



The Kenyan meat sector Opportunities for Dutch agribusiness

Ron Bergevoet and Anton van Engelen

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Ron Bergevoet¹ and Anton van Engelen²

1 LEI Wageningen UR

2 Private consultant

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P.O. Box 29703, 2502 LS Den Haag, The Netherlands, T +31 (0)70 335 83 30,

E informatie.lei@wur.nl, www.wageningenUR.nl/en/lei. LEI is part of Wageningen UR (University & Research centre).



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Preface

This study identifies opportunities for the Dutch agribusiness sector (industry as well as research and education) in Kenyan meat value chains at all levels. It can serve as a background document for Dutch agro-food business companies as well as other stakeholders. At the moment there is increased interest in exploring agro-food business opportunities in Kenya. This report will guide potential and interested investors to areas of interest and potential business partners within the Kenyan meat sector, and indicates a number of areas and directions in which Dutch experience and capacity can assist in all aspects of the further development of the Kenyan meat sector.

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The hospitality and the openness of the Kenyan contracts was of vital importance for the results of this project. Sharing their entrepreneurial vision and the drive to make their businesses successful was a heart-warming experience and gave us important insights into the possibilities of the Kenyan meat value chain.

Ir. L.C. van Staalduinen
Director General LEI Wageningen UR



Management Summary

Kenya has a vibrant economy and the SME sector plays an important role in it. Many multinational companies are present in Kenya. Globalization has widened the offer of supplies but also knowhow and technical support beyond the traditional suppliers from the west. With an increasing presence of companies from rapidly emerging economies, it is important for Dutch agribusiness to develop a unique strategy. This will guarantee and strengthen its presence within the Kenyan economy. The Kenyan livestock sector will need to develop a holistic approach towards the Kenyan meat sector, whereby the thinking is in terms of competitiveness, customer demand, food safety, environment, animal welfare and working efficiently with scarce resources to avoid competition with basic human nutrition. This means that the products and solutions offered to Kenyan agribusiness should be holistic, integrated and address all issues in order to develop results-oriented socially responsible and clean production systems. In essence the equipment, systems and solutions offered should aim not only at increasing production levels, but also at resolving and improving the total production system, meeting not only the requirements for producers and processors/traders, but also the demands of consumers and society at large. The Dutch agribusiness sector has developed these skills and this capacity. Based on this home-based experience and experience all over the world in different conditions of climate, scale of production and market circumstances, Dutch agribusiness can make a positive contribution to the further development and strengthening of the various meat value chains in Kenya: to develop viable models for domestic production and consumption of affordable, nutritious and safe animal-based products.

This study identifies the opportunities for the Dutch business community in the red and white meat sectors to collaborate with Kenyan counterparts and identify investment opportunities. It describes their outlines, challenges, opportunities and threats. The shift 'from aid to trade' in Dutch development cooperation creates opportunities in the meat sector. Besides the private investment and collaboration opportunities, there is a wide range of issues related to sector development and organization, development and application of standards and control/assurance systems, in which the public sector has an important role to play. The Dutch public-private partnership structures can give Kenya interesting suggestions concerning how to develop and improve the Kenyan meat sector in these respects.

Kenya is characterized by a rapidly growing population (projected to reach 96 million by 2050), rapid urbanization and growing urban poverty, water scarcity, falling food production and low resilience to climate change. The combined effects in Kenya of climate change and rapid population growth are increasing food insecurity, environmental degradation and poverty levels. In 2011, the average gross national income per capita was USD 840, making Kenya a low (though probably soon a middle) income country. Social inequality is significant, with 47% of the population living below the poverty line (2009 estimate). One third of Kenya's population live in urban areas, and of these people 40% reside in slums. Although the economy grew by 4.6% in 2012, it is thought that the GDP growth rate will remain around 5% in the coming years. The inflation rate in Kenya was 7.15% in December 2013. From 2005 until 2014, the inflation rate averaged 11.5%. Doing business in Kenya is not without challenges. Although Kenya has recorded some improvements in the past four years, Kenyan firms still face an adverse business environment.

Agriculture accounts for 24% of Kenya's gross domestic product (GDP), making it the second largest contributor after the service sector. The outlook is promising and a combination of trends could contribute to ensure positive prospects in the short to medium term. Meat consumption levels are still extremely low, but are expected to rise rapidly with increasing GDP and a growing middle class of increasingly conscientious consumers. These consumers will start making increasing demands concerning quality and safety, which the Kenyan meat production, processing and distribution sectors will have to make enormous efforts to satisfy. It is expected that meat consumption will double in the period 2000 to 2030. Pork and poultry meat consumption are expected to triple as a combined effect

of increasing per capita consumption and population growth. In this study, beef, sheep and goat, pig, poultry and rabbit value chains are described from the perspective of business opportunities.

Cattle production in Kenya mainly occurs within three systems:

1. Pastoral production system: responsible for 80–90% of red meat production in Kenya.
2. Cattle ranches production system: responsible for not more than 2–3% of total production, principally for the high-value market.
3. Highlands production system: produces the remainder.

Because Kenya is not self-sufficient in meat and prices in Kenya are higher than in surrounding countries, there is a net flow of live animals into Kenya from Somalia, Ethiopia, Tanzania and to a lesser extent Southern Sudan. Although official trade volumes are low, Kenya is generally considered an exporter of live cattle, with Uganda and Mauritius serving as its main export partners.

A continuous concern for the Kenya livestock sector is the reintroduction of contagious bovine pleuropneumonia (CBPP) from the north. Foot-and-mouth disease (FMD) is endemic and annual outbreaks occur. Although the commercial ranches vaccinate, many cattle in the pastoral community are not vaccinated. There are occasional outbreaks of anthrax, especially after droughts or severe floods, and blackleg. Vaccine against these diseases is widely available and many livestock owners vaccinate against these two diseases.

With the increasing density of wildlife in areas where cattle are kept, the incidence of tick-borne diseases is increasing due to a higher tick load. Especially East Coast fever is challenging, with exposure and treatment and tick control as the only control strategies as the development of an effective vaccine has so far been without results. Brucellosis in the dairy sector is on the increase and would require a control strategy.

Small ruminants play an important socioeconomic role in pastoral societies: if cattle and camels are 'share capital', then goats and sheep are people's savings booklets. This also means that most trade in small ruminants occurs when people need money. There are a number of registered slaughterhouses for small ruminants, from where carcasses are transported to shops. The export of goat and sheep meat is only possible from export registered slaughterhouses, of which the Aga Khan Foundation owned Quality Meats is one. In 2006, *peste des petits ruminants* (PPR) hit Kenya and has spread rapidly. Also sheep/ goat pox is endemic. Contagious caprine pleuropneumonia (CCPP) in goats causes up to 80% mortality and 100% morbidity. Both the availability and the quality of vaccines for these diseases (including CBPP) are being improved.

The Kenyan **poultry** sector is vibrant and diverse. The following sectors can be distinguished in Kenya:

- *Sector 1: industrial fully integrated production system with high level of biosecurity with clearly defined and implemented standard operating procedures, usually the place where grandparent stock and parent stock are kept, usually in well isolated places strictly preventing contact with other poultry or wildlife procedures for biosecurity.* In Kenya, probably only two or three companies meet these standards; they have GPS and PS, incubators, sell DOCs and run outgrower schemes. They have substantial market share and considerable influence on the market prices for product and inputs, have the capacity to fully process to ready to cook/eat products and in some cases have their own outlets (fast food) and sell in supermarkets. Their production and knowledge infrastructure is up to international standards. They buy from internationally renowned partners and are high quality buyers. There is increasing pressure on their market segment through cheap imports. Due to vertical integration and outgrowers, they are better able to plan production and market requirements than sectors 2 and 3. They have 50,000 or more birds. An example of this is Kenchic.
- *Sector 2: commercial poultry production system with moderate to high biosecurity, which mainly involves raising PS and operating hatcheries; most also raise commercial poultry (layers and/or broilers). The farms have birds that are kept indoors continuously.* Due to the mix of reproduction and production animals on the same premises, biosecurity is more easily compromised than in sector 1. There are no more than 10–15 farms in this category, united in the Kenya Poultry Breeders' Association (together with sector 1). Most parent stock is imported as DOCs. These

breeders usually have buyers of DOCs as their clients, as most do not have slaughterhouses. If they do not have their own feed mill, they suffer from the unreliable quality of commercially produced feed. The production of DOCs is not regulated, leading to periods of under- and oversupply. This sector is the first to suffer when the market drops, as sector 3 will not buy DOCs. Without integration, the planning of production is impossible. The final product is sold to wholesalers and supermarkets; some have outlets. Numbers of birds: usually parent stock of up to 10,000 animals and between 20,000 and 50,000 broiler places. Examples of this are Kenbrid and Brad Gate Poultry solutions.

- *Sector 3: farms involved in intensive commercial scale egg and broiler production from hybrid chickens.* Commercial poultry production system with usually bought-in chicks and feed. Wide range of housing and production systems. Biosecurity measures at the best sufficient, but usually rudimentary: usually no all in/all out, different batches and sometimes both broilers and layers on the same farm. Some are outgrowers for sector 1 (and 2?), but most produce for the open market – usually on-farm slaughter and transport to markets as meat (limited processing), usually uncooled, so time a critical factor. Price followers and carry a high marketing risk burden. 70% of all broilers produced in Kenya are slaughtered on farm; of these, 50% are not inspected by a veterinarian. Most of these broilers come from this sector. For their production they depend upon sector 1 and 2 for their DOCs; for feed there is some more choice, but no guarantees that feed received is of sufficient quality. Scale varies between 2,000 and 50,000 animal places.
- *Sector 4: Village, peri-urban or urban backyard production with minimal biosecurity and birds/products consumed locally or transported through a network of middlemen and transporters to urban areas with low to minimal biosecurity.* Birds/products usually enter live bird and wet markets. 80% of all birds in Kenya are kept in this way and provide 65–75% of the total poultry meat consumed. It is the preferred meat and is sold at preferential prices. 65% of Kenyan households keep on average 10–15 chickens. The main issue with animal disease is Newcastle disease. The commercial poultry sector gets its vaccines from commercial companies. The smallholder and village poultry sector's birds are vaccinated only when done by an NGO or government veterinarians. The availability of suitable vaccine is a problem. A continuous threat is highly pathogenic avian influenza (HPAI), although the urgency has been forgotten. Because Kenya has large numbers of migratory birds and overflying routes, domestic birds are prone to infection from passing birds, especially aquatic birds, which are known carriers. The major food safety issue is that more than 90% of all birds in Kenya are slaughtered on farm or in the homestead. From a hygiene and HPAI point of view, this is an undesirable situation. It will require extensive training and awareness raising to make people change in this respect.

The **pig** population was almost stagnant between 2000 and 2005, although in 2003 there was a short-lived recovery in population and numbers slaughtered, reflecting market fluctuations. Until recently, the pig market has been dependent on tourism, so factors that affect the performance of the tourist industry have always affected the market for pork and pork products. A variety of production systems currently operate in Kenya's pig sector. There are large intensive commercial pig farms, small-scale commercial farms and free-range traditional systems (including scavenging and roaming) in Western Kenya, Nyanza and the suburban slum areas of the major cities and towns. Over 80% of the slaughter was carried out by Farmer's Choice, which is the main supplier of pork and pork products to the domestic and the export market. The following systems can be distinguished:

Large-scale, intensive commercial pig farms: These farms each have between 5,000 and 30,000 pigs. Farmer's Choice Limited (owned by the Aga Khan Foundation Investment Promotion Service; IPS) is the only Kenyan company with an industrial/integrated production system and it is involved in the whole value chain. It breeds its own stock, raises piglets, slaughters and processes pork products. Farmer's Choice farms supply about 50% of their annual requirements, with the balance being sourced from contract farmers.

Commercial intermediate: Most of these farms keep fewer than 2,000 pigs. They supply pigs to local butcheries, urban centres and pork processing factories – mainly Farmer's Choice (FC). Their involvement in the value chain ends either when they sell the finished pigs for slaughter outside the farm, or when they sell the meat in their butcheries after slaughtering them on the farm. These intermediate commercial farmers tend to use commercial feeds (mainly pig finishing meal) to finish

the pigs. A few own factories where they produce their own feeds. Others buy the raw materials for home-made feed rations, which are usually cheaper and better than commercial feeds.

Small-scale, intensive pig-raising: The number of pigs kept in these systems varies, at any given time, from fewer than 10 to as many as 100 – the higher figures relating to commercial farmers. Sourcing good breeding material is a major challenge in these systems. There is an overuse of good boars, which leads to inbreeding, as the female offspring are sometimes mated with the only sire boar available. Some commercial farmers around Nakuru, Nairobi and Thika control a further stage in the process by owning slaughter slabs and butcheries in these towns.

Free-range traditional systems: These systems can be found in areas where there are many subsistence, resource-poor farmers who have taken up small-scale pig farming in order to improve their living standards. They characteristically supply pigs to local butcheries rather than to nearby urban areas. The finished pigs are small and underweight. The free-range system is characterized by high mortality rates, low offtake, low reproductive rates, minimal healthcare or supplementary feeding, lack of proper housing and high levels of inbreeding.

The Kenyan pig sector is confronted with a number of diseases of which African swine fever (ASF), foot-and-mouth disease, and porcine cysticercosis are the most important.

For **compound feed** for both the poultry and the pig sector the major feed millers are linked to the grain millers: Unga and Pembe. There are three major feed mills and a larger number of smaller ones. The major complaint of the primary livestock sector is that the quality is not constant and thus predictable. There is an urgent need for a quality and self-regulatory mechanism for the animal feed sector.

Other parts of the value chain and supportive infrastructure

A large variety in slaughterhouse facilities was encountered during the mission's field visit. They varied from marginally equipped, overpopulated slaughterhouses in Dagoretti, the basically equipped not overcrowded Soision slaughterhouse Athinia in Mogoto, an original game slaughterhouse on-farm now cattle slaughterhouse, to the export-certified slaughterhouse of the Farmer' Choice Company. It is only in recent years that the private sector has entered the slaughterhouse sector, especially for ruminants. There is need for new developments, ideas, approaches and operators.

Although slaughter facilities and processing for cattle and small ruminants have improved over the last 10 years, there is still a lot to do in the slaughtering, deboning, transport and retail fields in order to meet minimum standards of hygiene and public health and even more to meet international SPS standards. The design of the slaughterhouses is not adequate to the present needs and capacity and extensive remodelling and overhaul, if not new construction, will be required to meet current international standards. Especially the development and maintenance of a cold chain is important: most meat is still being transported in galvanized steel boxes. Although meat is sometimes kept in a fly-screened area, it is usually in the open. Private partnerships give the best chance to develop successful slaughterhouses in Kenya. Legislative categorization of slaughterhouses makes it difficult for specific value chains to transport their product to markets, unless animals are slaughtered in a category A slaughterhouse (channelling and transport of live animals over large distance). Officially, high income consumers in urban areas and tourists cannot be supplied from anything else but a category A slaughterhouse. There is need to revise this law and make it more realistic and in line with modern requirements and needs.

There are four main slaughter facilities for **pigs** in Kenya. Farmer's Choice Limited, Kenya's largest abattoir, is located at Kamiti, on the outskirts of Nairobi City. Other slaughterhouses have only a small slaughtering capacity of 15 to 50 animals per day. These slaughterhouses have basic facilities, do partly service slaughter, partly slaughter of own pigs, which are sold to local butchers as well as pork restaurants. The remaining pigs are slaughtered on-farm in cramped, poorly equipped and limited hygienic conditions. Simple pig slaughterhouses, preferably linked to local pig producers' associations, would become the place where all animals are slaughtered. This would allow for veterinary inspection and a better utilization of offal and by-products.

Several large and medium sized vertically integrated poultry processors have their own state-of-the-art **poultry** slaughterhouse, including processing plant. In these slaughterhouses, animals are slaughtered from the own company as well as the animals from outgrower schemes/contract farms. A

number of other poultry slaughterhouses are related to live bird markets in large cities such as Nairobi and Mombasa. Many clients, however, take their live bird home and slaughter it there. Besides these slaughterhouses, where 30% of broilers are slaughtered, the rest are slaughtered on the primary farms and are brought as fresh (seldom cooled) chicken to, for example, the city market in Nairobi. Although more than 1,000 animals are slaughtered in a single day at these on-site slaughter places, they have only rudimentary facilities. Especially food hygiene, adequate cooling and waste management are issues of concern in these places. Most of the backyard chickens are slaughtered on-farm or at the consumer's home. Meeting food safety standards is a precondition for the further growth and development of the poultry meat sector. Both slaughterhouses and the veterinary services stress the need to train slaughterhouse staff.

Also in Kenya supermarketization is speeding up. This means that there is an increasing demand for deboned, cut and packed beef, preferably with cooking instructions and information on production, date of packaging and sell by date information. Supermarkets currently do some of this deboning. There is enormous scope for deboning, cutting and packaging plants. Especially clean fleeced and well-portioned prime cuts are in high demand by the hotel and restaurant trade, which now often depends on imported beef to meet its needs.

Kenya is regularly confronted with outbreaks of foot-and-mouth disease (FMD). Until 1986, vaccination was free for cattle and about 80% coverage was achieved. Small ruminants were not vaccinated. The government then introduced costs recovery and coverage rates dropped to around 10% and remain low due to the cost of the vaccine which contains O, A, SAT1 and SAT2 serotypes. The task of the Kenyan government's **Veterinary Department** is to prevent and control animal diseases and pests in order to safeguard human health, improve animal welfare, increase livestock productivity, ensure high quality livestock and their products, and facilitate domestic and international trade. The increasing role of counties in governing the country also had its consequences for the provision of veterinary services. The devolvement has led to fragmentation and carries the risk of breaking the single line of command between CVO and the veterinarians in the field. To assist the Kenyan government in upgrading its veterinary service, the OIE conducted a number of missions that resulted in the PVS Evaluation of the Performance of Veterinary Services and a gap analysis of the Veterinary Services in Kenya. Unfortunately the reports of the assessment are not publicly available. These reports identify the issues and give suggestions for investment plans to overcome them or at least alleviate the problems.

The **extension service** is one of the priority instruments in the agricultural sector to help (resource) poor farmers to improve and increase their production within core poverty alleviation programmes. Whereas in the past the government was responsible for providing all of it at no cost to the farmers, extension is now broadly seen as a complex system whereby services are provided by a range of private and public sector entities. As a result of flaws in the public extension system, a third type of extension service has emerged: the privatized agricultural extension initiatives provided by private companies, NGOs, community-based organizations (CBOs) and faith-based organizations (FBOs). Private extension provision is generally skewed towards well-endowed regions and high-value crops. Farmers have a strong need for advice and information, often incidental, individual and on the spot. Classical extension systems cannot provide for this and new forms have to be found. In both the pig and the poultry sector, initiatives by partly integrated producers to extend their services with extension activities were seen. Their primary objective is to improve the quality of the final product they receive back from their outgrowers and to ensure the proper use of their production inputs (feed, DOC, etc.).

Access to further diagnostics or laboratory infrastructure is limited in Kenya. Although veterinary faculties and research institutes provide veterinary diagnostic services there is a need for a further developed veterinary infrastructure. The Dutch example of animal health services might be especially beneficial for these medium sized farms.

During the study visit, the following **opportunities for Dutch agribusiness** in the Kenyan meat sector were identified:

Development of value chains:

There is a big need to support the development or further development of value chains at all levels and in all sectors. Some examples:

- Branded high-quality beef produced on game ranches/conservancies; Kenya has a small number of commercial ranches, using Kenyan Boran cattle, which are known for their superb carcass and meat quality. Especially in Laikipia, a new system of livestock keeping in harmony with nature has developed: these so-called conservancies maintain their livestock together with game animals. The business model has become game viewing/tourism and livestock production. Kenya Boran cattle, raised exclusively in conservancies, together with wildlife, forms a brandable product for which premium prices in the local high-end market and in future perhaps even in the export markets, can be achieved.
- Improvement of the small ruminant value chain through the construction of regional small ruminants markets, holding grounds and slaughtering facilities that meet the standards for animal welfare, the environment, and food safety and hygiene.
- Increased production and marketing of indigenous chicken through better NVD control, improving on live bird markets and hygienic artisanal slaughter facilities. These birds are usually sold live in live bird markets and command a price that is twice (and during the festive season 2.5-3 times) as high as the commercial price. The biggest problem for local chickens is the annual outbreaks of NVD.
- Improve the planning, slaughter and marketing of broilers from medium size producers that are not part of a vertically integrated column. Currently only 80% of all poultry meat comes from the formal sector, the remainder comes from the smallholder poultry 'industry'.
- Establishment of pig value chains for fresh pork. Need for small rural pig slaughterhouses for the fresh pork value chain to build an alternative to the current monopoly position of the highly integrated Farmer's Choice processed pork value chain.
- Strengthen the role of the various producer associations to become value chain managers and promote cooperation with their Dutch homologues.

In the primary livestock sector:

- With the upcoming fresh pork markets there is place for hardy, heavier pig varieties with good mothering characteristics. At the moment the performance of the existing pigs is low due to not only suboptimal management but also the genetics and inbreeding.
- There is a need for knowledge of good farming practices that will focus on implementing better management to increase productivity and on the establishment of effective biosecurity measures that reduce the risk of disease. The main driver for farmers to participate and adopt the recommended practices will be higher productivity and production and thus income.
- Through trainer of trainer schemes, integrator staff and extension services will become involved in the development of the sector. Where necessary the quality of the input materials (e.g. feed and water) need to be improved. This will create commercial opportunities for the poultry and swine supply industry to get more involved in business in Kenya. Through improved levels of animal health, nutrition and growth, the overall animal welfare will improve.

Forage, fodder and feed:

- The Kenya livestock industry will have to switch its dependency on maize to other ingredients such as cassava and sorghum. Research has produced more disease-resistant varieties of both crops and only if Kenya can expand the area under sorghum and cassava will there hopefully be sufficient energy ingredients for the growing poultry and pig industry. Especially the processing of sorghum and cassava needs technology that is currently not available in Kenya.
- The feed milling industry is currently using premixes from different countries and sources. The technical results of their products are often not consistent and often disappointing. By the time farmers notice, their broilers are already behind the expected weight gain.

Improved slaughtering of cattle and small ruminants in urban centres:

- All current slaughtering facilities in Kenya for the urban areas are old and in many cases obsolete, because they are now in rather than on the outskirts of towns and settlements and would require a massive programme to improve. This could be done under a public-private partnership, a concept

that is fairly new to Kenyans. Consumers will increasingly demand guarantees and quality levels that the current setup of the industry cannot provide. Suggestions for institutional and government partners in the Netherlands to spearhead such an activity could be PVE (or what is left of it), Slagers Vakschool, Bond van Veehandelaren or Vee Logistiek Nederland, NVWA and other interested parties.

Use of calf milk replacer and development of a veal value chain:

- In the small-scale zero-grazing dairy system, most bull calves stay on the farm, where during their first months they compete with the farmer for the milk to be sold and later with their dams for the scarce feed and fodder resources. The growth rates of such calves are extremely poor and always lead to stunted animals. Also replacement heifer calves usually make a poor start in life as farmers tend to economize also on the milk provided to these calves to be able to sell more. The introduction of milk replacer would free up more fresh milk for sale and processing, give replacement heifer calves a better start in life, add value to bull calves and free up scarce fodder and feed resources especially on the smallholder dairy farms for the dairy cows, thus contributing to higher reproduction and production rates.

Large need for modern knowhow:

- Demonstration and training centres to demonstrate advanced and practical solutions with substantive ambitions in relation to the issues and challenges identified in all Kenyan livestock sectors and processing.

Strengthening the national veterinary infrastructure:

- Strengthen the Veterinary Faculty's training programmes for dedicated/specialized poultry and swine veterinarians.
- Develop and improve both public and private laboratory infrastructure to ensure basic veterinary care, high-quality diagnostics and a contribution towards increased food safety assurance.
- Improve the availability of quality vaccines and reduce the use of antibiotics.
- Help the various producers' associations develop sector programmes for disease control and eradication.
- Develop independent quality control institutes, initially funded by government/donors but eventually paid for by both the public and the private sector.

Feed milling industry:

- The many small and medium-scale feed mills need a source of information and consultation to in order to update their knowledge and information gap.
- Good quality premixes to improve local feed stuffs (alternatives to maize).

Dutch–Kenyan agribusiness collaboration:

- Create platforms for more effective business cooperation between Kenyan and Dutch business cooperation within Kenya via an information, demonstration and service centre representing the interests of the Dutch agribusiness industry.
- Create and strengthen business cooperation between partners in the same value chain in the Netherlands to be more successful in acquiring business in Kenya. Example initiatives are the Dutch Poultry Centre (DPC) or FoodTechAfrica.
- Promote mutual exchange programmes at farming, trade and industry level to increase knowledge levels of one another's production systems and conditions and build mutual understanding.

Liaison with other initiatives in the sector:

- In addition to the various public and private sector stakeholders, it is essential that programmes are also well linked with other donor-supported initiatives and developments in the sector.

List of abbreviations

EAC	East African Community – the regional intergovernmental organization of the republics of Burundi, Kenya, Rwanda, the United Republic of Tanzania, and the Republic of Uganda
GDP	Gross domestic product
KMC	Kenyan Meat Commission
PPP	Public–private partnership

1 Introduction

Increasing economic welfare combined with the growing population results in increasing demands for meat in Kenya. Beef and sheep meat are traditionally important in the consumption patterns of Kenyans. However, poultry and pig meat are gaining importance. In Kenya, meat consumption levels are still extremely low, but are expected to rise rapidly with increasing GDP and a growing middle class of increasingly conscientious consumers. These consumers will start making increasing demands concerning quality and safety, which the Kenyan meat production, processing and distribution sectors will have to make enormous efforts to satisfy.

This study was performed at the request of the Netherlands Ministry of Economic Affairs with the intention to identify the opportunities for the Dutch business community in the red and white meat sectors to collaborate with Kenyan counterparts and identify investment opportunities. This report does not present a detailed study of the various value chains, but describes their outlines, challenges, opportunities and threats. Where available, references are made to more detailed recent studies that we used as background information.

This report is the result of a desktop study and of a study visit to Kenya at the beginning of 2014, which provided much of the input. The team consulted key stakeholders both in Kenya and in the Netherlands. Many of the opportunities were identified during the meetings with the various sector stakeholders at different levels of the different meat value chains. In this report, beef, sheep and goat, pig, poultry and rabbit value chains are described from the perspective of business opportunities.

The shift 'from aid to trade' in Dutch development cooperation creates opportunities in the meat sector. Besides the private investment and collaboration opportunities, there are many issues related to sector development and organization, the development and application of standards and control/assurance systems in which the public sector has an important role to play. The Dutch public-private partnership structures can give Kenya interesting suggestions concerning how to develop and improve the Kenyan meat sector in these respects. This report indicates a number of areas and directions in which Dutch experience and capacity can assist in all aspects of the further development of the Kenyan meat sector.

In general it can be said that Dutch agribusiness (industry as well as research and education) will find opportunities in Kenyan meat value chains at all levels. This report will guide potential and interested investors to areas of interest and potential business partners within the Kenyan meat sector.

2 Introduction to Kenya

2.1 The country



Figure 2.1 Kenya and its neighbours

Kenya is a country with a great diversity in geographical conditions. It exhibits extremes of altitude, rising from sea level to 5,200 m at Mt. Kenya. Sheltered bays and estuaries can be found along Kenya's 640 km coast. Elevation is the major factor in temperature levels – with the higher areas, on average, some 11°C cooler, day and night – and in expected rainfall. Water resources are scarce and unevenly distributed within the country and over time. Kenya has a total land mass of 580,367 sq. km, of which 2% is water and only 20% can be considered suitable for agriculture. This constrains Kenya's agriculture potential, and explains why the Kenyan population and its agricultural activity are heavily concentrated in the southern half of the country. The arid and semi-arid northern half of the country is so far mainly used by pastoralists for livestock keeping, sparsely populated and characterized by fragmentary infrastructure coverage. There are some game parks, but due to security issues these are becoming increasingly out of bounds to tourists.

Resources

Kenya has recently discovered hydrocarbon reserves in the Lake Turkana basin and other areas.ⁱ Until its oil refinery capacity and overall oil sector have developed, it will continue to import all its crude petroleum requirements from the Middle East. There is an oil pipeline to Nairobi, and the Mombasa port also serves the hydrocarbon requirements of Uganda, Rwanda, Burundi and parts of East Congo. Initial plans have been developed by Rwanda, Uganda, South Sudan and Kenya to develop an oil pipeline to a to-be-developed deep sea port in Lamu Kenya on the Indian Ocean coast. The current political turmoil in South Sudan has slowed down this process for the time being. Only 8% of the Kenyan population is connected to the national electricity grid, which has lacked timely investments and improvements. The current power supply is insufficient, expensive and unreliable. Interesting opportunities to exploit geo-thermal and solar systems exist, and the production and use of biofuels is under research.

Land is the most important resource in Kenya. In densely populated regions, there is a major concern that land may have become too scarce to make any meaningful contribution to household incomes. Only companies that are 100% domestically owned can acquire agricultural land. Foreign companies

seeking to access land in Kenya have the option to lease land from private and public landholders. This land scarcity and the increasing frequency of droughts have led to an increased interest in the development of intensive livestock production systems that are less dependent upon land and climatic conditions (see further).

2.2 Economy and economic developments

Kenya is one of the five countries in the East African Community (the others are Tanzania, Uganda, Burundi and Rwanda). This community wants to widen and deepen economic, political, social and cultural integration in order to improve the quality of life of the peoples of East Africa through increased competitiveness, value added production, trade and investments. In terms of gross domestic product (GDP), Kenya's economy is the largest in East and Central Africa.ⁱⁱ

Gross national income and inflation

In 2011, the average gross national income per capita was USD 840, making Kenya a low (though probably soon a middle) income country (World Bankⁱⁱⁱ). Social inequality is significant, with 47% of the population living below the poverty line (2009 estimate). One third of Kenya's population live in urban areas; of these people, 40% reside in slums. A large proportion of urban dwellers are unable to meet food needs on a sustained basis over an extended period of time. In 2010, Kenya benefited from the global economic recovery as well as higher export prices for its traditional export commodities, namely coffee and tea. Although the economy grew by 4.6% in 2012, it is thought that the GDP growth rate will remain at around 5% in the coming years. This set off against a population growth of 2.6% means that poverty alleviation through economic growth is a challenge for Kenya if inflation levels are also taken into account. The inflation rate in Kenya was 7.15% in December 2013. From 2005 until 2014, the rate averaged 11.5%, reaching an all-time high of 31.5% in May 2008 and a record low of 3.2% in October 2010.^{iv}

Agriculture

Agriculture accounts for 24% of Kenya's gross domestic product (GDP), making it the second largest contributor after the service sector. The outlook is promising and a combination of trends could contribute to ensuring positive prospects in the short to medium term. The contribution to wage employment is 18%, and 50% of the revenues from export originate from agricultural products^v.

Tourism

Wildlife safaris have been the mainstay of Kenya's tourism for decades, and several Kenyan parks (e.g. Tsavo National Park) are among the best places in Africa to see lions, elephants and leopards. Tourists also come to experience the famous wildebeest migration in the Maasai Mara. The direct contribution of travel and tourism to GDP was 5.7% of total GDP in 2011 and 4.4% in 2012, and is expected to rise by 3.4% per annum from 2012 till 2022. The total contribution of travel and tourism to GDP was 13.7% in 2011, and is expected to rise by 3.7% each year to reach KES 603.1 bn in 2022^{vi}. The tourist industry is extremely sensitive to political unrest and the general security situation. There have been a number of shocks for the tourist industry, such as the post-election killings in 2007 and the 2013 terrorist attack on the Nairobi West Gate shopping centre. Although tourism development is a promising driver of economic growth in Kenya, its fortunes can quickly change as a result of the inherent risks of instability coming from the Great Lakes zone as well as from Somalia and South Sudan. Kenya's military forces entered Somalia in October 2011 to curb the threat of the Islamist militant al-Shabab movement, which it accused of kidnapping and killing tourists and aid workers. Kenyan troops are now largely integrated into the overall African Union forces in Somalia. There have been some reprisal attacks in Kenya itself^{vii}.

2.3 Demographic developments

Kenya is characterized by a rapidly growing population, rapid urbanization and growing urban poverty, water scarcity, falling food production and low resilience to climate change. The combined effects of climate change and rapid population growth are increasing food insecurity, environmental degradation and poverty levels in Kenya. Kenya's population grew from about 5.4 million in 1948 to about 41 million today, and it is projected to reach 96 million by 2050 (source: UDESA^{viii}). The population is growing at a time when the country is experiencing climate change effects such as erratic rainfall, food insecurity and flooding. Addressing population growth and climate change together should be a top priority if Kenya is to achieve sustainable development^{ix}.

Better macro-economic conditions in the past decade have helped to improve the general welfare of Kenyans, but the poor remain vulnerable to drought and other crises induced by environmental degradation and climate change. Rural and urban poverty remain a challenge. Analysis of the data from the 2005-2006 Kenya Integrated Household Budget Survey (KIHBS) indicates that national absolute poverty declined from 51% in 1997 to 46.1% in 2005-06. While this decline compares well with other sub-Saharan African countries, it can still be considered high in comparison to neighbouring countries such as Tanzania (about 36%) and Uganda (about 31%). In rural areas, overall poverty declined from 53% to 49%, while urban poverty declined from 49.2% to 34% over the same period. The share of the population with an income below USD 2 a day at 2005 international prices for Kenya was 67%.^x In 2010-12, 13 million people (30.4% of the population) were still undernourished.^{xi}

Rural-urban migration continues unabated: secondary school leavers go to college or university and most do not return to the rural areas, as there are no jobs there. The World Bank estimates that 50% of all Kenyans will live in cities by 2033.

Consumption patterns

Maize is the staple diet in Kenya. Other staples are bananas, cassava, sweet potato and rice. While the supply of milk and eggs per capita increased for the total population from 189 g/day in 1965 to 235 g/day in 2002, the amount of meat consumed remained stable at around 50 g/day. The value of the foods purchased per week in 2006 was almost equal for vegetables, milk cheese and eggs, and meats: all around KES 5,000 per week.^{xii} Kenyans are attached to their *ugali*, a stiff porridge made from white maize. The increasing share of maize for livestock in the high domestic maize consumption – which in total surpasses the domestic production by 30-40% per year, depending upon the type of agricultural production season – is competing with maize for human consumption. Currently imports from Uganda and Tanzania and through Mombasa (a congested harbour with poorly developed bulk handling facilities) make up for the shortfall. Similar developments in Uganda and Tanzania (i.e. rapid urbanization and the development of intensive livestock production) will also create an increasing demand for the maize produced locally in these countries and will make imports of maize more expensive for Kenya. Also Rwanda has set ambitious targets for increased production of meat, milk and eggs, and with even more scarce land resources per capita than Kenya it will increasingly start sourcing its maize deficit on the same markets as Kenya.

As Table 2.1 shows, it is expected that meat consumption will double in the period 2000 to 2030. Especially pork and poultry meat consumption are expected to triple as a combined effect of increasing per capita consumption and population growth.

Table 2.1

*Expected changes in consumption of meat in Kenya between 2000 and 2030**(in thousands of metric tons)*

	2000	2030	% increase
Beef	286.9	514.3	179%
Mutton	55.8	90.5	162%
Pork	11.4	37	325%
Poultry	54.8	164.6	300%
Total	408.9	806.4	197%

<http://www.fao.org/docrep/014/i2425e/i2425e00.pdf>

2.4 Infrastructure: roads, electricity, water, air and sea ports, and ICT

Infrastructure

A successful public–private partnership in air transport has made Kenya's airline a top carrier in the region and its international airport a key gateway to Africa. Institutional reforms in the power sector have reduced the burden of subsidies on the public by approximately 1% of GDP. But the power sector continues to pose Kenya's greatest infrastructure challenge. Over the next decade, current capacity will have to be doubled. A second challenge is to improve the efficiency of operations at the Port of Mombasa. Kenya Railways, once responsible for a large share of the goods transport to Uganda and the hinterland, is in dire straits and even its once lucrative Mombasa–Nairobi passenger service has now all but ceased. Other concerns include low levels of access to household services, underfunding of road maintenance, and negative progress on the Millennium Development Goals for water supply and sanitation. Addressing Kenya's infrastructure deficit will require sustained expenditures of approximately USD 4 billion per year (20% of GDP) over the coming decade. Evidence from enterprise surveys suggests that infrastructure constraints are responsible for about 30% of the productivity handicap faced by Kenyan firms, with the remainder being due to poor governance, red tape and financing constraints. Power is the infrastructure constraint that weighs most heavily on Kenyan firms, with transport a close second. The length of the trunk network is more than adequate, and it provides basic regional and national connectivity. However, the country faces a huge rehabilitation backlog that must be addressed before the trunk network can be considered to be in a maintainable condition. Linking the capital to the coast, to international border crossings and to provincial capitals in the interior, Kenya's rail corridor is of strategic importance to the region. Linking the port of Mombasa to Nairobi and continuing on into Uganda, it is a key conduit for bulk freight, easing pressure and providing additional capacity along the central corridor. Owing to the deterioration of the infrastructure, freight traffic on the rail corridor has declined to less than 1 million tons per year and handles less than 6% of the cargo passing through the central corridor that links Kenya, Uganda, Rwanda, Burundi, the Democratic Republic of Congo, parts of Tanzania, South Sudan and Ethiopia. Although there are talks about the development of a northern corridor to serve Uganda and South Sudan through a to-be-developed deep sea port near Lamu island with an additional oil pipeline and road, this will most probably take many years to develop and actions to at least maintain the effectiveness of the central corridor is a must for the government (Briceño-Garmendia, 2011).

Mobile phone infrastructure:

More than 90% of the population have access to GSM cell signals. A large proportion of the population have GSM phones. Innovative solutions using mobile phone infrastructure have developed, e.g. M-Pesa (M for mobile, *pesa* is Swahili for money) is a mobile-phone based money transfer and micro financing service for Safaricom and Vodacom, the largest mobile network operators in Kenya and Tanzania. Currently the most developed mobile payment system in the world, M-Pesa allows users with a national ID card or passport to deposit, withdraw, and transfer money easily with a mobile device.

2.5 Policies and strategies

Kenyan economic development is governed by an all-encompassing development plan developed in 2006–07 (usually called in short 'Vision 2030') 'to develop a globally competitive and prosperous nation with a high quality of life by 2030'. The aim is to maintain a sustained economic growth of 10% per year, develop a just and cohesive society that enjoys equitable social development in a clean and secure environment, and politically develop an issue-based, people-centred, result-oriented and accountable democratic political system.

For the agricultural and livestock sector, the following flagship projects were developed:

- Preparation and passage of consolidated agricultural policy reform legislation.
- Development and implementation of a 3-tiered fertilizer cost reduction programme.
- Improving the value gained in the production and supply chain through branding Kenyan farm products.
- Planning and implementation of four or five disease-free zones and livestock processing facilities to enable Kenyan meat, hides and skins to meet international marketing standards. There will be more domestic processing of these products for regional and international markets.
- Creation of publicly accessible land registries under an improved governance framework.
- Development of an Agricultural Land Use Master Plan.
- Tana River Basin Agricultural Development Scheme.

In 2010 a new constitution was adopted,^{xiii} in which the old administrative structure of provinces was replaced by a system of 47 counties. The aim of this move is to bring administration nearer to the people and improve accountability, transparency and service provision. Counties now receive a share of the national budget, but are also given considerable spending responsibilities. The continuity of delivery of existing services has rested on the shoulders of the counties from day 1 of the devolution. All counties are currently trying to establish a tax base, which causes worry and unease among the people due to the high number of additional taxes in addition to the key taxes, such as personal income tax, VAT, import duty and social fund, all of which are still centrally collected taxes.

In the field of direct foreign investments, the devolution will not bring major changes as all investors would want to serve the national market and be in areas with developed infrastructure. In the livestock sector there are, however, possibilities for the development of slaughterhouses, cold storage and cold chain to urban centres or even for export. The first impressions are that the county governments are keen to facilitate such investments by making land available and assisting in the development of infrastructure such as roads and access to electricity and water.

If counties fail to deliver, there is a risk of re-centralization. It is therefore important for the sub-national county governments to develop a strong administrative and financial basis to operate. It is therefore important for the national government to continue developing and setting national standards and supporting their adoption and implementation. In the light of this study, one can think of a national food safety policy and strategies, environmental protection and animal welfare regulations. The better and more applicable these standards are, the more likely it is that they will be applied in the counties far from the centre.

2.5.1 Land issues

Vision 2030 identifies land as a critical resource for the socioeconomic and political developments as planned within the Vision. Property rights to land owned by communities, individuals or companies are seen as an important driver of rapid economic transformation. This transformation depends upon a national land use policy, which is under development. The aim is to develop a computerized system of land registration and to introduce and use a GIS-based land use registration system and an enhanced legal framework for the faster resolution of land disputes.^{xiv}

In practice, Kenya still has its fair share of irregular and illegal land acquisition by Kenya's elite and by wealthy foreigners, and there is a great gap between the intentions and the realities.^{xv} The rapidly expanding cities demand large areas of peri-urban land.

A special case is the large-scale development plans for the Tana river delta. The president recently initiated the development of a 10,000-acre agro-industrial complex. There are high expectations about

the effect of the additional production, especially maize, and the linked processing on the country’s food availability and pricing level. Additional developments in the field of biofuel production (licenses for large-scale *Jatropha* plantations) and not so transparent deals with foreign governments (e.g. Qatar and China) for large-scale land lease deals are all clear signs that there is still a gap between reality and the intention to implement an equitable and transparent land allocation and use system.

2.6 Business environment

Although Kenya has recorded some improvements in the past four years, Kenyan firms still face an adverse business environment. In fact, the total losses incurred by businesses because of power outages, theft and breakage during transport, payments of bribes and protection payments are much higher than total losses experienced by middle income countries in Africa and by China and India. The top constraints identified by Kenyan managers were tax rates, access to finance, corruption, security, infrastructure services (electricity and transportation) and business licensing. Despite this, Kenya’s economy, one of Africa’s most developed, has gradually emerged from political instability and the economic slowdown. Reforms to public finance management have continued. Despite Kenya’s strong legal framework, there are problems with the length of arbitration proceedings and the enforcement of arbitration awards.

Doing business in Kenya is not without challenges. In a World Bank evaluation of 189 countries, Kenya came 129th, slightly higher than other sub-Saharan countries (average position: 143). Figure 2.2 below gives the ranking on different aspects related to doing business in Kenya.

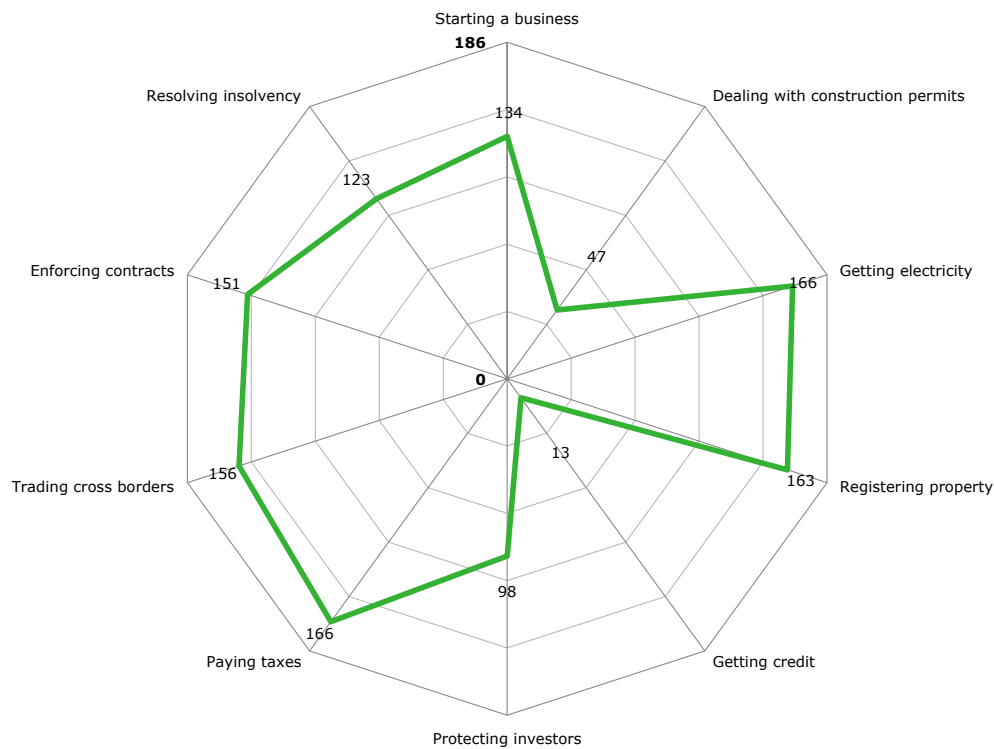


Figure 2.2 How Kenya ranks on Doing Business topics: comparing 189 economies Source: Doing Business

3 Agriculture in Kenya

3.1 Climate and agro-ecological zones

Kenya has a wide range of climates, varying from tropical along the coast to temperate in the highlands and arid in the north and north-east. Most of the country experiences a bimodal rainfall pattern with the 'long rains' season between March/April and May/June and 'short rains' between October and November. Over the years this bimodal rainfall pattern has become less pronounced and less predictable, giving an increased risk of crop failure. Whereas during the long rains the usual cropping plan would be maize with beans and in the short rains mainly beans, farmers are changing their practices towards more mono-cropping and more drought-resistant crops.

Kenya has a total area of about 582,646 square kilometres of which 11,230 (about 1.9%) are covered by water. The dry land mass is commonly divided into six agro-ecological zones as the Table below indicates. The following map and Table gives an overview of the distribution of the various agro-ecological zones over Kenya.^{xvi} Virtually 80% of the country lies in the semi-arid to very arid zones (ASALs), which are predominantly inhabited by pastoralists and agro-pastoralists. Kenya's ASALs also support about 7 million people and more than 50% of the country's livestock population. These areas, which are also classified as rangelands, are unsuitable for rain-fed cultivation due to physical limitations such as aridity and poor vegetation.^{xvii}

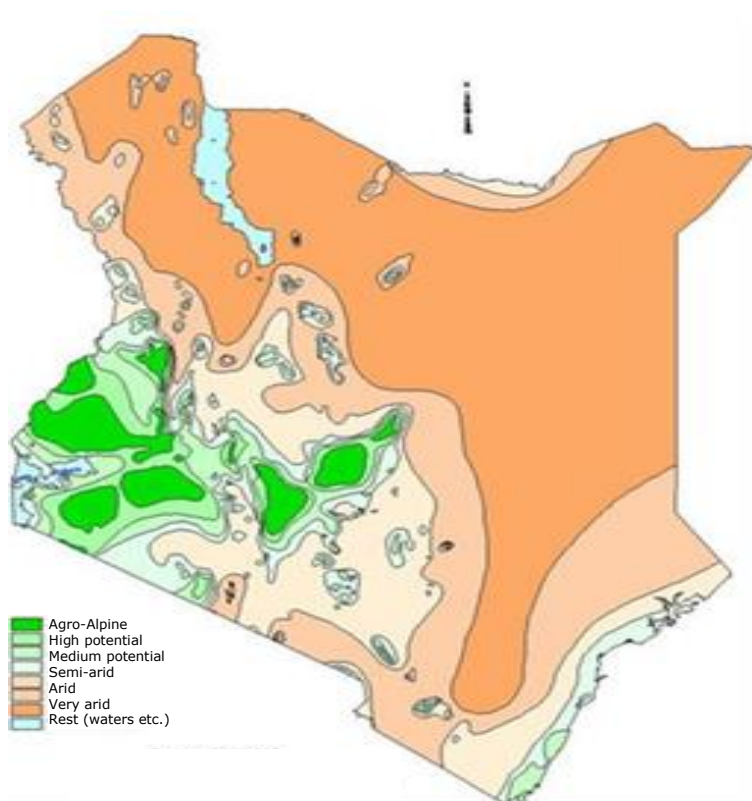


Figure 3.1 agro ecological zones in Kenya

(source Kenyan soil survey 2009)

Table 3.

Agro ecological zones in Kenya (source Kenyan soil survey 2009)

Zone	Approx. Area (km ²)	% Total
I. Agro-Alpine	800	0.1
II. High potential	53,000	9.3
III. Medium potential	53,000	9.3
IV. Semi-arid	48,200	8.5
V. Arid	300,000	52.9
VI. Very arid	112,000	19.8
Rest (waters etc.)	15,600	2.6

3.2 Grain crops

Kenyan grain production (Table 3.1) is mainly maize in most parts of the country where agriculture is possible, and wheat in the highlands.

The Kenyan maize industry is well developed, with most farmers in the highlands using hybrid varieties specifically recommended for that particular area. For the more marginal areas a number of open pollinating composite varieties have been developed. A number of state and parastatal organizations are active in the maize industry (National Cereals and Produce Board (NCPB) and Kenya Seed Company (KSC), to mention two). Contrary to neighbouring countries, which have a variety of staple foods besides maize (matoke, cassava, sorghum), the Kenyans in general prefer white maize and the per capita consumption hovers around 100 kg/year, which (with a population of 41 million) translates into an annual requirement for people alone of 410,000 tonnes; with an annual population growth of 2.8% one can easily see that with a limit to the land available to expand the area under maize cultivation, food security for maize cannot be achieved by striving for self-sufficiency. Maize production per year fluctuates wildly, depending upon rainfall and other climatic factors. The occurrence of maize lethal necrosis disease in the country has affected thousands of hectares and research and industry are searching for if not resistant then at least tolerant maize varieties and hybrids for this disease.

Table 3.1

Major grain crops in Kenya

year	Area harvested in '000 ha				Production in '000 tonnes			
	2000	2005	2010	2012	2000	2005	2010	2012
Maize	1500	1771	2008	2159	2160	2906	3465	3600
Wheat	132	159	160	149	204	369	512	442
Sorghum	122	122	226	224	82	150	164	167
other cereals	130	125	148	169	146	161	207	274

Source FAOstat

Wheat is grown in the highlands around Mount Kenya and the Aberdares, the Rift Valley and Narok County, where Maasai group ranches have leased out large tracks of originally grazing areas that have now been ploughed up for wheat production. The country's current wheat consumption is estimated at 900,000–1,000,000 tonnes per year. Because Kenya's annual wheat production is only around 300,000–400,000 tonnes, the country has to import about two thirds of its required wheat. The rapidly spreading new stem rust Ug99 caused havoc in the northern and central wheat production areas in 2010, leading to the need of massive import. In years with bad rainfall, yields drop from an average of 2,500–3,000 kg/ha to a mere 500–600 kg/ha. To accommodate such variability, large stocks and imports are required. Because especially the Great Lake countries are suffering similar climatic set-backs to grain production as Kenya, the Mombasa port, which also serves Uganda, Rwanda and Burundi, is congested with grain that comes in bulk and has to be bagged for onward transport.

With the country not self-sufficient for both maize and wheat, the increasing unreliability of the harvests due to climate change, emerging diseases and a growing population, there is a continuous

need to import grains. Uganda and Tanzania are currently the main regional sources for maize import, but despite the free movement of goods in the EAC these countries are inclined to restrict or forbid export in years when they too are facing a shortage of grain. Wheat is sourced further afield. Mombasa port now has bulk handling facilities for grain, but most of the up-country handling is still in bags and requires bagging in port for onward transport.

The intensive livestock industry in Kenya is dependent for a large part of its feed on grain and grain by-products, whose relatively high prices mean that the sector has a challenge to remain competitive within the region. It is also not clear how the poultry and pig sector could continue to grow to meet local consumption demand in a competitive way with all neighbouring countries members of the EAC and the WTO, and all developing their poultry and pig production industries; this does not even touch on the aggressive export practices of e.g. Brazil, the USA and other upcoming exporting countries (Ukraine, Belarus, Thailand) with a surplus, which if/when entering the Kenyan market would pose an enormous threat to the local industry.

Kenya would also in the light of climate change need to seriously consider the further development of cassava and sorghum production as more drought-resistant crops and develop the value chain for these crops, which would uplift e.g. cassava from a poor man's crop to feed his family into a commercial crop with, as shown in other countries, great potential for farmers in the, in terms of rainfall, more marginal zones if adequate processing and marketing channels can be developed.

3.3 Vegetable oil crops

Vegetable oil is one of the key subsectors of agriculture, with soybean and palm oil being the leading sources in the production of vegetable oil in the world. At present, Kenya's domestic production of edible oils is estimated at 380,000 tonnes, only about one third of its annual demand. The remainder is imported, at a cost of USD 140 million, making edible oil the country's second most import item after petroleum. The area under vegetable oil crops has remained fairly steady over the years. The key reason for this has partly been attributed to irregular and unstable weather conditions.^{xviii}

The key players in the vegetable oil industry in Kenya are processors – which extract the oil from the seeds and also produce oil cake for use in animal feeds – and refiners, which convert crude oils into a form suitable for human consumption.

Kenya's demand for vegetable oils continues on a strong upward trend. Reportedly, Kenya will increase domestic oilseeds area harvested to 125,000 hectares and produce just over 100,000 tons of oilseeds in 2009. Oilseed crops include coconut (leading oilseed crop), cashew nut, groundnuts, sunflower, soybeans, palm oil, *simsim* (sesame), cotton seed and maize germ. The Ministry of Agriculture recently began promoting palm oil production, promising palm tree seedling availability through the Kenya Agricultural Research Institute Centre at very modest prices.^{xix}

3.4 Total crop production

Smallholder farmers in especially western Kenya have responded to the food prices crisis by diversifying the crops they grow. Whereas in the past they would grow maize and beans as their main staple, market demand for pulses and soya has caused changes in their cropping pattern. Also climate change has been one of the reasons to reconsider cropping plans and include more profitable and/or drought-resistant crops. These changes will have to be accompanied by changes in the agricultural policies. It is remarkable that there are large areas where soya could be grown profitable and there is an industrial demand for soya beans, yet there is no policy or strategy to incorporate small holders in the lucrative soya bean value chain and close the knowledge gaps on growing and processing soya. Kenya has an annual import of over 100,000 metric tons of soybean meal and about 150 tons of soya protein concentrates and textured soy protein from China.^{xx}

From the above it can be concluded that the Kenyan agricultural sector will be increasingly unable to meet the increasing demands of the growing human and livestock population. It is unlikely that Tana

River schemes of new land, which are mainly in the hands of counties, which want to fill their own deficits, will assist Kenya in overcoming the current shortfall. A concerted effort will be needed to increase productivity, mitigate the effects of climate change and establish both regional (EAC) and international stable trading relationships to fill the shortfall, which cannot be produced in country. There should be no confusion between food security and food self-sufficiency: by changing to higher value crops and overall economic growth, accessibility to food, even when imported, can be guaranteed. It is up to the government and the private sector (trade and processors/manufacturers) to guarantee availability. Kenya will have to make sure that it builds up stable trading relationships with its neighbours (EAC), other countries in the region (COMESA) and internationally.

Table 3.2

Total staple crop production in Kenya

Year	Area harvested in '000 ha				Production in '000 tonnes			
	2000	2005	2010	2012	2000	2005	2010	2012
Roots and tubers	232	198	269	283	1643	3684	3897	4695
Pulses	1151	1352	1120	1523	478	530	594	846
Oilcrops Primary	214	228	231	250	40	40	37	49
Coarse grain	1739	2002	2362	2527	2335	3154	3750	3918
Cereals (rice milled eqv.)	1885	2178	2542	2701	2574	3564	4319	4442
Oilcakes equivalent	198	215	218	237	56	58	49	62

Source FAOstat



4 Livestock production

4.1 Introduction

Animal numbers

Due to its wide climatic and geophysical variation, Kenya has very diverse livestock populations. The major division is between the informal, largest part and the formal livestock production sector. The next division is between the arid- and semi-arid areas and the highlands. Each agro-ecological/ socioeconomic niche has its own breeds and production methods. It would be going too far to describe these in great detail, but in the separate chapters on each species an overview will be given. The collection of statistics especially in the arid and semi-arid areas' informal sector, which is the lion's share of e.g. the ruminants in the country, is a daunting task: numbers fluctuate strongly with e.g. droughts and floods, but also uncontrolled import and export of animals from neighbouring countries. The informal poultry sector is large (every household, even many in towns, keeps some chickens), but also here the number fluctuates over the year with the seasons (rainy season high mortality of young stock, outbreaks of coccidiosis and/or pasteurellosis) and in between years due to e.g. outbreaks of NVD, droughts and reduced feed availability. The official statistics are the best information available. The FAO statistics are usually derived from official government statistics, sometimes corrected with own collected data. Production data because of the high level of informal slaughtering, processing and marketing are hard to produce and existing data should be treated with caution.

Table 4.1

Kenya statistics for livestock numbers in millions of animals

Year	2000	2005	2010	2012
Cattle and buffaloes	11.44	13.02	17.86	19.13
Sheep and goats	17.94	23.92	45.74	47.58
Poultry birds	26.29	26.86	30.40	32.87
Pigs	0.31	0.32	0.35	0.35

Source FAO statistics

Fodder, feed and concentrates

Most of the ruminants in Kenya live on the range: with the wide variety in vegetation, timing and intensity of rain there is usually an area where it rains and where animals can be finished off the range. This is probably one of the reasons why feedlotting in Kenya has so far not become economic. In the 1970s, the Netherlands financed programmes to develop feedlotting based on sorghum silage, but this never took off (Lanet ADC feedlots supervised by van Arkel *et al.*).

For the more intensive ruminant production in the highlands, Kenya developed suitable species for pastures in crop rotations or long-term use. Also here the Netherlands' development support programmes of the 1970s played a role (supporting the Kitale National Grassland Research Station, developing and/or improving Pokot, Masaba, Boma and Elma Rhodes and Nandi Setaria, J. Boonman and A. van Wijk). These two grass species and especially Rhodes are still widely used in commercial livestock production. The intensive zero-grazing dairy industry is mainly based on Napier fodder (hybrid Pennisetum) and Guatemala grass.

For compound feed Kenya has a long tradition, started by the settler farmers last century. The major feed millers are linked to the grain millers: Unga and Pembe. Unga in turn has a link with Kenchick and makes all its poultry feed (same owners/shareholders). There are three major feed mills and a larger number of smaller ones. The major complaint of the sector is that the quality is not constant and is thus predictable. It is too late to discover during the growing period of a batch of broilers that the growth is suboptimal. Anybody can start a feed mill – and many do. Especially the small-scale producers have little defence against the malpractice of these fly-by-night feed millers. A sector-wide

quality control system, based on transparency (put composition on the bag), at least GMP and if possible HACCP principles, would be required.

The 70 members of the Association of Kenya Feed Manufacturers (AKEFEMA) produce more than 80% of all stock feeds brought onto the market. There is an urgent need for a quality and self-regulatory mechanism for the animal feed sector, in which the Kenya Bureau for Standards (KEBS) should play a role. KEBS would require extensive training and updating of its often out-dated standards to be able to comply with modern SPS measures and quality assurance principles; an upcoming EU project anticipates to do this.

Breeding material

For all species a division can be made between local and exotic breeds. 'Exotic' does not always mean 'improved' in Kenya: some of the local breeds are excellently adapted to the local conditions and can reach superior production levels in comparison to exotic breeds under similar conditions (e.g. Boran beef cattle, Gala goats). There are pedigree breed societies, but with a diminishing number of traditional pedigree breeders, traditionally the European farmers, this system is under pressure. The numbers of registered animals are now becoming so low that a meaningful breeding programme with sufficient room for selection is no longer possible. The Boran breeders have developed some export of embryos, breeding stock and semen, but also here the genetically active population is small and except some on-farm selection there are no other ways to select such as national performance testing schemes. In the past, this only took place as a project activity. For the dairy sector, all major semen selling companies are present (ABS, WWS, SEMEX to mention a few) or are represented. For dairy cattle, a number of cattle breeding organizations are represented in Kenya (ALTA, SEMEX, CBA). Commercial poultry and pig production make full use of the globalized genetic resources (see further). Farmer's Choice – the largest pig processor in Kenya – uses DanBred Landrace, the DanBred Yorkshire and the DanBred Duroc material.

There is little or no stratification in specialized breeding, multiplication, fattening, etc. farms: most farms with pedigree animals also have a commercial herd, breeders are also multipliers, etc.

Farmers

Farmers in Kenya can be divided into commercial farmers producing exclusively for a market, usually on a considerable scale, and smaller farmers, who at times also grow cash crops, such as tea and coffee, on their home plots. They sell to the open market, to the company for which they are outgrowers or to a cooperative. Especially the Kenya Tea Cooperative is often used as an example of a true cooperative union providing benefit for the individual farmers. After independence, the then president Jomo Kenyatta united a number of key farms holding seed production, pedigree animals, key herds or elements of the production process into the parastatal Agricultural Development Corporation. This structure still exists but has lost a lot of its role. In its place have come many commercial companies, which have invested in agriculture in Kenya. Some work with outgrowers, also in the livestock sector (Farmer's Choice in the case of pigs, Kenchick in the case of broilers), others have set up their own value chain (e.g. Delamere Dairy).

Processing and logistics

In the past, processing and logistics were often organized by the cooperatives or through parastatals. The cooperatives, which were started up in the colonial time (Uplands Bacon, KCC for dairy), and parastatals such as KMC for beef did not make it after independence. Their role has now been largely taken over by commercial companies, which in many cases take care of most of the value chain with in most cases a role in primary production for official outgrowers or individual farmers through middlemen.

Retail

Retail in Kenya is changing slowly from urban markets and hawkers into supermarket systems. However, at the bottom end of the market the name of the game is still cost reduction and as cheap as possible. Milk of unknown origin and raw is still hawked, most of the meat seen in butchers' windows bears veterinary stamps, but it is likely that considerable amounts go through informal channels to hawkers and the many cheap restaurants.

The supermarket trade opens opportunities for value addition through the preparation of cuts, ready-to-cook or ready-to-eat products, branding and advertisement. The growing middleclass is becoming quality conscious and the supermarket sector is taking advantage of that.

4.2 Cattle

4.2.1 Introduction



Kenyans consume on average 15–16 kg of red meat per capita annually, which amounts to a national total of around 600,000 MT. Beef forms 75–80% of this. Beef consumption more than doubled over the past two decades and it is likely that this trend will continue (South Africa's beef consumption, country with a similar developmental pathway, grows at 2% annually). Of the total amount of beef consumed, 80–90% comes from livestock raised by pastoralists, who are also an important link in the trans-border trade and in 'turning' foreign cattle into local cattle before selling into the urban markets. A significant share of the cattle come from neighbouring countries and Kenya is a meat deficient country. The total herd of both beef and dairy cattle is more than 13 million. The numbers of livestock vary from year to year due to drought shocks and high mortality and destocking. In general, the conditions in the pastoral areas for livestock keeping are deteriorating because of increasing incidence of droughts and in many places also of security incidents.

Livestock marketing in Kenya is ad hoc and hardly regulated. Most farmers practice distress sale: when money is required, animals are offered for sale. This means that many animals on offer are not really ready for slaughter. The capacity to finish such animals is low and many animals are slaughtered at sub-optimum weight. Although slaughter facilities and processing have improved over the last 10 years – e.g. all slaughter facilities use now a captive bolt for stunning and have to have a knocking box by law, and people wear white coats, caps and gum boots (but still walk freely in and out of the facilities) – there is still a lot to do in the slaughtering, deboning, transport and retail

sectors to meet minimum standards of hygiene and public health and even more to meet international SPS standards. Especially the development and maintenance of a cold chain is important: most meat is still transported in galvanized steel boxes, white with a red stripe and the word 'meat' plus the registration number of the trader written on it, as it was in colonial times. Most butcheries, especially in slums and high-density areas, do not have cool displays. Meat is sometimes kept in a fly-screened area, but most of the times it is in the open.



4.2.2 Overview of the various value chains

Cattle production in Kenya is mainly in three systems:

1. Pastoral production system: responsible for 80–90% of the red meat production in Kenya.
2. Cattle ranches production system: responsible for not more than 2–3% of total production, but principally for the high-value market.
3. Highlands production system: produces the remainder.

The pastoral production system uses local cattle breeds, of which the Small East African Zebu is the most important. This is a collection of different subtypes of animals. Pastoralists are keenly aware of the possibilities to improve their genetics and on a large scale use larger Boran or even Sahiwal bulls to improve their herds. Although the pastoralists in especially the northern zone have always been exposed to droughts and excesses of climate and weather, the incidence of such events has increased drastically over the last 10 years. Together with wildlife conservation bodies, the Northern Rangelands Trust (NRT) was set up to ensure that pastoralists can gain more from their livestock so that they can reduce their stocking rates. Conservancies, in which livestock and wildlife live side by side, are being created and neighbouring cattle ranches, together with NRT, assist in taking off growing animals so as to create more grazing for female stock, to reduce mortality in times of shortage and to increase income from increased extraction rate. Agro-/eco-tourism initiatives are being developed and create rural employment and additional income to the community.



The Kenyan cattle ranching sector is situated in the Laikipia plateau, where the now famous Kenyan Boran was developed, through the Rift Valley, along the railway line Nairobi–Mombasa, and between Tsavo and the coast. Most of these ranches belonged to settlers, but are now in the hands of institutional buyers or local elite. ADC had a number of ranches, including the Galana Ranch, which was a renowned experiment into the commercialization of game for milk production (Eland) and meat. These initiatives have all come to an end and most ADC ranches have been taken out of this group. The most interesting area is the Laikipia Plateau, which was settled after the first world war with demobilized soldiers, who were given a land title to start ranching. Most did not make it, sold out and left. The remaining ranches were the ones to develop the Kenyan Boran, with Mutara owned by Mr Curry as the centre. Mutara is now under ADC management and, with the assistance of OI Pejeta, has been converted into a conservancy, tapping into the tourist game-viewing industry as well. It still maintains a top herd of Boran cattle. The cattle produced on these ranches are of high quality and safety and quality guarantees can be given. However, there is no established market outlet for this high-quality product.

The highland livestock production system is mainly based on British beef and dairy breeds. Most dairy animals are cross-bred with nowadays a large share of Holstein and/or Ayrshire genetics. The zero-grazing dairy schemes, which were started in the 1970s and have long been supported by the Netherlands, have become a showcase of how smallholders can be incorporated in formal value chains. Still, not more than 30% of all milk in Kenya enters the formal value chains. One of the challenges for the smallholder dairy schemes is to grow and/or procure sufficient fodder and feed. This usually results in the cows in production being poorly fed – resulting in delayed re-conception and low production level – and in the growing stock being badly fed, so that it is an extremely long time before these animals are ready for first service or sale for slaughter.

If there were a market for young bull calves out of the dairy sector, farmers could sell these calves and save the fodder and feed for their dairy cows. Figure 4.1 gives an overview of the major trading stock routes. Most converge in Nairobi.

4.2.3 Statistical data on production, import and export

According to the 2009 livestock census (the last performed), at that time 23% of the cattle present were of exotic origin (and therefore 77% of the cattle were of indigenous origin). The rate of cross-breeding is substantial. Tables 4.2 and 4.3 give some production, export and import figures originating from FAO STAT. Knowing that anything between 20 and 40% of the ruminants slaughtered in Kenya have been unofficially imported, not too much value can be given to this table.

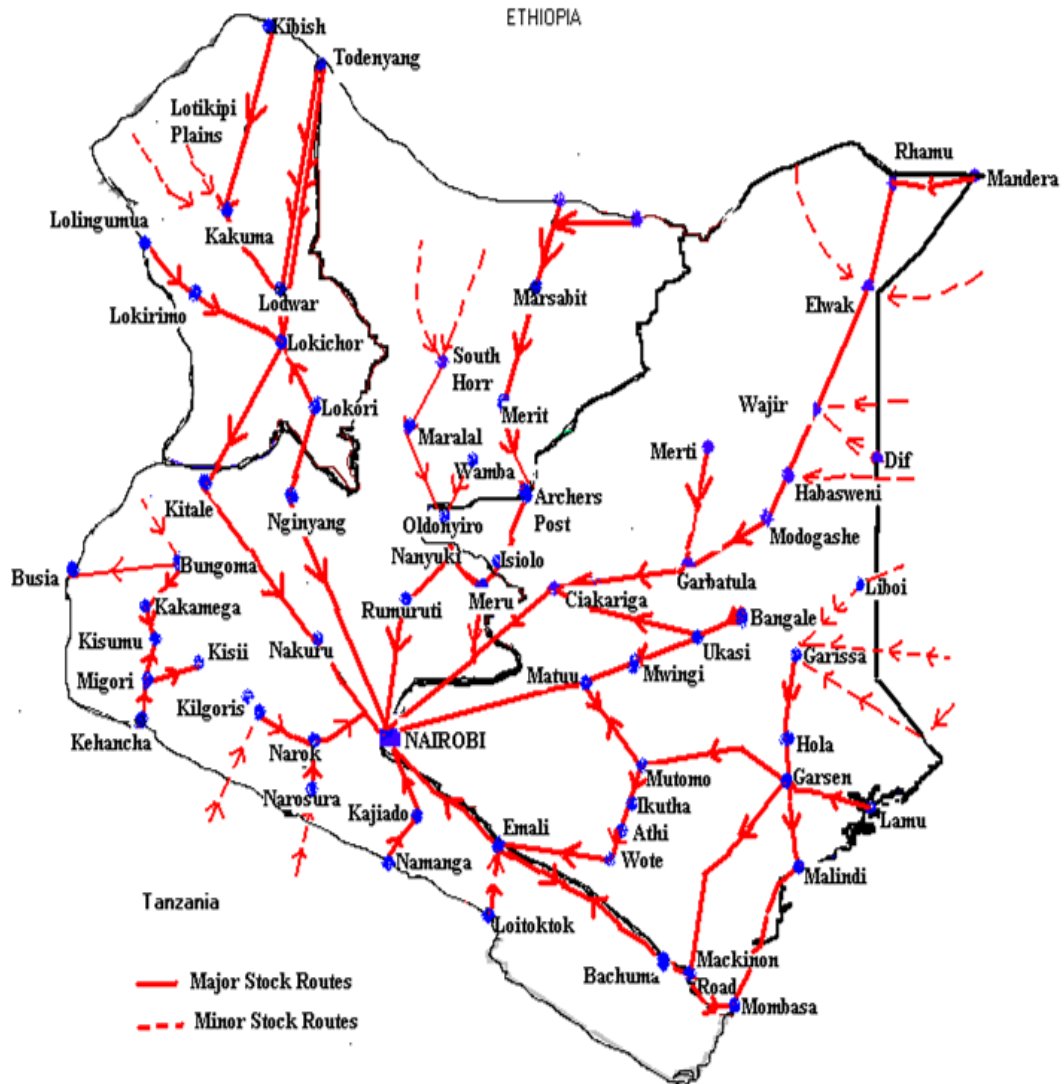


Figure 4.1 Major animal trekking routes

Table 4.2

Meat production of cattle, sheep goats and game

year	Producing Animals/Slaughtered in '000 heads					Production in' tonnes				
	2000	2005	2010	2011	2012	2000	2005	2010	2011	2012
Cattle	2870	1786	1923	2104	2194	257	396	462	4580	411
Sheep & goat	5670	6600	7060	7190	4413	65	76	88	90	51
Game meat						14	21	25	26	26

Source: FAO stat

Because Kenya is not self-sufficient in meat and prices there are higher than in surrounding countries, there is a net flow of live animals into Kenya from Somalia, Ethiopia, Tanzania and to a lesser extent Southern Sudan. Although official trade volumes are low, Kenya is generally considered an exporter of live cattle, with Uganda and Mauritius serving as its main export partners. The export of beef and beef products increased after the Kenya Meat Commission (KMC) – a parastatal that was started during the second world war to provide the British army with beef, and later expanded with American money in the 1960s and was at various times 'patched up' by different donors – restarted its operations in 2005, but towards the end of 2013 was closed down again. Meanwhile, Quality Meats – a subsidiary of the Aga Khan Business Network – has taken over the role of main exporter of beef, goat and mutton.

Table 4.3

Import and export volumes of animals in Kenya

Year	Export Quantity				Import Quantity			
	2000	2005	2010	2011	2000	2005	2010	2011
Pigs	47	0	0	0	190	0	7	7
Chickens	1247	3736	3268	1092	101	66	145	252
Bovine animals	36	2161	7855	3456	0	1	67	712
Sheep and goats	450	3775	140	305	0	15	67	0

Source: FAO stat

4.2.4 Animal disease and food safety issues

A continuous concern for the Kenya livestock sector is the reintroduction of CBPP from the north. FMD is endemic and annual outbreaks occur. Although the commercial ranches vaccinate, many cattle in the pastoral community are not vaccinated. There are occasional outbreaks of anthrax, especially after droughts or severe floods, and blackleg. Vaccine against these diseases is widely available and many livestock owners vaccinate against these two diseases.

With the increasing density of wildlife in areas where cattle are kept, the incidence of tick-borne diseases is increasing due to a higher tick load. Especially East Coast fever is challenging with exposure and treatment and tick control as the only control strategies as the development of an effective vaccine so far has been without results. Brucellosis in the dairy sector is on the increase and would require a control strategy.

4.2.5 SWOT analysis of the beef sector

Strengths: <ul style="list-style-type: none">- Large areas for extensive cattle production with experienced livestock keepers at a low cost price.- Many agro-ecological zones and corresponding best breeds and farming systems, giving a good spread of climate and marketing risks.- Well-defined markets for beef at national level and regional.- Through open borders, supply and demand easily balanced.	Weaknesses: <ul style="list-style-type: none">- Weak policy and legal frameworks to support the cattle industry.- Low livestock productivity in many systems due to sub-optimal management and disease occurrence.- Weak support structures for essential services(veterinary, extension).- Unreliable data and information management in the industry.- Increasing transport costs.- Dilapidated marketing and slaughtering infrastructure.
Threats: <ul style="list-style-type: none">- Droughts and erratic weather conditions.- Unpredictable availability and quality of fodder and feed for animals.- Presence of trans-boundary animal diseases and poor capacity to control and prevent these.- Uncontrolled influx of large numbers of animals from neighbouring countries having a price suppressing effect (e.g. South Sudan after cut off from traditional markets in Sudan).	Opportunities: <ul style="list-style-type: none">- Develop better dry season supplementary feeding programmes to reduce mortality, in situ and ex situ.- Improve on the control and prevention of trans-boundary animal diseases through a strong public-private partnership in the veterinary field.- Create more price differentiation for different qualities of meat, thus enabling more feedlotting, currently marginally profitable.- Development of 'deep' value chains: forward linking of pastoral groups with fatteners/feedlots and meat processors.- Improve livestock infrastructure (markets, slaughterhouses, transport, water supply) and reduce overhead costs for these.- Develop veal production based on milk replacer for use in the high-end Nairobi and tourist industry markets.

4.2.6 Possibilities for the Dutch agro-food complex

- Assist in the development of full value chains from pastoral areas to the retail sector, including fattening ranches/feedlots, licensed slaughterhouses, deboning and packaging plants through a PPP, extensive training and awareness raising.
- Develop a turnkey project for the construction of a modern slaughterhouse for Nairobi to replace the four slaughterhouses in Dagoretti: help the veterinary services to improve their inspection and food safety assurance role, develop a PPP between government/municipality and the meat trade.
- Develop novel products, quality and food safety assurance systems in the feed milling industry, whereby especially low-cost dry-season maintenance feeds as a disaster risk mitigation measure would be useful.

4.3 Small ruminants

4.3.1 Introduction



Small ruminants play an important socioeconomic role in pastoral societies: if cattle and camels are 'share capital', then goats and sheep are people's savings booklets. This also means that most trade in small ruminants is when people need money. Goats are the principal species in the arid and semi-arid areas (ASAL); sheep are more common in the higher rainfall highlands, where goats thrive less well. Between 20 and 30% of all red meat consumed in Kenya comes from small ruminants. Especially in the urban areas large amounts of goat and sheep meat are consumed as *nyama choma* (charcoal roasted meat), which is consumed in bars among friends.

The sheep breeds kept in the ASAL areas is the East African fat-tailed sheep, of which the Maasai Red is a subspecies, and in the north west the fat-rumped Blackhead Persian/Somali. Just as pastoralists use the Boran to improve their cattle and increase size and weight, the sheep farming pastoralists use Dorper sheep (stabilized cross between Blackhead Persian and Dorset Horn, a hair sheep) and the goat farmers the extremely hardy white Gala goats. In the highlands there is a range of exotic breeds, finewool Merino, Romney Marsh, Hampshires and Suffolks. As is the case with cattle, the population of registered and especially performance tested animals is decreasing.

4.3.2 Overview of the various value chains

Goats and sheep are mainly kept in the arid and semi-arid areas, some in the agro-pastoral system where the animals graze around crop fields and on the stubble and are fed crop residues. Few are kept in zero-grazing, mainly when there are many crops in the area to avoid crop damage and transported from the pastoral areas in trucks to cities, where they are slaughtered and usually consumed immediately. In the days when Kenya could export goat meat to the Middle East, large numbers of goats were bought in Tanzania and brought across the border. Many animals also cross the border

from Ethiopia and Somalia due to the higher prices in Kenya. As the breeds in those countries are the same as the ones kept in the neighbouring zone in Kenya, this is hard to control. Sheep from the highlands are more likely to be finished with feeding.

There have been programmes to promote milk production with goats: for many years there were programmes to develop the West Kenya Dairy goat synthetic breed. The marketing of the milk proved to be a major bottleneck and commercial goat milk production ceased; the increased fecundity and milk production remained within the local goat population. With decreasing grazing resources and increasingly small farm plots dairy goat farming is still a potential sector for development in especially densely populated Western Kenya. The earlier failure has to be analysed and it has to be established whether it merits a retry. A similar situation exists in Rwanda, where with government support high-potential dairy cows are distributed to people with not even 1 ha of land, from which also their family diet has to be derived. Also here dairy goats would form a better developmental alternative than dairy cattle.

4.3.3 Statistical data on production, import and export

The 2009 livestock census gives the number of goats as 27,740,153 and sheep as 17,129,608. It is hard to establish production data, as most of the slaughter is done informally. There are a number of registered slaughterhouses for small ruminants, from where carcasses are transported to shops. The export of goat and sheep meat is only possible from export registered slaughterhouses, of which the Aga Khan Foundation owned Quality Meats is one.

4.3.4 Animal disease and food safety issues

In 2006, PPR hit Kenya and spread rapidly. In naïve populations, it can cause up to 100% mortality; in later years abortions and high mortality in lambs and kids. Also sheep/goat pox is endemic. CCPP in goats cause up to 80% mortality and 100% morbidity. The availability and quality of vaccines for these diseases (including CBPP) is being improved through GALVmed's VACNADA programme (Vaccines for Control of Neglected Animal Diseases in Africa). Small ruminants in the more humid parts of and/or during the more humid periods in Kenya suffer from a high internal parasites level, including *Heamonchus*. Maasai Red has been proven to have a certain level of immunity to internal parasites. It is of importance for human health that the incidence of *Brucellosis melitensis* in small ruminants in Kenya is extremely low. There is the continuous risk of RVF outbreaks, for which an early warning and preparedness system with timely vaccination will have to be in place. The GALVmed programme has activities to increase the availability of RVF vaccines, but the whole system needs further development, in collaboration with the national veterinary services, FAO, OIE, ILRI and GALVmed.

4.3.5 SWOT analysis of the mutton/lamb and goat meat sector

<p>Strengths:</p> <ul style="list-style-type: none"> - Fast reproduction rate. - Ready market in the <i>nyama choma</i> business. - Spread out over all agro-ecological and farming systems. 	<p>Weaknesses:</p> <ul style="list-style-type: none"> - Marketing, slaughtering and distribution poorly organized. - Poor organization of animal health interventions resulting in high mortality. - Only a limited number of slaughterhouses with acceptable conditions.
<p>Threats:</p> <ul style="list-style-type: none"> - Large imports from neighbouring countries when e.g. their export markets close/become unprofitable. - PPR and CCPP if not controlled sufficiently. 	<p>Opportunities:</p> <ul style="list-style-type: none"> - Organize the marketing, cool transport and slaughter better. - Develop export possibilities, together with construction of slaughterhouses in the counties. - Further develop and strengthen the Kenyan goat dairy sector for zero-grazing in small holder sector with restricted land area.

4.3.6 Possibilities for the Dutch agro-food complex

- Assist in the development of small-scale preferably export worthy small ruminant slaughter facilities at the margins of the pastoral areas in collaboration with meat traders and county governments to upgrade current conditions of operation and improve food safety.
- Assist in the development of more hygienic meat outlets in the high-density areas, where the bulk of the meat is been sold: simple and robust cool displays, better equipment that can be disinfected/sterilized.
- Develop a quality and safety assurance system in the small ruminants value chains through which Kenya with investments in the above small-scale small ruminant slaughter facilities and improved cold chain can more easily gain access to lucrative export markets.
- Assist in the development of a strategy for the further development and strengthening of a Kenya dairy goat industry, based on zero-grazing in small holdings of limited land size only after a thorough revision of the earlier experiences.

4.4 Poultry

4.4.1 Overview of the various value chains



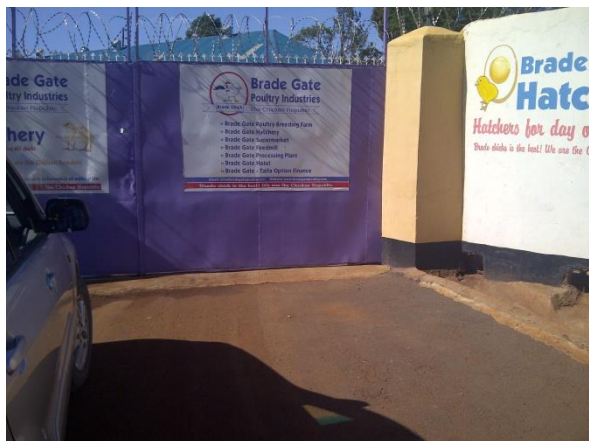
The Kenyan poultry sector is both vibrant and diverse. Again a major bottleneck is that the available statistics do injustice to especially the smallholder system. The sector has a number of organizations to represent it and to promote its general development. The Netherlands supported the poultry sector

development in the 1970s by developing the KARI Naivasha poultry development centre (e.g. cock exchange programmes)

The following sectors can be distinguished in Kenya:¹

Sector 1: *Industrial, fully integrated production system with a high level of biosecurity and clearly defined and implemented standard operating procedures, usually the place where grandparent stock and parent stock are kept, usually in well-isolated places strictly preventing contact with other poultry or wildlife procedures for biosecurity.* In Kenya, probably only 2 or 3 companies meet these standards; they have GPS and PS, incubators, sell DOCs and run outgrower schemes. They have substantial market share and considerable influence on the market prices for product and inputs, have the capacity to fully process to ready to cook/eat products and in some cases have their own outlets (fast food) and sell in supermarkets. Their production and knowledge infrastructure is up to international standards. They buy from internationally renowned partners and are high-quality buyers. Increasing pressure on their market segment through cheap imports. Due to vertical integration and outgrowers, they are better able to plan production and market requirements than sectors 2 and 3. They have 50,000 or more birds. An example of this is Kenchic.

Sector 2: *Commercial poultry production system with moderate to high biosecurity, which mainly involves raising PS and operating hatcheries, but usually also the raising of commercial poultry (layers and/or broilers).* The farms have birds that are kept indoors continuously. Due to the mix of reproduction and production animals on the same premises, biosecurity is more easily compromised than in sector 1. The number of farms in this category is no more around 10-15, united in the Kenya Poultry Breeders' Association (together with sector 1). Most parent stock is imported as DOCs. These breeders usually have buyers of DOCs as their clients, as most do not have slaughterhouses. If no own feed mill, they suffer from the unreliable quality of commercially produced feed. The production of DOCs is not regulated, leading to periods of under- and oversupply. This sector is the first to suffer when the market goes down, as sector 3 will not buy DOCs. Without integration, the planning of production is impossible. Sale of final product to wholesalers and supermarkets; some have outlets. Usually have a parent stock of up to 10,000 animals and between 20,000 and 50,000 broiler places. Examples of this are Kenbrid and Brad Gate Poultry solutions.



Sector 3: Farms involved in intensive, commercial-scale egg and broiler production from hybrid chickens. Commercial poultry production system with usually bought-in chicks and feed. Wide range of housing and production systems. Biosecurity measures at the best sufficient, but usually rudimentary: usually no all in/all out, different batches and sometimes both broilers and layers on the same farm. Some are outgrowers for sector 1 (and 2?), but most produce for the open market – usually on-farm slaughter and transport to markets as meat (limited processing), usually uncooled, so time factor is

¹ Following the FAO classification system for the poultry industry, based on their measures to maintain biosafety.

critical. Price followers and carrying a high marketing risk burden. Price information through informal networks of informants. 70% of all broilers produced in Kenya are slaughtered on-farm, of which 50% are not inspected by a veterinarian. Most of these broilers come from this sector. Organized in the Kenya Broiler Producers' Association, but as the large producers of sectors 1 and 2 are also members there is a conflict of interest and alternative associations to bypass the large ones have been formed. For their production they depend upon sector 1 and 2 for their DOCs; for feed there is some more choice, but no guarantees that feed received is of sufficient quality (some feed millers are known to have different poultry and pig feed for different clients). Scale varies between 2,000 and 50,000 animal places.

Sector 4: Village, peri-urban or urban backyard production with minimal biosecurity and birds/products consumed locally or transported through a network of middlemen and transporters to urban areas with low to minimal biosecurity. Birds/products usually enter live bird and wet markets. 80% of all birds in Kenya are kept in this way and provide 65–75% of the total poultry meat consumed. It is the preferred meat sold at preferential prices. 65% of Kenyan households keep on average 10–15 chickens (depending upon the year and season; multiple year average from statistical department). Chickens form an important aspect of especially poor rural families' food security and livelihood assurance system. Roaming traders and middlemen aggregate the birds and transport them to the urban markets, where on the live bird markets both birds from this sector as well as live broilers and spent hens and parent stock are on offer. Free-range traditional systems can be found in areas where traditional poultry production is common, the human development index is low, and the prevalence of poverty and HIV/AIDS is high. Most families are subsistence, resource-poor farmers who have adopted small-scale poultry farming to improve their living standards. They characteristically supply poultry to local butcheries rather than to nearby urban areas. In the backyard systems, poultry are left free to roam

Representation

The sector has a number of organizations to represent it and to promote the general development of the sector:

KARI Naivasha Poultry Unit

The Netherlands supported the poultry sector development in the 1970s by developing the KARI Naivasha poultry development centre (e.g. cock exchange programmes). The centre promotes indigenous poultry production and its commercialization.

Kenya Poultry Farmers Association (KEPOFA)

This organization has been funded by donors, aims at representing the whole poultry sector and has 7,000 paying members (KES 700 membership fee). Mostly small-scale producers are members of this organization. The organization developed a national poultry development policy, which was withheld till after the elections and will now move forward. The aim of this organization is to promote the commercialization of local chickens/poultry and mainstream these small-scale producers into lucrative value chains leading to the cities and creating value addition to indigenous birds for the producers. The 18% VAT recently imposed on poultry feed (kicks in at KES 5 million threshold) has increased the price of poultry by 12%, but according to KEPOFA it is impossible to charge this to the consumers, so the sector has to absorb this price increase. There is need for extensive training support for smallholders to better understand biosecurity, start vaccinating against NVD and other diseases, and understand the effect of strategic supplementary feeding.

Kenya Poultry Breeders' Association (KPBA)

This organization has seven members and was set up by a number of members of the KEPOFA, who felt that their interests were not in line with those of the other members of KEPOFA. They are basically talking on behalf of the large-scale (sectors 1 and 2) DOC producers, whose quality is too variable and whose price is much higher for non-outgrowers than for outgrowers.

Kenya Broiler Growers' Association

This association could and should play a role in matching supply and demand by monitoring the number of PSs set up and DOCs produced at any time. As the major producers are part of this association this association seems not to represent all commercial broiler producers in Kenya.

Mount Kenya Broiler Farmers' Association

This association has around 150 members who between them are raising 300,000 birds at any time. It keeps a close eye on the price of DOCs in both Kenya and Uganda, and creates economies of scale when purchasing chicks and feed. The dream of this association is to have its own poultry slaughterhouse and cold room, so that it can better regulate supply and demand. Most of its broilers are slaughtered on-farm and transported uncooled to the various urban markets in the region.

A problem for small and medium scale farmers:

Availability and quality of feed and DOC. Large variations in quality of both a reported by farmers as major problems

4.4.2 Poultry feed

Most of the large-scale farmers mix their own **poultry feed** rations, while small-scale farmers have formed cooperative societies and opened feed mills. The main ingredient of feed is cereals – especially maize and wheat, with soya and fishmeal used as sources of protein. In commercial feed, large variations in quality occur.

Concentrates are available but very expensive. The cost of feed increased by 450% in the period 2009–12 (KENPFA). The addition of 16% VAT to animal feed and no possibility to transfer higher production costs to the customers by higher meat prices pose a further challenge for the poultry industry. Challenges the feed industry is facing this area include the poor quality and high cost of ingredients and concentrates; inadequate and hard-to-access mineral supplementation; the unavailability of local sources of vitamins, amino acids, and macro- and micro-nutrients; and frequent droughts.

The main local producers of poultry feeds are: Unga Feeds; Ngeca Feeds; Sigma Feeds; Belfast Millers; Wann Feeds; Pembe Millers; Mombasa Maize Miller; Chania Feeds; Ngae Feeds Nakuru; Uzuri Feeds Nakuru.

The main pig feed manufacturers **import feed resources** as a source of protein. These are soya feed premix from Europe and India, sunflower and cotton cake from Tanzania and Uganda, and fish from Tanzania. The following energy sources are imported especially in years when the country experiences famine: maize from Tanzania and COMESA countries (in 2009), wheat grain from Tanzania, rice bran from Uganda; vitamins, mineral supplements and trace minerals in poultry feeds are imported from Europe.

4.4.3 Animal disease and food safety issues

The main issue with animal disease is Newcastle disease. The commercial poultry sector gets its vaccines from commercial companies. The smallholder and village poultry sector's birds will only be vaccinated when done by NGO or government veterinarians. The availability of suitable vaccine is a problem.

Highly pathogenic avian influenza (HPAI) is a continuous threat, although the urgency has been forgotten. Because Kenya has large numbers of migratory birds and overflying routes, domestic birds are prone to infection from passing birds, especially aquatic birds, which are known carriers.

The major food safety issue is that more than 90% of all birds in Kenya are slaughtered on-farm or in the homestead. From a hygiene and HPAI point of view, this is an undesirable situation. It will require extensive training and awareness raising to make people change in this respect.

4.4.4 SWOT analysis of the poultry sector

Strengths: <ul style="list-style-type: none">- In principle all technology and knowledge available in a number of vertically integrated chains.- A number of strong integrators, capable of adding value to the final product and work with outgrowers.- A large variety of poultry production systems and species, which gives chances to respond to market demands.- Mombasa port can be used for the import for poultry feed ingredients.	Weaknesses: <ul style="list-style-type: none">- Shortage of especially grain for poultry feed, making the sector less competitive in comparison to neighbouring countries with sufficient grain.- Lack of qualified specialized poultry veterinarians and knowledge support.- Public poultry laboratory diagnostic network not sufficiently capable of fulfilling the needs of the sector.- Weak supply and uptake of basic vaccination practices.- Poorly developed value chains leading to over- and undersupply and price fluctuations.
Threats: <ul style="list-style-type: none">- Poultry diseases are not sufficiently under control to avoid outbreaks of e.g. NVD.- Constant threat of HPAI transmission from wild to domestic birds.- Rapidly growing poultry industry in neighbouring countries, at times making use of Kenyan inputs (DOCs, premix, etc.) takes out regional export markets and drives up the prices of import grain from those countries.- Shortage of grain and increasing competition of poultry with human nutrition in terms of grain.- Dumping of poultry meat and/or eggs from regional and world markets.	Opportunities: <ul style="list-style-type: none">- Strengthen the organization of the sector and find shared interests to convince them to collaborate more.- Capacity building in HR and laboratories in the veterinary field, both public and private.- Develop and strengthen sector based training and demonstration initiatives.- Small improvements in the village poultry sector will, because of the large numbers, have an enormous impact on aggregate production: NVD vaccination, chain development, promotion of other poultry species than only chicken.

4.4.5 Possibilities for the Dutch agro-food complex

- With an increasing demand and consumption of poultry meat, the poultry industry will make investments in upgrading and expanding the production capacity in primary production, processing, logistics and marketing. This provides opportunities for improving the overall standard of production, quality and safety that can be supported through the involvement of Dutch companies.
- Meeting food safety standards is a precondition for the further growth and development of the poultry meat sector.

4.5 Pigs



The pig population was almost stagnant between 2000 and 2005, although in 2003 there was a short-lived recovery in population and numbers slaughtered, reflecting market fluctuations. Until recently, the pig market was dependent on tourism, so factors that affect the performance of the tourist industry have always affected the market for pork and pork products. Kenya has started to follow the trend in Uganda and Tanzania, where pork has become an integral part of the *nyama choma* culture and where even some Muslims consume pork, calling it *mbuzi katoliki* ('Catholic goat'). The popularity of pork continues to increase in the urban areas of Kenya.

4.5.1 Overview of the various value chains

Over 80% of the slaughter was carried out by Farmer's Choice, which is the main supplier of pork and pork products to the domestic and export market.

A variety of production systems currently operate in Kenya's pig sector. There are large intensive commercial pig farms, small-scale commercial farms and free-range traditional systems (including scavenging and roaming) in Western Kenya, Nyanza and the suburban slum areas of the major cities and towns.

Large intensive commercial pig farms

These farms each have between 5,000 and 30,000 pigs. Farmer's Choice Limited (owned by the Aga Khan Foundation Investment Promotion Service; IPS) is the only Kenyan company with an industrial/integrated production system, and is involved in the whole value chain. It breeds its own stock, raises piglets, slaughters and processes pork products. Farmer's Choice farms supply about 50% of its annual requirements, with the balance being sourced from contract farmers.

Commercial intermediate

Pig farms are found within the city boundaries of Nairobi (e.g. Karen and Kahawa), around Nairobi, in the Central Province, Central Rift Valley (around Nakuru), North Rift Valley (Eldoret, Kitale), parts of

Eastern Province, and a few in Western and Nyanza provinces. Most of these farms keep fewer than 2,000 pigs. They supply pigs to local butcherries, urban centres and pork processing factories – mainly Farmer’s Choice (FC).

Their involvement in the value chain ends either when they sell the finished pigs for slaughter outside the farm, or when they sell the meat in their butcherries after slaughtering them on the farm. These intermediate commercial farmers tend to use commercial feeds (mainly pig finishing meal) to finish the pigs. A few own factories where they produce their own feeds. Others buy the raw materials for home-made feed rations, which are usually cheaper and better than commercial feeds.

Small-scale intensive pig-raising

This system is common in the Central Province, Central Rift Valley, North Rift Valley, Narok and Eastern Provinces. There are a few smallholder intensive pig-raising systems in Busia, Bungoma and parts of Kisumu in Western and Nyanza respectively. The numbers of pigs kept in these systems vary, at any given time, from fewer than 10 to as many as 100 – the higher figures relating to commercial farmers. Sourcing good breeding material is a major challenge in these systems. There is an overuse of good boars, which leads to inbreeding, as the female offspring are sometimes mated with the only sire boar available.

Some commercial farmers around Nakuru, Nairobi and Thika control a further stage in the process by owning slaughter slabs and butcherries in these towns. They raise piglets, slaughter them and sell them at their own butcherries. Their slaughter slabs are also used by other local pork butcherries. Some of these farmers have recently set up and registered a trade association to champion the needs of pig farmers and to lobby for government support.

Free-range traditional systems

These systems can be found in areas where there are many subsistence, resource-poor farmers who adopted small-scale pig farming to improve their living standards. They characteristically supply pigs to local butcherries rather than to nearby urban areas. The finished pigs are small and underweight. The free-range system is characterized by high mortality rates, low offtake, low reproductive rates, minimal healthcare or supplementary feeding, lack of proper housing and high levels of inbreeding.

4.5.2 Supply of feed and services

For pig feed the situation is similar to that for poultry feed. The lack of good feed with constant quality contributes to the poor technical performance of intermediate and small commercial farms (Farmer’s choice has its a special formulation for its owned farm and a less luxurious formulation for its outgrowers).

Breeding animals are difficult to get because there are few breeding farms. Those that exist sell breeding stock at high prices. Popular breeds include Large White, Landrace and their crosses. A few Duroc are also available – used as terminal sires by Farmer’s Choice Ltd. in its three-way cross-breeding scheme. Breeding material is of Danish origin and is intended to produce bacon pigs. Other farms keep mainly Large White and Landrace crosses. These are sourced from Farmer’s Choice, large and small commercial farms. Exotic crosses are also common among the free-range/scavenging/roaming pig enterprises found in slum areas in major towns and cities in Kenya, and can be found in garbage dump sites, waste disposal pits and sewer disposal channels. Exotic cross-breeds are preferred by the market. Skin colour other than white attracts a penalty at most major slaughter facilities, especially if the colour is black.

There are no live pig markets in Kenya. Live pigs are traded on farmers’ premises. The farmer calls the trader, or traders visit the farmers, especially in the traditional free-range systems where traders move from village to village looking for pigs. Farmer’s Choice Limited does not buy live pigs. Farmers transport live pigs to the factory and are paid according to cold dressed weight (CDW) after slaughter.

4.5.3 Disease problems

African swine fever (ASF)

Contact between wild pigs and domestic pigs is one cause of ASF outbreaks. The virus is also transmitted by the soft tick *Ornithodoros moubata*. Outbreaks lead to close to 100% morbidity and extremely high mortality: surviving animals must be culled and destroyed. The recent outbreak in

Kenya originated in Busia and spread to all the other districts through pork and pork products. The outbreak of 2006–07 wiped out most of the free-range scavenging pigs at Nakuru, Eldoret and Kisumu garbage dump sites. Numbers are slowly building up again. A recent study has shown that 20–25% of pigs in the traditional free-range systems have antibodies against African swine fever (Okoth, unpublished). Keeping strict biosecurity is the only way to prevent the introduction of African swine fever since at the moment no vaccine is available

Foot-and-mouth disease

Due to the low vaccination coverage in cattle, regular outbreaks in cattle occur, which than can spread to pigs and cause high mortality especially in young pigs.

Porcine cysticercosis Porcine cysticercosis is the infection of pigs by larval stages of the human tapeworm *Taenia solium*. The tapeworm sheds eggs in faeces and these are picked up by pigs in areas where they are allowed to roam and scavenge, particularly where the human population does not use latrines. Humans get infected by eating raw or undercooked pork, allowing the larvae to reach human intestines and there develop into an adult tapeworm that starts laying eggs. Poor hygiene and sanitation may lead to humans ingesting the eggs of the *Taenia solium*. The larval stages lodge in various organs and lead to blindness. When they lodge in the brain they lead to a condition called neurocysticercosis (NCC), which is a major cause of acquired epilepsy and can be fatal.

4.5.4 SWOT analysis of the pig sector

Strengths:

- Capable of converting waste and by-products into high-value protein, especially suitable near urban centres.
- Low capital outlay to start up production.
- Good acceptance of pork in the market.

Weaknesses:

- Feed conversion rates are dramatically poor. There is a need for high quality genetics and adequate feed supplies to improve the efficiency and production results.
- Lack of sufficient veterinary services. Dedicated poultry or swine veterinarians. Basic laboratory infrastructure to ensure basic veterinary care. Independent quality control institutes.

Threats:

- Disease outbreaks, especially ASF and FMD.
- Increasingly poor productivity due to long-term inbreeding.
- Availability of maize at affordable prices for feed production.

Opportunities:

- Large need for knowhow: demonstration and training centres. Need for slaughterhouse for pigs in market channel competitive to Farmer's Choice. Establishment of pig value chains for fresh pork.

4.5.5 Possibilities for the Dutch agro-food complex

- Feed ingredients especially premixes to make rations adapted to the different animals on a pig farm.
- Pig genetics to improve production capacity, efficiency and slaughtering characteristics for fresh meat production.
- Knowledge transfer to teach good pig farming practices and to use modern insights into pig production (zootechnical as well as veterinary practice).

4.6 Rabbits

4.6.1 Overview of the various value chains

Like pig production, rabbit production in East Africa was introduced and promoted in colonial times by especially missions and practiced at schools with production facilities, from which the surrounding population would then get their breeding stock. Most rabbits in Kenya are kept in the smallholder sector, although there are some larger scale producers. Some of them are linked into an integration.²³ With the increasing meat prices, rabbits have become 'in' among middle class Kenyans who have a plot around their house. The price for breeding does is anything between KES 800 and 1500 (EUR 8–15 per head), whereas the meat goes at around KES 500–600/kg in the supermarkets. The Rabbit Breeders Association of Kenya (RABAK⁴) is a national club for domestic rabbit breeders. Its headquarters are in Thika. It promotes its own sustainability by assisting rabbit farmers in marketing, accessing loans, commercializing skins and distributing breeding stock. The association has over 2,500 registered members countrywide, the majority in Kiambu, Murang'a, Nyeri, Nairobi, Embu, Machakos, Nakuru, Meru, Tharaka Nithi and Athi River Counties, among others. The association serves both small-scale and commercial rabbit production. It develops training materials and sets up demonstrations.

Production of rabbit meat in Kenya

	000 heads					Tonnes				
Year	2000	2005	2010	2011	2012	2000	2005	2010	2011	2012
Rabbit	2100	2350	2650	2450	2500	2520	2820	3180	2940	3000

Source FAO stat

4.6.2 Statistical data on production, import and export

Rabbit statistical data as in all sectors with a high level of informal production and marketing can only be indicative. The FAO statistics show the presence of a considerable rabbit population in the country.

4.6.3 Animal disease and food safety issues

Besides the normal management diseases of coccidiosis and pasteurellosis and ear canker, which can all to a certain extent be controlled by good hygiene, rabbits in Kenya have recently been contracting rabbit haemorrhagic viral disease. A vaccine is available, but not yet in Kenya.

4.6.4 SWOT analysis of the rabbit sector

Strengths:

- Little demanding animal, which can be raised on smallholdings and even near houses on kitchen waste and some additional greens.
- Relatively free from diseases if kept clean.
- Can be kept in low-cost housing and requires little space as hutches can be piled.
- Ready meat supply to poor families.

Threats:

- Diseases, especially rabbit haemorrhagic viral

Weaknesses:

- Poorly developed value chain, which in a better supplied market might pose a problem with lack of markets and falling prices.
- Sector using many different breeds and crosses, so no uniformity and varying technical results, especially on the reproductive side.

Opportunities:

- Work towards a more standard product

² <http://www.rabbitrepublic.co.ke/>

³ <http://kerayicch.kbo.co.ke/Photo+Gallery>

⁴ <http://rabak.or.ke/>

- disease.
- Oversupply of the existing market if the expansion continues as reported by the various sources of information and the value chains not more developed.
 - Import from low cost production countries when Kenyans develop a taste for rabbit meat.

- through setting up breeding centres from where does and males are sold to breeders.
- Develop local production of cages and equipment to replace import.
 - Develop the value chain further and conduct promotion campaigns to popularize rabbit meat consumption.

4.6.5 Possibilities for the Dutch agro-food complex

- Possibilities are limited due to the small investment possibilities of the rabbit producers and a small rabbit supporting infrastructure in the Netherlands. However, involvement of the feed industry in combination with poultry and pig feed knowledge would be a possibility.
- Given the high level of inbreeding in Kenyan rabbit production, there is a high demand for new genetic input (breeding material).



5 Other parts of the value chain and supportive infrastructure

5.1 Slaughtering

A large variety of slaughterhouse facilities were observed during the field visit. They varied from marginally equipped overpopulated slaughterhouses in Dagoretti, the basically equipped not overcrowded Soision slaughterhouse Athinia in Mogoto, an original game slaughterhouse on-farm now cattle slaughterhouse, to the export certified slaughterhouse of the Farmer' Choice company. It is only in recent years that the private sector has entered the slaughterhouse sector, especially for ruminants. It used to be a government and parastatal activity and this ownership structure is also an explanation why the sector is in such dire straits. KMC has once again gone bankrupt (end of 2013) and with its obsolete installations dating back to the 1960s should not once again at high public cost become a stakeholder in the sector. There is need for new developments, ideas, approaches and operators.

Table 5.1

Categorization of slaughterhouse according to Meat Control Act 359

(Source: pers. com. from Dr Nicholas Ayore, chief food hygiene officer)

Cat	capacity	Area establishment	Presence of cooler and freezer	Sales area
Cat A:	>200 head of cattle a day and equivalent number of sheep	>2.5 ha	Obligatory	cooled product to whole territory of Kenya
Cat B:	50–200 head of cattle per day	>1.5 ha	Obligatory	cooled produced cooled in area of 50 km around slaughterhouse
Cat C:		>0.5 ha		Not allowed to transport outside town. Transport of warm product allowed

Cattle and small ruminants

Although slaughter facilities and processing have improved over the last 10 years – e.g. all slaughter facilities use now a captive bolt for stunning and have to have a knocking box by law, and people wear white coats, caps and gum boots (but still walk freely in and out of the facilities) – there is still a lot to do in the slaughtering, deboning, transport and retail to meet minimum standards of hygiene and public health and even more to meet international SPS standards. The design of the slaughterhouses is not adequate to the present needs and capacity and extensive remodelling and overhaul, if not new construction, will be required to meet the current international standards.

At the moment, eight slaughterhouses meet the standards for export (beef, sheep goats, pork, turkeys), but there is no actual export at the moment (slaughterhouses have recently undergone inspection in relation to export to Saudi Arabia).

The handling of wastewater and high-risk materials is a challenge in most slaughterhouses. A few have biogas systems in which waste products are digested, but also here effluent runs freely into the open, as it does in the other slaughterhouses.

Especially the development and maintenance of a cold chain is important: most meat is still being transported in galvanized steel boxes, painted white with a red stripe and the word 'meat' plus the registration number of the trader written on it, as it was in the colonial time. Most butcheries, especially in slums and high-density areas, do not have cool displays. Meat is sometimes kept in a fly-screened area, but most of the times it is in the open.



Figure 5.1 Export certified sheep and beef slaughterhouse of Farmer's Choice

The government plans to build four export slaughterhouses (Wajir, Garissa, Isiolo as part of the DFZ, and West Pokot) and 18 local slaughterhouses for cattle and small ruminants.

The government has the following strategy for the further development of slaughtering infrastructure:

1. Transform community slaughterhouses into private slaughterhouses.
2. Publicly owned slaughterhouses are rented to private companies.
3. Cooperatively owned and exploited slaughterhouses.
4. County government builds and runs slaughterhouses.

Option 3 is the preferred option of the Veterinary Services.

The Veterinary Services as the competent authority in the field of meat production feels that public-private partnerships offer the best chance to develop successful slaughterhouses in Kenya. So far the government has built a number of the abovementioned 18 slaughterhouses, but they are empty shells. The government restructuring from provinces into counties has complicated the matter of how to put these slaughterhouses to work.

The Meat Control Act 356 categorization rules of 2010 categorized the different slaughterhouses in Kenya and describes the requirements (Table 5.1). This categorization makes it difficult for specific value chains to transport their product to markets, unless animals are slaughtered in a category A slaughterhouse (channelling and transport of live animals over large distance). Officially, high income consumers in urban areas and tourists cannot be supplied from anything else but a category A slaughterhouse. There is a need to revise this law and make it more realistic and in line with modern requirements and needs.



Figure 5.2 Soison slaughterhouse in Mogoto

Pigs

There are four main slaughter facilities for pigs in Kenya:

Farmer's Choice Limited: Kenya's largest abattoir is located at Kamiti, on the outskirts of Nairobi.

Besides the large Kamiti slaughterhouse of Farmer's Choice, there are three others: Ndumboini Farm slaughterhouse, Lyntano slaughterhouse and Kabati slaughterhouse. These all have a slaughtering capacity of 15–50 animals per day. These slaughterhouses have basic facilities, and do partly service slaughter and partly slaughter of own pigs, which are sold to local butchers and pork restaurants. The remaining pigs are slaughtered on-farm in cramped, poorly equipped and limited hygienic conditions.

Simple pig slaughterhouses, preferably linked to local pig producers' associations, would become the place where all animals are slaughtered. This would allow for veterinary inspection and a better utilization of offal and by-products (e.g. blood meal).

Poultry

Several large and medium sized vertically integrated poultry processors have their own state-of-the-art poultry slaughterhouse, including processing plant. In these slaughterhouses, animals are slaughtered from the own integration as well as the animals from outgrower schemes/contract farms. A number of other poultry slaughterhouses are related to live bird markets in large cities such as Nairobi and Mombasa. Many clients, however, take their live birds home and slaughter them there. Besides these slaughterhouses, where 30% of broilers are slaughtered, the rest are slaughtered on-site at the primary farms and are brought as fresh (seldom cooled) chicken to, for example, the city market in Nairobi (Figure 5.3). Although more than 1,000 animals are slaughtered on a single day at these on-site slaughter places, they only have rudimentary facilities. Especially food hygiene, adequate cooling and waste management are issues of concern in these places. Most of the backyard chickens are slaughtered on-farm or at the consumer's home.



Figure 5.3 *Live bird sales in slums in Nairobi*

Meeting food safety standards is a precondition for the further growth and development of the poultry meat sector. This means that the various broiler producer associations must come up with a solution to the problem. Most changes in the meat sector in Kenya have been made by the government through legislation. If a ban is imposed on the way broilers are currently slaughtered on-farm, the associations could develop a mobile slaughter facility that moves from farm to farm. The larger farms should eventually create their own cold rooms (second-hand cooling containers were seen being used as cold stores), from which they supply the markets.

Rabbit

The Rabbit Breeders Association of Kenya (RABAK) has a rudimentary slaughterhouse where they slaughter animals from their members. However, only a fraction of the total rabbit meat production is

slaughtered here. The various rabbit production promotion organizations/integrators will have to develop adequate slaughter facilities.



Figure 5.4 RABAK.

Education and training:

Both slaughterhouses and the veterinary services stressed that there is a need to train slaughterhouse staff. At the moment there is no veterinary public health on the veterinary curriculum and no training of slaughterhouse staff outside Kenya in slaughterhouses that comply with all international requirements. There is training provided by an agricultural college on good hygiene practice, meat inspection (public health) and abattoir inspection (hygiene and management of abattoir). Slaughterhouses will have to prove that training has been followed and exams passed with good results as a prerequisite to get and/or maintain a slaughter license.

Main challenges in Kenyan slaughterhouses:

- Capacity building to support good slaughtering practices.
- Capacity building activities that focus on veterinary public health and slaughterhouse inspections.
- Being able to comply with clients' requirements in terms of food safety and quality: working GMP, GHP and HACCP systems that are audited and certified.
- Product development, better presentation and building up a system for tracking and tracing in due course.

5.1.1 Deboning, cutting and packaging

Also in Kenya, supermarketization is speeding up. This means that there is an increasing demand for deboned, cut and packed beef, preferably with cooking instructions and information on production, date of packaging and sell by date information. Supermarkets currently do some of this deboning. There is one specialized deboning company in Italian hands, which buys carcasses and produces products that are ready to cook and eat for the supermarket trade. There is enormous scope for deboning, cutting and packaging plants. Especially clean fleeced and well-portioned prime cuts are in

high demand by the hotel and restaurant trade, which now often depends on imported beef to meet its needs.

5.1.2 Distribution, cold chain and retail

Most meat in Kenya is transported in galvanized steel boxes on the back of pickup trucks. With increasing deboning and cutting outside the market or supermarket, this practice will have to change and cool transport with washable crates has to be introduced. Simple cool displays should become the new standard, even in high-density suburbs, perhaps even run on solar panels. Ready-to-cook/eat products (e.g. prepared kebabs, stuffed chicken or chicken breasts, smoked and cooked cold meat) should be gradually introduced. For this there is need for a practical training centre where butchers learn the fine art of making the more sophisticated meat products (see the chapter on training).

5.2 Possibilities for the Dutch agro-food complex

- Assist in the development of small-scale, preferably export-worthy slaughter facilities at the margins of the pastoral areas in collaboration with meat traders and county governments to upgrade current conditions of operation and improve food safety.
- Development of knowledge infrastructure on veterinary public health, GMP codes in slaughterhouses, training of management and midlevel staff in slaughterhouses.
- With an increasing demand and consumption of poultry meat the poultry industry will make investments in upgrading and expanding the production capacity in primary production, processing, logistics and marketing. This provides opportunities to improve the overall standard of production, quality and safety that can be supported.

5.3 Supportive infrastructure: veterinary and extension infrastructure in Kenya

5.3.1 Veterinary services

In the delivery of veterinary services to Kenyan livestock keepers, a distinction has to be made between the marginal areas and the high- and medium-potential areas.

The following animal delivery channels within Kenya's **marginal areas** can be distinguished:

- The traditional system of government veterinary professionals and their accompanying para-professionals, who exist on a reduced scale owing to decline in government funding. Their lack of mobility makes them ineffective.
- Community-based animal health workers (CBAHWs), who have been promoted by nongovernmental organizations (NGOs). CBAHWs do not fit within the existing legal and policy framework for animal health and do not have defined roles. Professional veterinarians therefore have reservations about the desirability of CBAHWs. For most communities, however, CBAHWs represent the only access they have to animal health services, besides treating animals themselves.
- The village veterinary drug shops (popularly known as agrovets) that supply drugs, often along with advice, to livestock keepers.
- A limited number of purely private veterinarians and para-veterinarians.
- Ethno-veterinary practices undertaken by some community members.

Producers in the **high- and medium-potential areas** keep crossbred and purebred animals, and herd health has increasingly been handled by **private practitioners**. Even in cases where government services are available, they are provided at a fee. In these areas, therefore, both beneficiaries and service providers well understand the concept of privatized animal health. In the arid and semi-arid lands, farmers keep predominantly indigenous breeds of animals under either pastoral or agropastoral production systems. Qualified veterinary personnel have not set up

private practices here, given the cost of establishment, the hardships of living in these areas and the low demand for their paid services in these areas. If left alone, the market for veterinary services in Kenya's marginal areas may evolve toward a situation in which clients demand low-quality services, with the risk of charlatans moving in. This situation is likely to produce suboptimal results for livestock keepers, animal health practitioners and society at large.^{xxi}

The task of the Kenyan government's Veterinary Department is to prevent and control animal diseases and pests in order to safeguard human health, improve animal welfare, increase livestock productivity, ensure high-quality livestock and their products, and facilitate domestic and international trade.^{xxii}

The increasing role of counties in governing the country also had its consequences for the provision of veterinary services. The devolvement has led to fragmentation and carries the risk of breaking the single line of command between CVO and the veterinarians in the field. All counties will now have to be approached individually with programmes to improve e.g. food safety assurance, meat inspection and safeguarding animal welfare and environmental protection in slaughterhouses. Central veterinary services will need assistance to take up this new role of coach and trainer of veterinarians who no longer fall hierarchically under central government veterinary services. In the international system of SPS measures, there is one competent authority, which logically is the National Veterinary Services: the devolution has undermined this.

Kenya is regularly confronted with outbreaks of foot-and-mouth disease (FMD). Up until 1986, vaccination was free for cattle and about 80% coverage was achieved. Small ruminants were not vaccinated. The government then introduced costs recovery and coverage rates dropped to around 10% and remain low due to the cost of the vaccine, which contains O, A, SAT1 and SAT2 serotypes. After confirmation of an FMD infection, a general quarantine is proclaimed and the markets are closed and sales of animals and animal products are prohibited. Ring vaccination is undertaken by government officers around outbreaks. However, restricting animal movements is difficult to monitor and communal grazing often leads to local spread. Furthermore, pastoral herdsmen move their herds and flocks over large areas grazing traditional lands, and these herds often spread FMD infection as few farms have secure boundary fencing.

To assist the Kenyan government in upgrading its veterinary service, the **OIE** conducted a number of missions that resulted in the PVS Evaluation of the Performance of Veterinary Services and a gap analysis of the veterinary services in Kenya. Unfortunately the reports of the assessment are not publicly available. These reports identify the issues and give suggestions for investment plans to overcome or at least alleviate the problems.

Extension services

The extension service is one of the priority instruments in the agricultural sector to assist resource-poor farmers to improve and increase their production within core poverty alleviation programmes. Whereas in the past the government was responsible for providing all of it at no cost to the farmers, extension is now broadly seen as a complex system whereby services are provided by a range of private and public sector entities. Kenya's small farmers had traditionally benefited from two major types of extension systems.

The first is the **government extension system**. Since independence, the ministry in charge of agriculture has played a leading role in agricultural extension services, focusing mainly on food crops. The government and its donors have tried a number of extension models and styles, including progressive or model farmer approach, integrated agricultural rural development approach, farm management, training and visit (T&V), attachment of officers to organizations, farming systems approaches and the farmer field school (FFS) principle, one of the most recent approaches. These approaches have had varying levels of success. Following the implementation of structural adjustment programmes (SAPs) in the 1980s, budgetary allocations for extension services declined from about 6% of the overall annual government budget in the two decades after independence to less than 2% currently. The traditional public extension system was perceived as out-dated, top-down, paternalistic, uniform (one-size-fits-all), inflexible, subject to bureaucratic inefficiencies and therefore unable to cope with the dynamic demands of modern agriculture.

The second type of extension system includes the **commodity-based systems** run by government parastatals, outgrower companies, and cooperatives. The commodity-based extension deals mainly, but not exclusively with commercial crops such as coffee, tea, pyrethrum and sisal. These extension services are deliberately motivated by profits, and tend to work well when both the firm and the farmers clearly benefit from the extension expenditures.

As a result of flaws in the public extension system, a third type of extension service has emerged: the **privatized agricultural extension initiatives** provided by private companies, NGOs, community-based organizations (CBOs) and faith-based organizations (FBOs). Private extension provision is generally skewed towards well-endowed regions and high-value crops. Remote areas and poor producers – especially those growing low-value crops with little marketable surplus – are poorly served. One interesting example related to livestock is I-COW (<http://icow.co.ke/>), an electronic advisory system with SMS messages, Q & A facility and – most importantly – an electronic cow calendar, which can alert farmers when to check for heat and when to dry off a cow. It assists in identifying an inseminator or veterinarian nearby. It is an example of how modern communication tools can revolutionize farm advisory services and extension.

The institutional and functional changes spelled out in Vision 2030, and the Agricultural Sector Development Strategy 2010–2020 (ASDS), emphasize the need to improve extension system delivery. Historically, the country has used various extension management systems with varying degrees of success. These approaches had weaknesses: they were top-down and prescriptive with high demand on human, capital and financial resources. The Kenyan government is addressing a number of challenges in extension management and extension services delivery which include: developing private sector operated extension services to complement public extension services; commercializing and privatizing public extension services without compromising public interest; addressing institutional weaknesses in capacity building and technology development and dissemination; addressing weaknesses in research–extension–clientele linkages; packaging and disseminating technologies; and creating functioning institutional frameworks to coordinate and provide linkages among stakeholders. During the country visit it became clear that farmers have a strong need for advice and information, often incidental, individual and on the spot. Classical extension systems cannot provide this and new forms have to be found. I-Cow is an example of what is possible. Demonstration and training centres, run by the integrator or processor (e.g. a smallholder dairy unit for training and demonstration run by the dairy purchasing milk in that area), would all form alternative approaches to formalized extension services, which have proven to be costly and in the end to change from an instrument into a purpose of its own. There is need to talk about best and worse practices, establishing value chain concepts and defining one's role and place in it, strengthening producer cooperation networks and knowing market demands. All of these have in the past hardly been covered in the classical transfer of technology extension approaches.

Initiatives by commercial companies in the pig and the poultry sector

In both the pig and the poultry sector, initiatives by partly integrated producers to extend their services with extension activities were seen. The primary objective of this is to improve the quality of the final product they receive back from their outgrowers and to ensure the proper use of their production inputs (feed, DOC, etc.). Examples of this:

The initiative by **Brade Gate Poultry Industries** of Nyeri, a major investor in the poultry industry in Kenya. The firm has interests in the entire circle of poultry production, from breeding, hatchery, broilers and layers, as well as processing and feed milling. It also has subsidiaries in hotels and financing for poultry farmers. Recently, having noted a gap in the education of farmers, the firm established a middle level college: the Bradegate International College of Poultry Science (BIC). It will offer training at all levels of poultry production, from simple skills to certificate, diploma and, eventually, degree level. This form of training is not offered anywhere else in Kenya. The Kenyan higher education system only offers training in general animal health and production, in which poultry receive inadequate attention.

In the pig sector, **Farmer's Choice** established a demonstration farm on its Kamiti Farm. The basic idea behind this initiative is to show interested farmers best practices on veterinary and housing issues. Farmer's Choice wants to specifically address women, since it considers women to be better pig farmers than men.

Latia Resource Center in Isinya aims at providing training and demonstrations for the emerging entrepreneurial farmer: trainees work on the centre's farm with dairy cattle and goats, pigs, poultry, rabbits and crop production. The impact of this centre in the Maasai community has been large: they have now formed an association of over 100 Maasai (mainly women) who produce slaughter pigs after the last droughts killed off their cattle, goats and sheep. Men are increasingly realizing that this form of livestock production is less dependent on rains and the availability of increasingly scarce grazing.

5.4 Laboratory infrastructure and related services

Access to further diagnostics or laboratory infrastructure is limited in Kenya. Although veterinary faculties and research institutes provide veterinary diagnostic services, there is a need for a further developed veterinary infrastructure. Animal health issues are often seen as important hurdles that have to be overcome in the development of livestock sectors. Partly integrated companies in the poultry sector are adding veterinary services to their extension portfolios, since the medium sized farms are in need of support. A model with first-line and second-line diagnostics – the Dutch example of animal health services – might be especially beneficial for these medium sized farms.

6 Identified opportunities for Dutch agribusiness in the Kenyan meat sector

6.1 In the primary production

6.1.1 Animals

In general, the Kenyan livestock sector has a wide range of both local and imported breeds. Especially in the case of ruminants the existing local and localized breeds are superior under the prevailing conditions. In the dairy sector, most major international genetics companies are represented in Kenya (ALTA, WWS, SEMEX and ABS, to name just a few) besides smaller initiatives to introduce Fleckvieh, learn about ET, MOET and the collection and storage of semen by the French Livestock Institute. For sheep and goats the breeds present can hardly be improved by any foreign genetics. Probably some imports of dairy goat genetics, if a serious dairy goat keeper with the potential and possibilities can be identified.

In the fields of pig production: besides the old British pig genetics of the colonial time and after Farmer's Choice has brought Danish genetics, which is mainly used in processing pigs. With the upcoming fresh pork markets there is place for hardy, heavier pig varieties with good mothering characteristics. There is no active pig producers' association, but if such an association were to be formed it could take charge of a breeding nucleus to support its members with superior breeding material. At the moment the performance of the existing pigs is low due not only to suboptimal management but also to the genetics and inbreeding.

Commercial poultry production is fully based on the few remaining commercial poultry breeding companies and there is little to add.

For the family poultry sector the old dual-purpose breeds might have a future for improved scavenging systems. An example of such a line is Bovan Nera's, with the added advantage of sex-linked colouring of DOCs, making for easy sexing.

The rabbit sector does not make use of the various commercially developed hybrid varieties. With the established rabbit breeding integrators, a programme to introduce these varieties could be set up. There is need for knowledge on good farming practices that will focus on implementing better management to increase productivity and establishing effective biosecurity measures that reduce the risk of disease. The main driver for farmers to participate and adopt the recommended practices will be higher productivity and production and thus income.

Through trainer of trainer schemes, integrator staff and extension services will become involved in the development of the sector. Where necessary, the quality of the input materials (e.g. feed and water quality) need to be improved. This will create commercial opportunities for the poultry and swine supply industry to get more involved in business in Kenya. Through improved levels of animal health, nutrition and growth, the overall animal welfare will enhance.

6.2 Forage, fodder and feed

Kenya has a livestock production system in which grass production has always been paid its due respect. The Netherlands in the 1970s supported the development of Rhodes grass and Setaria varieties, which are still in use today. These form the backbone of the ruminant production in the Rift Valley and other slightly drier areas; in the highlands, kikuyu for grazing and Napier fodder for cut and carry systems are the backbone of the production system.

The Netherlands has wide knowledge of and experience in equipment for hay and silage making. Specialized maize varieties for silage making are not always available in Kenya, but these are very zone specific. The Kenya livestock industry will have to switch its dependency on maize to other ingredients, such as cassava and sorghum. Research has produced more disease-resistant varieties of

both crops and only if Kenya can expand the area under sorghum and cassava in agro-ecological zones 3 and 4 will there hopefully be sufficient energy ingredients for the growing poultry and pig industry. Especially the processing of sorghum and cassava needs technology that is currently not available in Kenya.

The feed milling industry is currently using premixes from different countries and sources. The technical results of their product are often not consistent and often disappointing. By the time farmers notice, their broilers are already behind the expected weight gain.

6.3 Improve slaughtering of cattle and small ruminants in urban centres

All current slaughtering facilities in Kenya for the urban areas are old and in many cases obsolete, due to their now being in rather than on the outskirts of towns and settlements and would require a massive programme to improve. In most cases this will mean relocation, developing all infrastructure required (water, roads, electricity, waste management and drainage) and considerable investments in new installations. The Kenyan government has in its development plans the construction of 18 local slaughterhouses and an additional four export slaughterhouses.

The case of Nairobi Dagoretti – where four privately run slaughterhouses do their business now in the middle of a built up area next to a food market with extremely poor access and further facilities – is a case in point of the above mentioned. The development of an alternative would require a process of extensive consultation between government and the private sector involved and reaching consensus on what, where, how and with whom. Minimum requirements would have to be set based on planological criteria, environmental requirements, food safety and quality assurance, and people's and animals' welfare and wellbeing. From this a design should come forth, not only of the physical infrastructure, but also of the institutional and organizational infrastructure of such a development. The planners will need to have access to good statistics and prognosis of production and consumption/commercialization of red meat so that the expected growth in production and consumption will be incorporated, information on how such a turnkey project should be organized, the technical knowhow to design and equip, and the financial administrative knowledge how to finance and manage the whole undertaking.

Such a massive **public-private partnership** is fairly new to the Kenyan situation; the Netherlands agribusiness sector has such experience and all the required technical knowledge to offer the Nairobi city council, veterinary services, and the owners of the slaughter sheds and the meat traders the support to develop such a PPP and an integral plan for the development of a modern red meat production centre that meets all modern requirements, that adds value to the offal that now goes largely unutilized (e.g. production blood, bone, bone/meat meal), responsible disposal of high-risk materials (currently no incinerator), production of casings for the sausage industry, etc. Such a 'ruminants industrial park' should contain a dirty side where animals arrive, good layerage or even trading pens, water purification, solid waste processing, and truck wash and disinfection sites are located. On the clean side are the meat and meat products outlets, both in wholesale and retail, and a butchers' practical training facility for instruction in basic hygiene, deboning and preparation of cuts. For those who are aware of the current situation in Dagoretti and the meat outlets, especially in the high-density suburbs/slums, know that this will be a quantum leap, but developments in Kenya happen very fast. Consumers will increasingly demand guarantees and quality levels that the current setup of the industry cannot provide.

A similar situation exists in Kiserian, mainly for small ruminants, Ngong and a number of other suburbs. Government policies could promote slaughter in up-country slaughterhouses and consecutive transport of carcasses to wholesale/deboning plants in the urban areas; this would require a national master plan for the future of the meat industry. This statement serves as an illustration that the Kenya meat industry requires a master plan, in which supply and demand are matched, quality and safety are assured, and maximum value addition and minimal environmental impact will be achieved. Suggestions for institutional and government partners in the Netherlands to spearhead such an activity could be PVE (or what is left of it),^{xxiii} Slagers Vakschool,^{xxiv} Bond van Veehandelaren or Vee Logistiek Nederland,^{xxv} NVWA^{xxvi} and other interested parties.



6.4 Development of a high-quality, high-value beef value chain

Kenya has a small number of commercial ranches concentrated in the belt running from Laikipia Plateau north of Mount Kenya through the Rift Valley along the Nairobi–Mombasa railway line to the coast. These ranches largely use Kenyan Boran cattle, which are known for their superb carcasses and meat quality. Especially in Laikipia, when due to the increasing insecurity in the north game started migrating south, destroying the traditional fenced paddock ranching system, a new system of livestock keeping in harmony with nature has developed: conservancies, which keep their livestock together with game animals. The business model has become game viewing/tourism and livestock production. At the beginning of this century, the Laikipia Ranchers Association developed plans for a slaughterhouse for the area, but never realized it.

The Kenya Boran cattle, raised exclusively in conservancies, together with wildlife, forms a brandable product for which premium prices in the local high-end market and, in future, perhaps even in the export markets can be achieved. However, there will have to be a category A slaughterhouse (throughput capacity > 200/day, total area of 2.5 ha, stone-walled with cold storage facilities) to allow this beef to reach the urban markets legally. Although currently it does go to the urban markets, this is largely undocumented and not according to the rules. Slaughter in adequate but very basic on-farm slaughterhouses can then be changed into service slaughter in a well-equipped and supervised slaughterhouse. In this way the ranchers can gain higher returns from their livestock segment of the conservancy activities through branding, better use and quality of by-products.

Also the current initiatives to include the cattle of pastoralists in an improved production system, whereby growing stock is quarantined and fattened on conservancies with sufficient grazing resources, would benefit from such developments: if the slaughterhouse is within trekking distance, these animals could be slaughtered on special days to make the slaughterhouse economically feasible and reach a sufficiently high throughput.

With training in carcass handling, cutting and deboning, even preparation of ready-to-cook and/or ready-to-eat products and packaging, cold storage and a modern distribution system, more value can be added to the carcasses, local employment can be created, and quality and safety guarantees can

be given. All should be developed in such a way that if/when Kenya gets easier access to export markets for beef, this plant and its SOPs and quality and safety assurance measures are ready for inspection and approval by the respective responsible authorities.

6.5 Development and promotion of alternative poultry meat value chains

Currently only 80% of all poultry meat comes from the formal sector; the remainder comes from the smallholder poultry 'industry'. These birds are usually sold live in live bird markets and command a price that is twice (and during the festive season, 2.5-3 times) as high as that of commercial broilers (the same situation occurs with eggs: eggs that are 60–75% of the weight of an egg from modern hybrid birds fetch 50% more). The biggest problem for local chickens is the annual outbreaks of NVD. Vaccination campaigns have had mixed results, because they are usually started at the time of the outbreak, too late to build protection but in time for people to associate the vaccination with the outbreak, so many farmers do not believe in vaccination. The thermostable I2 vaccine can be locally produced and the various extension networks promote its use (3 times per year eye-drop or mixed with feed or water, booster in case of outbreak). The local poultry industry can and should also include turkeys, ducks (mallard, Peking, Muscovy) and guinea fowl. The current quail boom in Kenya will soon be over and production will return to normal.

The current live bird markets in Nairobi are a public health hazard: nothing can be disinfected and the markets are near to where people live, where birds are also stored overnight for safekeeping. A fenced live bird market with artisanal slaughtering facilities, where no bird leaves the market alive and with some semblance of biosecurity measures, cleaning and disinfection, plucking machines to reduce contact, etc. would go a long way to improve this issue. The local poultry keepers' associations could run such markets, charging a levy and providing 'free' vaccine to the production sector: in this way, indirect cost recovery will facilitate the vaccination of chickens against NVD, probably fowl cholera and at a later stage fowl pox as the major problems in traditional poultry.

6.6 Use of calf milk replacer and development of a veal value chain

According to the 2009 livestock census, in that year Kenya had 3,355,404 head of cattle of exotic breeds. It is likely that most of these animals are cross-breeds with various degrees of exotic genes. In 1991, there were according to the ministry 3,065,000, showing a steady increase. If for argument's sake we set this Figure now at 3,500,000, that means that per year in Kenya – assuming a calving rate of between 50 and 60% per year – 1,750,000 to 1,950,000 bull calves are born. Most of these bull calves stay on the farm, where during their first months they compete with the farmer for the milk to be sold and later with their dams for the scarce feed and fodder resources. Growth rates of such calves are extremely poor and always lead to stunted animals, which remain on-farm to satisfy a sudden need for cash, when they will be sold in this poor state and thus command an extremely low price. Also replacement heifer calves usually make a poor start in life as farmers tend to economize also on the milk provided to these calves to be able to sell more.

Milk replacer can play a role in increasing farmers' income by freeing more milk for sale and ensuring that calves get a good start in life. A very strong extension programme would be needed to promote proper colostrum feeding (the 3 'V's in Dutch: *vroeg* (just after birth), *veel* (ample quantity) and *vaak* (often)) and an intensive feeding programme with milk replacer, teaching calves to drink from buckets and prepare the bull calves for veal production. Kenyans have a cultural barrier to eating extremely young animals. For this reason, bobby veal is not being used. The best choice would be rose veal production. Such an activity is best developed in Central Province, where more than half the cross-bred and pure exotic animals are kept. An intensive campaign to promote and teach the use of milk replacer would be required and a veal producer would need to be supported to build up his enterprise. This speciality value chain would need to find a market in the high-end markets in Nairobi, Mombasa and the coast (supermarkets, hotels and restaurants).

The introduction of milk replacer would free up more fresh milk for sale and processing, give replacement heifer calves a better start in life, add value to bull calves, and free up scarce fodder and feed resources especially on the smallholder dairy farms for the dairy cows, thus contributing to higher reproduction and production rates. This market for 1- or 2-week-old calves that have good maternal immunity and are capable of drinking from a bucket will increase the prices for such calves and convince farmers to sell these bull calves. The company engaging in this will have to develop a strong and proactive advisory service, which through dairy farmers' associations and milk collection points, dairy plants and the government livestock services approaches the dairy farmers to bring about this change in current practices.

6.7 Development of value chain

Support the development or further development of value chains at all levels and in all sectors.

- Branded high-quality beef produced on game ranches/conservancies; prepare for a possible future lifting of the ban on the utilization of game meat from such conservancies.
- Improvement of the small ruminant value chain through the construction of regional small ruminants markets, holding grounds and slaughtering facilities that meet standards for animal welfare, the environment, and food safety and hygiene.
- Increased production and marketing of indigenous chicken through better NVD control, improving on live bird markets and hygienic artisanal slaughter facilities.
- Improve the planning, slaughter and marketing of broilers from medium sized producers that are not part of a vertically integrated column.
- Establishment of pig value chains for fresh pork. Need for small rural pig slaughterhouses for the fresh pork value chain to build an alternative to the current monopoly position of the highly integrated Farmer's Choice processed pork value chain.
- Strengthen the role of the various producer associations to become value chain managers and promote cooperation with their Dutch counterparts.

6.8 Large need for modern knowhow

Demonstration and training centres to demonstrate advanced and practical solutions with substantive ambitions in relation to the issues and challenges identified in the all the Kenyan livestock sectors:

- Practical pig production demonstration and training centres, linked to the main integrator and independent, to improve technical results.
- Practical broiler and layer production demonstration and training centres linked to the major integrators and independent.
- Recently, having noted a gap in education of farmers, Brade Gate established a middle level college: the International College of Poultry Science (BIC). It will offer training at all levels of poultry production, from simple skills to certificate, diploma and, eventually, degree level. This form of training is not offered anywhere else in Kenya. The Kenyan higher education system only offers training in general animal health and production, in which poultry receives inadequate attention.
- Training and demonstration slaughterhouse for the introduction of GMP, GHP and in the long run HACCP into the meat sector; butcher training to meet increasing product quality and presentation demands of the upcoming middle class.

6.9 Strengthening the national veterinary services

- Strengthen the Veterinary Faculty's training programmes for dedicated/specialized poultry and swine veterinarians.
- Develop and improve both public and private laboratory infrastructure to ensure basic veterinary care, high-quality diagnostics and a contribution towards increased food safety assurance.
- Improve the availability of quality vaccines and reduce the use of antibiotics.

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- Strengthen the various producers' associations to develop sector programmes for disease control and eradication.
 - Develop independent quality control institutes, initially funded by government/donors but eventually paid for by both public and private sector.

6.10 Improved genetics

- Especially in pig and rabbit production, input of new genetics is needed since small and medium sized producers have all started up from the same genetic material and are now, due to uncontrolled breeding, confronted with a narrow genetic base leading to inbreeding and reduced vigour and productivity.

6.11 Feed milling industry

- The many small and medium-scale feed mills need a source of information and consultation to update their knowledge and information gap.
- Good quality premixes to improve local feed stuffs (alternatives for maize).

6.12 Dutch–Kenyan agribusiness collaboration

- Create platforms for more effective business cooperation between Kenyan and Dutch businesses within Kenya with an information, demonstration and service centre representing the interests of the Dutch agribusiness industry.
- Create and strengthen business cooperation between partners in the same value chain in the Netherlands to be more successful in acquiring business in Kenya. Example initiatives are the Dutch Poultry Centre (DPC)^{xxvii} or FoodTechAfrica.^{xxviii}
- Promote mutual exchange programmes at farming, trade and industry level to increase knowledge levels of one another's production systems and conditions and build mutual understanding.^{xxxxxx}

6.13 Liaison with other initiatives in the sector

In addition to the various public and private sector stakeholders listed in the paragraph above, it is essential that the programme is also well linked with other donor-supported initiatives and developments in the sector.

7 Concluding remarks

Kenya has a vibrant economy in which the SME sector plays an important role. Many multinational companies are present in Kenya. Globalization has widened the offer of supplies as well as knowhow and technical support beyond the traditional suppliers from the west. With an increasing presence of companies from rapidly emerging economies, which with the support of their governments also get actively involved in production and processing, it is important for the Dutch agribusiness sector to develop a unique strategy that will guarantee and strengthen its presence within the Kenyan economy.

The horticulture sector has presented a holistic approach, in which installations, equipment, planting material, knowhow, quality control and marketing channels have been offered. The effect has been tremendous. The livestock sector will also need to develop a holistic approach towards the Kenyan meat sector, whereby the thinking is in terms of competitiveness, customer demand, food safety, environment, animal welfare and working efficiently with scarce resources to avoid competition with basic human nutrition. This means that the products and solutions offered to Kenyan agribusiness should be holistic, integrated and address all issues to develop results-oriented socially responsible and clean production systems. In essence, the equipment, systems and solutions offered should be aimed not only at increasing production levels, but also at resolving and improving the total production system, meeting not only the requirements for producers and processors/traders, but also the demands of consumers and society at large.

The Dutch agribusiness sector has developed these skills and this capacity. Based on this home-based experience and experience all over the world in different conditions of climate, scale of production and market circumstances, Dutch agribusiness can make a positive contribution towards the further development and strengthening of the various meat value chains in Kenya: to develop viable models for the domestic production and consumption of affordable, nutritious and safe animal-based products.



Relevant contacts

Cattle and Sheep

RVDT technology farm/Deloraine estates Nakuru David K. Cheruiyot Groups farms manager
technologyfarm@yahoo.com
Kenya livestock breeders Organization (www.klbo.co.ke) Leonard M. Mukhebi, ICT administrator,
mukhebi@klbo.co.ke
Olepejeta conservancy, www.olepejetaconservancy.org Giles Prettejohn, Livestock Manager,
giles.prettejohn@olepejetaconservancy.org

Poultry

Research institute KARI Naivasha:
Ann M. Wachira (animal scientist) karipoultry@gmail.com
Dr Thomas Muetya muasyakt@yahoo.com
Kenya Poultry breeders' Association: Dr Humphrey C.W. Mbugua Technical adviser
hcwmbugua@yahoo.com
Kenya Poultry breeders Association (KEPOFA) Wairimu Kariuki Board member/ National Chair,
kepofakuku@yahoo.com
Arthur John Barasa Business Development Officer abarassa@live.com
Broiler producers of Kenya:
Monica W. Kariuki, director Nyeri Kenchic Inn/Mount, monicaicel@gmail.com
Eric Murayori, muranyori@yahoo.com
Benson Muriruri, benchicproducts@yahoo.com
Brade Gate Poultry Industries, Humphrey Mwangi Group General Manager,
humphrey.mwangi@bradegatepoultry.com

Kenbrid Farms, George A. Miheso, kenbrid@kenbrid.
Daniel Muthanji Muguku, proprietor Ngong Muguku Farm 0722764371 danmuguku@hotmail.com

Swine

Christine Mosoti: Consultant in the pig value chain PO Box 19928-00100. Nairobi, Kenya
drchristinekendi@gmail.com Mobile: +254 722 337 609
Farmer's Choice (www.Farmerschoice.co.ke):
James F.T. Taylor, managing director JTaylor@farmerschoice.co.ke
Niels Engstrom, Quality Assurance NEngstrom@farmerschoice.co.ke
Cynthia Makena, director Nalai Farm (www.nalaifarm.com incl. pork restaurants)
cynthia@nalaifarm.com also president of Porkstop info@porkstop.org

Rabbits

Rabbit breeders association of Kenya (RABAK) (www.rabak.or.ke) Peter Waiganjo chairman
info@rabak.or.ke
Government
Department of Veterinary Service
Dr Nicholas Ayore, chief food hygiene officer, nicholassayore@gmail.com
Dutch embassy <http://kenia.nlembassy.org>
Bert Rikken, Agricultural Counsellor, Embassy of the Kingdom of the Netherlands, Riverside Lane off
Riverside Drive, Nairobi Kenya, bert.rikken@minbuza.nl
Marnix Sanderse, Agricultural Assistant Office of the Agricultural Counsellor, Embassy of the Kingdom of the
Netherlands, Riverside Lane off Riverside Drive, Nairobi Kenya, T + 254 20 4288 232,
marnix.sanderse@minbuza.nl,

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LEI Wageningen UR
P.O. Box 29703
2502 LS Den Haag
The Netherlands
E publicatie.lei@wur.nl
www.wageningenUR.nl/lei

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