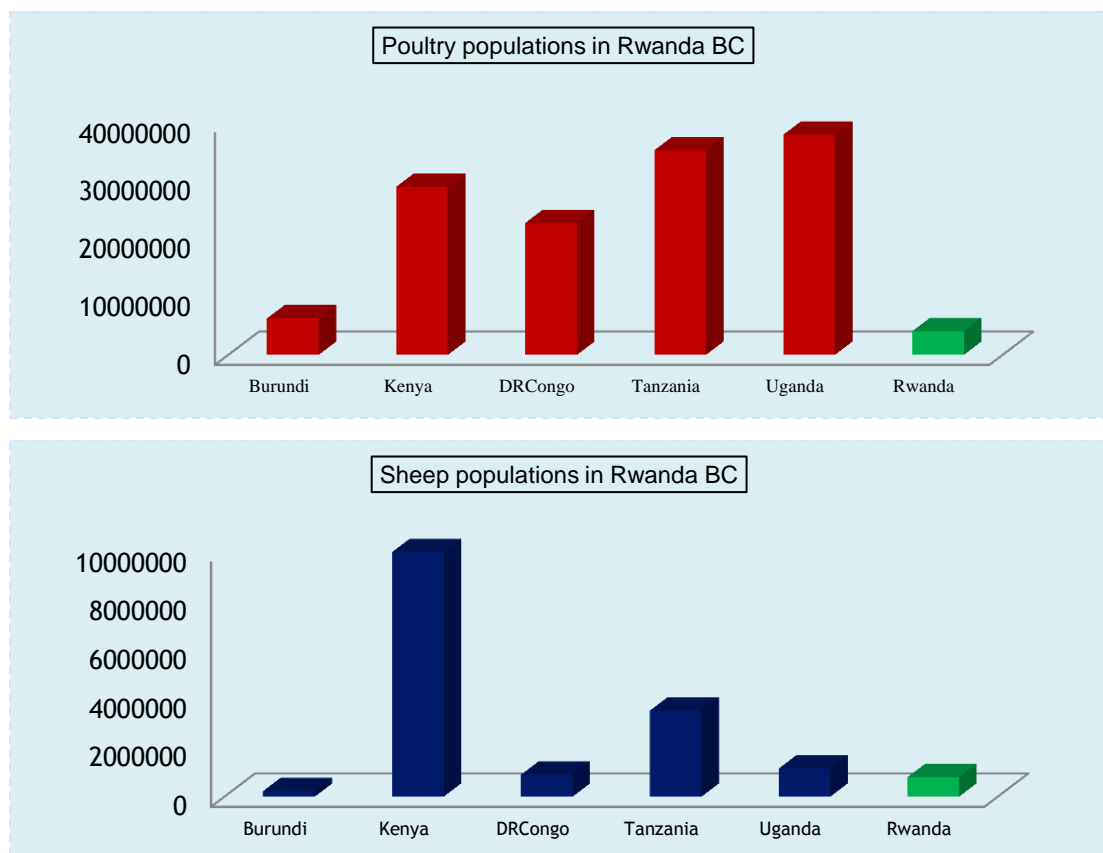
The absolute values of small animals populations indicate that Rwanda, as compared to bordering countries is relatively well supplied with pigs (3rd supplier after Uganda, 1300000 and DR Congo, 959 080) and goats (although 5th supplier after Tanzania, 12550000; Kenya, 12000000; Uganda, 7700000; DR Congo, 4021000, the goat population, 2971000, confers to Rwanda an enviable position considering the size of the country).



Graph. 16 : Goats and pigs populations in Rwanda and bordering countries, Source: FAO, 2011

However, the sheep population is rather low, far from those of Kenya (10 000 000) and Tanzania (3 521 000). Poultry population is the lowest among the country considered; almost 10 times lower than countries such as Uganda (38 000), Tanzania (35 000 000) and Kenya (30 000 000).

The bovine population (1 335 000) is very small as compared to bordering countries. Such as Tanzania (17 800 000), Kenya (12 000 000) and Uganda (6 100 000), but exceeds those of Burundi (325 000) and DR Congo (759 900).



Graph. 17 : Sheep and poultry populations in Rwanda and bordering countries, Source: FAO, 2011

4.1.4 Value chain of the meat industry

Five major players determine the meat industry in Rwanda:

- **Traditional farmers:** households owning animals from traditional farming sell their animals in very small markets located near their homes. In some places, farmers can also expect purchase on site by «commissioners». Traditional farmers resupply on local markets where they purchase animals to raise, either from the distributors of improved breeds or from other broadcasters.
- **Commissioners:** Sponsored by wealthy merchants, several junior intermediates commonly called "brokers" literally crisscross the areas likely to house and buy the animals. These are conveyed on foot in small groups and are transported to the slaughterhouses where waiting for their sponsors.

- **Merchants:** Intermediate leading in this marketing chain, traders gather at the scene of slaughter animals brought by their agents. It goes without saying that the successful organization of this system requires strong cash advances made by commission merchants in charge of collecting animals. It should be noted that traders, last links in the chain of sale of live animals, take the stage on the basis of an order or contract with the main buyers of meat that are restaurateurs and butchers.
- **Butcher:** There are four modern butcheries localized in the city of Kigali: La Boucherie Charcuterie de Kigali ; La Galette; La Côte à l'Os ; Alimentation Chez Venant. They are usually the only ones with trucks vans equipped with refrigerators for the transport of animals carcasses.
- **Consumers:** Final consumers are rural people and urban households who buy fresh meat (roast or chop) or meat products in supermarkets. The pattern of consumption of fresh meat from the roast is generally toasted, mostly in restaurants. It should be emphasized that a considerable amount of pig, sheep meat or live animals was previously sent to the cities of Goma and Bukavu in Eastern Democratic Republic of Congo.

The red meat industry of Rwanda can be schematized as follows.

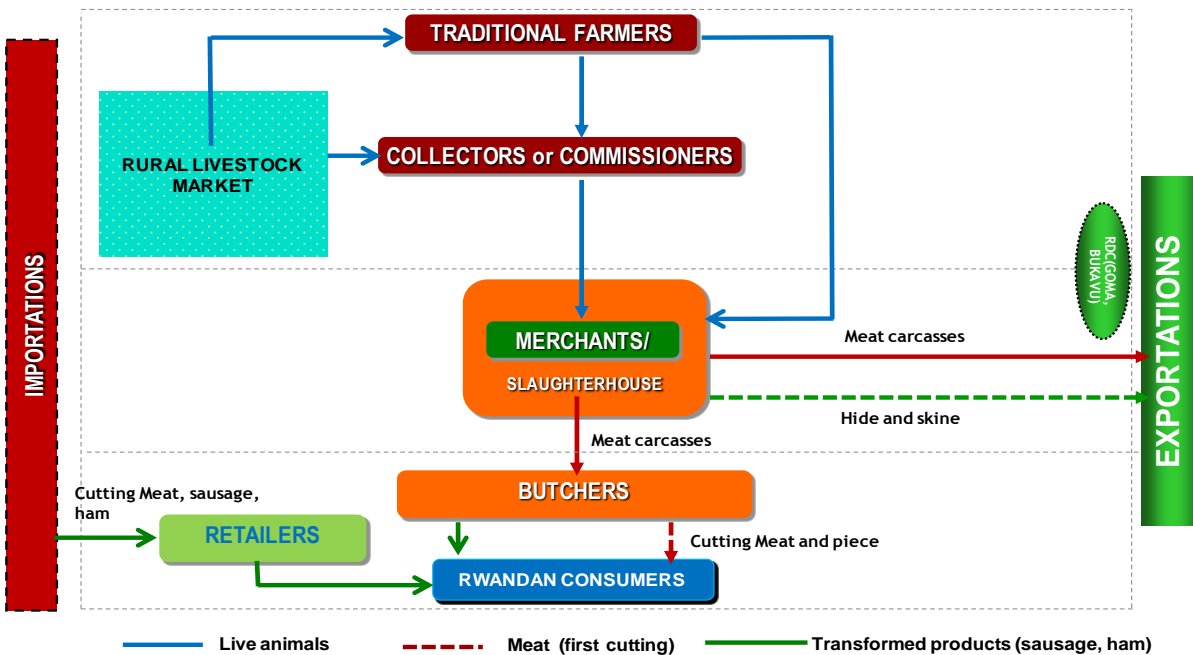


Figure 1 : Red meat industry in Rwanda, Source: Dr Papa Ndary NIANG, 2012

The poultry meat industry can be schematized as follows:

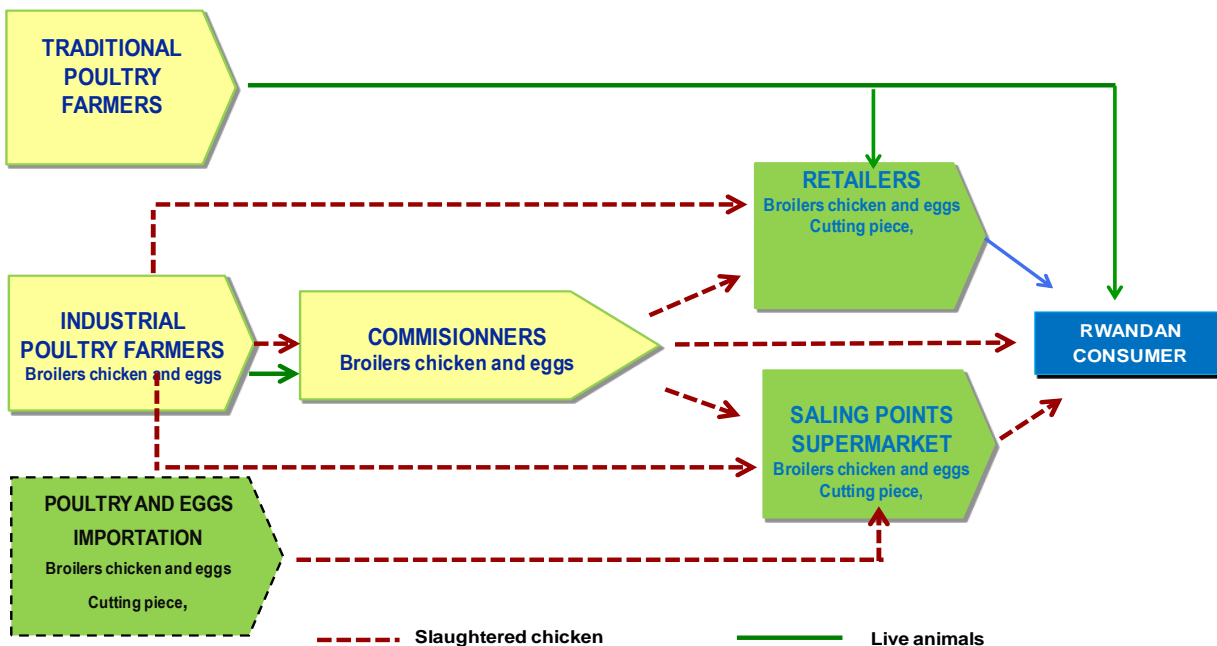
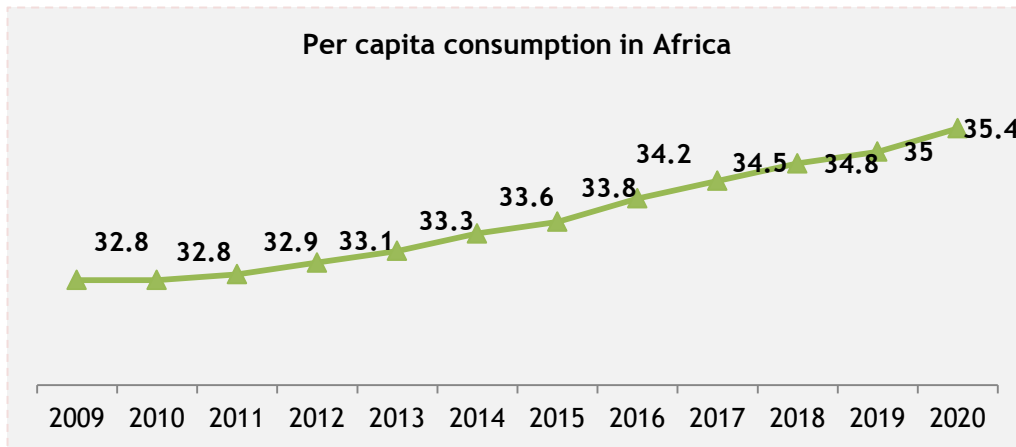


Figure 2 : Poultry meat industry in Rwanda, Source: Dr Papa Ndary NIANG, 2012

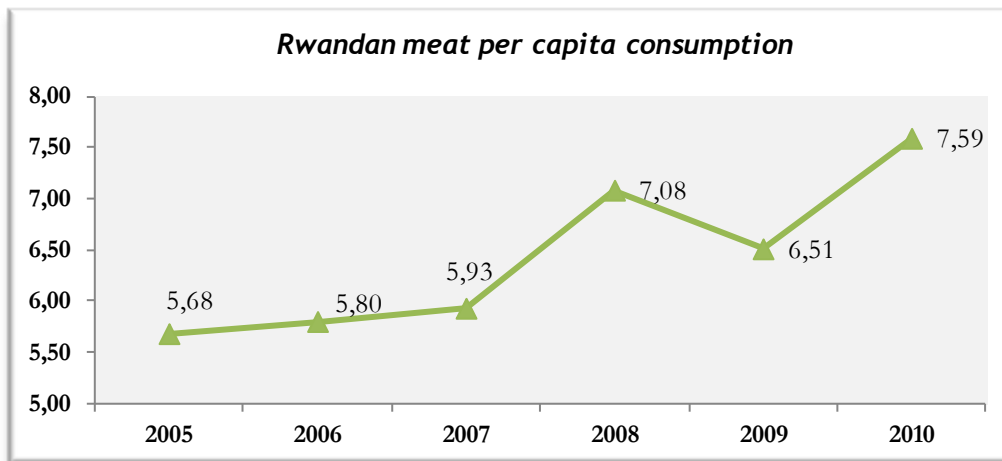
4.1.5 Meat consumption in Rwanda

The meat per capita consumption for Rwandans is very low as compared to African average. In reality, there is a low propensity to meat consumption by the population. The reasons could be due to the purchasing power of the people; the eating habits e.g. food taboos related to consumptions of mutton and rabbit meat; the access to quality meat, particularly for rural people.

Per capita consumption is in an increasing trend since 2004 but is still below 10 kg per year while the FAO rate for African countries is 32 Kg per year and will reach 35.4 kg in 2020.



Graph. 18 : Trends of per capita meat consumption in Africa, Source: FAO, 2010



Graph. 19 : trends of per capita meat consumption in Rwanda, Source: National Institute of Statistics of Rwanda, Statistical yearbook 2011 edition

4.2 Strategic diagnosis: the SWOT of the meat industry

4.2.1 Strengths of the meat industry

The tool SWOT is used to describe, analyze and diagnose the meat industry in Rwanda.

4.2.1.1 The framework for livestock development

Various reform policies have given to Rwanda a framework favoring the development of livestock and meat industry.

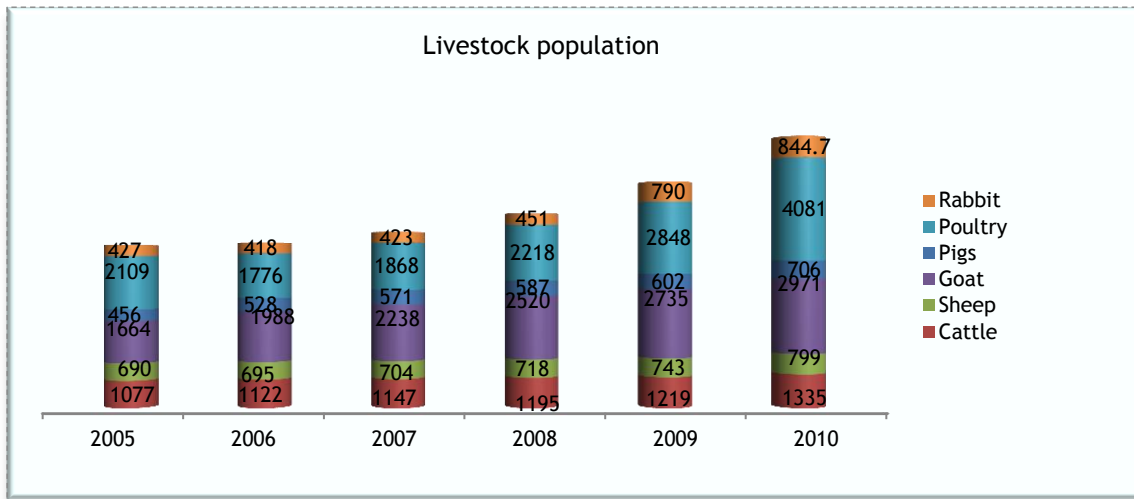
- The decentralisation policy: adopted by the government of Rwanda to bring services close to populations, making «Umurenge» the focal unit for development;
- The new land policy: the aim is to secure land tenure to encourage investments in farming;
- The review of laws related to Animal Health: laws related to animal husbandry are currently reviewed by the government for adapting the context of livestock development and modernization ;
- Strengthening of the veterinary profession: the veterinary profession in Rwanda through the Veterinary Association (ARMV) and the future Order of Veterinarians will play a significant role in veterinary service delivery and other aspects of animal husbandry; other organizations of animal scientists (zootechnicians) should be strengthened too.

4.2.1.2 The availability of a large supply of animals

The increasing trend of the stock animal observed since the floor level of the mid 90s currently offers a raw material that can support the development of a strong meat industry. Thus the meat industry can rely on the availability of the following species to launch its development:

- Goats (2 971 000 heads);
- Pigs (844 700);
- Cattle (1 335 000);
- Sheep (799 000) ;
- Poultry (4 081 000);
- Rabbit (706 000).

This asset is reinforced by a system of animal traceability throughout the Rwandan territory. The meat consumption is essentially driven by poultry, goats and cattle.



Graph. 20 : livestock populations in Rwanda: trends 2005-2010, Source: MINAGRI, 2011

4.2.1.3 A climate favorable to animal husbandry

Having a long rainy season is an advantage. Indeed, livestock development in many African countries is burdened by the consequences of a long dry season: drought, lack of roughages and watering points.

4.2.2 Weaknesses and constraints of the meat industry

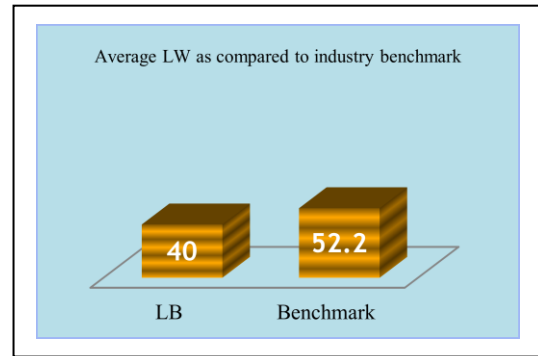
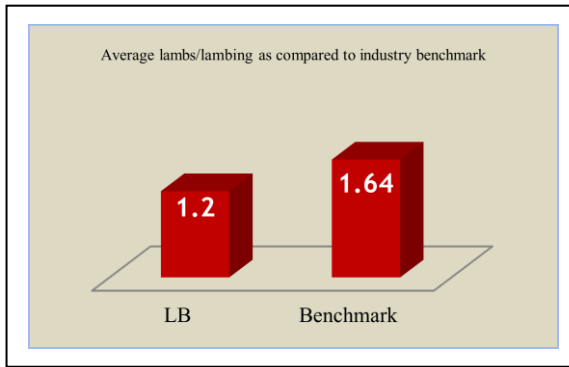
4.2.2.1 In the value Chain

The meat industry is limited by several general constraints:

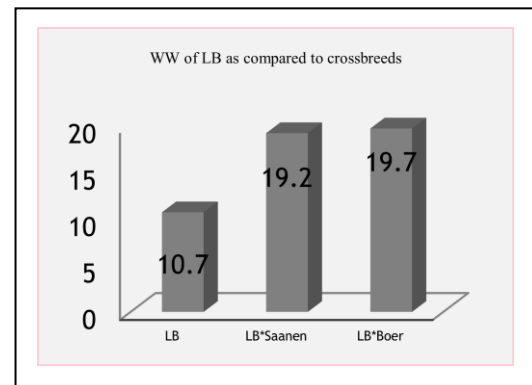
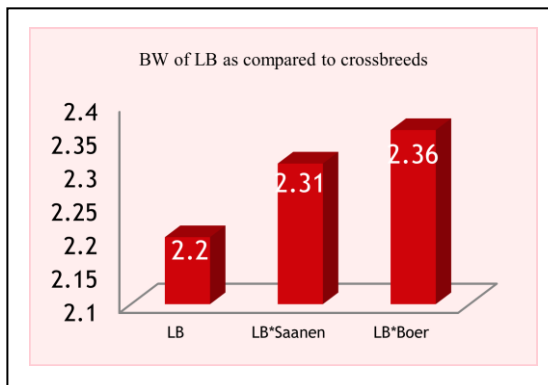
- Poor animal nutrition, both quantity and quality due to:
 - Shortage of farming lands,
 - Insufficient and no controlled commercial feeds,
 - Limited use of agricultural by-products.

The constraints related to animal nutrition are exhaustively described in the document «Animal nutrition strategy» (MINAGRI)

- Low productivity of indigenous breeds, due to the poor quality of genetic stock;
- Poor performing local breeds (see «Small animal industry strategy and investment plan»).



Graph 21 : Average parameters compared to industry benchmark, Source: Bister, 2010; Singh, 2006, Seck, 1992



Graph 22 : Local breed performance compared to industry benchmark, Source: Bister, 2010; Singh, 2006, Seck, 1992

- Lack of productivity data regarding the local breeds. Most cases records are not kept by farmers on the parameters measuring productivity;
- Nutritional constraints. The nutritional constraints Rwandan livestock are well described in the document « Strategic Plan for Animal Nutrition Improvement Programme for Rwanda. MINAGRI, 2009»;
- Housing constraints: Housing problems are mainly related to the high price of the equipment for small ruminants and the inadequacy to good husbandry practices (rabbits).
- Environmental constraints: constraints related to land access and tenure, soil fertility and forage quality, are exhaustively described in the PSTA II Document. In summary, the relative abundant average rainfall as compared to many African countries conceals large regional disparities. Thus, the western part of the country receives the heaviest rainfall while the eastern part is more subject to droughts, due to spatiotemporal irregular rainfall. Moreover most of the soils are highly weathered, and combined effects of soil acidity, low cation exchange capacity and aluminum toxicity led to a relatively poor fertility in many areas.

- Socioeconomic constraints are:
 - Access to new markets: although export markets already exist (Congo, DRC, Kenya, U.S and Asia), the growing of livestock exports are dependent on quantitative and qualitative improvements;
 - Lack of skilled farmers
 - Lack of entrepreneurship: livestock husbandry is still largely considered as subsistence activity;
 - Food taboos: sheep and rabbit meats.
- Inaccessibility of credit to small scale farmers
- Weak farmers' organizations.
 - Small farmers associations in the rural areas ;
 - Low organizational capacity.
- Animal diseases, including zoonosis. The presence of certain zoonosis could seriously compromise the achievement of meat industry in Rwanda.
- Poor investment in livestock industry: Livestock farming especially is usually done with minimum inputs.
- Lack of coordination within the Institutional framework involving all stakeholders
- Low level of meat processing. The value chain is still characterized by the low level of meat processing. The industry doesn't take advantage of the added value offered by modern distribution channels and VIP customers.

Livestock activity is focused inclusively on farming; the slaughtering process only delivers the following outputs: whole or semi and quarter carcasses:

- Cutting and transformation (ham, sausage, etc...) does not really exist.
- Chicken are sold live or "Ready to Cook".
- Preparation of poultry, pigs and sheep is usually done in the "backyard slaughterhouses" .

These general constraints are in addition to specific constraints to hinder the development of the Meat Industry:

- Predominance of "backyard slaughterhouses".
- Semi modern slaughterhouses exist in cities
- Rules of their implementation are not respected:
 - Slaughterhouses are near residential areas;
 - Hygienic conditions are precarious;
 - No ante mortem inspection;
 - Slaughter processes are outdated;
 - There is no system of re wiping after slaughtering;

- Pollution of the environment by cutting waste and waste water is not taken into account;
- Management of seizures slaughter doesn't guarantee the preservation of Public Health (no incineration system, no safety insurance risk of soil-borne diseases with the current method by chlorination);
- Slaughter of pigs is rather a domestic activity like poultry;
- Low value of slaughtering by-products ;
- No training strategy of the abattoir industry.
- Control of illegal animals slaughtering is not demonstrated
- Transportation conditions and retailers conditions are very inadequate
- Sanitary inspection of butchereries and retailers

In fact, the optimum conditions for the establishment of a true meat industry in Rwanda are still very low. A focus on the value chain gives a synoptic view of the major weaknesses of the Meat Industry.

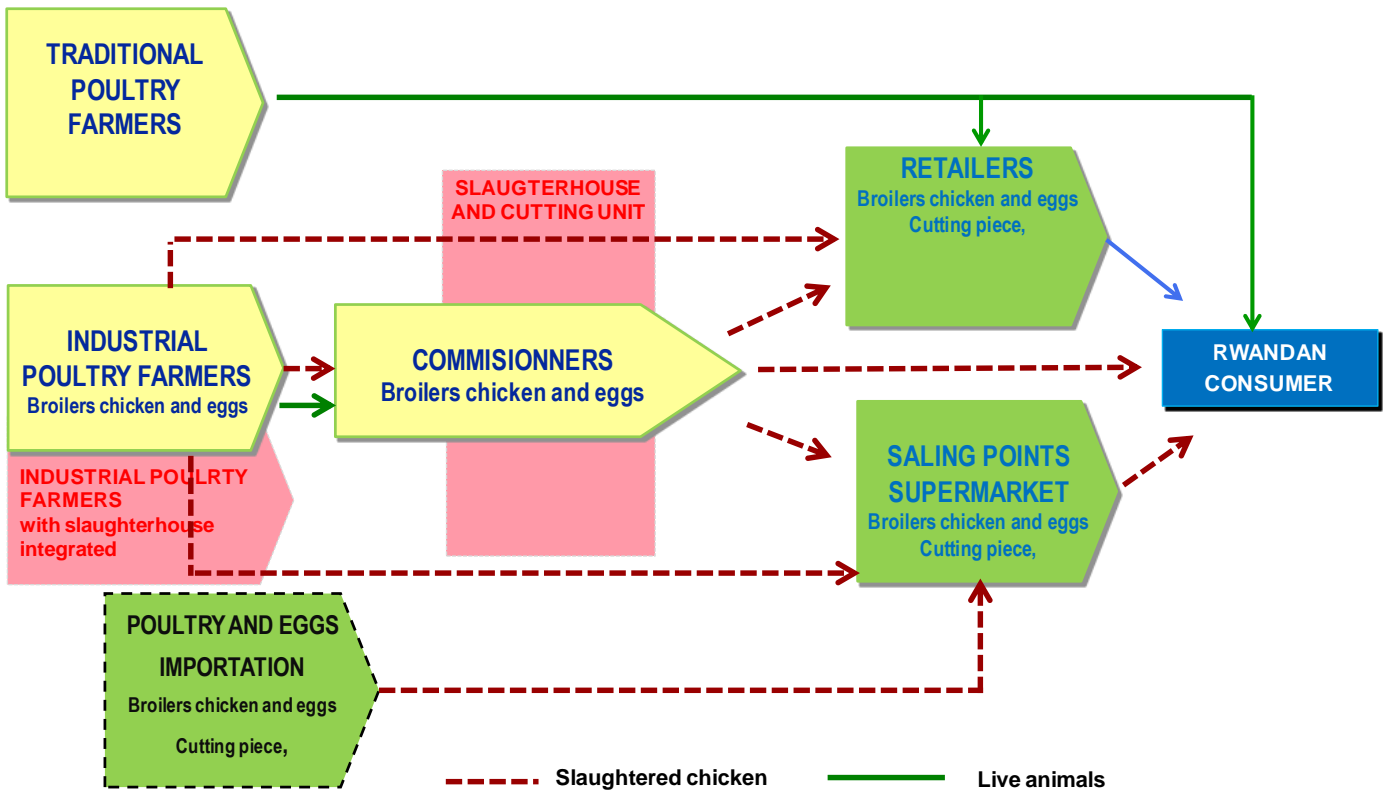
- At the farming/production stage
 - Poor animal nutrition;
 - Poor performing local breeds;
 - Weak veterinary services delivery;
 - Endemic diseases;
 - Many fragmented small producers without real support from the government;
 - Profitability not demonstrated (ignorance of the pricing structure of meats).
- At the slaughter stage
 - Most of them are just “backyard slaughterhouses”;
 - Semi modern slaughterhouses exist in cities;
 - Rules of their implementation are not respected;
 - No ante mortem Inspection;
 - Control of illegal animals slaughtering is not demonstrated;
 - Preparation of poultry, sheep and pigs is usually done in the “backyard slaughterhouses”;
 - Profitability not demonstrated (ignorance of the pricing structure).
- At the cutting/processing stage:
 - Inexistence or a small number of processors (Cutting and packaging);
 - Profitability not demonstrated (ignorance of the pricing structure).

- At the retailing stage:
 - A small number of mass market retailers;
 - Low Sanitary inspection of retailers;
 - Profitability not demonstrated;
 - Competition of imported products (ignorance of the pricing structure).



Picture 1 : Some weaknesses in the meat industry, Source: Dr Papa Ndary NIANG, 2012

Regarding the particular case of chicken, one of the weaknesses of the sector is due to the lack of infrastructure for cutting and processing.



Graph 23 : some weaknesses in the poultry meat industry, Source: Dr Papa Ndary NIANG, 2012

4.2.2.2 Meat by products: Hides and Skins

The hides and skins sector, which is the second export livestock product (3.5 million \$ between 2009 and 2010) is hindered by some constraints.

- Poor added value

The exports opportunities in foreign markets are not fully exploited due to poor added value for exports products:

- Exclusively live bovine and small ruminants are exported in the neighboring countries;
- 63% of hides and skins are exported in raw stage. Thus, 37% are tanned or crusted, depriving the national economy of additional resources.

- Poor quality skins

Poor quality is attributed to poor animal husbandry practices, lack of appropriate slaughter facilities and tools, poor storage and preservation techniques, lack of incentives to producers to improve quality, price setting that does not encourage quality, lack of grading of raw hides and skins, outdated law on hides and skins and cultural patterns and social styles of traditional livestock keepers.

- Low recovery of skins

This is attributed to poor quality leading to rejection, low awareness especially among primary producers on the economic value, low prices of hides and skins.

- Capacity utilization of tanneries and investments

Although 37% of hides and skins are semi-processed, capacity utilization of tanneries remain low, due to worn out machinery and equipment and outdated technology, as well as a low investment capacity.

- Effluent treatment problems and adherent to sound environmental management standards

Most of the tanneries in Rwanda lack proper effluent treatment plants; as a result they contribute to environmental pollution.

- Poor and deteriorating physical infrastructure

The infrastructure which includes abattoirs, slaughter slabs are in most cases in poor condition and rehabilitation costs are usually relatively high.

4.2.3 Opportunities and threats of the meat industry

Despite the constraints aforementioned, Rwanda has opportunities to launch a strong meat industry if the threats that hinder its development are removed.

4.2.3.1 Opportunities

The main opportunities are:

- Livestock in growing trends;
- Decrease of meat imports national invoice;
- Getting currencies in value markets;
- Increase valorization of hides and skins.

4.2.3.2 Threats

The main threats are the competition of imported products from bordering countries (Uganda, Tanzania, Kenya, European Union, etc.).

5 CHALLENGES AND STRATEGIC OPTIONS FOR MEAT INDUSTRY

5.1 Vision by 2017

The challenge can be divided into five major objectives:

- Insure meat security for Rwandans.
- Becoming a major asset in malnutrition and poverty fighting.
- Developing Rwandan livestock competitiveness in Africa.
- Promoting the development of a strong and sustainable meat industry.
- Developing foreign exchanges.

These targets will be structured around the vision for the industry by 2017. The vision for Rwandan meat industry on 2017 should integrate the needs of Rwandans in meat consumption and give a great framework to encourage Rwandans and foreigners to invest in meat sector. This vision can be summarized as follows:

«An industry pushing domestic consumption of quality meat, diversified, and taking advantage of business opportunities on value markets in East and Central Africa. »

Therefore, the meat industry will contribute significantly in achieving MDG and EDPRS targets at the end of the 6-years recovery plan in 2017.

5.1.1 An industry pushing domestic consumption of quality meat

In 2017, the meat industry in Rwanda will be boosted by the existence of an important herd of meat breeds, healthy, well-fed, and able to meet the growing consumer demand in Rwanda.

Meats sold in the domestic market will mostly be homemade and will be good organoleptic and nutritional quality, health safety and enviable position resulting of the coaching of veterinary and zootechnicians. Labels of Meat Quality will then spread to ensure the quality of meat for Rwandan's consumers. Modern SMEs and efficient farms will replace the traditional farms and promote the emergence of a new class of businessmen farmers participating in the socio-economic development of their provinces.

5.1.2 A diversified meat industry

In 2017 the consumer should have a choice of various meat products with the Rwandan label. The consumer should have the choice of meat species: cattle, sheep, goat, pig, rabbit, and poultry.

The consumer should make a selection of product categories: first, second or third choice depending on his purchasing power. The consumer should have the choice of product lines: entire or cut products, sausage, ham, and canned. By-products will also be valued due to the existence of modern recycling units respecting the environment.

5.1.3 An industry taking advantage of business opportunities on value markets in East and Central Africa.

In 2017 the dynamism of the meat industry will give to the Rwandan economy foreign currencies by selling branded and labelled meat in two value markets: Democratic Republic of Congo and Congo Brazzaville. The level of recovery of hides and skins will be more accentuated for selling secondary processed products in the international market.

5.2 Strategic options

Three strategic priorities will achieve the vision which will increase the meat industry from the primary step to a sustainable industry serving the social and economic development of Rwanda.

- Increasing meat supply;
- Modernization and development of the industry infrastructure;
- Improving access to domestic and foreign markets.

The objective of consumption per capita is to pass from 7.5 kg to the rate 15.07 kg in 2017 taking into consideration the purchasing power of Rwandan consumers.

Table 1 : Trends of livestock populations

Livestock	Growth rate (2005-2011)	2011	2012	2013	2014	2015	2016	2017	Growth rate (2011-2017)
Cattle	6,18%	1 143 553	1 135 141	1 131 633	1 132 810	1 138 799	1 149 749	1 165 835	2%
Sheep	-8,57%	630 860	635 860	642 860	649 860	656 860	663 860	671 418	6%
Goat	52,18%	2 532 277	2 732 277	3 032 277	3 432 277	3 932 277	4 132 277	5 119 760	102%
Pigs	57,16%	716 629	806 629	906 629	1 016 629	1 146 629	1 326 629	1 484 536	107%
Rabbits	94,10%	828 802	978 802	1 128 802	1 303 802	1 478 802	1 608 802	1 733 015	109%
Poultry	84%	3 890 274	4 790 274	5 790 274	6 890 274	7 990 274	9 090 274	10 677 269	174%

Source: Dr Papa Ndary NIANG, 2012

Trends of livestock population's growth during the period 2005-2011 are shown in the table above. For the next seven years, cattle population should increase by about 2% related to lack of land as confirmed by Drs BUTERA and RUTAGWENDA (2004: Plan stratégique de transformation de l'Agriculture au Rwanda , Animal production sub-sector).

Regarding other species, it is assumed that the growth rate within the period 2011-2017 will be higher than the growth rates of the period 2005-2011, due to operational and investment plans 2012-2017 to develop small animals and meat industries in Rwanda.

The average take-off rates for meat animals are respectively 28%, 32%, 40%, 85% and 95% for cattle, small ruminants, pigs, rabbits and poultry. When the mortality rates are taken into account, the conversion rates live animals/meat are: cattle (12.71%); sheep (17.60%); goat (19.8%), pigs (25%); rabbits (77%) and poultry (90%).

Table 2 : Trends of meat production (in tons)

Livestock	Conversion rate Live animal/ meat	2011	2012	2013	2014	2015	2016	2017	Growth rate (2011-2017)
Cattle	12,71%	58 141	57 713	57 535	57 595	57 899	58 456	59 274	2%
Sheep	17,60%	4 996	5 036	5 091	5 147	5 202	5 258	5 318	83%
Goat	19,80%	22 563	24 345	27 018	30 582	35 037	36 819	45 617	85%
Pigs	25,00%	17 916	20 166	22 666	25 416	28 666	33 166	37 113	115%
Rabbits	77,00%	1 276	1 507	1 738	2 008	2 277	2 478	2 669	127%
Poultry	90%	5 252	6 467	7 817	9 302	10 787	12 272	14 414	190%
	Total meat consumption	110 144	115 234	121 865	130 049	139 868	148 448	164 405	

The strategic axis will include 7 components:

- Strategic axis n°1: Increasing meat supply
 - Increasing Production;
 - Animal health.
- Strategic axis n°2: Modernization and development of the industry infrastructure
 - Modernization of supply chain;
 - Developing cutting and processing industry.
- Strategic axis n°3: Improving access to domestic and foreign markets
 - Control of sanitary quality;
 - Modernization of distribution channels;
 - Promotion of the products.

6 OPERATIONAL AND INVESTMENT PLAN

The overall budget to lift the meat industry of Rwanda to the rank of a performing meat industry should be around **8 539 000 000 RWF (16 644 251 US \$)**.

Table 3 : *Budget of investment plan for meat industry strategy in Rwanda*

Strategical axis	Component	Amount in RWF	Amount in \$
A1. Increasing meat supply	A1.C1. Animal Health	2 210 000 000	4 307 740.29
	A1.C2. Increasing production	3 225 000 000	6 286 182.09
	SUB TOTAL 1	5 435 000 000	10 593 922
A2. Modernization & development of the industry infrastructure	A2.C1. Modernization of Supply Chain	735 000 000	1 432 664.76
	A2.C2. Development of a processing industry	850 000 000	1 656 823.19
	SUB TOTAL 2	1 585 000 000	3 089 488
A3. Improvement markets access	A3.C1. Control of Sanitary Quality	390 000 000	760 189.46
	A3.C2. Modernization of the Distribution Channels	250 000 000	487 300.94
	A3.C3. Promotion products	729 000 000	1 420 969.53
	SUB TOTAL 3	1 369 000 000	2 668 460
Transversal action: Coaching for the implementation of the operational action plan	SUB TOTAL 4	150 000 000	292 381
TOTAL		8 539 000 000	16 644 251

Table 4 : *Contribution of key actors*

TIMEFRAME	RWANDA CONTRIBUTION	PRIVATE SECTOR CONTRIBUTION	PARTNERS of DEVELOPMENT CONTRIBUTION	TOTAL
SHORT TERM	80 000 000	0	135 000 000	215 000 000
MEDIUM TERM	762 500 000	350 000 000	1 602 500 000	2 715 000 000
LONG TERM	914 500 000	1 802 000 000	2 892 500 000	5 609 000 000
TOTAL	1 757 000 000	2 152 000 000	4 630 000 000	8 539 000 000
Contribution	21%	25%	54%	100%

Source: *Dr Papa Ndary NIANG, 2012*

6.1 Overall approach

Strategies for «*Small animals industry*» and «*Meat industry*» have many cross-cutting issues. Indeed, strategies regarding animal health, policy and regulatory framework, promotion of livestock and livestock products, capacity building for stakeholders, access to regional and international market... cannot be dissociated. As a consequence, the need of consistency command the fusion of the 2 operational and investment plans while emphasizing the specificities of each study.

The budgets of the strategic axis are determined as follows:

- Taking into account of existing studies on costs of specific operation while adjusting these to the context of our studies: e.g. costs of broodstock purchase in APEL document; costs of capacity building for senior scientists in PSTA II document;
- Adjusting to the Rwandan context assessments of costs studies made by CABINET AFRIQUE EMERGENCE CONSEIL in other countries: e.g. costs of HACCP system implementation, costs of updating food security laboratories, feasibility studies for the implementation of slaughterhouses;
- Adjusting to the Rwandan context assessments of costs undertaken in neighboring countries: e.g. modernization of tanneries (Tanzania); or by organizations such as ILRI (mapping of fodder resources).

6.2 Transversal actions

6.2.1 Management of the Approach & Harmonization of the Action Plans

Strategic approaches for «Meat industry» and «Small animals industry» were similar regarding the methodological approach and the strategic diagnosis.

Harmonization of the 2 Action Plans is a prerequisite for an overall success, namely the strategic axis n° 1 of the 2 studies (related to increase of meat production and the increase of livestock) and the strategic axis n°3 (related to the marketing of livestock and livestock products).

Two main actions to be included as cross-cutting actions and be included:

- The communication plan of the strategy with stakeholders, authorities and development partners:
- Supporting the implementation of operational action plan through coaching (regular meetings, monitoring and evaluation, strategic dashboard). This item must be budgeted for 6 years around 25 Million RWF per year (in total 150 Million RWF).

6.2.2 Guarantee fund & Fund for financial support

The funds will aim at the development of a dynamic private sector. It will enable:

- the vitalization of Agri-business through actions such as loans guarantee programs, rural financial services and strengthening of stakeholder's organizations;
- The development of exports through actions such as subsidies for upgrading and labeling process, modernization of tanneries, promotion of livestock products.

6.3 Strategic axis 1: Increasing meat supply

6.3.1 Component 1: Animal health

Ensuring good health of animals is the basis of any livestock development policy. Five strategic objectives are needed to achieve the goal.

6.3.1.1 Strategic objectives

6.3.1.1.1 Communication of animal diseases and zoonosis information

The objective is to communicate timely and accurate animal disease information, including information on zoonosis, by making the best use of scientific data modelling, modern information technologies, and non-official information tracking systems:

- There are two main streams of communication of animal disease information: scientific information gathering, analysis and official communication, and public communication based on this scientific analysis;
- Communicating timely and accurate animal disease information, including information on zoonosis, should be one of the core functions of the Veterinary services. That requires processing and real-time operating of data on epidemiological monitoring conducted in the laboratory of veterinary services;
- Dissemination of the official information in a transparent, responsive and efficient manner.

Implementation of a sanitary alert system based on epidemiological analysis of data in its information system and in cooperation with the bordering countries.

6.3.1.1.2 Development and implementation of scientifically based standards and guidelines

The objective is to Develop scientifically based standards and guidelines on all matters concerning animal health, veterinary public health, animal welfare, diagnosis and control of diseases, assessment and relevant recognition of animal health status, and sanitary safety in animal production and international trade in animals and animal products.

- Developing scientifically based standards and guidelines for safe trade in animals and animal products;
- Developing animal production food safety standards complementary to the food safety standards;
- Improving public and private sector awareness of the importance of the national standards for animal health and veterinary public health and;
- Strengthening collaboration with relevant international and regional Organizations on technical and legal issues related to veterinary products, including legislation, registration and control and monitoring of use.

The regulatory framework must be strengthened with laws, regulations and decrees as existing in other countries:

- Regulations for the safety of plants, animals and food Legislative texts in the sub region;

- Law on food control and fraud prevention;
- Law on hygiene code;
- Decree mandating deposit in cold storage of meat for consumption;
- Decree on production, processing, packaging and marketing of hides, skins and skin appendages;
- Decree regulating the safety and health inspection of meat animals, meat and by-products intended for human consumption;
- Decree on animal health measures;
- Standards on meat:
 - Transportation of meat by cold storage;
 - Meat and sausage;
 - Meat cutting.

6.3.1.1.3 Prevention, control and eradication of animal diseases, including zoonosis

The objective is to provide scientifically based recommendations on measures for the prevention, control and eradication of animal diseases including zoonosis, taking into account the economic, social and environmental impacts of such measures:

- Develop, together with partner organizations at international and regional levels, common strategies concerning the control of transboundary diseases and their implications for trade;
- Cooperation with OIE in developing and carrying out coordinated regional programmes for preventing, controlling and eradicating priority animal diseases;
- With international and regional partners, address the animal and zoonotic disease risks of the smallholder farming sector, including communities in peri-urban areas;
- Strengthen cooperation and information exchange in relation to border control.

6.3.1.1.4 Ensuring the scientific excellence of information and advice

The objective is to ensure the scientific excellence and timeliness of information and advice available to national Veterinary Services and to other interested parties in the country:

- Meeting the scientific standards of OIE.
- Specialization among scientist to incorporate new subjects such as climatology, ecology or entomology as well as an increased degree of interaction and interdisciplinary across diverse areas of science.
- Encouraging comprehensive and continuing epidemiological studies to understand infection and disease transmission dynamics between wildlife, domestic animals and humans.
- Encouraging research into inter-species pathogen transmission and migration patterns, in collaboration with the wildlife sector;
- Encouraging research into the surveillance of antimicrobial resistance in pathogens and the possible causes leading to the development of antimicrobial resistance;

- Strengthening opportunities for interaction between the public and private sectors in scientific research to meet animal health and welfare challenges.

6.3.1.1.5 *Capacity building for national veterinary services*

The objective is to strengthen the capacity of Veterinary Services to achieve the improvement of animal health, veterinary public health and animal welfare, while improving their ability to participate in the development of international standards and guidelines on these matters; and strengthen their ability to apply these standards and guidelines:

- Strengthening the good governance of Members' Veterinary Services, including technical and management capacities and legislation;
- Upgrading the laboratory of the Veterinary services to reach the level 3;
- Implementing a laboratory of food analysis;
- Develop surveillance capacity, including the development of tools and monitoring processes for use at national, regional and global level;
- Encourage improved collaboration between the public health and animal health sectors and other competent ministries to improve preparedness for and response to potential natural or intentional infectious disease outbreaks;
- Encourage and evaluate the initial and continuing education of veterinarians and veterinary para-professionals;
- Working with veterinary statutory bodies for a better selection of, and the continuing education of, veterinarians and para-professionals.

Other objectives, not less significant are:

- The protection of public health by providing the consumer with meat free of any danger that could compromise his health;
- The protection of the country from all animal diseases threats.

6.3.1.2 *Evaluation indicators*

These indicators will enable the monitoring of the rates of achievements of the strategic objectives:

- Number of seizures of carcasses;
- Number of cases of zoonosis reported;
- Number of national alerts;
- Gradual decrease of the prevalence of the controlled diseases/zoonosis;
- Integrating the OIE's network of reference centers;
- Level 3 status for the laboratory of the veterinary services.

6.3.1.2.1 *Operational and Invest plan*

The operational and invest plan includes the stakeholders involved and the timeframe for each strategic objective.

Table 5: Operational and Investment plan for Animal Health

	BUDGET (in RWF)* 10 ⁶	STAKEHOLDERS	2012	2013	2014	2015	2016	2017	PRIORITY	RWANDA CONTRIBUTI ON	PRIVATE SECTOR CONTRIBUTI ON	PARTNERS of DEVELOPME NT CONTRIBUTI ON
Capacity building for research scientists (nutrition, animal health, genetics...)	400	MINAGRI/RAB							MEDIUM TERM	150	-	250
Capacity building for the Veterinary Services (equipment)	600	MINAGRI/RAB							MEDIUM TERM	180	-	420
Upgrading the laboratory of the veterinary services to level 3	400	MINAGRI/RAB/ VET SERVICES							MEDIUM TERM	120	-	280
Prevention, control and eradication of animal diseases including zoonosis	625	MINAGRI/RAB/ VET SERVICES							LONG TERM	187.5	-	437.5
Improvement of information system on animal diseases and zoonosis	100	MINAGRI/RAB/ VET SERVICES							LONG TERM	30	-	70
New Animal Health Policy	25	MINAGRI/RAB/ VET SERVICES							MEDIUM TERM	7.5	-	17.5
Annual report on the animal health status in Rwanda	60	MINAGRI/RAB/ VET SERVICES							LONG TERM	20	-	40

Source: Dr Papa Ndary NIANG, 2012

6.3.2 Component 2: Increasing meat production

To achieve an average meat consumption of 15.07 kg per capita by the year 2017, the strategy must emphasize the development of small animals (Goats, sheep, pigs and poultry). Indeed, the rearing of beef cattle is less relevant in the Rwandan context characterized by the lack of grazing lands and the subsequent «Zero grazing» policy. The strategy to increase meat production is in a large extent the strategy proposed to increase livestock production (cf. document on Small animal's strategy.).

6.3.2.1 Strategic objectives

- Ensure availability of the national herd (livestock and poultry) to offer consumers the choice of a Rwandan variety of meat from several species (cattle, sheep, goats, poultry, pigs, rabbits);
- Establish a genetic improvement program (cf. document on Small animal's strategy.)
- Develop animal nutrition in Rwanda based on locally available and affordable feed resources (cf. document on Small animal's strategy).
- Reduce imports of meat from neighboring and industrial countries;
- Influence the price structure to provide meat at an accessible price to the Rwandan' consumer;
- Impulse SME and farmers businessmen in Rwanda.
- Impulse Feedlot activities: feedlots is enterprise in which animals are fed grain and other concentrates for usually 90-120 days to gain adequate muscle and finish (fat deposit) for slaughter. This targets the local market which needs fat animals. Feedlot farms must be encouraged. The principal functions of feedlot operations are to assemble large numbers of sheep and goats, bulls, and pigs, often coming from different origins and produce products of acceptable standard for Rwandan consumers. Fattening offers many advantages:
 - Technically, it is quite simple and within the capabilities of small farmers to implement; moreover, the results are highly visible. This helps farmers to have confidence in the technique;
 - Benefits can be realized within a short period of time unlike other animal production activities;
 - Fattening generates cash income that is eagerly sought by farmers;
 - Fattening is generally profitable because the value per kilogram of live weight increases as both weight and condition increase.

Traditional fattening can be done but modern fattening with by-products shall be the best practice. This system can be promoted with sugar processing by-products such as molasses and corn (grain and residue). Protein sources like oilseed cakes can be purchased and/or forage legumes can be grown.

The strategy must be focused on:

- Selection of animals for fattening;
- Management of finishing animals;
- Health for fattening stocks;
- Feeding finishing animals;
- Records keeping;
- Profit of fattening operation: feedlot operators need to keep a close watch on feedlot profit, which is a very sensitive measure of the efficiency of management. The factors affecting profit in a feedlot include:
 - The number of days spent in the feedlot, which is related to the initial weight of the animal on entering the feedlot and the growth rate of the animal;
 - Price of feed;
 - Feed efficiency;
 - The difference in price between starting and finished animals
- Other expenses incurred include the following:
 - Transport;
 - Interest on capital;
 - Labor costs;
 - Mortalities and veterinary costs; and
 - Pre-treatment costs (dipping, dosing, vaccination).

Table 6: *Example of a simple financial record and calculation of profit (in Ethiopia)*

Sales and Receipts			Purchases and expenses		
Date	Details	RW Francs	Date	Details	RW Francs
11.05.2000	Sale of 50 fattened sheep	861 000	05.02.2000	Hay – 200 bales	138 000
			08.02.2000	Concentrate 10 quintals	52 000
			08.02.2000	Drugs	6700
			10.02.2000	50 Sheep	344 310
			10.02.2000	Transport	34 431
			10.02.2000	Labour	24 102
TOTAL RECEIPTS		861 000	TOTAL EXPENSES		599 543
PROFIT (RECEIPTS – EXPENSES) = 861 000 - 599 543 = 261 457 (50 Sheep)					
PROFIT/ SHEEP FATTENED = (261 457/50) = 5 229.14 RW Francs					

6.3.2.2 *Evaluation indicators*

These indicators will enable the monitoring of the rates of achievements of the strategic objectives:

- Growth rates of livestock;
- Growth rates by species;
- Increased rates of exotic breeds and crossbreeds
- Map of fodder resources according to the ecological zones and seasons Annual assessments of crop residues and agricultural by-products
- Tables of bromatological values
- Standard diets developed from local by-products for each species
- Availability of industrial animal feed
- Feed standards controlled by RBS
- Trends in imports of livestock and meat from the sub-region;
- Evolution of the price of meat sold in the domestic market;
- Per capita consumption of meat by the Rwandan;
- Incomes of Farmers and SMEs solvability;
- Number of feedlot farmers;
- Incomes of feedlot farmers and profitability.

6.3.2.3 *Operational and invest plan*

The operational and investment plan includes the stakeholders involved and the timeframe for each strategic objective.

Table 7: Operational and Investment plan for Increasing Meat production

	BUDGET (in RWF)*10 ⁶	STAKEHOLDERS	2012	2013	2014	2015	2016	2017	PRIORITY	RWANDA CONTRIB UTION	PRIVATE SECTOR CONTRIB UTION	PARTNE RS of DEVELO PMENT CONTRIB UTION
Business Plan for implementation of fattening farms	25	MINAGRI							SHORT TERM	5		20
Support the implementation of fattening farms	1 500	MINAGRI/RAB / GIRINKA							LONG TERM	150	1 000	350
Capacity building for ruminants and pig fatteners	200	MINAGRI/RAB							LONG TERM	50		150
Capacity building for poultry producers	100	MINAGRI/RAB							LONG TERM	20	-	80
Contests of best breeders, annual livestock exhibition	250	MINAGRI/ RAB, RTV							MEDIU M TERM	50	50	150
Recovery of animal feed factory in PPP (participation in the capital)	500	MINAGRI/ RAB, RDB, RPIA							MEDIU M TERM	100	300	100
Capacity building for ruminants and pig fatteners	150	MINAGRI/RAB							LONG TERM	50	25	75
Mapping and quantification of fodder resources	100	MINAGRI/ RAB, (Department of Statistics)							LONG TERM	20		80
Quantification of crop residues	100	MINAGRI/ RAB, (Department of Statistics)							MEDIU M TERM	20		80
Determination of feeding values of feed resources	100	MINAGRI/ RAB, Consultants							MEDIU M TERM	30		70
Research - Development of linkages between the ration formulations and the feed resources locally available	200	MINAGRI/ RAB, ISAE, Feed Industry							LONG TERM	50	50	100

Source: Dr Papa Ndary NIANG, 2012

6.4 Strategic axis 2: Modernization and development of the industry infrastructure

6.4.1 Component 1: Modernization of the supply chain

6.4.1.1 Strategic objectives

- To Strengthen the organizations of the different stakeholders of the supply chain: cooperatives of farmers, poultry producers and slaughterhouses' cooperatives which are all private;
- Contractualization of business relationships between these stakeholders to have a steady offer for slaughterhouses and secure income for farmers;
- Bridging the gap between stakeholders by implementing slaughterhouses in the provinces;
- To have slaughter lines respecting health standards and give to consumers healthy and diversified meat and meat products;
- To Provide a place of safe supply to meat consumers;
- Development of an industry training strategy for the abattoirs.

The aim of the Training Strategy is to effectively target the needs of the industry and workers and ensure outcomes both in terms of industry productivity and established pathways for workers both within the industry as well as for opportunities in other sectors. The industry will face a number of challenges including the introduction of technology, safety standards, restructuring and the development and implementation of an effective training culture. The Training Strategy will effectively target existing training resources for the industry and up skill employees in a range of essential requirements including quality assurance, meat safety, language and literacy, management, workplace assessment and training and information technology.

A variety of training needs can be summarized as:

- Increased provision and awareness of future training pathways to the industry (e.g. prevocational training and apprenticeship and traineeship training);
- Hygiene and safety standards;
- Quality assurance;
- Qualifications regarding meat processing;
- Meat inspection.

The training strategy should involve veterinarians, slaughterhouses' inspectors, butchers, retailers.

6.4.1.2 Evaluation indicators

These indicators will enable the monitoring of the rates of achievements of the strategic objectives:

- Number of livestock markets upgraded;
- Number of rural slaughterhouses implemented;

- Number and type of slaughterhouses built and upgraded ;
- Number of butchers trained.

6.4.1.3 Operational and investment plan

The operational and investment plan includes the stakeholders involved and the timeframe for each strategic objective

Table 8: Operational and Investment plan for Modernization of the supply chain

	BUDGET (in RWF)*10 ⁶	STAKEHOLDERS	2012	2013	2014	2015	2016	2017	PRIORITY	RWANDA CONTRIB UTION	PRIVATE SECTOR CONTRIB UTION	PARTNER S of DEVELOP MENT CONTRIB UTION
Capacity building of agents in charge of control of slaughterhouses	20	MINAGRI/RAB							MEDIUM TERM	5	-	15
Rehabilitate a livestock market in each province and build 5 rural slaughterhouses	250	MINAGRI/RAB/ Cooperatives							LONG TERM	20	50	180
Business Plan for the implementation of modern slaughterhouses	25	MINAGRI/RAB							SHORT TERM	5	-	20
Establishment of a pig slaughterhouse in Kigali (PPP)	150	MINAGRI/RAB/ Cooperatives							LONG TERM	-	150	-
Establishment of a poultry slaughterhouse in Kigali (PPP)	150	MINAGRI/RAB, RPIA, Cooperatives							LONG TERM	-	150	-
Support the implementation of the upgrade plan for delicatessens and butcheries	100	MINAGRI/RAB, Coop (SATRA, SABAN), Delicatessens							LONG TERM	20	20	60
Training of butchers	40	MINAGRI/RAB, Coop (SATRA, SABAN)							LONG TERM	10	-	30

Source: Dr Papa Ndary NIANG, 2012

6.4.2 Component 2: Development of cutting and processing industry

The activities of the meat sector may be divided into three stages: slaughtering, meat cutting and further processing. Each stage involves completely different technical operations which must not be viewed as separate and independent processes. There are significant interactions between the stages and shortcomings at one stage can have a serious negative impact on the product or process in a subsequent stage. They may influence technological, biochemical or microbiological aspects.

Improper slaughtering techniques such as faulty stunning, bleeding, skinning, evisceration and carcass splitting can damage parts of the carcass and certain by products and make them unsuitable for further use. Poor standards of hygiene during slaughtering or carcass handling result in high levels of microbial contamination in the meat, thus reducing the shelf-life and adversely affecting the sensory properties of products fabricated from this raw material. Although controls imposed on the meat industries have become more stringent and effective, improper treatment of slaughter animals and poor meat-handling techniques persist in many meat plants. These problems are evident in many developing countries. Apart from deficiencies in veterinary meat inspection, serious shortcomings with regard to general meat hygiene and meat technology can frequently be observed. This is to some extent due to the lack of adequate facilities in the meat sector in developing countries, but carelessness and lack of skills on the part of the personnel involved in meat operations are also important factors, hence the industry training strategy aforementioned.

The purpose of the expected guidelines is to disseminate practical information on meat hygiene and meat technology to meat industry personnel, and to provide the necessary encouragement for improving production in the meat sector and reducing post-harvest losses. The expected guidelines will comprise basic techniques in slaughtering, meat cutting and further processing and the respective hygienic regulations applicable to both the small-scale and the medium-sized meat plants. Adherence to these basic guidelines would contribute to the production and consumption of safe, good-quality meat and meat products. Other purpose is the process of slaughterhouses' by-products, namely hides and skins, in a way meeting environmental requirements

There is a wide variety of procedures and products in the meat sector all over the world. However, the technological, microbiological and biochemical properties of the raw material (meat) do not vary significantly and can easily be adapted to local conditions.

Where appropriate, reference will be made to the traditional meat-handling methods without refrigeration, since these conditions are likely to prevail in the near future in many developing countries, particularly in rural areas. On the other hand, in view of the growing populations not only in urban but also in rural areas, refrigeration as a means of meat preservation will become more and more important and information on these aspects will be included. Refrigeration of meat will also have a positive impact on the introduction of further processing of meat in developing regions, since refrigerated meat under suitable hygienic conditions is essential for most meat-processing operations.

Furthermore, the strict adherence to general hygienic rules in the meat industry can minimize food-borne diseases. The expected guidelines will therefore also play a useful role in the public health sector.

6.4.2.1 *Strategic objectives*

- Cutting and processing industry meeting hygiene and safety requirements;
- Valorize meat categories to match with the needs of consumers;
- Promote the emerging of a domestic supply of meat and meat products;
- Increase domestic market share by providing delicatessens with meat products currently imported in a large extent: ham, sausage...;
- Increase domestic consumption by offering products that meet the needs of low-income clients e.g. cutting of poultry.

6.4.2.2 *Evaluation indicators*

These indicators will enable the monitoring of the rates of achievements of the strategic objectives:

- Satisfaction rate of consumers (acceptance of poultry sold in pieces, organoleptic qualities of meat and meat products);
- Percentage of processors upgraded;
- Incomes of Processors and SMEs solvability;
- Increase of skin exports;
- Tanneries certified;
- New guidelines before 2015.

6.4.2.3 *Operational and investment plan*

The operational and investment plan includes the stakeholders involved and the timeframe for each strategic objective.

Table 9: Operational and Investment plan for Development of cutting and processing industry

	BUDGET (in RWF)*10 ⁶	STAKEHOLDERS	2012	2013	2014	2015	2016	2017	PRIORITY	RWANDA CONTRIBUTI ON	PRIVATE SECTOR CONTRIBUTI ON	PARTNERS of DEVELOPME NT CONTRIBUTI ON
Modernization of tanneries	600	MINAGRI/RAB, Tanneries cooperatives, NAEB, RBS							LONG TERM	50	100	450
Training of skins processors (skills, grading, storage technics)	200	MINAGRI/RAB, Tanneries cooperatives, NAEB, RBS							LONG TERM	50	-	150
Guidelines for skins processing effluent treatments and environmental standards	50	MINAGRI/RAB, Tanneries cooperatives, NAEB, RBS							LONG TERM	10	-	40

Source: Dr Papa Ndary NIANG, 2012

6.5 Strategic axis n°3: Improving access to domestic and foreign markets

6.5.1 Component 1: Control of sanitary quality

Meat and meat products are derived from muscle, originally uncontaminated. The slaughter and subsequent transformations undergone by these products are all risks of contamination of food by these agents (bacteria or other) from live animals (endogenous contamination) or environment itself (exogenous contamination). The dangers to the consumer through contamination of food by germs such as *Salmonella*, *Escherichia coli* (enterohemorrhagic strain), *Listeria monocytogenes*, and *Campylobacter jejuni* concern the possibility of outbreak of foodborne illness. The latter mostly concerns the digestive tract, but some complications may worsen the prognosis, often at the level of populations "at risk". Control methods in place to control the sanitary quality of this industry go through analysis of the risks of contamination throughout the processing steps including the breeding and marketing. This control requires minimizing opportunities for endogenous or exogenous contamination (reducing animal infections, hygienic slaughter, further processing). It also assumes the implementation of methods to prevent microbial growth (refrigeration, vacuum packaging or controlled atmosphere ...). It finally passes through the use of methods that allow the destruction of pathogens, either in commodities themselves (cooking, pasteurization, canning ...) or at the "sources" who must be destroyed. Government and professional partners in this sector must implement the methodology for risk management (HACCP) in the context of the implementation of a new legislation regarding "Food Hygiene".

6.5.1.1 *The strategic objectives*

- Fulfill the mission of protecting public health by fighting zoonosis and diseases related to the post-mortem contaminations of carcasses;
- Get Hygiene and sanitary standards in the mid-term perspectives of promoting meat and meat products exports;
- Protect public health by providing the consumer with meat free of any danger that could compromise his health;
- Increasing consumer awareness on food quality and health;
- Give to consumers means and a framework to express their demands and influence in the right direction the work of professionals.

6.5.1.2 *Evaluation indicators*

These indicators will enable the monitoring of the rates of achievements of the strategic objectives:

- Implementation rate of training programs;
- Number of consumers' associations created;
- Consumers survey reports;
- Number of guides manufacturing practice validated;
- Level of sanitary quality of meat on the Rwandan market.

6.5.1.3 Operational and investment plan

The operational and investment plan includes the stakeholders involved and the timeframe for each strategic objective.

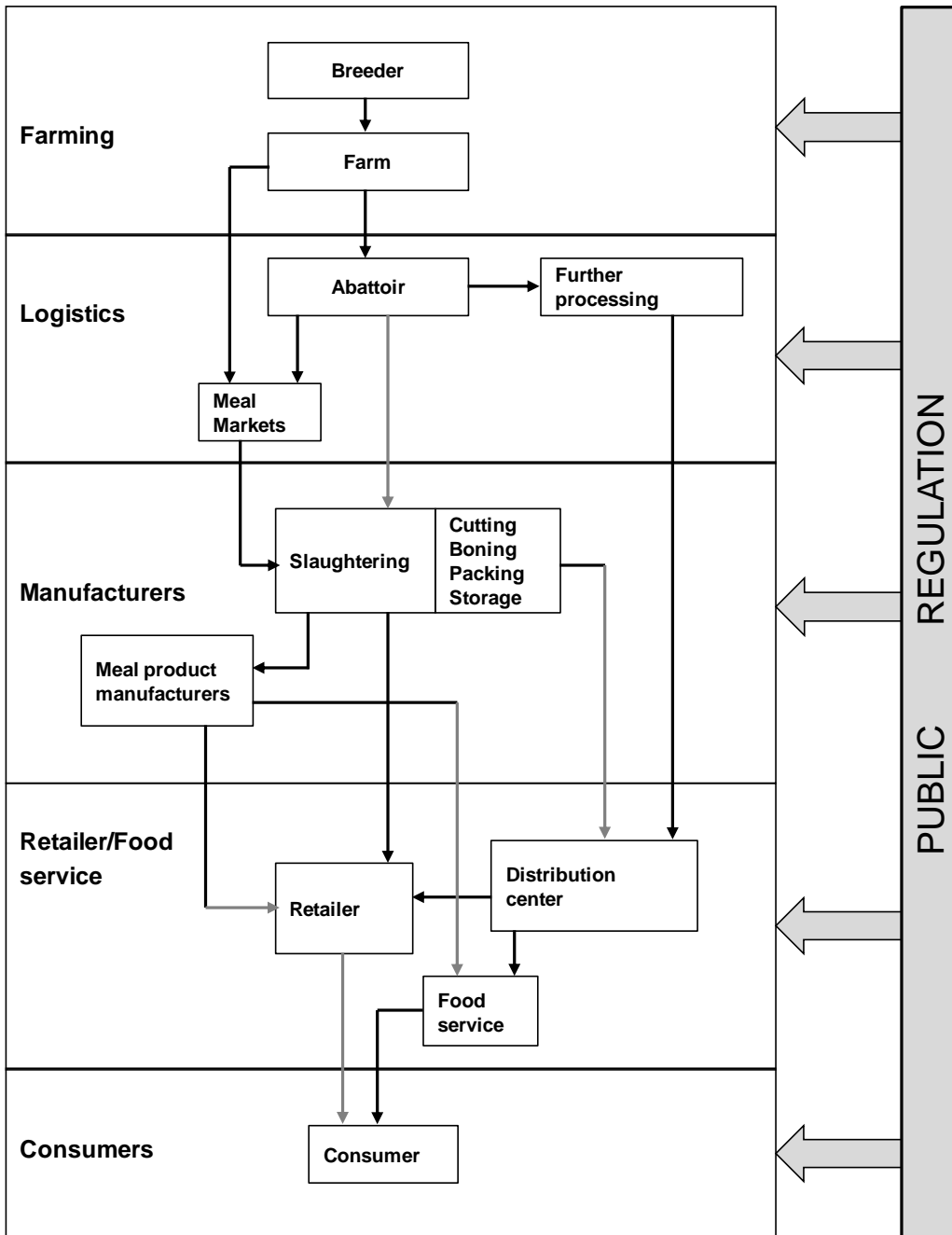
Table 10: Operational and Investment plan for Control of sanitary quality

	BUDGET (in RWF)*10 ⁶	STAKEHOLDERS	2012	2013	2014	2015	2016	2017	PRIORITY	RWANDA CONTRIBUTION	PRIVATE SECTOR CONTRIBUTION	PARTNERS of DEVELOPMENT CONTRIBUTION
Capacity building of agents in charge of food security	120	MINAGRI/ RAB							LONG TERM	20	-	100
Upgrade the laboratory of food security	200	MINAGRI/ RAB/RBS							MEDIUM TERM	50	-	150
Strengthen the sanitary, phytosanitary and food safety system	20	MINAGRI/ RAB/RBS							MEDIUM TERM	10	-	10
Development of Guidelines for good hygiene practice Hygiene of meat for slaughter - Design, preparation and dissemination practices	50	MINAGRI/ RAB/RBS							MEDIUM TERM	15	-	35

Source: Dr Papa Ndary NIANG, 2012

6.5.2 Component 2: Modernization of distribution channels

A modern distribution channel should include steps from the farmer to the consumer, favouring implementations of SMEs working in meat processing and distribution.



Graph 24: Model of modern distribution channel

6.5.2.1 Strategic objectives

- Give to consumers opportunities to buy quality meat at safe retail outlets.

- Promote the development of SME recognized in terms of meat quality.
- Building capacities of commissioners.
- Upgrade the distribution chain: meat transport conditions, butcheries, delicatessens.

6.5.2.2 *Evaluation indicators*

These indicators will enable to monitor the rates of achievements of the strategic objectives:

- Evolution of the meat price from the domestic market.
- Number of SMEs upgraded.
- Number of SMEs certified HACCP or obtaining a quality label;

6.5.2.3 *Operational and Investment plan*

The operational and investment plan includes the stakeholders involved and the timeframe for each strategic objective.

Table 11: Operational and Investment plan for Modernization of distribution channels

	BUDGET (in RWF)*10 ⁶	STAKEHOLDERS	2012	2013	2014	2015	2016	2017	PRIORITY	RWANDA CONTRIBUTI ON	PRIVATE SECTOR CONTRIBUTI ON	PARTNERS of DEVELOPME NT CONTRIBUTI ON
Labeling process for delicatessens and retail outlets	200	MINAGRI/RAB/RB S							LONG TERM	10	40	150
Strengthening organizations of the skin sector	50	MINAGRI/RAB/ Tanneries/ RBS/NAEB							LONG TERM	25	-	25

Source: Dr Papa Ndary NIANG, 2012

6.5.3 Component 3: Promotion of the products

This component will be the outcome of the previous components reviewed. Producers who raise livestock with the intent of marketing their own meat or processed meat products should give careful consideration to where they will have their livestock slaughtered or meat processed. The type of plant where animals are slaughtered has a significant impact on where the meat can be marketed.

Marketing meat and meat products nationally or internationally requires adequate meat inspection.

If the intent is to market meat in foreign markets, the animal must be slaughtered and processed in a certified slaughterhouse. Meat Inspection will be conducted by officials of MINAGRI/VETSERVICES previously trained. On the other hand, new regulations containing strict facility construction and sanitation standards to ensure the safety of the meat/meat product, and require ante- and post-mortem inspection of each animal and carcass will be promoted.

Some countries require food safety standards above and beyond African countries' certification. The European Union, for example, applies its own certification standards above and beyond the African ones. Some meat and meat products are subject to specific labelling requirements.

For all these reasons, the short and mid-terms exports targets should be limited to bordering countries.

6.5.3.1 *Strategic objectives*

- Promote the consumption of meat produced in Rwanda.
- Understand changes in the meat market in Rwanda and the sub region and protect the Rwandan consumer;
- Make available the consumption of meat through an accessible price;
- Ensure the competitiveness of the meat and meat products of Rwanda;
- Reduce taboos related to consumption of sheep, rabbit and modern poultry meats;
- Hence, the necessity of awareness campaigns ;
- Anticipate the intensifying competition of meat and meat products from foreign countries in the context of the EAC by promoting the label «Made in Rwanda».

6.5.3.2 *Evaluation indicators*

These indicators will enable to monitor the rates of achievements of the strategic objectives:

- Growth rates of meat per capita consumption;
- Price trends on the domestic market and sub-regional pricing structure per actor of the value chain;
- Availability of a desk for livestock statistics.

6.5.3.3 *Operational and invest plan*

The operational and invest plan includes the stakeholders involved and the timeframe for each strategic objective.

Table 12: Operational and Investment plan for Promotion of the products

	BUDGET (in RWF)*10 ⁶	STAKEHOLDERS	2012	2013	2014	2015	2016	2017	PRIORITY	RWANDA CONTRIBUTION	PRIVATE SECTOR CONTRIBUTION	PARTNER S of DEVELOPMENT CONTRIBUTION
Establish a livestock statistic desk with real-time market information on livestock and livestock products	50	MINAGRI/RAB, G.D of SP and PC							SHORT TERM	10	-	40
Subsidize producer's costs of obtaining quality certifications	360	MINAGRI/RAB, RBS, RDB							LONG TERM	50	150	160
Harmonize quality standards of livestock products with the EAC region	15	MINAGRI/RAB, RBS, MINICOM, RDB							SHORT TERM	15	-	-
Establishment and support of consumers' associations	10	MINAGRI, RAB, Coop (SATRA, SABAN), Professional Organisations							LONG TERM	7	3	-
Strengthening the ability of meat sellers (animal traceability, meat grading, contracting for meat purchase and sale)	50	MINAGRI/RAB, Coop (SATRA, SABAN)							LONG TERM	20	-	30
Advertisement campaigns to fight food taboos and promote food security	120	MINAGRI/RAB, RTV							LONG TERM	10	30	80
Promoting labels for Rwandan meat products (including Inyambo meat)	50	MINAGRI/RAB, MINICOM, RBS							LONG TERM	5	30	15
Annual report of meat consumption in Rwanda	24	MINAGRI, RAB, Professional organisations, RBS, Consumer Associations, MINICOM							LONG TERM	5	4	15
Geo-mapping of all infrastructures involved in the industry (Abattoirs, markets...)	50	MINAGRI/RAB							SHORT TERM	20	-	30

Source: Dr Papa Ndary NIANG, 2012

SUMMARY TABLES

Table 13: *Operational and Investment plan- Short term*

	BUDGET (in RWF)*10 ⁶	STAKEHOLDERS	20 12	20 13	20 14	20 15	20 16	20 17	RWANDA CONTRIBU TION	PRIVATE SECTOR CONTRIBU TION	PARTNERS of DEVELOPM ENT CONTRIBU TION
Business Plan for implementation of fattening farms	25	MINAGRI							5		20
Establish a livestock statistic desk with real-time market information on livestock and livestock products	50	MINAGRI/RAB, G.D of SP and PC							10	-	40
Business Plan for the implementation of modern slaughterhouses	25	MINAGRI/RAB							5	-	20
Harmonize quality standards of livestock products with the EAC region	15	MINAGRI/RAB, RBS, MINICOM, RDB							15	-	-
Geo-mapping of all infrastructures involved in the industry (Abattoirs, markets...)	50	MINAGRI/RAB							20	-	30
Transversal action: Coaching for the implementation of the operational action plan	50	MINAGRI/RAB, PARTNERS							25	-	25

Source: *Dr Papa Ndary NIANG, 2012*

Table 14: Operational and Investment plan- Medium term

	BUDGET (in RWF) *10 ⁶	STAKEHOLDERS	201 2	201 3	201 4	201 5	201 6	201 7	RWANDA CONTRIBUTI ON	PRIVATE SECTOR CONTRIBUTI ON	PARTNERS of DEVELOPME NT CONTRIBUTI ON
Capacity building for research scientists (nutrition, animal health, genetics...)	400	MINAGRI/RAB							150	-	250
Capacity building of agents in charge of control of slaughterhouses	20	MINAGRI/RAB							5	-	15
Capacity building for the Veterinary Services (equipments)	600	MINAGRI/RAB							180	-	420
Upgraded the laboratory of food security	200	MINAGRI/RAB/RBS							50	-	150
Upgrading the laboratory of the veterinary services to level 3	400	MINAGRI/RAB/ VET SERVICES							120	-	280
Strengthen the sanitary, phytosanitary and food safety system	20	MINAGRI/RAB/RBS							10	-	10
Contests of best breeders, annual livestock exhibition	250	MINAGRI/RAB, RTV							50	50	150
New Animal Health Policy	25	MINAGRI/RAB/ VET SERVICES							7.5	-	17.5
Development of Guidelines for good hygiene practice Hygiene of meat for slaughter - Design, preparation and dissemination practices	50	MINAGRI/RAB/RBS							15	-	35
Recovery of animal feed factory in PPP (participation in the capital)	500	MINAGRI/RAB, RDB, RPIA							100	300	100
Quantification of crop residues	100	MINAGRI/RAB, (Department of Statistics)							20		80
Determination of feeding values of feed resources	100	MINAGRI/RAB, Consultants							30		70
Transversal action: Coaching for the implementation of the operational action plan	50	MINAGRI/RAB, PARTNERS							25	-	25

Source: Dr Papa Ndary NIANG, 2012

Table 15: Operational and Investment plan- Long term

	BUDGET (in RWF)*10 ⁶	STAKEHOLDERS	20 12	20 13	20 14	20 15	20 16	20 17	RWANDA CONTRIB UTION	PRIVATE SECTOR CONTRIB UTION	PARTNER S of DEVELOP MENT CONTRIB UTION
Support the implementation of fattening farms	1 500	MINAGRI/RAB/ GIRINKA							150	1 000	350
Capacity building of agents in charge of food security	120	MINAGRI/RAB							20	-	100
Rehabilitate a livestock market in each province and build 5 rural slaughterhouses	250	MINAGRI/RAB/ Cooperatives							20	50	180
Establishment of a pig slaughterhouse in kigali (PPP)	150	MINAGRI/RAB/ Cooperatives							-	150	-
Establishment of a poultry slaughterhouse in Kigali (PPP)	150	MINAGRI/RAB, RPIA, Cooperatives							-	150	-
Subsidize producer's costs of obtaining quality certifications	360	MINAGRI/RAB, RBS, RDB							50	150	160
Modernization of tanneries	600	MINAGRI/RAB, Tanneries cooperatives, NAEB, RBS							50	100	450
Establishment and support of consumers' associations	10	MINAGRI, RAB, Coop (SATRA, SABAN), Professional organisations							7	3	-
Support the implementation of the upgrade plan for delicatessens and butcheries	100	MINAGRI/RAB, Coop (SATRA, SABAN), Delicatessens							20	20	60
Training of butchers	40	MINAGRI/RAB, Coop (SATRA, SABAN)							10	-	30
Labeling process for delicatessens and retail outlets	200	MINAGRI/RAB/RBS							10	40	150

Strengthening the ability of meat sellers (animal traceability, meat grading, contracting for meat purchase and sale)	50	MINAGRI/RAB, Coop (SATRA, SABAN)							20	-	30
Capacity building for ruminants and pig fatteners	200	MINAGRI/RAB							50		150
Capacity building for poultry producers	100	MINAGRI/RAB							20	-	80
Training of skins processors (skills, grading, storage technics)	200	MINAGRI/RAB, Tanneries cooperatives, NAEB, RBS							50	-	150
Strengthening organizations of the skin sector	50	MINAGRI/RAB/Tanneries/RBS/NAEB							25	-	25
Advertisement campaigns to fight food taboos and promote food security	120	MINAGRI/RAB, RTV							10	30	80
Promoting labels for Rwandan meat products (including Inyambo meat)	50	MINAGRI/RAB, MINICOM, RBS							5	30	15
Prevention, control and eradication of animal diseases including zoonosis	625	MINAGRI/RAB/ VET SERVICES							187.5	-	437.5
Improvement of information system on animal diseases and zoonosis	100	MINAGRI/RAB/ VET SERVICES							30	-	70
Annual report on the animal health status in Rwanda	60	MINAGRI/RAB/ VET SERVICES							20	-	40
Annual report of meat consumption in Rwanda	24	MINAGRI, RAB, Professional organisations, RBS, Consumer Associations, MINICOM							5	4	15
Guidelines for skins processing effluent treatments and environmental standards	50	MINAGRI/RAB, Tanneries cooperatives, NAEB, RBS							10	-	40
Capacity building for ruminants and pig fatteners	150	MINAGRI/RAB							50	25	75
Mapping and quantification of fodder resources	100	MINAGRI/RAB, Department of Statistics)							20		80
Research - development linkages to formulate rations matched with the feed resources locally available	200	MINAGRI/RAB, ISAE , Feed Industry							50	50	100
Transversal action: Coaching for the implementation of the operational action plan	50	MINAGRI/RAB, PARTNERS							25	-	25

Source: Dr Papa Ndary NIANG, 2012

7 LOGICAL FRAMEWORK

The logical framework is given by the tables below.

Table 16: *The logical framework*

OBJECTIVES	Indicators	Means of verification	Assumptions
<p>Overall objective: An industry pulsing domestic consumption of quality meat, diversified, and taking advantage of business opportunities on value markets in East and Central Africa.</p>	<ul style="list-style-type: none"> Increased meat per capita consumption Meat imports 	<ul style="list-style-type: none"> MINAGRI REPORTS ANNUAL MINICOM REPORTS ANNUAL 	At the end of the action plan, the meat industry will enable increasing incomes for all stakeholders: farmers, collectors, slaughterhouses, retailers; but also the improvement of the trade balance
<p>Specific objectives:</p> <ul style="list-style-type: none"> Increasing meat supply .Modernization and development of the industry infrastructure .Improving access to domestic and foreign markets 	<ul style="list-style-type: none"> Meat per capita consumption Implementation and upgrading of slaughterhouses, butcheries and delicatessens Imports and exports of meat and meat products 	<ul style="list-style-type: none"> MINAGRI REPORTS ANNUAL MINICOM REPORTS ANNUAL 	The availability of a modernized meat industry will enable the filling of the domestic market and exports to regional and international markets
<p>Outputs:</p> <p>1. Animal Health</p>	<ul style="list-style-type: none"> Availability of the official data on main diseases and zoonosis affecting the small stock Development of standards regarding animal health, veterinary public health, animal welfare, diagnosis and control of diseases in relation with RBS Gradual decrease of the 	<ul style="list-style-type: none"> ANNUAL REPORTS MINAGRI/VETSERVICES ANNUAL REPORTS RBS ANNUAL REPORTS 	No new outbreaks of major epidemic animal and poultry diseases in countries of the region

<p>2. Increasing production</p>	<p>prevalence of the controlled diseases/zoonosis</p> <ul style="list-style-type: none"> • Integrating the OIE's network of reference centres • Growth rates of livestock • Growth rates by species • Trends in imports of livestock and meat from the sub-region • Map of fodder resources according to the ecological zones and seasons • Annual assessments of crop residues and agricultural by-products • Tables of bromatological values • Standard diets developed from local by-products for each species • Availability of industrial animal feed • Evolution of the price of meat sold in the domestic market • Per capita consumption of meat by the Rwandan • Incomes of Farmers and SMEs solvability • Number of feedlot farmers • Incomes of feedlot farmers and profitability • Number of annual livestock exhibitions held 	<p>OIE</p> <ul style="list-style-type: none"> • MINAGRI REPORTS ANNUAL • MINICOM REPORTS ANNUAL 	<p>At the end of the action plan, 164 405 tons of meat will be produced per year to support the growing domestic demand and take into account exports opportunities</p>
<p>3. Modernization of the supply chain</p>	<ul style="list-style-type: none"> • Number of livestock markets and rural slaughterhouses implemented • Number and type of slaughterhouses built and upgraded • Number of butchers trained • Number of agents in charge of control of slaughterhouses trained 	<ul style="list-style-type: none"> • MINAGRI REPORTS ANNUAL • MINICOM REPORTS ANNUAL • RBS REPORTS ANNUAL 	<p>Availability of quality meat countrywide</p>

<p>4. Development of cutting and processing industry</p>	<ul style="list-style-type: none"> • Satisfaction rate of consumers (poultry sold in pieces to increase affordability) • Percentage of processors upgraded • Incomes of Processors and SMEs solvability • Increase of skin exports • Tanneries certified • New guidelines before 2015 	<ul style="list-style-type: none"> • MINAGRI REPORTS ANNUAL • MINICOM REPORTS ANNUAL • RBS REPORTS ANNUAL 	<p>Widespread acceptance of locally processed meat</p>
<p>5. Control of the sanitary quality</p>	<ul style="list-style-type: none"> • Implementation rate of training programs • Number of guides manufacturing practice validated • Level of sanitary quality of meat in the Rwandan market 	<ul style="list-style-type: none"> • MINAGRI REPORTS ANNUAL • MINICOM REPORTS ANNUAL • RBS REPORTS ANNUAL 	<p>At the end of the action plan, availability of quality meat meeting the requirements of public health and exports standards</p>
<p>6. Modernization of distribution chains</p>	<ul style="list-style-type: none"> • Evolution of the price of meat sold in the domestic market • Number of SMEs upgraded • Number of SMEs certified HACCP or obtaining a quality label 	<ul style="list-style-type: none"> • MINAGRI REPORTS ANNUAL • MINICOM REPORTS ANNUAL • RBS REPORTS ANNUAL 	<p>Presence of butcheries and delicatessens meeting the requirements of public health and exports standards</p>
<p>7. Promotion of the products</p>	<ul style="list-style-type: none"> • Growth rates of meat per capita consumption • .Price trends on the domestic market and sub-regional pricing structure per actor of the value chain • Availability of a desk for livestock and livestock products statistics • Number of consumers' associations created • Consumers survey reports • Meat imports • Labeling 	<ul style="list-style-type: none"> • MINAGRI REPORTS ANNUAL • MINICOM REPORTS ANNUAL • RBS REPORTS ANNUAL 	<p>Consumers will have the choice between labelled products «made in Rwanda» and imported products</p>

ACTIVITIES	BUDGETS	STARTING CONDITIONS
	7 984 000 000 RWF	
<u>Output 1: Operational and Investment plan for Animal Health</u>	<u>2 125 000 000 RWF</u>	
1.1. Capacity building for research scientists (nutrition, animal health, genetics...)	400 000 000	
1.2. Capacity building for the Veterinary Services (equipment)	600 000 000	
1.3. Upgrading the laboratory of the veterinary services to level 3	400 000 000	
1.4. Prevention, control and eradication of animal diseases including zoonosis	625 000 000	
1.5. Improvement of information system on animal diseases and zoonosis	100 000 000	
1.6. New Animal health policy	25 000 000	
1.7. Annual report on the animal health status in Rwanda	60 000 000	
<u>Output 2: Operational and Investment plan for Increasing Meat production</u>	<u>2 925 000 000 RWF</u>	
2.1. Business Plan for implementation of fattening farms	25 000 000	
2.2. Support the implementation of fattening farms	1 500 000 000	
2.3. Capacity building for ruminants and pig fatteners	200 000 000	
2.4. Capacity building for poultry producers	100 000 000	
2.5. Contests of best breeders, annual livestock exhibition	250 000 000	
2.6. Recovery of animal feed factory in PPP (participation in	500 000 000	
		<ul style="list-style-type: none"> • <i>Harmonization of the 3 Action Plans: «Meat industry strategy»; «Small animal industry strategy» and «Poultry industry strategy»</i> • <i>Communication plan of the strategy with stakeholders, authorities and development partners which support 34% of the budget</i> • <i>Calls for expressions of interest to select the private investors, which support 52% of the budget</i> • <i>Deposit of the government counterpart (14%)</i> • <i>Implementation of operational action plan through coaching (regular meetings, monitoring and evaluation, strategic dashboard). this component could be done in collaboration with a consultancy firm</i>

the capital)		
2.7. Capacity building for ruminants and pig fatteners	150 000 000	
2.8. Mapping and quantification of fodder resources	100 000 000	
2.9. Quantification of crop residues	100 000 000	
2.10. Determination of feeding values of feed resources	100 000 000	
2.11. Research – development linkages to formulate rations matched with the feed resources locally available	200 000 000	
<hr/>		
<u>Output 3: Operational and Investment plan for Modernization of the supply chain</u>	715 000 000 RWF	
3.1. Capacity building of agents in charge of control of slaughterhouses	20 000 000	
3.2. Rehabilitate a livestock market in each province and build 5 rural slaughterhouses	250 000 000	
3.3. Business Plan for the implementation of modern slaughterhouses	25 000 000	
3.4. Establishment of a pig slaughterhouse in Kigali (PPP)	150 000 000	
3.5. Establishment of a poultry slaughterhouse in Kigali (PPP)	150 000 000	
3.6. Support the implementation of the upgrade plan for delicatessens and butcheries	100 000 000	
3.7. Training of butchers	40 000 000	

<p><u>Output 4: Operational and Investment plan for Development of cutting and processing industry</u></p> <p>4.1. Modernization of tanneries</p> <p>4.2. Training of skins processors (skills, grading, storage technics)</p> <p>4.3. Guidelines for skins processing effluent treatments and environmental standards</p>	<p><u>850 000 000 RWF</u></p> <p>600 000 000</p> <p>200 000 000</p> <p>50 000 000</p>	
<p><u>Output 5: Operational and Investment plan for Control of sanitary quality</u></p> <p>5.1. Capacity building of agents in charge of food security</p> <p>5.2. Upgraded the laboratory of food security</p> <p>5.3. Strengthen the sanitary, phytosanitary and food safety system</p> <p>5.4. Development of Guidelines for good hygiene practice Hygiene of meat for slaughter - Design, preparation and dissemination practices</p>	<p><u>390 000 000 RWF</u></p> <p>120 000 000</p> <p>200 000 000</p> <p>20 000 000</p> <p>50 000 000</p>	
<p><u>Output 6: Operational and Investment plan for Modernization of distribution channels</u></p> <p>6.1. Labeling process for delicatessens and retail outlets</p> <p>6.2. Strengthening organizations of the skin sector</p>	<p><u>250 000 000 RWF</u></p> <p>200 000 000</p> <p>50 000 000</p>	

<p><u>Output 7: Operational and Investment plan for Promotion of the products</u></p>	<p><u>729 000 000 RWF</u></p>	
<p>7.1. Establish a livestock statistic desk with real-time market information on livestock and livestock products</p>	<p>50 000 000</p>	
<p>7.2. Subsidize producer's costs of obtaining quality certifications</p>	<p>360 000 000</p>	
<p>7.3. Harmonize quality standards of livestock products with the EAC region</p>	<p>15 000 000</p>	
<p>7.4. Establishment and support of consumers' associations</p>	<p>10 000 000</p>	
<p>7.5. Strengthening the ability of meat sellers (animal traceability, meat grading, contracting for meat purchase and sale)</p>	<p>50 000 000</p>	
<p>7.6. Advertisement campaigns to fight food taboos and promote food security</p>	<p>120 000 000</p>	
<p>7.7. Promoting labels for Rwandan meat products (including Inyambo meat)</p>	<p>50 000 000</p>	
<p>7.8. Annual report of meat consumption in Rwanda</p>	<p>24 000 000</p>	
<p>7.9. Geo-mapping of all infrastructures involved in the industry (Abattoirs, markets...)</p>	<p>50 000 000</p>	
<p><u>Output 8: Transversal action: coaching of the Action Plan</u></p>	<p><u>150 000 000 RWF</u></p>	

8 INVESTMENT IN LIVESTOCK; A WISE CHOICE FOR AFRICAN COUNTRIES

The implementation of the strategic and investment plan must involve three categories of stakeholders: government, private sector and partners of development: yet the major impetus must come from the government in relation to its goals of economic growth and poverty reduction. The World Bank has developed an instrument for measuring the impacts of public investments in livestock in economic growth of African countries.

8.1 Relationships between Livestock development and economic growth

The relevance of the implementation of livestock development projects in developing countries must be judged by their contribution in economy growth and poverty alleviation.

The World Bank World Development Report on Agriculture for Development (WDR) advocated in 2008 for a smallholder-based 'productivity revolution', particularly for staple food in agriculture based countries of sub-Saharan Africa.

A test of the causal relationship between growth in livestock sector productivity and per capita GDP in a sample of 18 African countries shows that increases in livestock sector productivity tended to precede growth in per capita GDP in the majority (16/18) of sample countries, many of which are agricultural -based.

The test was developed by the Pro-Poor Livestock Policy Initiative (PPLPI), launched in 2001 by the Animal Production and Health Division of the FAO.

- *The hypothesis:* a wide array of economic literature has documented that increased agricultural productivity triggers economic growth and poverty alleviation in developing countries (Datt and Ravallion, 1998; Gallup et al., 1997; Irz et al., 2001; Winters et al., 1997). Given the share of livestock value-added in agriculture increases as economic development progresses, up to over 50 percent in most industrialized countries, the PPLPI research group hypothesized that increases in livestock productivity act as a stimulus of economic growth on their own right.
- *The methodology:* Drawing on the World Bank's World Development Indicators Database (World Bank, 2007) and FAO's Internal Statistical Database (FAO, 2007), a panel dataset spanning the period 1961 to 2003 for a total of 18 African countries was assembled. Per capita GDP (constant 2000 US\$) is taken as an indicator of level of development as well as of the demand for animal food; livestock productivity (constant 2000 US\$) is measured by value added per tropical livestock unit (TLU).

To trace the causality between GDP growth and livestock productivity Granger causality test (1969) was used and the methodology developed by Toda and Yamamoto (1995) applied (See Appendix 1).

- *The results:* The following table summarizes the empirical results for the African countries in which a significant relationship (at 5 percent level) was found between GDP growth and livestock productivity growth.

Table 17: Countries exhibiting causality between growth of livestock productivity (VA) and growth in per capita GDP

Country	Livestock VA \Rightarrow GDP		GDP \Rightarrow Livestock VA	
	Stat.	Prob.	Stat.	Prob.
Burundi**	9.48	0.01	22.31	0.00
Central African Rep.*	4.56	0.03	1.62	0.20
Congo DRep.*	53.13	0.00	1.76	0.62
Congo rep.*	4.06	0.04	1.12	0.29
Gambia*	13.09	0.00	3.08	0.21
Guinea Bissau*	39.88	0.00	1.10	0.58
Ghana*	15.14	0.00	2.57	0.28
Kenya*	8.90	0.01	1.63	0.44
Lesotho*	9.21	0.01	0.59	0.74
Madagascar*	7.22	0.03	1.87	0.39
Malawi**	41.39	0.00	9.63	0.01
Niger*	40.54	0.00	12.77	0.00
Nigeria**	21.13	0.00	7.64	0.02
Senegal*	8.83	0.00	0.67	0.41
South Africa**	8.25	0.02	6.85	0.03
Sudan*	18.71	0.00	1.04	0.6
Togo***	0.43	0.51	4.22	0.04
Zambia***	0.99	0.61	6.20	0.05

* Countries exhibiting causality from growth of livestock productivity to growth in per capita GDP; ** countries exhibiting bi-directional causality; *** countries exhibiting causality from growth in per capita GDP to growth in livestock productivity

In 16 of the 18 countries analyzed, that is in almost 90 percent of the sample, a statistically significant causal relationship was found between livestock sector development and economic growth. Almost all these countries are agricultural-based. In 16 of the 18 countries in which a statistically significant relationship was found, livestock sector development appears to be / have been a driver of per capita GDP growth; in four of these countries a bi-directional causality was also found. Only in two countries (Togo, Zambia), increases in livestock sector productivity appear

to be / have been driven by per capita GDP growth.

8.2 Findings and policy implications

The finding that increases in livestock sector productivity are associated with economic growth in 16 of the 18 countries in which a statistically significant relationship was found appears plausible. There is a large body of economic literature which shows that increased agricultural productivity is anticipated to lead to lower food prices that directly benefit the poor and also generate a surplus of products and factors that can be exported from agriculture to the rest of the economy, thereby facilitating economic growth and poverty alleviation. Historical evidence largely supports this hypothesis. First, globally prices for agricultural products, including those of livestock products, have declined by about 0.5 to 0.7 percent per year relative to those of other goods since 1900 (Mundlak, 1990), though some major increases have been recorded in the last years. Second, a number of studies have empirically documented that agricultural growth supports broad-based economic growth. Timmer (2002) finds that over the period 1960 to 1985 in a sample of 65 developing countries past growth in agricultural GDP has a significant impact on current non-agricultural sector growth; Bravo-Ortega and Lederman (2005) replicate the analysis by Timmer for the 1960 to 2000 period and obtain similar results, although they find some heterogeneity across regions. For instance, in the case of Latin America, the impact appears weaker than in the case of other developing regions, such as in our results. They also find a significant impact of non-agricultural growth rates on agricultural growth, which suggests that the causality can run both ways. Tiffin and Irz (2006) test for the direction of causality between agricultural value-added per worker and gross domestic product in 85 countries and conclude that agricultural value-added is the 'causal' variable in the majority of developing countries, such as our results suggest too.

Overall, PPLPI findings indicate that the orthodox paradigm of increased agricultural productivity being a driver of economic growth in developing countries also applies to the livestock sector on its own right, possibly because of the increased contribution to the sector in agricultural value added along the process of economic development. The implications of these findings are that the WDR's vision of the livestock sector as primarily driven by exogenous demand factors can be misleading in terms of policy conclusions. Whereas some priority should certainly be given to policies which allow smallholders to profitably sell meat and milk in high-value markets, policies which address the fundamental constraints to livestock sector development, such as for instance inadequate access to forage, water and basic animal health services appear equally relevant.

In other words, the productivity revolution the WDR envisages for smallholder farmers should not

only include basic staples but also livestock products, which are not only high-value products for better-off consumers but also basic food items for many rural communities in developing countries.

8.3 Appendix

Granger (1969) defined a simple concept of causality by which a cause has to precede the effect: if per capita GDP growth affects productivity in the livestock sector, knowledge of the former should improve predictions of the latter (or vice versa). To avoid issues related to non-stationarity and co-integration, we apply the methodology developed by Toda and Yamamoto (1995) who showed that, irrespective of whether the variables involved are stationary or not and regardless of the existence of a co-integrating relationship among them, tests for Granger non-causality can be performed by estimating a Vector Autoregression Model VAR($p + d_{max}$), where p is the optimal lag length in the original VAR system and d_{max} is the maximum order of unit roots in the variables of the model. The following VAR model are estimated:

$$gdp_t = \alpha_{11} gdp_{t-1} + \dots + \alpha_{1d} gdp_{t-d} + \beta_{11} live_{t-1} + \dots + \beta_{1d} live_{t-d} + \varepsilon_{1t} \quad (1)$$

$$live_t = \alpha_{21} live_{t-1} + \dots + \alpha_{2d} live_{t-d} + \beta_{21} gdp_{t-1} + \dots + \beta_{2d} gdp_{t-d} + \varepsilon_{2t} \quad (2)$$

where gdp_t is per capita GDP in year t ; $live_t$ is livestock value added per TLU in year t ; $d = p + d_{max}$ is the number of time lags included in the model; ε_t is the error term. The Granger non-causality test is a modified Wald test on the parameters of the true VAR (p) model, i.e. it involves testing $\beta_{11} = \beta_{12} = \dots = \beta_{1p} = 0$ for each equation with the remaining d_{max} parameters regarded as zeros. This test has an asymptotic χ^2 distribution when the augmented VAR ($p + d_{max}$) is estimated. Estimating the above VAR requires three steps. First, Augmented Dickey Fuller (ADF) tests was used with trends to determine the number of units roots for both GDP and livestock productivity in the sample countries. The Schwarz Information Criterion (SIC) is used to determine the lag structures in the ADF tests. Second, the Akaike's Final Prediction Error (FPE) criterion was used to select the optimal lag length in the VAR models for each sample country. Finally, Seemingly Unrelated Regressions (SUR) are used to estimate the VAR systems and perform the modified Wald tests on the relevant coefficients, as these tests experience efficiency improvement when SUR models are used in the estimation (Rambaldi and Doran, 1996). The null hypotheses are tested at the 5 percent significance level.

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ANNEX

Table 18: *Meetings with stakeholders*

LOCATION	STAKEHOLDERS	FUNCTION
MINAGRI	Dr Theogene RUTAGWENDA	Director General of Animal Resources
MINAGRI	Raphael RURANGWA	Director General of Planning & Programme coordination
MINAGRI	Didace RUSHIGAJIKI	Professional in charge of Poultry & Pigs
RWANDA AGRICULTURE BOARD	Dr Alphonse NSHIMIYIMANA	Animal Production RAB
PROGRAMME D'APPUI AU PETIT ÉLEVAGE (APEL)	Luc de Bruyne Dr Fabrice NDAYISENGA	Director APEL Coordinator Small Stock Program RAB & Director of Operations APEL Program
NGOMA DISTRICT	Xaverine UWIMANA Innocent KARURANGA	Entreprise development coordinator, Heifer International Goat milk farmer, Maître fromager (Les Caves de l'Abondance)
KICUKIRO	M. Claire INGABIRE Maurice MWIZERWA	Technicians SATRA Coop Slaughterhouse
NYABUGOGO	Peace MUKAMISHA	Technician SABAN Coop Slaughterhouse
RWANDA DEVELOPMENT BOARD (RDB)	Clare AKAMANZI	Chief Operating Officer
DIRECTION VETERINARY SERVICES	Dr David KIIRA Dr Otto Vianney MUHINDA	Virology specialist Director of Veterinary Services
KICURIKO	Dominique GAKWAYA	Pig farmer
BISAGARA	Naphtaly NSHOGOZABAHIZI	Goat meat farmer
MINAGRI	Felix NYIRISHEMA Dr Vincent NIYIRAGIRA	Cattle Development MINAGRI Veterinary inspection ARE/RAB
BUSOGO	P. Céleste NIYIBIZI Thomas BISHIZEHAGABI	President COODERU Busogo Président Association des exportateurs de laine UMUZABIBI W'UKURI
MUHOZA	Jean-de-Dieu MANIRAKIZA	Poultry farmer

LOCATION	STAKEHOLDERS	FUNCTION
KIGALI	Jean Claude RUZIBIZA Oleg STENBOCK	Managing Director RWANDA BEST, Poultry farmer Director RWANDACHICK Ltd, Poultry farmer
RWANDA BUREAU OF STANDARDS (RBS)	Prisca MUKARUMONGI Angeline WIBABARA Yves Severin RWIGIMBA Eric NIGABA	Librarian RBS Librarian RBS Certification Bureau Market Surveillance
ISAR (INSTITUT DES SCIENCES AGRONOMIQUES DU RWANDA)	Dr Théogene SAFARI Jules MUTABAZI	Veterinary ISAR Zootechnician ISAR
MINICOM	Gaudence MUKAMURENZI	A.g Director International trade Department
MINAGRI	Peter Clever NKUNDABAGENZI	Budget officer/MINAGRI
KICURIKO	Athanase KARAMBIZI	Rabbit Producer
KICURIKO	Immaculée MUHAVE Donatha NIYOYITA	CODEPAE (Coopérative de Développement Intégré pour l'Auto-Promotion Economique)
RWANDA AGRICULTURAL BOARD (RAB)	Dr Joy MUHUMUZA NDUHURA	Small Stock Program
KIGALI	Anton VAN ENGELEN	Consultant in charge of genetic improvement