



Kingdom of the Netherlands



Poultry Sector Analysis Rwanda

based on the Poultry Learning Event 2019



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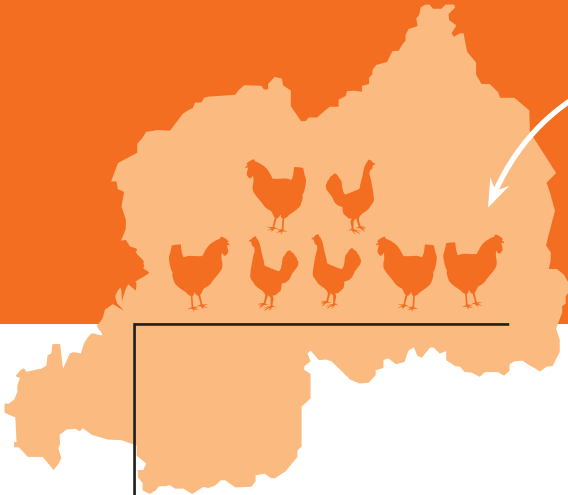
Contents

| | |
|---|-----------|
| FACT SHEET POULTRY SECTOR IN RWANDA | 3 |
| INTRODUCTION | 4 |
| Rwandan context | 5 |
| Development of the poultry sector in Rwanda | 5 |
| THE POULTRY INDUSTRY IN RWANDA | 6 |
| Broiler poultry in Rwanda | 7 |
| Layer poultry in Rwanda | 8 |
| INPUTS AND SERVICES | 9 |
| Day old chicks | 10 |
| Chicken breeds | 10 |
| Animal feeds | 10 |
| Feeding equipment | 11 |
| Biosecurity, animal health & veterinary services | 12 |
| Access to finance | 12 |
| MARKETS AND TRADE | 13 |
| Domestic market | 14 |
| Import and export | 15 |
| OVERVIEW OF ACTORS OF THE POULTRY INDUSTRY | 16 |
| Private sector | 17 |
| Public sector | 17 |
| CHALLENGES AND OPPORTUNITIES | 18 |
| Challenges | 19 |
| Opportunities | 20 |
| Conclusion | 21 |
| REFERENCES | 22 |
| ANNEX 1 | 23 |

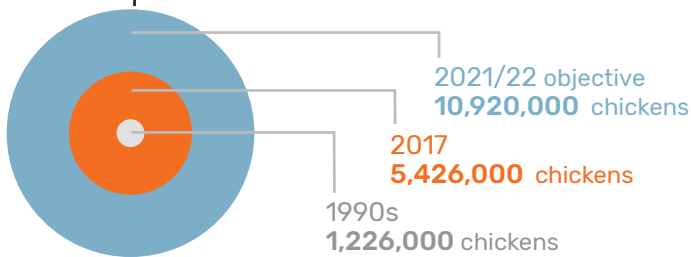


TRAIDE

Fact sheet Poultry sector in Rwanda



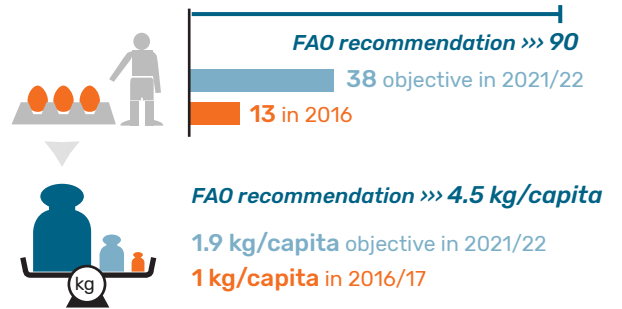
currently **5-7 million chickens** are reared in Rwanda⁶



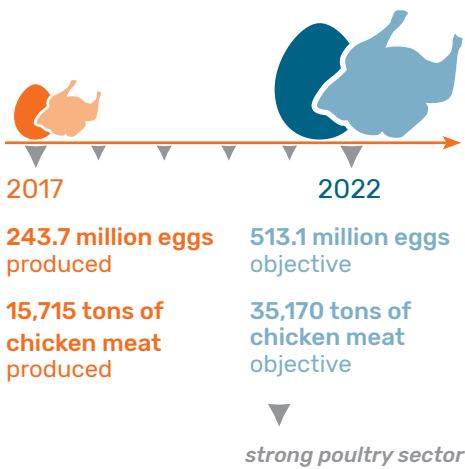
POULTRY SECTOR IMPORT:

- day-old chicks
- fertilized eggs
- ingredients for feeds

ANNUAL EGG CONSUMPTION PER CAPITA IN RWANDA⁶



CHICKEN MEAT AND EGG PRODUCTION⁶



IDENTIFIED OPPORTUNITIES IN THE POULTRY SECTOR:



TRAINING

In Rwanda, technical and/or specialized knowledge on poultry is often missing. Moreover, poultry farmers often lack management skills needed to successfully run their businesses. Considering the financial position of farmers, this is an opportunity for development cooperation rather than businesses.



FEED

Poultry feed is scarce, expensive and often of low quality. Increased regional imports of raw materials (maize), increased local production of raw materials – or new production facilities – would undoubtedly benefit the sector. There would be strong market demand for innovative substitutes for maize.



BREEDING AND GENETICS

The demand for day old chicks is high and is not met by local hatcheries. Day old chicks are mostly imported from Uganda and Europe. New hatcheries could offer an alternative to imports.



FINANCE

Improved access to and affordability of finance would highly benefit poultry farmers, allowing them to invest in their businesses and obtain a higher and better-quality production.



01.

Introduction



This document aims at providing insights in the current functioning of the poultry sector in Rwanda. Moreover, it identifies opportunities for foreign and local investors, focusing in particular on Dutch businesses operating in the sector. The report was written following the second edition of the Poultry Africa 2019 expo in Kigali, Rwanda.* Data was collected on the businesses of emerging farmers and a literature review was conducted. The results from data collection and literature review efforts have been compiled in this report.

RWANDAN CONTEXT

Rwanda has an agrarian economy; which constitutes a third of the country's GDP, accounts for almost half of the exports and employs two thirds of the population¹. The agricultural sector accounted for about 31% of the Rwandan Gross Domestic Product (GDP) in 2017², which was 9,509 billion RWF in 2018³ (equal to 9.26 billion Euro). The Government of Rwanda is planning on moving from low to middle income country and to be recognized as a knowledge-based economy. This structural transformation of the economy firstly requires increased productivity in the agricultural sector, followed by increased employment in other sectors.

The National Agricultural Policy published in 2018 outlines the development objectives of the Rwandan government. It aims at transforming the agricultural sector from a subsistence sector to a knowledge-based value creating sector. Modernization of the agricultural sector will be realized via the implementation of policies promoting technological upgrading, crop intensification, high-value commodities, land registration, organisation in farmer cooperatives and decentralization. Private sector-led development and foreign investments are also major components of the government strategy.

DEVELOPMENT OF THE POULTRY SECTOR IN RWANDA

The poultry sector in Eastern Africa has been substantially growing in the 5–7 years, driven by rapid urbanization, growing middle class in the region and growing demand for animal protein⁴. Similarly, the Rwandan poultry sector is growing rapidly along with the population and demand for animal protein. In Rwanda, poultry farming is prevalently rural and family-based, with 69% of all poultry farmers rearing one to two chickens⁵. Overtime, the sector has started to attract entrepreneurs that set up medium to large-scale farms, initiating the development of the commercial poultry system in Rwanda.

The Government of Rwanda recognizes the important and strategic role the poultry sector can play. Its vision for the sector is described in the Livestock Master Plan, published in 2017 and covers market prospects for the next 5 years. The objective is to transform the country's poultry industry from dominantly subsistence-based to knowledge-intensive and market-oriented. The aim is to raise the number of hens from 5.2 million in 2016 to 7.1 million in 2022⁶. The government wants to enhance productivity in three coexisting sub-systems: Improved Traditional Family Chicken (ITFC), Crossbreed Family Chicken (CFC) and Specialized Commercial Chicken (SP) production. This transformation would result in a more advanced poultry sector, better income for chicken growers and improved food and nutrition security for the Rwandan people.



In October 2019, AgriProFocus Rwanda, Resiliencia Rwanda (in the context of the TRAIDE Program) and PUM organized a poultry learning event that was attended by 47 farmers from seven different African countries: Burundi, Cameroon, Ethiopia, Rwanda, Tanzania, Uganda and Zambia. Field visits were organized to four different farms (broiler and layer) and workshops on biosecurity, feeding techniques and economic management were organised. The program was funded by the Netherlands Embassy in Kigali and RVO.

More info on the TRAIDE Program can be found at:
<https://resiliencebv.com/projects/traide-rwanda/>

More info on the Poultry Learning event can be found at:
<https://agriprofocus.com/poultry-masterclass-2019>



Table 1. AIMS FOR THE POULTRY SECTOR, ADAPTED FROM LIVESTOCK MASTER PLAN (SOURCE: ILRI *et al.*, 2017: 76)

| System(s) | Item (unit) | 2016/17 (baseline) | 2021/22 (target) | Change (%) |
|-----------------------------|-------------------------|--------------------|------------------|------------|
| Family poultry (ITFC & CFC) | Hens (million) | 5.2 | 7.07 | +35 % |
| | Eggs (thousands) | 83,370 | 190,754 | +129 % |
| | Chicken meat (MT) | 5,081 | 9,018 | +77 % |
| Commercial poultry (SP) | Layers (million) | 0.77 | 1.55 | +101 % |
| | Broilers (million) | 0.97 | 2.42 | +149 % |
| | Total chicken (million) | 1.74 | 3.97 | +128 % |

* See box above.



02.

The poultry industry in Rwanda



In Rwanda, there are two coexisting poultry production systems: traditional/rudimentary village poultry (which roughly corresponds to the aforementioned ITFC and CFC) versus commercial poultry. Traditional village poultry is the dominant system. The number of chickens reared in Rwanda varies between 5 and 7 million, of which only one million is part of the commercial production system⁶. In 2017, the total chicken meat production in the country counted for 15,715 tons, while total egg production counted for 243.7 million eggs⁶ (ca 8,160 tons).

Traditional system

The traditional system is relatively well-distributed throughout rural, urban and peri-urban areas. It is characterized by minimal biosecurity measures and by a direct connection between producers and consumers. In the village poultry system, farmers usually consume eggs and chicken meat themselves, or sell/give it to family and neighbours, often in exchange for other agricultural products they lack. Rudimentary village poultry is largely practiced by Rwandan families living in rural areas. In village poultry farming, flock size is usually between 2 and 20 birds per household, with the majority being below 10 chickens per household^{7,8}. Traditional poultry farmers initially buy the birds from neighbours or village markets. After that, replacement of flock almost exclusively happens with their own birds⁸. Cross breeding of local chicken with high performing improved/pure breed is very scarcely applied in traditional poultry, despite evident positive effects in terms of both meat and egg production⁸. Scavenging and free-range are by far the most diffused chicken farming systems amongst low cost poultry production. However, these traditional systems result in low production rates and high risks (that, if not properly addressed, can also impact commercial farms) linked to diseases, worms, pests and predators.

Commercial system

The commercial poultry sector in Rwanda still remains in the initial phase of development. It is characterized by larger flock sizes than village poultry and sales of chicken meat and eggs produced in the farm. Moreover, commercial farm implement (basic) biosecurity measures and make use of (semi)automatic feeding systems. In commercial poultry production, a distinction must be made between broiler poultry, aimed at chicken meat production, and layer poultry, aimed at egg production. In addition to selling meat and eggs, commercial poultry farms generate some income from selling chicken manure to farmers and the remains of birds processing (heads, innards and feet) to pig growers.

BROILER POULTRY IN RWANDA

In Rwanda, the majority of poultry farms are small (meaning their capacity is less than 1000 chickens) and medium, with a capacity of 1000–5000 chickens. There are approximately twenty-six small farms, eleven medium-size farms and five large-scale broiler poultry farms*.

In commercial broiler poultry, chickens are reared in open sided chicken houses, with five to ten chickens per square meters. After the first two weeks, chickens are usually moved to a different chicken house. When birds are forty-two/forty-three days old, they are slaughtered and the meat is processed, packaged and stored until sales. Some large-scale poultry farms are equipped with more facilities: hatcheries, feed mills, slaughterhouses and cold storages. It is not unusual for broiler farms with processing facilities to buy live chickens from smaller farmers, process them and sell the meat. Small-scale farmers often do not have the required financial resources or access to finance to invest in slaughtering facilities. Moreover, they have limited market connections. Therefore, they benefit from selling live chickens to farms that can process them and easily place the meat on the market.

During the Poultry Learning Event two broiler farms were visited: PEAL, one of the most advanced farms in Rwanda, and Bishenyi Chicken Farm, a smaller and more traditional farm. PEAL has a capacity of 50,000 chickens with all necessary facilities in-house: hatchery, feed mill and slaughtering and storage plants. They either import chicks or fertilized eggs (Cobb breed) that they hatch for twenty-one days and then move to chicken houses. After two weeks, chickens are transferred to a different house to be slaughtered when they reach forty-five days of age and a weight of 2.4/2.5 kg. The slaughtering plant can process up to four hundred birds per hour. Subsequently, the meat is stored in a 12T cold storage (also called a 'chiller') from zero to five degrees Celsius and moved to a 16T cold container (freezer). In addition to chicken rearing, PEAL has also set up an outgrowing scheme. They provide small farmers with inputs (chicks, feed and medication) and buy the fully-grown chickens, process them and sell the meat.

The second farm visit was to Bishenyi Chicken Farm, with a total capacity of 24,000 chickens. At the moment of the visit, the farm only hosted 6,000 chicks following the production cycle. Bishenyi imports chickens every two weeks, mostly from the Netherlands. They manually feed chicks non-stop for two weeks. Then, they proceed by feeding twice a day in the morning and afternoon. The farm owner also has a butchery and gives the farm manager indications of the required number and weight of chickens in order to plan the slaughtering process accordingly.

* Name, location and capacity of large-scale farms are reported below in the document.



LAYER POULTRY IN RWANDA

Similar to broiler farms, small and medium producers count for the vast majority of layer poultry farms in Rwanda. Approximately 210 small farms, 108 medium-size farms and 27 large-scale farms are active in the country*.

In commercial layer poultry, chicks are first reared in a rearing house for twelve to fourteen weeks and then transferred to a layer house until they reach around ninety weeks of age. It is common practice that, once their laying capacity is over, chickens are sold alive on local markets, to hotels and restaurants or to chicken processors.

During the Poultry Learning Event, participants visited two layers farms: Abusol and Isimbi. Abusol is the biggest and most advanced layer farm in Rwanda. They import day-old chicks (Isa Brown) from the Netherlands (ISA Export BV, under Hendrix Genetics) and rear them in houses with a

capacity of 8,000 chickens. At Abusol, a deep litter system is in place, meaning chicken dropping and bedding materials compost inside chicken houses. The manure is immediately removed from the property and sold to neighbouring farmers. Abusol has its own feed mill which they use to mix raw materials with nutrient formulas/supplements they buy. The raw materials used in the mix depends on availability and price. The peak production is roughly 80% and reaches peaks of 95% at seventeen weeks. Most eggs are exported and sold to the Democratic Republic of Congo (DRC) at 75 RWF each (0,08 Euro).

Isimbi has a capacity of 15,000 chickens and rears Isa Brown breed chicks they buy from Agrotech. Half of the flock at Isimbi is reared in deep litter houses, while the other half is kept in three tier battery cage systems. The latter system allows for a cleaner and easier collection of eggs. Feed is bought from Rwandan producers, and is a mix of premix, maize, soya, sunflower cake, and calcium. On average, production reaches 16,000 eggs per day. Eggs are then sold to local businesses: supermarkets, small shops and restaurants.

* Name, location and capacity of the five main large-scale farms are reported below in the document.



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03.

Inputs and services



DAY OLD CHICKS

Three large hatcheries are operational in Rwanda: Easyhatch Ltd, Rwanda-chick Ltd and Uzima Chicken. The latter was previously known as the Rubilizi National Hatchery, but it was privatized in 2017 following a three million USD investment from AgDevCo. This investment will enable Uzima Chicken to reach an annual production capacity of eight to ten million day-old chicks. Uzima Chicken is the only Rwandan producer of Sasso breed dual purpose chicks, and also offers Isa Brown breed. The parent lines of both breeds are imported from the Netherlands (Hendrix Genetics). Easyhatch offers chicks for both layers (Lohmann Brown) and broilers (Ross 308). The total production of day-old chicks in Rwanda reached 413,760 units in 2015⁹.

Despite the presence of local hatcheries, the demand of day-old chicks in Rwanda continues to exceed supply. Commercial farms often import day-old chicks or fertilized eggs, if they have hatching facilities. Most Rwandan commercial poultry farmers buy day old chicks from Belgium, the Netherlands, or Uganda^{10,9}. Uganda is a good source of inputs in terms of day-old chicks and chicken feed thanks to its scale of production. However, the Government of Rwanda seeks to prevent overdependency on imports. This objective can also explain the privatization of the national hatchery. In village poultry production, farmers mainly get their chickens from local markets or neighbours.

Currently, the main importers of day-old chicks are Agrotech Ltd and Biyinzika that, in 2015, imported approximately 276,000 and 420,000 day-old chicks⁹. The two companies import chicks and resell them to Rwandan farmers. Agrotech exclusively imports from Europe, mostly from Belgium, where they buy 20,000 layers and 3,000 broilers chicks per month⁹. Biyinzika buys 19,000 layers and 16,000 broilers every month from Uganda⁹. Combined, these two companies count for around 80% of all the imported day-old chicks in the country. For broiler poultry, an imported day-old chick costs between 540 and 900 RWF (0.52 and 0.87 Euro), while imported layer day-old chicks are sold at 790–1025 RWF⁹ (0.76 and 0.99 Euro).

CHICKEN BREEDS

In Rwanda, the most diffused breeds are the following:

- **Cobb 500 and Ross 308**
Both breeds are suitable for broiler and are usually imported from Uganda. Sometimes they're imported from Europe.
- **Kuroiler**
Hybrid dual purpose breed. It can produce up to 150 eggs per year and yield 2.5/3.5 kg of meat, outperforming indigenous breeds.
- **Isa Brown and Lohmann Brown**
Both breeds come from Belgium and are suitable for layer poultry. Chicken of these breeds start laying eggs after 6 months and live around 1.5 years. In ideal conditions, brown breeds chickens lay more than 400 eggs during their lifetime. In Rwanda Isa Brown yields about 360 eggs at 90 weeks of age. For both breeds, the price of a day-old chick is around 1200 RWF (1.16 Euro).

- **Sasso breed (France)**
The Sasso breed is suitable for both layer and broiler poultry. During their lifetime, they lay 200–300 eggs. The price of a Sasso day-old chick is 600 RWF (0.58 Euro). Farmers often start their business with Sasso breed chickens, as they are cheap and easy to manage.
- **Inyarwanda (Rwanda)**
Local breed suitable for layer poultry; chickens start laying eggs between 8 and 11 months.

In rudimentary village chicken farming, indigenous breeds are dominant. Local breeds have lower productivity but higher resistance to local diseases and lower quality feeds in comparison to European breeds. Hence, they are more suitable for the rudimentary systems. Dwarf breeds are widely diffused. These chickens are smaller and offer poor production and growth parameters. Nonetheless, dwarf breeds are characterized by high prolificacy, adaptability to harsh environmental and poor feeding conditions, and resistance to diseases. Improved exotic chickens produce more eggs and meat than indigenous chicken breeds, but they are not always compatible with tropical climate, e.g. because of high temperature, diseases and shortage of feed.

ANIMAL FEEDS

In Rwanda, farmers have two options to procure feed: they can either buy it or produce it. The required components for chicken feed are carbohydrates (e.g. maize, rice and wheat bran), protein (e.g. soy, cotton seed cake and fish meal) plus vitamins and minerals (concentrates). Farmers can either buy complete feed or a pre-mix, a concentrated formula that covers for the vitamins and minerals components. In the first case, the feed is already mixed and homogenous. In the second case, the farmer needs to properly mix the concentrate and raw materials (sources of carbohydrates and protein); otherwise there is a risk of obtaining non-homogeneous feed. This will result in non-homogeneous chicken growth because chickens will neglect eating the smaller parts with the micronutrients. This risk is also higher in case of (small) farmers who use shovels to mix the ingredients.

During different stages of life, chickens need different nutrients and thus need to be fed accordingly. In broiler poultry, three feeding phases can be identified:

1. **Starter feed**, from 0 to 10 days of age. In this first phase, it is crucial to have high quality tasty feed, that will establish a good appetite and maximize early growth. During the first 10 days, 22% of the intake should be crude protein.
2. **Grower feed**, from 11 to 25 days of age. Grower feed has less protein than starter feed and is more energy dense. The major sources of energy in poultry feeds are carbohydrates (such as corn and wheat) and fats (oils). The transition from starter to grower feed involves a change of texture from crumbs/mini-pellets to pellets, which should be as uniform as possible.
3. **Finisher feed**, from 26 days of age until slaughtering (if chickens are slaughtered later than the usual 42/43 days of age, a second finisher formula may be needed). Finisher feed usually accounts for the major volume and cost of feeding a broiler chicken.

In layer poultry, four different feeding stages are identified:

1. Starter: for the first ½ weeks after hatching; it is formulated to support organs' development and is dispensed in crumbles;
2. Grower: from the 5th until the 10th week; supports the development of the birds' skeleton and is dispensed in mash or crumbles;
3. Developer: from the 11th until the 16th week; it is dispensed in mash or bigger crumbles;
4. Pre-lay: after the 16th week, dispensed in mash.

At the moment, farmers report feed prices in Rwanda ranging from 375 and 410 RWF/kg (0.36 and 0.40 Euro). The price of animal feed in Rwanda is very high and is subject to major fluctuations. It was reported by Rwandan farmers that prices doubled in the course of one year. There are two main reasons why this is the case:

- Scarcity of raw materials and dependency on imports. The main reason for high and fluctuant prices of chicken feed in Rwanda is linked to the national (and regional) scarcity of raw materials for animal feed production. Such scarcity led to increased prices for both maize and soy. The situation is even worsened by export and import bans that countries in the region are implementing (e.g. Uganda, Tanzania and Zambia). Rwandans are therefore forced to import grains from abroad, sometimes from as far as Malawi, for very high prices.
- Lack of economies of scale. A multitude of feed producers operates in Rwanda, each at (relatively) small scales. In 2015, the total amount of feed produced in the country was 12,800 MT⁹. In the same year, Tanzania produced 58,400 MT of poultry feed, Uganda produced 284,520 MT and Kenya produced 654,260 MT⁴.
- Limited access to finance also subjects farmers to fluctuations in feed prices. Farmers reported they would like to invest in greater amounts of feed whenever prices drop. However, they do not have the financial resources to develop storage facilities or to purchase great amounts of feed at once.

In Rwanda, the main feed producers are PAFI, Gorilla Feed, PEAL and Zamura Feeds, that together account for sixty percent of the total production sold in the country¹⁰⁻⁹. The remaining forty percent is covered by ten other smaller non-specialized units⁹. Feed producers do not always follow the recommended formulas⁹, hence reducing the quality of the product. This may be due to the unavailability of certain components or to the lack of specific knowledge on poultry of the animal feed producer. The combination of high and fluctuant prices and low quality incentivizes farmers to prepare the feed themselves, with an average cost of 290 RWF/kg⁹ (0.28 Euro). Despite the aforementioned issues, the import of ready mixed poultry feed is low, while it is more common to import raw ingredients and mix them according to the demand⁹.

FEEDING EQUIPMENT

In order to feed and water their chickens, advanced commercial farms in Rwanda usually install feeders to be manually refilled and 'line' drinkers, as shown in the picture below.

Smaller poultry farms utilize non-fixed feeders that employees place on the ground in the chicken houses during the appropriate feeding time. This feeder positioning triggers serious health risks, as it implies high chances of faecal contamination in feed and consequent spread of diseases. According to the age (and size) of chickens, feeders must hover above the ground in order to prevent chickens from climbing on top. In village poultry farming, chickens mostly practice scavenging and are often fed on open feeder and drinkers, again resulting in serious risks of disease.





BIOSECURITY, ANIMAL HEALTH & VETERINARY SERVICES

The implementation of biosecurity measures continues to be a challenge for many Rwandan poultry farmers. Effective implementation is crucial for the prevention of diseases. Large-scale commercial farms usually have better biosecurity protocols in comparison to small poultry farms. In traditional village poultry production, biosecurity measures are almost non-existent, with, for instance, records of chickens living in family houses¹¹. These free-ranging village chickens pose a risk to poultry businesses nearby as they are continuously exposed and at risk of diseases, which they can spread.

In commercial poultry in Rwanda, farmers are generally aware regarding biosecurity measures and health risks. For instance, the large majority (80%) of the participants to the Poultry Learning Event declared they regularly use antibiotics and/or medicines in their farm. A larger percentage (83%) has equipped the farm with a hand washing station with soap and trained (77%) personnel and occasional workers to wash their hands frequently. However, such measures are not sufficient. When entering the different areas of a poultry farm, it is necessary that both workers and visitors follow precise measures, amongst which changing clothes (or wearing single use security gear), stepping in a disinfectant footbath before entering chicken houses and washing cars' wheels before allowing them in the premises. Moreover, chicken houses must be cleaned and disinfected regularly, especially (but not only) when a new batch of day-old chicks is brought in.

Chickens are subject to several diseases of different nature, both infectious and parasitic. The main diseases are Newcastle, Gumboro (infectious bursal disease) and Coccidiosis (parasite). Other diseases commonly affecting

chickens are Marek, Salmonellosis (bacteria), infectious bronchitis, fowl pox, epidemic tremor and avian influenza. In this last case, the Government is forced to shut down and isolate the farm. Every farm, independently of its size, should follow a strict vaccination plan, for instance the one suggested by RAB, in order to prevent their chickens to get sick on the most diffused diseases.

The access of poultry farmers to medicine and health services is still limited. Antibiotics and medicines are usually bought from local agro-dealers, which are usually part of the Agrotech network. Agrotech is also the main supplier of vaccines. However, shops tend to run out of stock and vaccines are mostly sold in Kigali⁹. Depending on the different vaccinations, they can be dispensed through drinking water, aerosol, eye drop, injection, wing web or oral. With regards to veterinary services, differences arise between commercial and village poultry farmers. The majority of the former consult veterinarians regularly or in case of a disease outbreak. By contrast, village poultry farmers often leave their sick birds for self-cure or use traditional indigenous treatments^{7,11}.

ACCESS TO FINANCE

Poultry farmers interviewed during the Poultry Learning Event reported that one of their main difficulties is to access finance to improve their businesses. Loans are not easily obtained by small farmers. When this happens, farmers face very high interest rates that can even reach 25%. Limited availability and accessibility to finance hampers farmers from investing in more advanced and/or larger scale equipment. This is often because of lack of collaterals and guarantees small-scale farmers can offer. Farmers are trying to team up to invest in machinery together like feed mills. Hence, it keeps them from growing and improving their businesses contributing to the development of the poultry sector.



04.

Markets and trade



DOMESTIC MARKET

Africa has the lowest meat consumption worldwide¹², that often implies a protein shortage in one's diet. The average annual poultry meat consumption per capita in Africa is 6.73 kg, followed by Asia (9.79 kg), Europe (23.35 kg), Americas (39.13 kg) and Oceania (42.67 kg). The world's average is 14.99 kg per person per year¹². Furthermore, Rwanda is one of the African countries with the lowest consumption of poultry meat per capita, with only 0.2 kg of chicken meat consumed per capita per year in 2011⁴ (no more recent data is available).

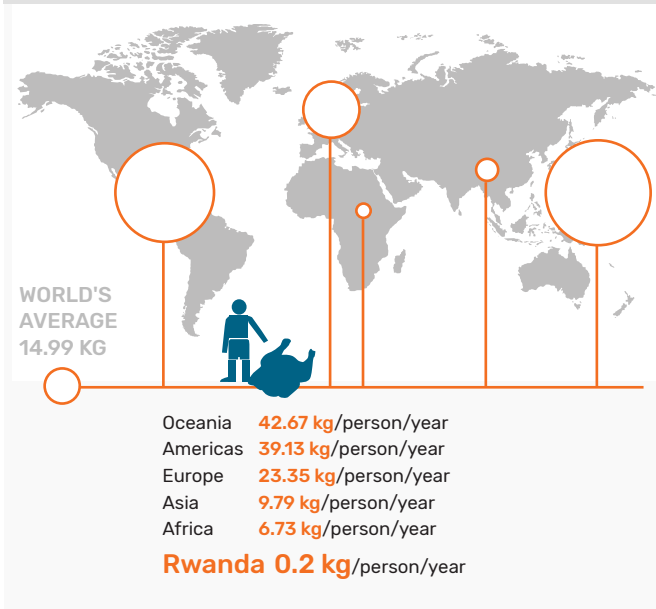
Alongside meat and plant-based protein, eggs are a great source of nutrients. During the Poultry Africa Expo, the Dutch Embassy organized a promotion event for the egg together with VNU, Abusol, GAIN and the Rwandan Government. The average Dutch person eats 281 eggs a year. In Rwanda, egg consumption counted for 0.63 kg/person/year in 2014¹, against an African average of 2.5 kg/person/year⁴. These numbers illustrate a huge difference in the development of the poultry sector. Protein deficiency is therefore not only a problem in Rwanda but for many African countries.

OneEgg Rwanda provides kids with one egg a day at their preschool activities. In 2018, they reached 4,400 kids across 36 preschools¹⁶. In the same year, the World Food Programme handed over ownership and management of their School Feeding Programme to GoR (which however did not include the distribution of eggs¹⁷). Moreover, a National Early Childhood Development Programme is in place with the aim, amongst others, of improving nutrition in children¹⁸. The further growth and extension of such programmes can play a crucial role in fostering demand for eggs.

The growth of the local poultry sector offers a relatively sustainable solution to the diffused protein deficiency in Rwanda. It is necessary to look at feed conversion rates: a low conversion rate means greater efficiency. The production of one kilo of chicken meat or eggs requires around 1.2–2 kilos of chicken feed^{13,14}. The production of a kilo of beef requires 6–10 kilos of animal feed^{13,15}. In terms of nutrition, poultry is a great solution, as it is affordable, it is a source of proteins, contains many essential vitamins and minerals and has less saturated fats than other types of meat. Therefore, the poultry sector has great growth potential in Rwanda, further enhanced by the low investment required and the short life cycle of broiler poultry. This indeed allows farmers to have a stable and recurrent source of income every few weeks. Finally, chicken meat is acceptable by all sorts of consumers, irrespective for instance of religious constraints.

Commercial poultry farmers mostly sell to local markets (or on the Kigali market), hotels and restaurants. Nowadays, chicken meat is sold at around 1300 RWF/kg (1.3 euro/kg), while eggs are sold at 70–75 RWF (0.07–0.08 Euro) each.

Figure 1. AVERAGE ANNUAL POULTRY MEAT CONSUMPTION PER CAPITA. (SOURCE: FAOSTAT, 2019)



IMPORT AND EXPORT

Meat and egg consumption in Rwanda are on the rise. National production volumes do not always meet the demand. In 2015, Rwanda imported 2,960 tonnes of chicken meat, 16% of the country's demand⁹. In the same year, exports reached 1,480 tonnes, counting for the 8% of the national demand⁹. At this point, there are no formal regular export flows of poultry products from Rwanda to its neighbouring countries. Rwanda does not have the production capacity to compete with its neighbouring countries like Uganda,

Tanzania and Kenya, where the poultry industry is more advanced. Informally, poultry farms in the Western province of the country do often sell meat and eggs across the border with DRC. In DRC, prices can be much higher with, for instance, a tray of 30 eggs that is sold for 2.1 USD (1.9 Euro) in Rwanda, being sold at 4–5 USD (3.62–4.53 Euro). The same dynamics apply to the sale of live chickens. Some Rwandan farmers also sell their products in Burundi.

The following tables illustrate the position of Rwanda in the region, in terms of live chickens and egg production.

Figure 2. DATA 1990–2017 LIVE ANIMALS: CHICKEN (SOURCE: FAOSTAT, 2017)

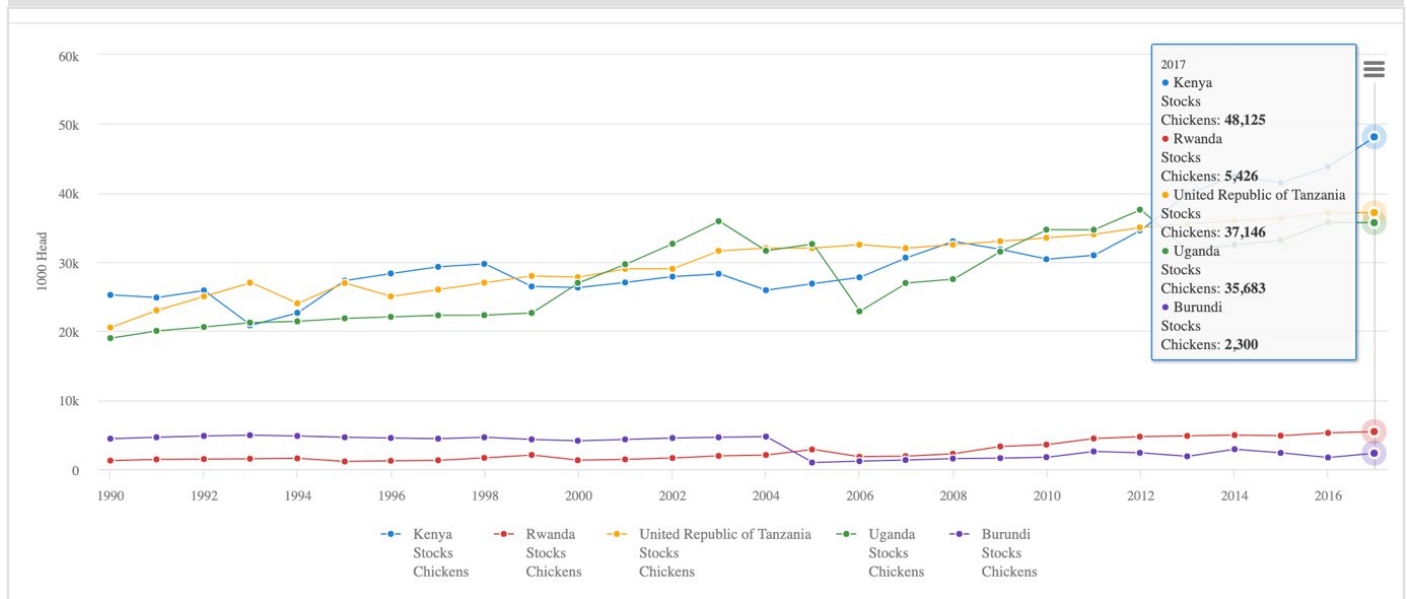
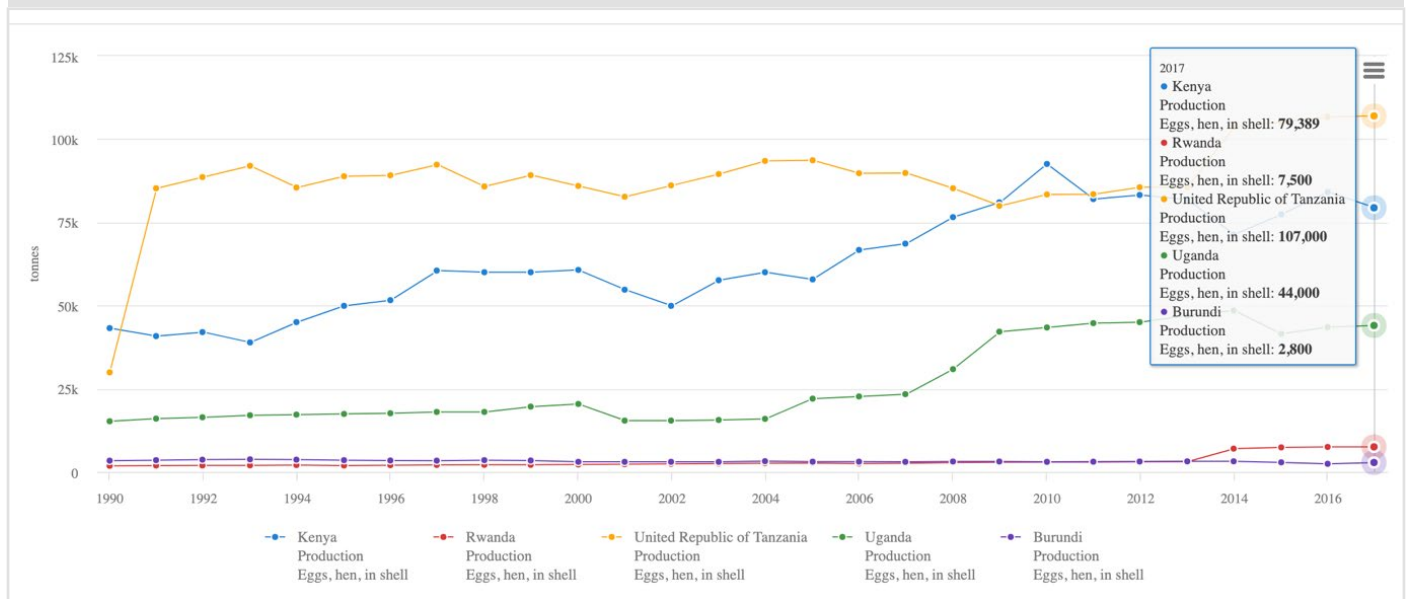


Figure 3. DATA 1990–2017 PRODUCTION QUANTITY: EGGS (SOURCE: FAOSTAT, 2017)





05.

Overview of actors of the poultry industry



PRIVATE SECTOR

Table 2. provides a clear overview of the main private actors involved in different activities of the poultry value chain in Rwanda⁹.

PUBLIC SECTOR

- Minister of Agriculture: as explained in the Livestock Master Plan of 2017, Rwanda aims at transforming the traditional chicken farming from subsistence to knowledge-based, with consequent increase in households' income and food and nutrition security.
- Rwanda Agriculture Board (RAB): provides extension services.
- Rwanda Poultry Industry Association (RPIA): the association was born to bring together all the stakeholders in the poultry industry, with the objectives of defending professional interests of the members, promoting members' activities and serving as a permanent forum for dialogue between the stakeholders and the public and private sector.

Table 2.

| Category | Actor/Organization | Location | Capacity |
|--|--|-------------------------------------|--|
| Day-old chick producers | Easyhatch Ltd | Musanze | 20,000 chicks/week |
| | Rwandachick Ltd | Kigali | |
| | Uzima Chicken | Kigali | 8 mil chick/year (planned capacity, not yet reached) |
| Day-old chick importers | Agrotech Ltd | Imports from Europe, mostly Belgium | Import 2015: 240,000 layers 36,000 broilers |
| | Biyinzika | Imports from Uganda | Import 2015: 228,000 layers 192,000 broilers |
| Feed producers | Zamura Feeds | Musanze | Production 2015: 300 MT layers feed 100 MT broilers feed |
| | PAFI | Rwamagana | Production 2015: 95 MT layers feed 38 MT broilers feed |
| | Gorilla Feed | Kigali | Production 2015: 53 MT layers feed 41 MT broilers feed |
| | PEAL | Bugesera | Production 2015: 75 MT broiler feeds |
| Broiler chicken farmers and processors | PEAL | Bugesera | 50,000 |
| | Mugisha Farm | Bugesera | 24,000 |
| | Indian Farm | Kabuye/ Nyarugenge | 20,000 |
| | dr. Abel Ukundimana | Kicukiro | 16,000 |
| | Kime Ltd | Kamonyi | 5,000 |
| Layer chicken farmers | Abusol Ltd | Bugesera | 51,000 |
| | Kigali Golden Farm | Kicukiro | 27,500 |
| | dr. Gakuba | Gakenke | 20,000 |
| | Butera Antoine | Kicukiro | 19,500 |
| | Isimbi Farm | Rwamagana | 15,000 |
| Veterinary products suppliers | Agrotech is by far the biggest provider of veterinary products. Agrotech set up a multitude of local branches that cover all the provinces of Rwanda, allowing farmers to avoid long trips to bigger cities in order to get their supplies. However, vaccines are reported to be only available in Kigali (FAO, 2016). | | |



06.

Challenges and opportunities



CHALLENGES

The poultry sector in Rwanda is still developing and obstacles hampering growth remain. Poultry farmers face several challenges, the most common are reported in the following table, together with potential solutions. The second column intends to indicate the prevalence of the issue according to the responses of farmers to the questionnaire dispensed during the Poultry Learning Event. The question stated: *'What are the main challenges (maximum 3 answers) you experience in poultry farming?'*.

When it comes to village poultry, more challenges need to be added, namely: lack of training on modern poultry production practices and lack of attention from agricultural policy makers, researchers, development and extension workers.

| Challenge | Recognition of issue* in PLE questionnaire | Intervention needed |
|---|--|---|
| 1. FEED | | |
| Low availability of maize and soy, due to lower regional yields (most likely climate change-related) and competition with human consumption (mostly concerning maize) | Low | <ul style="list-style-type: none"> • Make land available for additional production of cereals needed in poultry feed • Introduce innovative substitutes for maize as raw material for animal feed like rice and cassava |
| High and variable price | Very high | <ul style="list-style-type: none"> • Resolving the issue of low availability would in turn reduce the price (and its variability) of chicken feed |
| Low quality | Low | <ul style="list-style-type: none"> • Improve policy, regulations and controls on the matter • Raise awareness on the importance of high-quality feed for healthy and productive chickens |
| 2. DAY-OLD CHICKS AND GENETICS | | |
| Dependency on DOC imports | Low | <ul style="list-style-type: none"> • Support the establishment of new hatcheries in Rwanda that, at high production volumes, can compete with import from Uganda or Europe |
| Low yielding potential of local breeds** | Not applicable | <ul style="list-style-type: none"> • Shift towards high-yielding dual-purpose breeds (e.g. Sasso breed) |
| 3. ANIMAL HEALTH AND BIOSECURITY | | |
| Diseases incidence | High | <ul style="list-style-type: none"> • Publicize RAB vaccination program • Make vaccines more easily accessible in every province |
| Low biosecurity measures implementation | Low | <ul style="list-style-type: none"> • Raise awareness and offer support for implementation through extension services |
| 4. LACK OF KNOWLEDGE/TRAINING AND SKILLS ON POULTRY FARMING | | |
| Lack of technical training | Medium | <ul style="list-style-type: none"> • Improve extension services • Collaborate with young graduates from Colleges of Agriculture and Veterinary Medicine and of Business and Economics |
| Lack of management training | Low | |
| 5. POOR ACCESS TO CREDIT | | |
| | Medium | <ul style="list-style-type: none"> • Guarantee easier access through (micro)finance |
| 6. MARKET: FREQUENT FLUCTUATIONS IN CHICKEN MEAT AND EGGS PRICE | | |
| | Medium | <ul style="list-style-type: none"> • Promote the value of chicken meat and eggs |

* Very high: more than 30% respondents mentioned the issue
 High: between 25 and 30% of the respondents mentioned the issue
 Medium: between 10 and 25% of the respondents mentioned the issue
 Low: less than 10% of the respondents mentioned the issue

** This issue mostly applies to village poultry, as commercial chicken farmers largely rear exotic breeds.

OPPORTUNITIES

The challenges listed below can be considered opportunities for investors and traders. The list shows the gaps, which can be filled making use of new technologies, knowledge or perhaps foreign investments.

Training

Poultry farmers in Rwanda are often unaware of certain requirements for rearing healthy and productive chickens and hence, training can have an enormous impact on the sector. Farmers firstly need to gain knowledge on poultry farming and subsequently, they can make the right investments. Businesses should take into account this need for education and proper aftercare when entering this emerging market. Moreover, farmers reported to be lacking management skills that would help them improve and maximize their investments and revenues.

These knowledge gaps highlight an opportunity for development programs to provide training to Rwandan poultry farmers. Knowledge institutions or development actors (like PUM Senior Experts) with extensive experience and know-how can collaborate with government or donor programs. These training sessions would have the immediate benefit of spreading knowledge amongst farmers. Moreover, they would raise awareness amongst farmers regarding possible investments to upgrade their farm productivity. Hence, it would make the Rwandan poultry sector more appealing to potential investors.

An example of an ongoing program funded by the Netherlands Ministry of Foreign Affairs is SEAD: Strengthening Education for Agricultural Development. SEAD strengthens linkages between education and the labor market working with education institutions, extension service providers and private sector actors. In the poultry sector, SEAD seeks to tailor education and training of extension services providers as well as farmers to better fit market demand. The program aims to improve education and training; research and community services in Agricultural production; value chain management and land and water management.

Feed

The decisive factors for future growth of the Rwandan poultry sector are the quantity and quality of poultry feed available. Nowadays, commercial farms often are unable to make use of their full production capacity because they cannot afford or procure enough raw materials and/or concentrated premix. This situation could however be improved with increased imports of premix (and/or raw materials, but this is hardly a problem that can be solved from outside the region). Foreign companies could team up with local importers to sell their concentrated premix to Rwandan farmers.

A second solution is for a foreign company to initiate a new feed producing plant in the country, benefitting from their experience in the business (e.g. connection with suppliers of raw materials) and knowledge. This would allow to offer a high-quality product. If new producers enter the market and have large enough volumes, it could result in economies of scale that would allow them to sell feed at affordable prices. This however still depends on the availability and price of raw materials. High production scale and lower prices would be appealing not only to commercial but also to village poultry farmers, allowing them to obtain higher yields and better nutrition for their households.

In such case, a broader system could be put in place, where the same actor produces – internally or via an outgrowing scheme – the raw materials necessary to the production of poultry feed. However, this option would require further studies, as available (flat) land is scarce in Rwanda and could hamper the creation of such a system.

It must be noted that the shortage of poultry feed, but also animal feed in general in Rwanda, cannot be solved by sporadic investments. It requires a structural targeted intervention. The East-African region is struggling with underproduction of maize and soybean and consequent rising prices. Alternative feed components (like cassava or rice) are available and cheaper but these have limitations; they can only substitute for a certain percentage of maize when fed to layers and broilers. Annex 1 shows possible alternatives to maize and soybean, their characteristics and their limitations.

Breeding and genetics

There is high demand for day-old chicks, which ensures a market for both layer and broiler farms. New hatcheries in Rwanda could offer an alternative to imports from Europe. Parent lines would still be imported from Europe. With proper conditions, a large-scale production resulting in economies of scale, these hatcheries could compete with imported chicks from Uganda.

Newcomers could compete on the sale of Sasso breed, currently only produced by Uzima chicken. As seen above, this is a dual-purpose breed, optimal food security and easy to grow. Moreover, Sasso chickens are reported to be very similar in taste to village chickens, often preferred by locals. Alternatively, attention can be given to hybrid breed like Cobb 500 (currently imported from Uganda) and Ross 308, that offer good yielding values in the region.

Access to finance

The provision of loans at affordable interest rates would be highly beneficial for those farmers that practice village poultry farming and sell their products on local markets. Improved access to finance would benefit the poultry sector providing commercial poultry farmers the possibility to expand their businesses and expand larger production scale. This would also benefit consumers, giving them access to a larger offer at (possibly) lower prices.

Business development

In Rwanda, eggs are sold in supermarkets, kiosks, and markets; while chicken meat is mostly sold in butcheries and supermarkets. During the past decades, awareness about the important role of eggs in a balanced diet has grown. Purchasing eggs is not as expensive as it used to be, which lead to higher consumption overtime. Differently, poultry meat is still often considered as a food for wealthy people, especially in rural areas.

In terms of business development, opportunities (mainly for development projects) lie in raising awareness about the importance of eggs and poultry meat in one's diet. Moreover, organizations can partner up with existing projects, such as OneEgg Rwanda or school feeding programmes. Such initiatives have a strong potential of raising demand for poultry products. Finally, Democratic Republic of Congo and Burundi can be considered as stable pools of demand for chicken meat and egg. Rwandan producers can easily place their products across the borders, often for higher prices than in the domestic market.

CONCLUSION

The poultry sector in Rwanda would benefit from the entrance on the market of actors with availability of capital and technical knowledge. Nonetheless, according to the Dutch exhibitors present at the expo in Kigali, the Rwandan market is not yet ready for advanced technologies and hence, for the products they are selling. Production volumes are still (far) too low for slaughtering plants that have processing capacity of 500 to 15,000 birds per hour or for automated feeders. Moreover, there is no quality-based market with higher prices for larger eggs and hence, there is no need for egg grading machines. Nonetheless, there is a general agreement that the poultry sector in Rwanda has potential. The stakeholders present at the Poultry Learning Event and Poultry Africa 2019 agree that the poultry market in Rwanda (and in East Africa) is slowly but steadily growing. Moreover, Rwanda acknowledges and recognizes the potential of poultry as a way to reduce malnutrition and protein deficits. The efforts and commitment of the Rwandan Government to improve the sector are demonstrated by – amongst other things – the publication of the first Livestock Master Plan in 2017, that lays the foundation for a further strengthening of the poultry industry in Rwanda.

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ANNEX 1

| ALTERNATIVE ENERGY SOURCES | | |
|--|---|--|
| Feedstuff | Characteristics | Maximum use |
| Wheat | Can be used when cost competitive. Limitation: high non-starch polysaccharide contents result in intestinal digesta viscosity problems. | Can be used without restriction when exogenous carbohydrates are added |
| Sorghum | Limitation: tannins lower protein and energy digestibility | Low-tannin sorghum can completely replace maize |
| Millet | Limitations: high fibre contents, presence of tannins | Can replace 50–65% of maize, depending on millet type |
| Rice bran/polishing | Limitations: high fibre, phytic acid, rancidity | Good-quality material can be used at levels of 5–10% in broiler diets and up to 40% in layer diets |
| Wheat bran/pollard | Limitation: high fibre | 5% in broiler diets and 15% in layer diets |
| Cassava root meal | High in starch, excellent energy source. Limitations: low protein, powdery texture, needs detoxification to remove the cyano-genic glucosides | Can be used at levels of 30–40% in nutritionally balanced, pelleted diets |
| Cassava peel meal | Limitations: high fibre, very high levels of cyanogenic glucosides, needs processing (drying) | Carefully prepared meal may be used at 5% level |
| Sweet potato tuber meal | High in starch, good energy source. Limitation: powdery texture | Can be used at levels up to 50% in nutritionally balanced, pelleted diets |
| Banana and plantain meal | Limitation: low palatability due to tannins in the peel; removal of peels improves nutritive value | 10–20% |
| Mango seed kernel meal | Limitation: high levels of tannins | Processed meal can be used at levels of 5–10% |
| Distillers dried grains with solubles (DDGS) | High fat content (10%), good energy source | 25% |
| ALTERNATIVE PROTEIN SOURCES | | |
| Feedstuff | Characteristics | Maximum use |
| Cottonseed meal | Limitations: high fibre, presence of gossypol. Limit use in layer diets because of effects on internal quality of eggs | Low-gossypol meal can be used at levels of 10–15% in broiler diets |
| Canola meal | Limitation: glucosinolate | Low-glucosinolate meals can be used at up to 30% |
| Sunflower meal | Rich in methionine. Limitation: high fibre | 15% |
| Grain legumes (e.g. lupins, field peas, chickpeas, cowpeas, pigeon peas, faba beans) | Limitations: presence of anti-nutrients, low in methionine; current cultivars contain low levels of anti-nutrients | 20–30% when processed and supplemented with methionine |
| Leaf meals, aquatic plant meals | Rich in minerals, moderate levels of protein. Limitations: high fibre, high moisture content and requires drying | Most green meals can be used at levels less than 5% |
| Distillers dried grains with solubles (DDGS) | Good source of protein, amino acids and available energy. Limitation: variable amino acid availability | Good-quality meals can be used at up to 25% |

Adapted from: FAO, 2013¹⁹



TRAIDE