Platform
for Agricultural
Risk Management

Burundi

Agricultural risk assessment study in the Burundi rabbit value chain

Main Report

January-July 2024

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Managing risks to improve farmers' livelihoods

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1_ Executive summary

The agricultural risk assessment studies on the Burundi rabbit, maize, and rice value chains were conducted for the Government of Burundi by the Platform for Agricultural Risk Management (PARM) through the Ministry of Environment, Agriculture and Livestock (MINEAGRIE) from January to July 2024. The preliminary results of the study were thoroughly discussed and validated in two workshops held in Bujumbura on 23 and 24 May 2024, with the participation of key stakeholders and oversight and support institutions for the three value chains.

Burundi's rabbit value chain

Rabbit farming was introduced in Burundi in the 1980s by Italian missionaries, who helped found the Mutoyi Union of Cooperatives (UNICOMU) of Bugendana in Gitega province.

In late 2022, the President of Burundi's decision to make rabbit farming a strategic value chain to bolster the country's food security and development injected a robust dynamic into this value chain, with rapid growth in the number of rabbit farming operations, the professionalization of certain farmers and the introduction of major projects to develop a modern, partially export-oriented value chain (breeding centres, slaughterhouse in Gitega).

Because the design and construction of the value chain are recent and ongoing, there is no way to assess the risks in terms of their historic frequency and intensity, as can be done with the rice and maize value chains. To assess the risks in this value chain as it is developing, the experts relied, on the one hand, on an analysis of the risks among the 26 farmers interviewed who engaged in traditional or specialized rabbit farming, and on the other, on an estimate of the anticipated risks in the modern value chain, segmented by trade (service providers and input suppliers, selectors/breeders, farmers/fatteners, slaughterhouses, dealers and butchers), based on the risks observed in the European rabbit value chains (among other things, in consultation with veterinarians specializing in rabbit raising) and the Beninese value chains (through a literature review).

Main risks identified

Assessment of the risks in the Burundi's rabbit value chain and actors' capacity to manage risks revealed the value chain's particularly high vulnerability to two major types of risk:

- Health risks: Although mortality in the traditional rabbit value chain appears to be under control, the current professionalization and intensification of rabbit farming exposes it to a growing frequency and intensity of health pressures and epizootic risks in particular. With very limited and ill-equipped diagnostic capacity in this value chain, public and private veterinary services currently have little capacity to mitigate these risks. Furthermore, the current focus of specialized farmers on importing breeder animals exposes the value chain to a very high risk of importing the VHD[1] variant that recently decimated the European value chain.

- Market risks: Rapid production growth in a context where eating habits and value chains that promote the various products of rabbit farming are still rather undeveloped expose the value chain to a very high risk of overproduction and lack of marketing outlets. This risk is even higher, as the Burundi government envisions the construction of an export value chain, and global demand and trade in rabbit products is down.

[1] VHD: Viral haemorrhagic disease: Haemorrhagic disease of rabbits.

The figure below ranks the risks identified by each of the actors in the value chain and the value chain under construction as a whole. Each score is the product of an estimate of the frequency of the risk to the actors involved, its average impact and its potential impact.

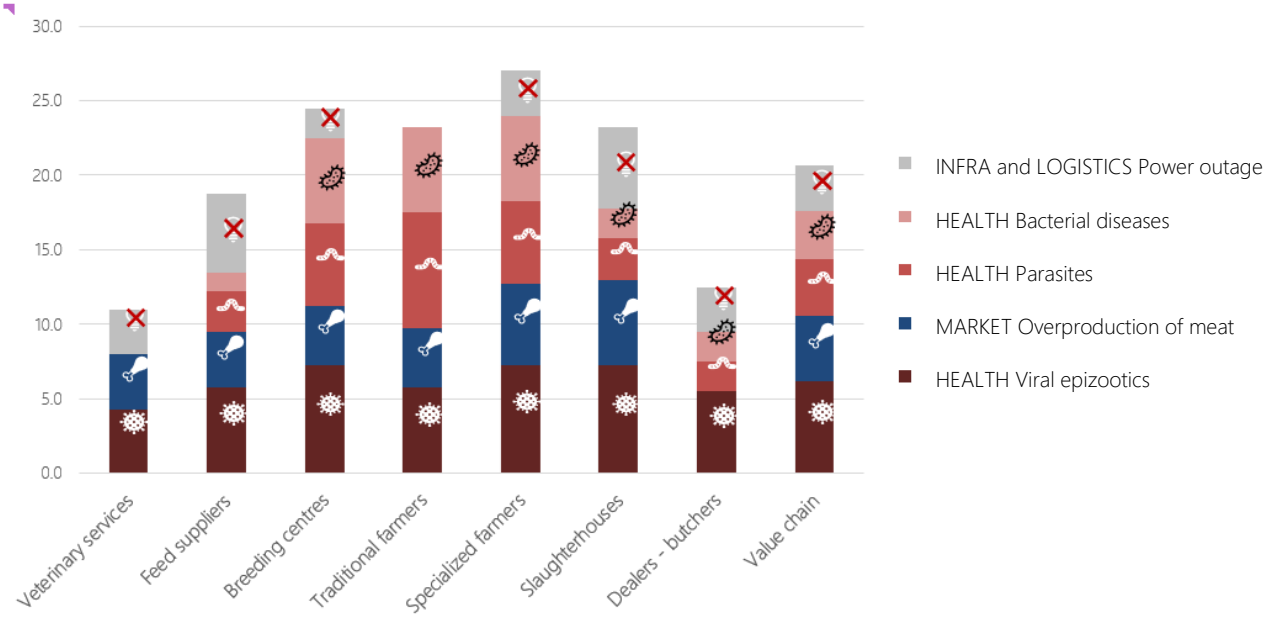


Figure 1: Scores for the main risks to actors and the entire rabbit value chain in Burundi (Source: Authors)

In light of these risks, the study recommends the introduction of a risk management programme targeting seven major activities, as diagrammed below.

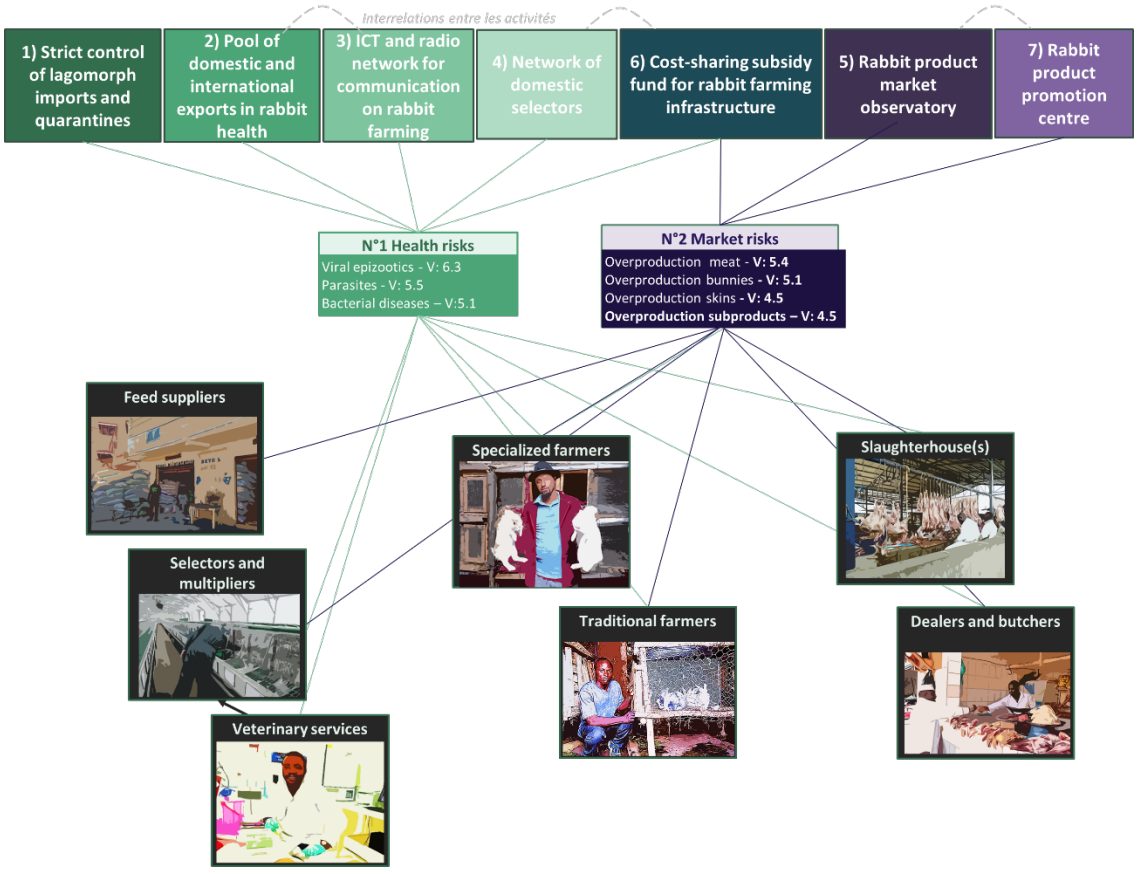


Figure 2: Diagram recapping the risks and seven priority activities of a risk management programme (Source: Authors)

The seven proposed priority activities are:

A health programme

- Control of the importation of lagomorphs by entities other than selection centres, mainly to prevent the importation of lagomorphs from other countries, especially those where the value chain is highly developed and VHD and myxomatosis prevalence is highly probable
- The creation of a pool of domestic experts in rabbit diseases and their diagnosis and treatment, supported by a pool of international experts (qualified veterinarians)
- The creation of communication and video training networks on the prevention, diagnosis and treatment of rabbit diseases
- Support for the creation of a network of domestic selectors/breeders capable of developing a supply of hardy diversified breeds suited to the Burundian context, based on the genetic resources already available in Burundi

A trade programme[2]

- Support for investment in risk management equipment and the diversification of marketing outlets for actors downstream in the value chain (cost-shared grants for self-sufficient electricity generation through solar panels + convertor + battery, the procurement of cold chambers and shipping containers for live rabbits (stackable transport crates), and for the launch of activities to promote the use of subproducts.
- A domestic, subregional and international market observatory for rabbits and their subproducts.
- An organization to promote rabbit products in potential markets (primarily domestic and subregional): rabbit meat, rabbit fur, rabbit manure, rabbit skins, rabbit meal for fish food, rabbit claws for jewellery, etc.

Following this report, a design mission from the Risk Management Programme should intervene to propose modalities for the design, coordination, implementation and financing of these activities.

[2] Furthermore, specific recommendations for traditional breeding operations are proposed:
Training for DPAE agents and all Burundi agronomists and agricultural monitors in small-scale rabbit raising and measures to improve such operations so that they in turn can support rural households;

Strengthening of the role of "hubs" and even service providers and input suppliers by industrial farming operations: the dissemination of good practices in in managing the farm, nutritional counselling, the sale of feed supplements, especially for nursing does and weaning bunnies, the sale of improved hutches and even the collection of skins if a value chain emerges;

Promotion of rabbit meat in nearby restaurants: community cooking contests and even a rabbit festival to promote innovative ways to prepare it and rabbit recipes to support demand;

Promotion of the selection of hardy domestic breeds suited to the conditions of traditional rabbit farming.;

Promotion of initiatives to sell subproducts in local markets through a provincial or communal system of prizes for innovation: rabbit offal recipes., tanning and shoemaking with rabbit leather, the manufacture of rabbit-based fish food, etc.

Promotion of hardy plants requiring little investment and care that can be grown in uncultivated areas (parcel boundaries, small rice dikes, home gardens, etc.) for rabbit food.

2_ Context

2.1. The Platform for Agricultural Risk Management (PARM)

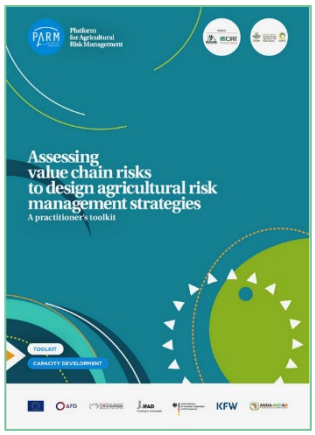
Launched in 2013, the Platform for Agricultural Risk Management (PARM) aims to make risk management an integral part of agricultural policy and investment planning. PARM is a G20 initiative hosted and managed by the International Fund for Agricultural Development (IFAD) and financed by a partnership among the European Commission (EC), the French Development Agency (AFD), the Italian Agency for Development Cooperation (AICS), IFAD and the German Development Bank (KfW), the latter of which has supported the partnership between PARM and the African Union Development Agency, formerly the New Partnership for Africa's Development (NEPAD), since phase 1 of PARM.

The Platform encourages the use of a rigorous overall assessment and agricultural risk management methodology in developing countries. It offers factual data on risks and provides tools for the management of agricultural risks.

It also fosters dialogue between public authorities and stakeholders to:

- integrate agricultural risk management in agricultural policy and practice;
- stimulate investment in agriculture.

2.2. Study objectives



This assessment should make it possible to identify, quantify and prioritize agricultural risks and suitable risk management tools, design an agricultural risk management (ARM) project/programme and assist national authorities with the implementation of risk management tools in Burundi.

Its roll-out recapitulates the stages of the PARM methodology spelled out in the practical guide *Assessing value chain risks to design agricultural risk management strategies*.

1) An initial report concluded the **start-up phase,** which made it possible to target the main risks in the three value chains designated by the government, namely: rice, maize and rabbits.[3]
2) Following this report, a study phase to assess agricultural risks in all three targeted value chains should lead to the development of a risk scoring system.
3) At the same time, a study phase to assess the vulnerability to agricultural risks will be conducted, listing the tools, mechanisms and agricultural risk management competencies already in place and/or planned in Burundi in the pre-targeted agricultural value chains;
4) Following these risk and vulnerability assessments, a risk map will be drawn up to prioritize the risks with the highest vulnerability ratings. This prioritization will then be presented, discussed and adapted with the Burundi government to arrive at the final stage.
5) The fifth and final stage will consist of drafting an action plan for the implementation of agricultural risk management tools and policies in Burundi, focusing on the three targeted value chains and the risks with the highest vulnerability scores. It will be presented and validated in a workshop.

The detailed methodology is available in an annex.

[3] Rice and maize are two commodities already targeted in Burundi's Food and Agriculture Compact, along with pigs and poultry. The targets in terms of the scores for production, exportable surpluses, potential income generated and jobs created have been set in this document. Rabbits, in contrast, are an emerging priority of Burundi's President and have captured the attention of MINEAGRIE, which ranks this value chain at the same level as that for poultry and pigs.

2.3. Overview of the Burundi economy

Burundi ranks among the low-income countries and, according to the World Bank, had the lowest GDP per capita in the world in 2022, standing at US$259/year (current 2022 United States dollars).[4]

It is also the country with the second-lowest urbanization rate on the planet, at 14 per cent, one of the highest contributions of agriculture to GDP (28 per cent) and one of the lowest contributions of international trade to GDP (28 per cent)[5].

With a food self-sufficiency rate of over **99 per cent**[6] in 2020–2021, Burundi, and more particularly its agriculture sector, can be described **as little involved in international trade,** but at the same time only very slightly dependent on it.

Some Burundi economic indicators
(2022– World Bank)

Population: 13.2 million
Population density: 489 inhab/km²
GDP:US$3.34 billion current
GDP per capita: US$259
Growth 2022:1.8%
Inflation: 18.8%
HDI ranking: 187/191 (UNDP)
GINI Index: 38.6
Poverty: (US$2.15 PPP): 70.4%

Based on the classical macroeconomic indicators used in country comparisons, Burundi is considered one of the poorest countries in the world, with the lowest level of economic and social development.

This analysis should be tempered, however, for several reasons:

1. Burundi was one of the most densely populated countries in the pre-industrial world. Its relatively intensive traditional agriculture and dynamic rural economy have always been turned inward towards a large domestic market. This economic model and social structure are hard to grasp using the measurement indicators of classical macroeconomics, which primarily consider wealth at the enterprise level (GDP based on production), trade (GDP based on commerce) or households (GDP based on consumption). In the Burundi economy, the majority of households and enterprises are in fact economic units, and their trade, while intense,[7] is hard to measure, as it is highly dispersed, informal and to a certain extent, non-monetary.
2. The ability of Burundi farms to grow a **multitude of crops on the same parcel** and, at the same time, **successively grow different crops** in one year with virtually continuous use of the land makes measuring the productivity of a single crop, and hence, the production of agricultural statistics, a very complex undertaking. Our discussions with agricultural technicians have confirmed this difficulty and the tendency in public statistics not to consider that the main crop[8] in an association of crops and changing crop rotations marked by an interruption (dry season, land left fallow), as well as a good part of the crop rotations, are intertwined and follow one another virtually without interruption.
3. The ability of the Burundian State to gather information on production, artisanal processing (this, also highly dense and intense) and informal flows appears to be limited in this context, where trade bottlenecks (ports, central markets, border crossing points, large factories) account for but a marginal share of trade. Public statistics systems, therefore, appear to have difficulty capturing part of the country's economic activity,[9] and crop, livestock, forestry and rural artisanal production are likely undervalued in the calculation of GDP.

[4] https://data.worldbank.org/
[5] https://thedocs.worldbank.org/en/doc/b3502c65235d8c72aef5f34d87ed6298-0500062021/related/data-bdi.pdf
[6] https://www.afdb.org/fr/documents/rapport-danalyse-des-bilans-alimentaires-du-burundi-2020-2021
[7] It is worth noting that numerous studies and works describing Burundi agriculture as unproductive and even archaic appear to have seriously failed to collect field data and elements for visual and qualitative comparison with other contexts in developing countries and the agricultural economy in general.
[8] The methodology of Burundi's National Agricultural Surveys (ENAB) specifies that in crop associations, a maximum of one primary crop and two secondary crops should be considered. During our field visits, we observed up to six associated crops on a single parcel.
[9] Which explicitly recognizes the Bank of the Republic of Burundi's (BRB) surveys on cross-border trade, with technical support from the Institute of Statistics and Economic Studies of Burundi (ISTEEBU): https://www.brb.bi/sites/default/files/Rapport_enquete_commerce_informelper cent202018.pdf

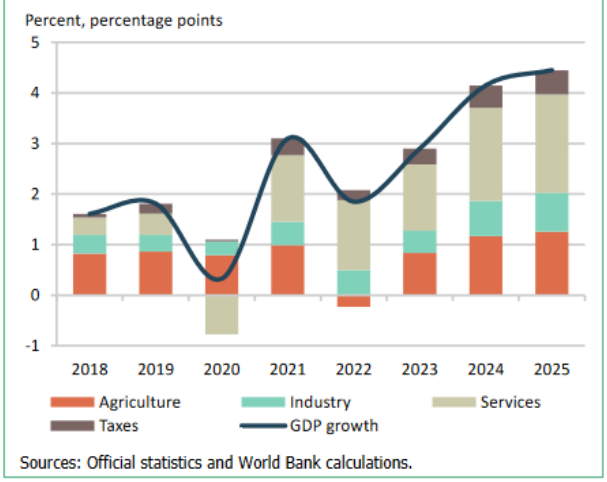
Within this particular economic context, woven around a densely populated rural setting rather than cities unlike the majority of the world's economies, **the integration of imports of innovative agricultural technology** (selected seeds, mineral fertilizer) and **agrifood technologies** (small mills, huskers, electric presses) in recent years has rapidly accelerated economic growth.

This acceleration, based on the growth of international trade, can be seen in the trend in the GDP, marked by strong growth of agriculture and services (notably trade and credit).

The **mineral fertilizer and improved seed utilization rate has substantially** increased in recent years, thanks to input subsidy programmes (PNSEB and PNSS). The former has risen from 15.8 per cent[10] of farms in 2018 to 38.1 per cent[11] in 2020 and probably more than 50 per cent in 2024;[12] the latter has risen from 2.2 per cent in 2018 to 7 per cent in 2020 and probably more than 20 per cent in 2024.[6] The use of **organic fertilization** with crop waste and manure is very widespread, with 60 per cent utilization in 2018, 72 per cent in 2020 and probably more than 80 per cent in 2024. The use of **phytosanitary products** is also on the rise, increasing from 7.3 per cent in 2018 to 12.9 per cent in 2020 and probably more than 20 per cent in 2024.

Income diversification is also relatively high. Some 68.5 per cent of crop farmers also raised livestock (ownership of at least one type of animal) in 2018 (ENAB).

FIGURE 1 Burundi / Real GDP growth and sectoral contributions to real GDP growth



Sources: Official statistics and World Bank calculations.

Figure 3: GDP growth structure by sector – World Bank analysis

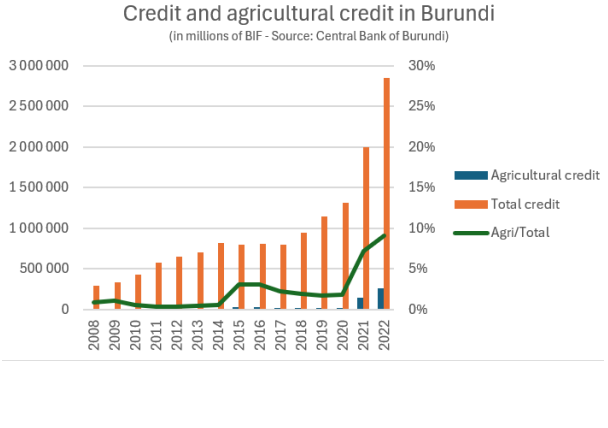


Figure 4: Evolution of credit amounts and the share of credit to the agriculture sector,

Moreover, in many rural households, the **men sell their labour** to more affluent farmers and work part of the year in transport, green crop silage, maintenance, small-scale processing, construction, livestock production and commerce,[13] while **women work the family fields**, largely as unpaid labour.[14]

Finally, we note that the **penetration of microfinance and banking in rural areas** has swiftly accelerated and led to remarkable growth in the amounts of credit granted to farmers in recent years. The recent increase in the level of credit and investment in agriculture, however, appears to have been accompanied by a sharp increase in the balance of payments deficit. The major crisis triggered by lack the foreign exchange in the country is one of the main problems burdening the Burundi economy today.

During our mission, the official EUR-BIF exchange rate was EUR 1 = BIF 3,075, but the rate on the black market (used by the majority of economic actors) was EUR 1 = BIF 5,150, a more than **67 per cent** rate differential

[10] ENAB 2017-2018

[B] https://www.worldbank.org/en/country/burundi/overview

[11] ENAB 2019-2020

[12] Estimate based on our interviews and surveys.

[13] https://www.resilience-burundi.org/wp-content/uploads/2023/01/Brochure-resilience-Diversif-03.pdf et http://www.tropicultura.org/text/v14n1/17.pdf

[14] Burundi Poverty Assessment 2016, World Bank, ENAB data from 2012 to 2013

with the official exchange rate. This observation is confirmed by an IFC report[15] noting that this is one of the most serious macroeconomic constraints to growth of the country's private sector and trade.

2.4. Overview of Burundi agriculture

Thanks to the diversity of agroclimatic gradients due to altitude and significant rainfall associated with the country's proximity to the Equator, Burundi's agriculture is extremely diversified.

Tubers, bananas (three species), proteinacious crops[16] and cereal grains dominate crop rotations but are complemented by a wide variety of fruits and legumes, trees (nitrogen-fixing trees and trees for firewood and food) and high use of fodder plants (with a predominance of green silage) to feed a large herd of ruminants.

Except for bananas, taro and eleusine, all subsistence crops have exhibited high growth in recent decades. This reflects a change in consumption habits, with an increase in the consumption of cereal grains (maize, rice) at the expense of bananas in particular.

Some Burundian agricultural indicators

Average national rainfall (mm– CHIRPS 81-23):
Min: 972 (2005), **Ave: 1,224**, Max: 1,499 (2018)

Number of months in the dry season (<50mm-CHIRPS 80-23): Min: 3, **Ave: 4**, Max: 5

Land use (millions ha– FAOSTAT 2022):
Agri: 1.6 *(58% of the country)*
Prairies/Pastures: 0.5; Forest: 0.3; Other: 0.3

Crop rotation on useful agricultural land (millions ha– FAO 2022):
Proteinaceous crops: 0.8 (53%)
Tubers: 0.4 (26%)
Cereals: 0.3 (20%)

Two traditional cash and export crops, **coffee and cotton, however, have exhibited a structural decline in production** linked to comparatively low profitability for producers vis-à-vis crops destined for the local and subregional market. The third traditional export value chain, **tea, has fared rather well** and exhibited steady growth, probably because of its increased deregulation.

We note that **exports of banana beer,** an iconic Burundi product, have exhibited high growth in recent years. In this fully deregulated sector, a multitude of small artisanal and semi-industrial enterprises have emerged in the domestic and subregional market.

[15] https://www.ifc.org/content/dam/ifc/doc/mgrt/cpsd-burundi-fr.pdf
[16] Notably, the two species of green bean, Vigna sp and Phaseolu ssp.

	Production (INSBU+ *est. FAOSTAT 2021*)							Evolution production	
	1961	1971	1981	1991	2001	2011	2021	1961-2021	2011-2021
Cassava	370	378	451	584	717	509	2732	2362	2223
Bananas	1000	1223	1239	1586	1549	1849	1301	301	-547
Sweet potatoes	380	390	497	681	781	955	1113	733	158
Dried beans	230	285	294	338	249	201	633	403	432
Maize	95	133	146	172	124	128	610	515	482
Other fresh legumes	102	120	160	220	250	435	*485*	383	50
Potatoes	30	35	36	46	27	28	394	364	366
Rice	3	4	10	40	61	91	259	256	168
Cane sugar	0	5	6	132	124	204	*201*	201	-3
Other fruits	37	53	69	88	85	116	*131*	94	15
Taro	95	98	100	132	85	58	52	-43	-6
Palm seed	6	12	12	15	10	70	*89*	83	19
Tea (leaves)	0	0	2	23	44	41	*50*	50	10
Sorghum	20	20	53	65	69	87	42	22	-45
Soybeans	1	1	1	1	1	3	18	18	16
Raw coffee	14	25	44	34	71	42	*17*	3	-25
Groundnuts (unshel	3	7	12	14	9	9	16	13	7
Dried peas	29	31	30	37	33	31	*13*	-16	-19
Millet	8	9	11	13	10	10	*11*	3	1
Wheat	4	5	7	9	9	10	9	5	-1
Eleusine	0	0	0	0	11	11	6	6	-5
Pigeon peas (dried)	2	2	2	3	2	6	3	1	-3
Cottonseed	9	9	7	7	3	3	*2*	-8	-1
Yams	6	6	6	8	10	10	1	-5	-9
Raw tobacco	1	1	3	4	1	1	*1*	1	0

Figure 5: Evolution of Burundi's main agricultural products from 1961 to 2021 (Sources: FAOSTAT and INSBU)

The distribution of rainfall over an 8-10 month period, depending on the production zone, enables most farms to link **at least two crop cycles,** which they complement with small off-season crops in wetlands and along waterways during the dry season.

For simplification purposes, the Ministry of the Environment, Agriculture and Livestock (MINEAGRIE) recognizes three crop seasons per year:

- **Season A**: From September (or rarely, the beginning of October if the rains are late) to late January or early February, depending on the length of the crop cycles.
- **Season B**: From the height of the rainy season in February or the beginning of March at the latest to the beginning or even the end of June, depending on the length of the crop cycles.
- **Season C**: The off-season, which starts between mid-June and early July and ends in September. In this season, crops are grown only in areas that are irrigated (either by gravity or the manual transport of water) and generally involve smaller average areas per farm.

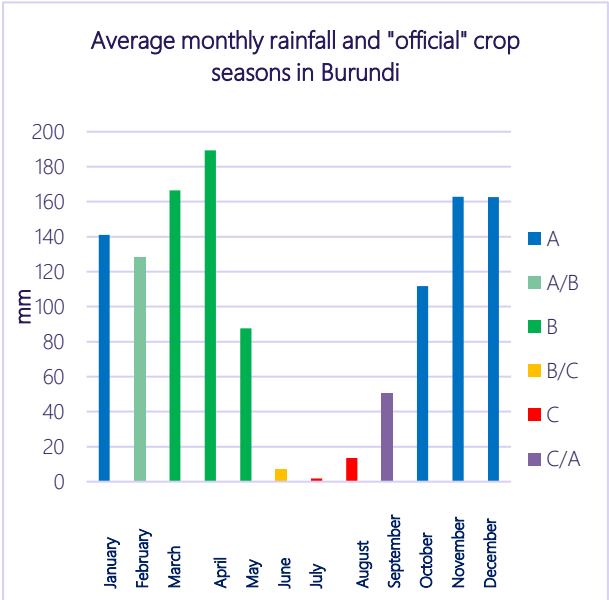


Figure 6: Average monthly rainfall distribution 1981-2023 (Source: CHRIPS)

In practice, **many crops are grown in association and linked according to much more complex calendars** tailored to the working capacity, exposure and gradient of the farms.

Certain crops, such as bananas, cassava and palm oil, are harvested virtually year-round. In irrigated rice paddies, many producers stagger their crop cycles, and harvests are spread out over more than four months per year.

Overall, **food availability and the sale of crop surpluses are subject to moderate seasonality** that is less marked than in countries with a prolonged dry season and more homogeneous topography.

The "hunger season" – that is, the time of the year when food is generally less available and agricultural work (and thus, farmers' caloric needs) intense – occurs between **December and mid-February**, before the start of season A harvests.

As seen below (figure 5), Burundi's agrarian trajectory leans towards the expansion of farmland at the expense of pastureland (and humid wetlands). The Government of Burundi's decision to **ban open grazing**[17] in 2018 but whose entry into force was postponed in October 2021, is leading to a rapid acceleration of this trend, with **the virtual disappearance of livestock from the landscape**.

After a steep decline in 1980, 1990 and 2000, forested areas have witnessed a comeback nationally since 2010, primarily due to the growth of artificial woodlands created through agroforestry.[18] In a country where deforestation has long existed, the high demand for timber for construction and firewood appears to have sparked renewed interest over the past 10 years in very small-scale forestry (wooded areas on just a few areas) and more particularly, agroforestry.[19]

This latter, moreover, plays a strategic agronomic role in soil stabilization, vertical fertility regeneration and fodder production (notably Grevillea[20]) in most crop systems.

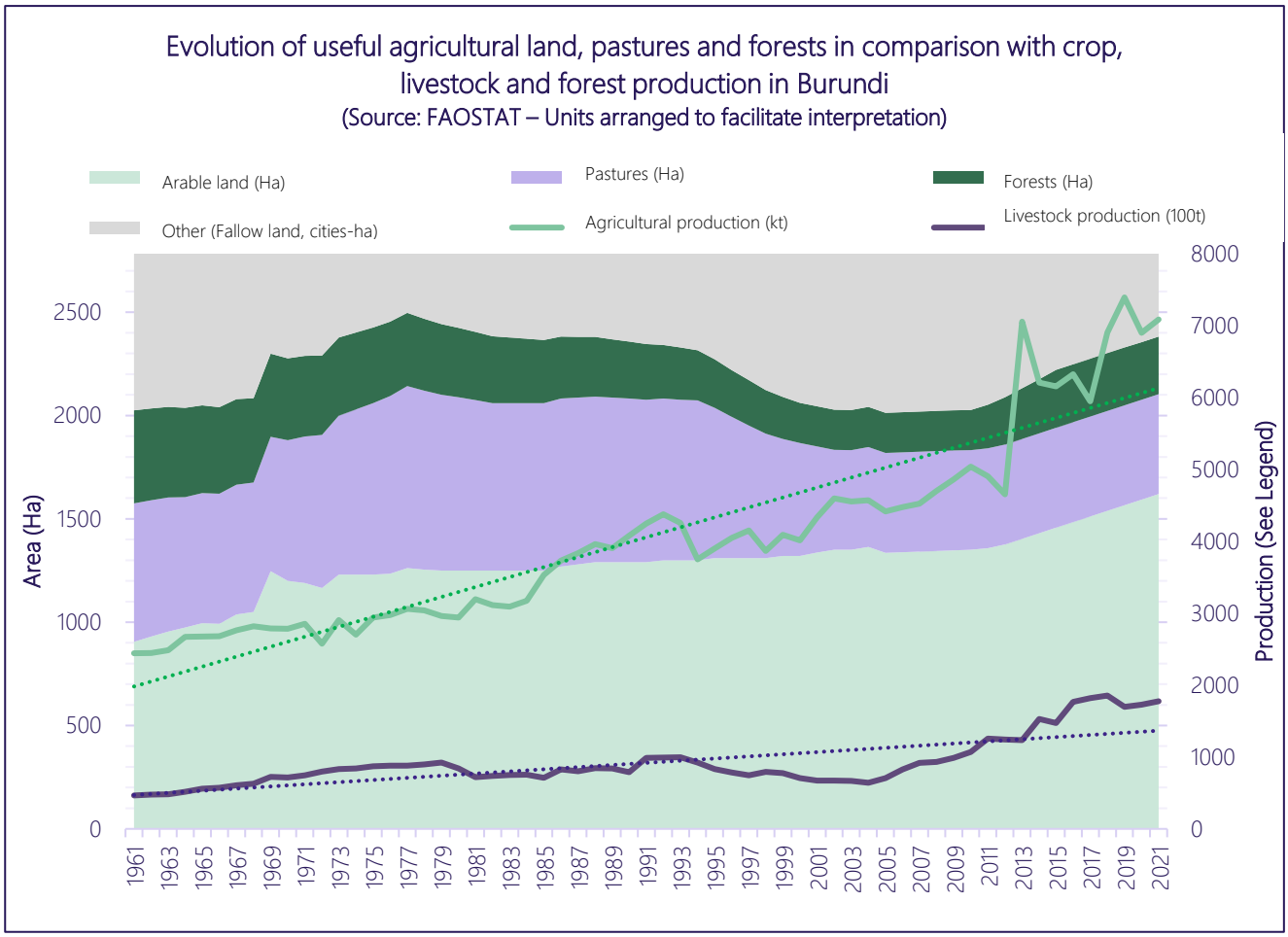


Figure 7: Evolution of principal soil use and crop and livestock production

As we can also see, crop and livestock production are growing faster than land areas, and despite Burundi's historically highly fragmented labour-intensive farming, it continues to enjoy **a steady and rapid acceleration of yields** in both crop and zootechnical production. The average yield per hectare for all crops combined,

[17] https://mineagrie.gov.bi/mineagrie/uploads/decret_loi/64ab5cd6b293dtmp
[18] https://www.cbd.int/doc/world/bi/bi-nbsap-v2-p1-fr.pdf
[19] https://hal.science/hal-03425303/document
[20] https://www.agter.org/bdf/fr/corpus_chemin/fiche-chemin-235.html

therefore, grew from 2.7 to 4.4 tonnes of crops per hectare between 1961 and 2022 according to FAOSTAT, and livestock production from 65 kg/ha/year to 368 kg/ha/year during the same period.

The three value chains targeted by the Government of Burundi for the agricultural risk assessment are emblematic of this intensification of Burundi agriculture.

The maize value chain is probably the one with the highest yield growth in recent years (2020–2024), due to rapid growth in the utilization of improved seeds (particularly hybrids) and the use of a mix of mineral and organic fertilizers. Although recent production estimates are not available, the latest data from Burundi's National Agricultural Survey (ENAB) indicate that production more than doubled between 2019 and 2021, increasing from 270,000 to 610,000 tonnes.

The rice value chain is the one whose cultivated area has expanded the most, thanks to the construction of major hydro-agricultural infrastructure in the *marais* (inter-*colline* wetlands) and Imbo Plain. These infrastructure projects are the product of several large rural development programmes – in particular, those financed by IFAD, which have led to the development of 16,714 ha[21] of wetlands in irrigated areas out of the national potential of 123,317 ha[22] identified by MINEAGRIE.

The rabbit value chain, identified by the Office of the President as a strategic value chain in 2023, is emblematic of the spread and intensification of small-animal husbandry in rural areas, with an economic return from manure that is almost as high as that from meat and hence, the processing of certain biomasses to convert them to concentrated organic inputs more tailored to the precision manual farming practiced on farms.

[21] https://www.ifad.org/documents/38714182/43045086/burundi_workshop_report.pdf/a653456e-2150-ef43-6d66-0543a527e807
[22] https://www.atlasdesmarais-bdi.org/bur/doc/marais/Atlas_v1_251017.pdf

3_ Overview of rabbit farming and the global market for rabbit products

Rabbit farming has its origins in Europe, where the European rabbit (*Oryctolagus cuniculus*) is an indigenous species. Romans have raised rabbits since antiquity for their meat and fur in rabbit warrens or *leporaria*. In the Middle Ages, European monasteries played a role in the development of rabbit farming, raising rabbits for their own consumption and disseminating these practices. With the great maritime explorations that began in the sixteenth century, Europeans introduced the European rabbit in many regions around the world, including the Americas, Australia and certain islands.[23] Rabbit farming gradually developed and adapted to local conditions in the different countries, based on their climate, available resources and culinary traditions.

It was in the twentieth century that rabbit production really became a large-scale industrial and commercial activity, especially in Europe, Asia (China, Japan, Korea) and North America.[24] Rabbit farming became a public policy issue at the end of the Second World War in the countries where agricultural production had been ravaged the most (Europe, Japan) to "enable populations to compensate for the lack of meat from large species."[25] Special breeds were selected, rabbit raising techniques were streamlined (batch farming) and organized value chains were established to meet the growing demand for rabbit meat.

More recently, rabbit farming has been booming in several African countries, among them Egypt, Nigeria and Benin, promoted by development programmes aimed at increasing food security and diversifying the income of small farms.

Except for some breeds raised for their fur or skins (notably angora rabbits), rabbits are produced primarily for their meat, known for its nutritional benefits. High in protein and low in fats, it is particularly recommended for a balanced diet. However, its co-products (skin and fur, manure and urine, viscera, head) may be important in the "material balance".[26]

3.1. Rabbit farming

Rabbit farming is often valued for its very low upfront investment, especially in traditional farming (farmyard or domestic hutch raising), its short production cycle and the prolific nature of rabbits. Some of the farmers interviewed compared it to raising guinea pigs, but with a lower meat yield.

Breeding and raising of the young follow the cycle below:[27]

- A breeder doe can be bred at the age of 5-6 months;
- Gestation lasts 31 days;
- The number of bunnies (kits) per litter ranges from 1 to 12, averaging 5 to 7;
- Feeding of bunnies:
    - Exclusive nursing for 18-20 days;
    - Introduction of solid food in the third week of life;
    - Weaning at 35 days (minimum: 28 days);
    - Fattening to the age of 3-4 months for sale;
- New pregnancy 11 days after giving birth (kindling).

[23] Source: COLIN & LEBAS (1994), Production et consommation de viande de lapin dans le monde: une tentative de synthèse https://www.researchgate.net/publication/271843971_Production_et_consommation_de_viande_la_lapin_dans_le_monde_Une_tentative_de_synthese

[24] https://www.lafranceagricole.fr/bien-etre-animal/article/837583/les-sept-commandements-de-la-filiere-cunicole

[25] http://www.cuniculture.info/Docs/Documentation/Publi-Lebas/1990-1999/1996-Lebas-&-al-FAO-Leper cent20lapinper cent20elevageper cent20etper cent20pathologie.pdf

[26] Material balance is the ability to make use of all parts of a carcass, whether first or second choice, as well as the other types of sub- or co-products.

[27] Sources: Our surveys and DJAGO A.Y. and KPODEKON M. (2007), Méthodes et techniques d'élevage du lapin en milieu tropical, 2nd edition, revised

The diagram below recaps the production potential of a breeder doe in one year (339 days), with continuous pregnancies and no spacing. We see that for litters of five bunnies with an 80 per cent survival rate (four adult rabbits of marketing age), one doe can produce 20 adult rabbits per year.

Semi-intensive rabbit farming scheme over 1 year for a breeding female rabbit															
Litter 1			**Litter 2**			**Litter 3**			**Litter 4**			**Litter 5**			**Total**
Coupling	D	1													
Gestation	31	days													
Kindling	D	31	Coupling 2	D	42										
Lactation	20	days	Gestation	31	days										
Weaning	D	51	Kindling	D	73	Coupling 3	D	84							
Feeding	120	days	Lactation	20	days	Gestation	31	days							
Adult rabbits	**Day**	**171**	Weaning	D	93	Kindling	D	115	Coupling 4	D	126				
			Feeding	120	days	Lactation	20	days	Gestation	31	days				
			Adult rabbits	**Day**	**213**	Weaning	D	135	Kindling	D	157	Coupling 5	D	168	
						Feeding	120	days	Lactation	20	days	Gestation	31	days	
						Adult rabbits	**Day**	**255**	Weaning	D	177	Kindling	D	199	
									Feeding	120	days	Lactation	20	days	
									Adult rabbits	**Day**	**297**	Weaning	D	219	
												Feeding	120	days	
												Adult rabbits	**Day**	**339**	
Adult rabbits sold		4		4			4			4			4		20

Figure 8: Diagram of semi-intensive farming in one year for a breeder doe

In countries where rabbit farming is industrialized, we see:

1) **selection operations** that produce purebred breeder rabbits called "great-grandparents" and have expertise in selecting breeds/genetic material according to their purpose and managing bloodlines;
2) **multiplier operations** that produce breeder rabbits called "grandparents" that are then supplied to breeding centres;
3) **breeding operations** that have a herd of breeder rabbits called "parents" that produces batches of bunnies that are sold once they are weaned;
4) **fattening operations**, where the pipeline consists of batches – that is, a group of bunnies of the same age and breed that arrive and leave the operation at the same time. This synchronized production allows for batches of animals that are homogeneous in age and stage, facilitating management and allowing for a complete fallowing period between each batch.

We note that the intensive breeding of rabbits with similar genetics in the same building makes them especially **vulnerable to contagious diseases.** Numerous epizootics appear in the annals:

- **Myxomatosis** killed almost 95 per cent of Europe's rabbit herd in the 1950s, following its accidental introduction (the virus had been used to regulate the proliferation of rabbits in Australia). Fortunately, an effective (and inexpensive) vaccine was developed.
- **Rabbit viral haemorrhagic disease** (VHD) appeared in the early 1980s in China, spreading very rapidly to Europe. The vaccine initially developed is now ineffective, given the mutation of the virus : a vaccine has been developed to combat this second variant, but is extremely expensive, leading actors in the value chain to vaccinate only breeder rabbits.

	Diseases	Consequences, mortality	Vaccination, preventive care	Curative care
VIRUSES	**Haemorrhagic virus** (VHD)	Internal haemorrhaging and death in a few days. Mortality of nearly 100%	Vaccination is expensive, especially after the resistance developed by the virus to the initial vaccines Good hygiene, biosafety practices	None
	Myxomatosis	Fever, swelling, conjunctivitis. Can lead to death in 2-10 days. Mortality of nearly 100%	There is an inexpensive vaccine	None
PARASITES	**Mange** (acariasis)	Skin problems, hair loss, intense itching, anorexia, general weakness. Death if untreated (secondary infections, malnourishment, weakness)	Sanitary measures (cleaning/disinfection of hutches, foot cleaning, building disinfection plan) Quarantine of new rabbits Preventive ivermectin treatment of the herd every three months	Topical application of ivermectin or fluralaner to affected areas
	Coccidiosis (*Eimeria* protozoan)	Diarrhoea, sometimes bloody, wasting, dehydration, seizures. Very high mortality in rabbits.	Sanitary measures Quarantine of new rabbits Avoid stress, excessive humidity and draughts Clean food and water.	Sulfamide-based coccidiosis drugs Farmers in Benin use neem leaves.[28]
	Ringworm (dermatophyte)	Benign cutaneous mycosis: scaly red patches with hair loss, primarily on the head (nose, eyelids, ears) and feet. Scabs. Possible itching. Low mortality.	Sanitary measures Quarantine of new rabbits prior to their introduction in them in the breeding facility	Antifungal drugs
BACTERIA	**Epizootic rabbit enteropathy (ERE) or enterocolitis**	Digestive pathology causing metabolic disorders such as caecal paresis. High mortality.	Fallowing between batches	Bacterial dominant treated with Tiamulin or Bacitracin
	Pasteurellosis	Different clinical forms: • respiratory (rhinitis, sinusitis, pneumonia) • digestive (enteritis, diarrhoea) • genital (genital abscesses) • septicemic, often fatal Frequent complications (secondary infections, ophthalmitis, otitis, abscesses).	Sanitary measures Quarantine of new rabbits Avoid stress, excessive humidity and draughts Clean food and water Screening to identify healthy pregnant does; elimination of infected ones.	Targeted antibiotic therapy is often ineffective (frequent relapses); total elimination of the herd is often necessary
	Coryza	Respiratory disease that, left untreated, can progress to serious complications that may lead to death: abscesses and ulcers of the respiratory tract, pneumonia, otitis media, pleurisy	Sanitary measures Quarantine of new rabbits Avoid stress, excessive humidity and draughts Clean food and water	Targeted antibiotic therapy, antiseptic treatment and decongestion of the airways are also necessary.

[28] Source: FAO (2018), Etude de marché du lapin au Benin

	Diseases	Consequences, mortality	Vaccination, preventive care	Curative care
	Colibacillosis (*Escherichia coli*)	Serious Infections that can entail: acute enteritis, respiratory infections, generalized infections. Frequent complications (secondary infections, abscesses, etc.). Mortality can exceed 30 per cent.	Idem	Targeted antibiotic therapy is often ineffective (frequent relapses): total elimination of the herd is often necessary
	Salmonellosis	Affects the digestive system: diarrhoea, often bloody, vomiting, weakness, anorexia, high fever	Idem	None

Figure 9: Rabbit health, main pathologies (Source: Authors, based on a literature search)

Commercial rabbit breeds are distinguished by their fur (colour, length, density) and size, as seen in the following examples:[29]

Small breeds: Adult male < 3 kg	Medium-sized breeds: Adult male 3-5 kg	Giant breeds: Adult male 5-7 kg
Dwarf Russian English Silver Black fire	Champagne d'Argent Fauve de Bourgogne New Zealand White Vienna White/Blue Californian	Giant Blanc de Bouscat Checkered Giant French Lop Flemish Giant

Figure 10: Examples of rabbits by size (Source: Authors, based on cuniculture.info)

While rabbits are largely produced for their meat (carcass), their co-products can be important in material balance:

- Skins:
  - Fur and skins are used, among other things, in the manufacture of hats and coats, sometimes in the form of felt or even wool, generally from specialized breeds (angora rabbits, for example).)
  - Rabbit-skin glue is used primarily in cabinetry
- Waste for fertilizer (manure and urine)
- Viscera and other offal.

[29] Source: DJAGO A.Y. and KPODEKON M. (2007), Méthodes et techniques d'élevage du lapin en milieu tropical, 2nd edition, revised

Clothing made of rabbitskin and fur	Rabbit-skin glue	Rabbit droppings and liquid manure sold as fertilizer	Dishes made with rabbit offal (liver, kidneys, heart, tongue and cheeks)
 		 	 

Figure 11: Examples of rabbit products other than rabbit meat

3.2. Production and global market for rabbit products

Rabbit farming/raising is found on all continents but with very different degrees of development, depending on the region. It remains a small-scale activity in many countries, often practiced at the household or semi-intensive level.

China (especially Sichuan) is the world's leader in rabbit farming, with some 300 million rabbits slaughtered annually (although down from 400-500 million between 2006 and 2016),[30] or 55 per cent of the rabbits slaughtered worldwide. Unlike other countries, which produce rabbits for meat, China also possesses 18 per cent of the herd destined for the production of skins and 7 per cent for the production of fur. It is followed by North Korea (20 per cent of the rabbits slaughtered worldwide), then Egypt (11 per cent), Spain (8 per cent) and France and Italy (with 3 per cent each).[31]

[30] Source: FAOSTAT
[31] Source: FAOSTAT

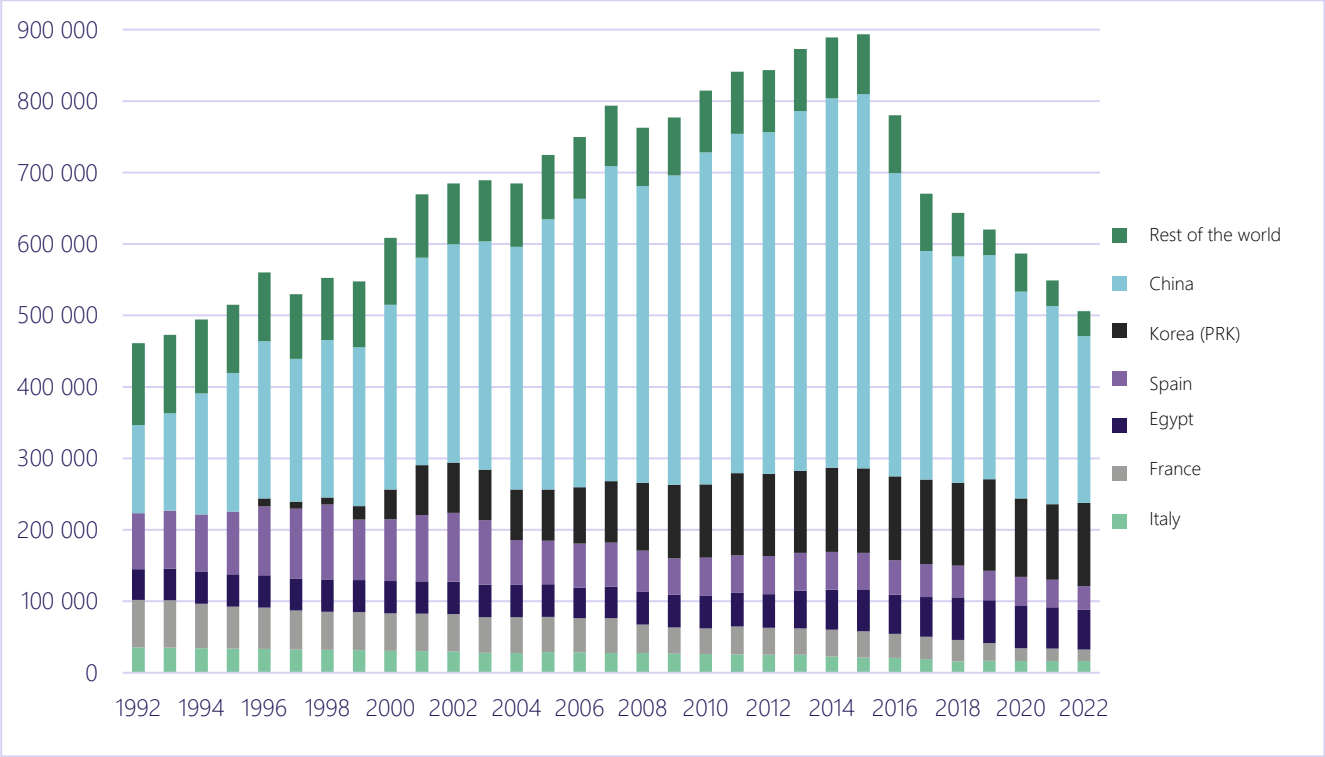


Figure 12: Number of rabbits slaughtered annually by country (in millions) (Source: FAOSTAT)

The live rabbit trade was valued at some US$42 million globally in 2022 and, naturally, involved trade between neighbouring countries. Intra-European Union trade accounted for the vast majority of the international trade, with a little over 8,000 tonnes of live rabbits traded in 2022 in the 27 member countries and 2,000 tonnes traded in the rest of the world.

International trade in rabbit meat is, naturally, weightier: around US$130 million-worth in 2022, with 28,000 tonnes traded. Even so, global trade was dominated far and away by trade in the European Union, amounting to some 20,000 tonnes of rabbit meat, leaving only 8,000 tonnes traded in the international market.

Excluding trade in the European Union, global trade is clearly dominated by **Chinese exports, which account for more than 50 per cent of the global trade.** These exports are destined mainly for the European Union and to a lesser extent, Russia and the United States.

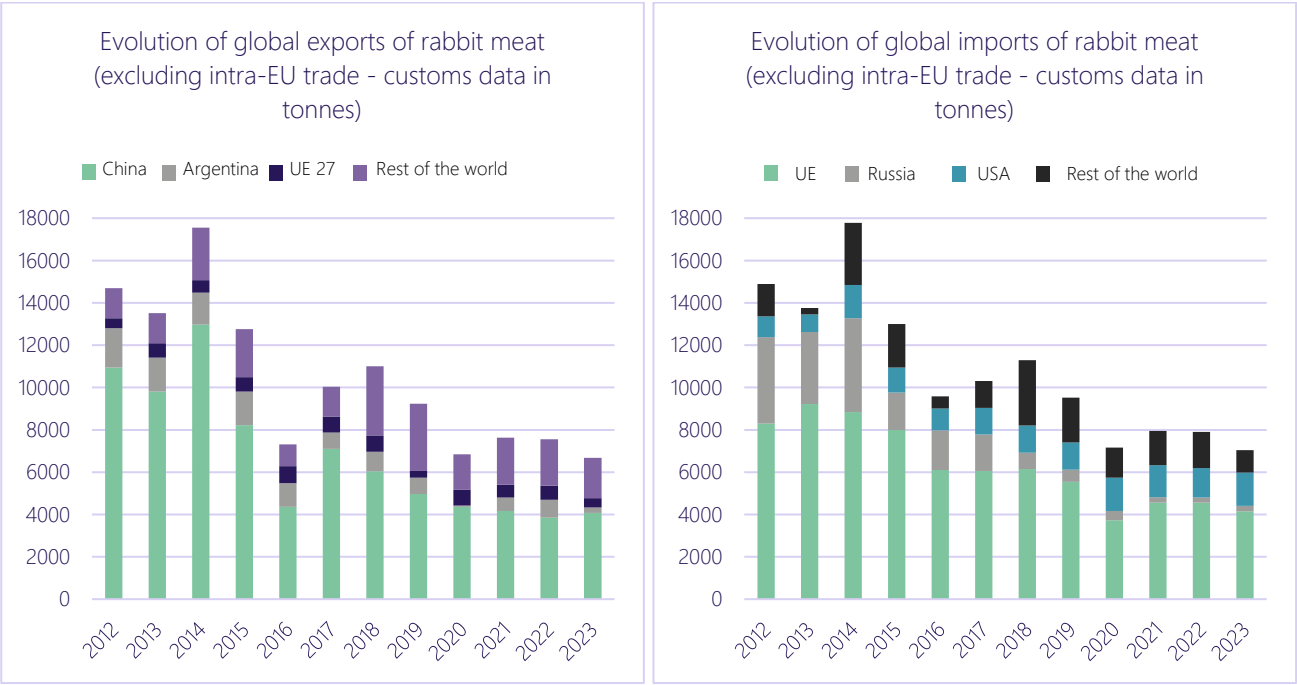


Figure 13: Evolution of international trade in rabbit meat exports (excluding intra-European Union trade)

The global trade in rabbit skins is calculated at hundreds of tonnes per year internationally. Like the other products of rabbit farming, most of the trade occurs within the European Union (610 tonnes in 2022) and very little at the global level: 175 tonnes exported by the European Union and 27 tonnes exported by China in 2022.

Global trade in rabbit fur is even lower. The European Union exported 134 tonnes of rabbit fur (95 per cent from angora rabbits) to the rest of the world in 2022, and European countries traded 180 tonnes of it among themselves. China did not export rabbit fur, but it is likely that the rabbit fur it produces is directly fuels its enormous textile industry and that much of it is exported under the customs codes for textiles, in which the types of wool/fur are not specified. Angora rabbit wool/fur is especially used in the manufacture of socks and hats and in any case, is an extremely marginal niche market in the textile sector.

Like the rabbit meat trade, the global rabbitskin and fur trade is declining. This reflects the weak global demand for rabbit products, due, among other things, to a change in attitudes about rabbits, which for a growing number of people have shifted from the status of farm animal/game to domestic animal/pet.

3.3. Rabbit farming in Africa

In Africa, rabbit farming has exhibited a moderate but surge in several countries. It represents an affordable source of animal protein for rural populations, while offering them an opportunity for income generation.

- Egypt is a pioneering country, producing some 40 million head annually, mainly through small-scale family rabbit raising.
- Production in Nigeria is estimated at 5 million head annually, with high potential for growth to meet local demand.
- In Benin, Burkina Faso, Cameroon and Côte d'Ivoire, village rabbit farming has gradually developed, thanks to outreach and training programmes.

Many challenges persist, however, including a lack of infrastructure, training and access to inputs and markets.

3.4. An inspiring example: Benin's National Rabbit Farming Development Strategy (2018-2022)[32]

According to our research, Benin is the only country in Sub-Saharan Africa to have formalized (with FAO support) a National Rabbit Farming Development Strategy (SNDC) for the 2018–2022 quinquennium. While an evaluation of its results is not publicly available as yet, the preliminary evaluation and development of this strategy can serve as a source of inspiration for Burundi.

Rabbit farming surged in southern Benin with the creation of the Rabbit Farming Research and Information Centre (CECURI) at the University of Abomey-Calavi in 1988. Several projects and programmes (Corus, FAO, etc.) proceeded to support the value chain's development. While the herd remains small, Beninese appear to prize grilled or braised rabbit meat.[33] In 2015, rabbit meat consumption exceeded 1,900 tonnes, 56 per cent of it from Beninese rabbit farming operations,[34] or nearly 1,100 tonnes (in contrast to an estimated production of 400 tonnes in 2005). Some 90 per of rabbit farming operations are unspecialized family operations pursued as a complement to other agricultural activities; 9 per cent are semi-intensive systems in urban or peri-urban settings; and only 1 per cent are intensive operations with at least 100 breeders does.[35]

The growth of the domestic herd has unfortunately been accompanied by serious epizootics of viral haemorrhagic disease. The first wave in 1995 appears to have decimated some 80-100 per cent of the rabbit

[32] Source: FAO (2018), Stratégie Nationale de Développement de la Cuniculture au Benin (2018-2022), https://www.fao.org/3/i8180fr/I8180FR.pdf
[33] Source: FAO (2018), Etude de marché du lapin au Benin
[34] Added to the rabbits from local farming operations are: imported frozen carcasses (7.6 per cent) and the hunting of wild rabbits and hares (36.4 per cent)
[35] Source: FAO (2018), Stratégie Nationale de Développement de la Cuniculture au Benin (2018-2022), https://www.fao.org/3/i8180fr/I8180FR.pdf

herd, and the estimated losses from the second wave of 2015–2016 are likely equivalent, despite a vaccination subsidy.[36]

The SNDC diagnostic phase reveals the following weaknesses:

- Little access to specific inputs and services (feed,[37] genetic material, technical and economic advisory services, credit)
- Low productivity and production (poor performance of local breeds, the absence of standards and quality control for granulated feed, limited capacity of the VHD early warning and control system, the preponderance of small-scale operations)
- Weak competitiveness and trouble accessing the market: in particular, we found competition with frozen rabbit meat imported from France,[38] especially in coastal regions
- A fairly unstructured value chain with little gender sensitivity
- An unfavourable environment for development of the value chain (in the Department of Livestock and also in terms of the availability of data and public investment)

Within this context, the SNDC aims to *"heal the administrative and institutional environment for rabbit farming to boost its productivity and competitiveness, create better marketing conditions and ultimately, a profitable and attractive sector that can serve as a source of self-employment for youth and women."*

Its specific objectives are to:

1. Boost the productivity and competitiveness of the rabbit value chain in Benin
2. Create better marketing conditions for the products of rabbit farming (meat, skins, etc.)
3. Make rabbit farming a profitable and attractive sector that can serve as a source of self-employment for youth and women

The strategy consists of a five-year action plan with four main strategic lines of action:

1. Improvement of the institutional and regulatory framework
    a. Creation of a specific regulatory framework for rabbit farming
    b. Strengthening the capacity of technical services and professional organizations
2. Sustainable development of rabbit farming operations
    a. Genetic improvement of local breeds
    b. Promotion of feed derived from agricultural subproducts
    c. Support for the creation of modern production units
3. Promotion of marketing and consumption
    a. Structuring of marketing circuits
    b. Promotion of rabbit meat consumption
    c. Development of rabbit product processing
4. Strengthening of actor capacities
    a. Technical training for farmers and technicians[39]
    b. Support for the launch of rabbit farming projects
    c. Facilitation of access to financing

The action plan details the specific activities for each line of action, with an estimated budget of FCFA 3.5 billion (EUR 5.34 million) for the period 2018–2022.

[36] Vaccine sold to rabbit farmers at a price of FCFA 200 per head, versus FCFA 500 without the subsidy
[37] In Benin, there is only one supplier of granulated feed, giving it a monopoly
[38] We can assume that they are carcasses of culled breeder rabbits that French producers discard at a very low cost or even pay to discard, which explains their competitive prices, even though Beninese consumers say they prefer local rabbit from the standpoint of taste.
[39] With the 2018 publication of a technical handbook for rabbit farmers in Benin: https://www.fao.org/documents/card/fr?details=I7640FR/

4_ The rabbit value chain in Burundi

4.1. The rabbit farming context in Burundi

Rabbit farming is not part of Burundi farming traditions or consumption habits. It was introduced in the early 1980s by Italian missionaries, who then supported the creation of the Mutoyi Union of Cooperatives and imported purebred rabbits from Europe. According to our inquiries, even today, specialized rabbit farming operations obtain breeder bunnies from Mutoyi.

According to ENAB data, between 2002 and 2010, Burundi's rabbit herd grew from some 300,000 head to 400,000 head. During the next decade, it averaged 500,000 head. According to the ENAB 2019-2020, the **domestic herd numbered more than 800,000 head**.

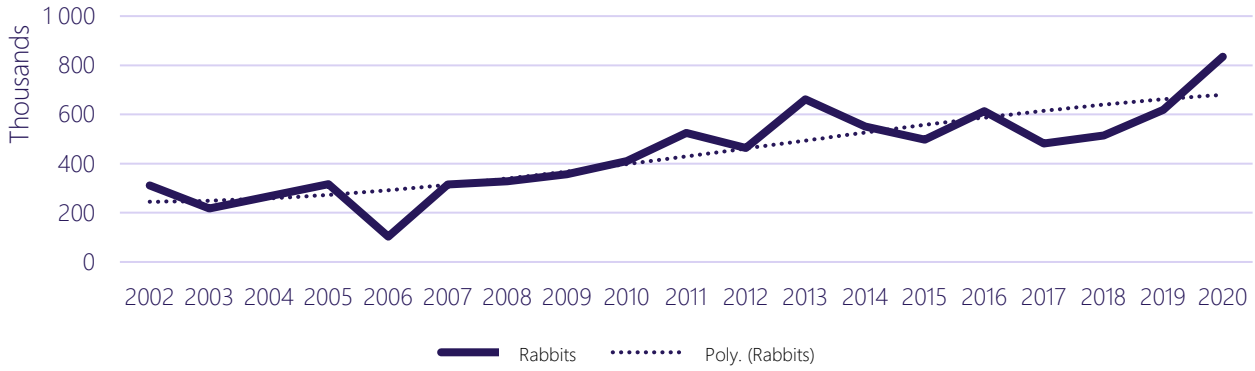


Figure 14: Evolution of Burundi's rabbit herd from 2002 to 2020 (Source: ENAB data compiled by the authors)

According to the ENAB 2019-2020, **56 per cent of the rabbit herd was concentrated in three provinces: Kayanza, Ngozi and Kirundo**. In these three leading provinces, farm households with more than two rabbits accounted for 20.3 per cent, 11.6 per cent and 10.8 per cent, respectively.

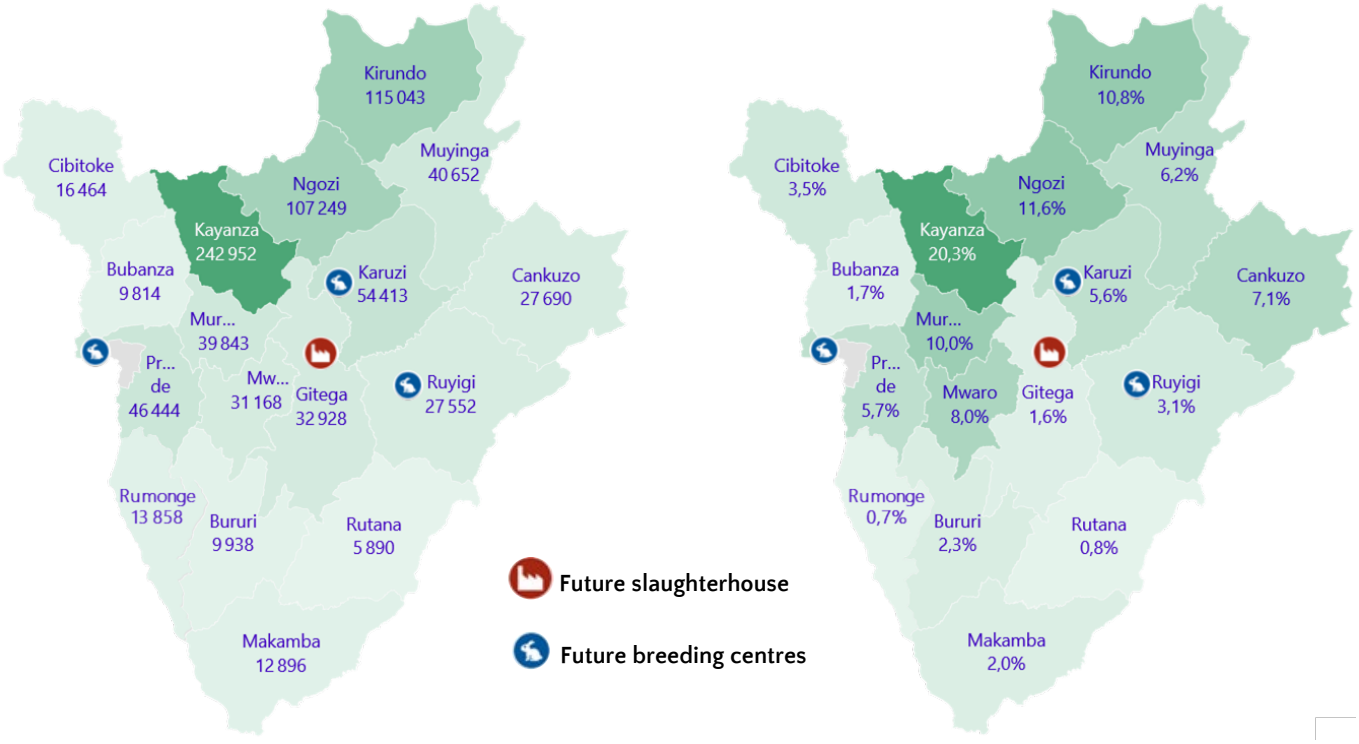


Figure 15: Distribution of the rabbit herd by province (left) and proportion of farm households with at least two rabbits (right) (Source: ENAB 2019-20)

Since 2022, rabbit farming has been booming in Burundi. In fact, Burundi's government, spurred by President Evariste Ndayishimiye,[40] has been actively encouraging the development of rabbit farming as a source of income, especially in rural communities. The stated objective is for every rural household to possess at least five rabbits.

This is a key element of the President's policy to make Burundi an emerging country by 2040. A note from Martin NITERETSE, Minister of the Interior, Community Development and Public Security, dated 27 September 2023, calls on all government offices to set an example by mounting a breeding operation with five rabbits before 31 October 2023 and then encouraging all farm households to do so. The Head of State's ambition is to get rural households out of poverty and malnutrition by developing this type of animal husbandry, which requires little upfront investment, throughout the country and creating a domestic export value chain.

To accomplish this, a number of infrastructure projects are under construction or planned (see figure 15: Distribution of the rabbit farming herd by province (left) and proportion of farm households with at least two rabbits (right) (Source: ENAB 2019-2020, figure 10):

- A modern slaughterhouse located in Gasunu *colline* (Gitega commune), whose operations are expected to commence in 2024[41]
    - Property of the SOPRAGRIE cooperative
    - Processing capacity: 1,000-2,000 rabbits/hour
    - Accompanied by a modern hutch facility and rabbit farming training centre
- Three breeding centres that import purebred foreign breeds as multipliers and will be located in:
    - Kigarika (Ruyigi province)
    - the Gatumba zone (Bujumbura Rural province)
    - Karusi province

Rabbit farming training events have been held by a number of institutions:

- In July 2023, a "Modern rabbit farming" training event with some 40 participants was held in Rumonge.[42]
- In November 2023, the Youth Economic Empowerment and Employment Programme (PAEEJ) brought together 46 participants:[43] specialized farmers, future staff from breeding centres, representatives of MINEAGRIE and technical advisors in rabbit farming. The event was conducted by the representative of Hypharm Afrique, a Grimaud Group subsidiary specializing in genetics.[44]

Loans and financing are also provided through various programmes and banking institutions:

- For youth: through the *Banque d'investissements pour les jeunes* (Investment Bank for Youth) (BIJE) and the PAEEJ, for farmers and other actors in the value chain (breeding centres, etc.)
- For women: The *Banque d'investissement et de développement pour les femmes* (Women's Investment and Development Bank) (BIDF), opened in Gitega in March 2022. whose objective is the financial empowerment of women. Its shareholders are the communes (85 per cent) and the State (15 per cent). BIDF grants low-interest loans to women's associations and cooperatives, including for the launch of rabbit farming activities.[45]
- The Support, Guarantee and Assistance Fund (FIGA), attached to the Ministry of Finance, offers project owners assistance in securing bank loans, a guarantee fund (50 per cent to 80 per cent) and subordinate loans. The eligible beneficiaries are women, youth, and farmers. The Fund works with

[40] https://www.rfi.fr/fr/afrique/20231027-burundi-comment-le-prper centC3 per centA9sident-mise-sur-l-per centC3 per centA9levage-de-lapins-pour-sortir-son-pays-de-l-extrper centC3 per centAAme-pauvretper centC3 per centA9

[41] https://presidence.gov.bi/2024/02/01/le-president-ndayishimiye-inspire-les-hommes-politiques-burundais-dans-le-developpement/ / https://www.facebook.com/watch/?v=1097713411217665 / http://lerenouveau.bi/paeej-visite-du-chef-de-letat/

[42] https://burundi-agnews.org/ecoNameie/lelevage-de-lapins-populaire-au-burundi-atelier-a-rumonge/

[43] https://presidence.gov.bi/2023/11/07/le-president-ndayishimiye-passe-a-une-nouvelle-phase-dans-la-cuniculture/ / http://lerenouveau.bi/paeej-visite-du-chef-de-letat/ https://www.facebook.com/watch/?v=1097713411217665

[44] https://grimaud.com/organigramme/: the Grimaud Group is one of the global leaders in genetic selection

[45] https://burundi-eco.com/bidf-pour-stimuler-competition-dans-secteur-bancaire/ / https://www.iwacu-burundi.org/va-t-elle-reellement-financer-les-femmes/

livestock operations and livestock product processors. Suffering from a lack of funds, FIGA is in the process of reform to enable new partners (World Bank, AfDB, IFAD and even the EU) to participate.

Despite the eagerness sparked by the presidential declarations encouraging widespread rabbit farming, the national media have highlighted a number of weaknesses and concerns:[46]

- With regard to the market and marketing component:
  - The uncertain success of introducing rabbit meat in the Burundian diet and even that of neighbouring countries to make it an export value chain
  - The development of marketing circuits: very few dealers today sell rabbits and rabbit products
  - The use of co-products, beginning with urine and manure (urine is in the process of certification as a fertilizer and insecticide), and especially the marketing of skins/fur
- With regard to rabbit raising:
  - The availability of improved breeds of breeder bunnies[47]
  - The initial investment, especially to launch a specialized breeding operation: the purchase of breeder bunnies and hutches; working capital
  - Support technical advisory and veterinary services and their expansion, as well as the availability of a specialized pharmacopoeia: the first farmers to get started, who lacked the necessary know-how, experienced high bunny mortality, often because of improper feeding
  - Access to granulated feed appropriate for the different ages of bunnies: our interviews with feed suppliers has revealed that their knowledge and competencies in this area have yet to be developed.

These issues will be resolved by the structuring under way or should be considered when drafting the national rabbit farming development strategy promised by the Director-General of Livestock,[48] who has announced the creation of a national commission.

To summarize, this reveals that Burundi appears to have chosen to encourage all farm households to procure rabbits but first and foremost has put in place the infrastructure and services for specialized farming operations (with 100 or more rabbits): training, breeding centres, slaughterhouse, loans, etc. The objective, therefore, is for these specialized operations to help disseminate technical know-how and access to inputs in their intervention area. This strategy, while not formalized as such, differs from that of Benin, which clearly targets 90 per cent of family livestock operations, for which rabbit farming is but one activity.

There remains the challenge of promoting rabbit meat in the Burundi diet: some rabbit farmers view the higher beef prices stemming from the compulsory stabilization as an opportunity to promote this healthy, less expensive meat.

[46] Obtained from our inquiries in the field and articles in the press: https://www.jimberemag.org/politique-elevage-lapins-burundi-adhesion-defis/ / https://burundi-eco.com/elevage-des-lapins-il-y-a-loin-de-la-coupe-aux-levres/ / https://www.jimberemag.org/structuration-filiere-cuniculture-burundi-gitega/

[47] However, with the downside of a heightened risk of epizootics and a range of diseases due to the circulation of bunnies and lack of genetic diversity in a farming operation.

[48] Source: https://www.jimberemag.org/structuration-filiere-cuniculture-burundi-gitega/

4.2. Stages in the value chain and direct actors (units of analysis)

4.2.1. Selection operations and multiplier breeding centres

The purpose of selection operations is to maintain and genetically improve rabbit breeds by selecting the best breeder rabbits based on specific criteria. To do so, they must choose and mate the best breeder males and females in their operation to produce bunnies with the desired characteristics (body type, weight, resistance, fur, etc.), while regularly importing foreign breeder rabbits to avoid consanguinity. Parental lineage strategies will differ depending on the rabbits' function, namely: those for producing breeder rabbits will select rabbits for their fecundity; those for producing meat will select them for their body type. Selection operations will then multiply these blood lines to supply breeder bunnies to rabbit farming operations that request them.

During our interviews, several specialized operations mentioned the Mutoyi Union of Cooperatives (UNICOMU) as a supplier of more or less purebred breeder rabbits. In fact, since 1982, Italian missionaries have imported bunnies from Europe to develop rabbit farming. Our surveys lead us to believe that most of the varieties of "improved breeds" available in recent years come from this cooperative, though it is likely that diverse hybridizations have occurred along the way and that imports of breeder rabbits from neighbouring countries and even Europe have also taken place informally.

Traditional rabbit farming operations, in contrast, obtain breeder bunnies not from breeding centres but from neighbours or the local market. In fact, with the current popularity of rabbit farming, numerous specialized rabbit farming operations now sell more breeder bunnies than rabbits for meat, thus becoming de facto multiplier operations.

During our interviews with farmers, we found substantial differences in the sale price of breeder bunnies: from BIF 5,000 to 30,000. It likely depends on the breed and availability of bunnies in a particular area but is also a result of the lack of pricing information circulating at the national level. The specialized rabbit farming operations that obtain their supply from Mutoyi do not hesitate to shell out BIF 25,000 to 30,000 per head.

Under the rabbit farming deployment policy, three breeding centres should emerge – one in Kigarika (Ruyigi province) and the other two in the Gatumba zone (Bujumbura Rural province) and Karusi province. These centres will receive financing from the PAEEJ and import purebred breeder bunnies to multiply them.

4.2.2. Feed and granulated product supply

Following the closure of the Alcovit (Alimentations Composés Vitaminés) livestock feed factory in Bujumbura, the sector was dominated by largely informal artisanal SMEs in the country's urban centres. A Burundian investor also built a small feed factory in the vicinity of Ngozi but was unable to get it up and running because he could not find a technician to complete the installation of the furnace.

Most artisanal feed suppliers to not sell ready-made products but provide ingredients and formulate the feed requested by the customer. If a customer asks for their advice, they can also suggest their own recipe. The main ingredients available from feed suppliers for livestock feed are:

- Crushed maize
- Wheat, maize and rice bran
- Maize and sorghum flour
- Molasses from sugar cane
- Soybeans
- Sunflower, cotton and palm cakes
- Fish and shrimp waste (imported largely from Tanzania)
- Snail shells imported from Tanzania (for calcium fortification in the poultry value chain).

Figure 16: Ingredients for the formulation of livestock and granulated feed at the facilities of two feed suppliers in Bujumbura

Among the feed suppliers found, **only one had a granulator** (a grain compactor),[49] that he had recently acquired so he could offer (granulated) feed specifically formulated for rabbit farming. He told us that, while most rabbit farmers produce their own feed, they are increasingly looking for suppliers to fortify their rabbits' diet (especially that of nursing and pregnant does, which require an enriched diet).

Although he was unwilling to share his specific recipe, the information he shared (a recipe based on wheat and rice bran, palm seed, soybeans and molasses) and the appearance of the granulated feed he sold led us to conclude that the proposed formula was too rich in carbohydrates and too poor in fibre for rabbit feed.

In general, feed suppliers appear to be poorly trained and ill-informed about the nutritional needs of rabbits and the necessary formula/composition and quality of the raw materials.

Only **UNICOMU** appears to offer farmers, in partnership with it, **different feed formulas** for nursing does, weaning bunnies and rabbits for fattening.

All the suppliers confirmed that the demand for feed for rabbit farming is currently marginal compared to that for poultry and pig farming and for dietary supplements for ruminants.

4.2.3. Veterinary services (consults and pharmacopoea)

In 2019, MINEAGRIE identified **343 veterinary pharmacies** in the country (only 66 of which were authorized).[50] A good number of them were cooperatives and also sold phytosanitary products, fertilizer, livestock feed and occasionally tools for crop farming and livestock production.

During our interviews or in newspaper articles about the recent rabbit farming policy,[51] farmers lamented the lack of veterinary services for rabbit farming (territorial network, transportation for veterinarians and veterinary technicians) in terms of both quantity and quality (specific knowledge for rabbit farming).

Thus, certain rabbit farmers are exploring the use of **phytotherapy**, adding plants with antiparasitic immune properties to the formula.[52] This seems an interesting avenue to explore in the strategy to support farmers.

[49] We note that a small Chinese grain compactor like the one we observed in Bujumbura is relatively inexpensive (between US$250 and US$750 /unit FOB China, depending on its power/capacity).

[50] https://burundi-eco.com/louverture-des-pharmacies-veterinaires-provisoirement-mise-en-demeure/

[51] https://rtnb.bi/fr/art.php?idapi=7/1/246 / https://www.jimberemag.org/structuration-filiere-cuniculture-burundi-gitega/ / https://www.iwacu-burundi.org/gitega-ruyigi-elevage-des-lapins-des-debuts-difficiles/ / https://www.jimberemag.org/politique-elevage-lapins-burundi-adhesion-defis/

[52] Source: Our surveys.

4.2.4. Traditional rabbit farmers

"Traditional" farmers who raise rabbits have 1-10 breeder does, but their entire herd does not generally exceed a few dozen rabbits, often fewer than 50. Rabbit raising is a supplementary farmyard activity practiced in association with other agricultural activities to take advantage of crop waste and obtain fertilizer from rabbit manure and urine. The rabbits are rarely raised in hutches but instead on rickety shelves or are even allowed to run free. Rabbits at the end of gestation dig burrows to give birth (kindle).

According to our discussions with maize and rice growers,[53] since the launch of the rabbit farming development policy, the spread of traditional rabbit farming among Burundian farms has been impressive, especially if we compare the rate at which rabbit farming has spread with the data from the latest available ENAB, provided below.

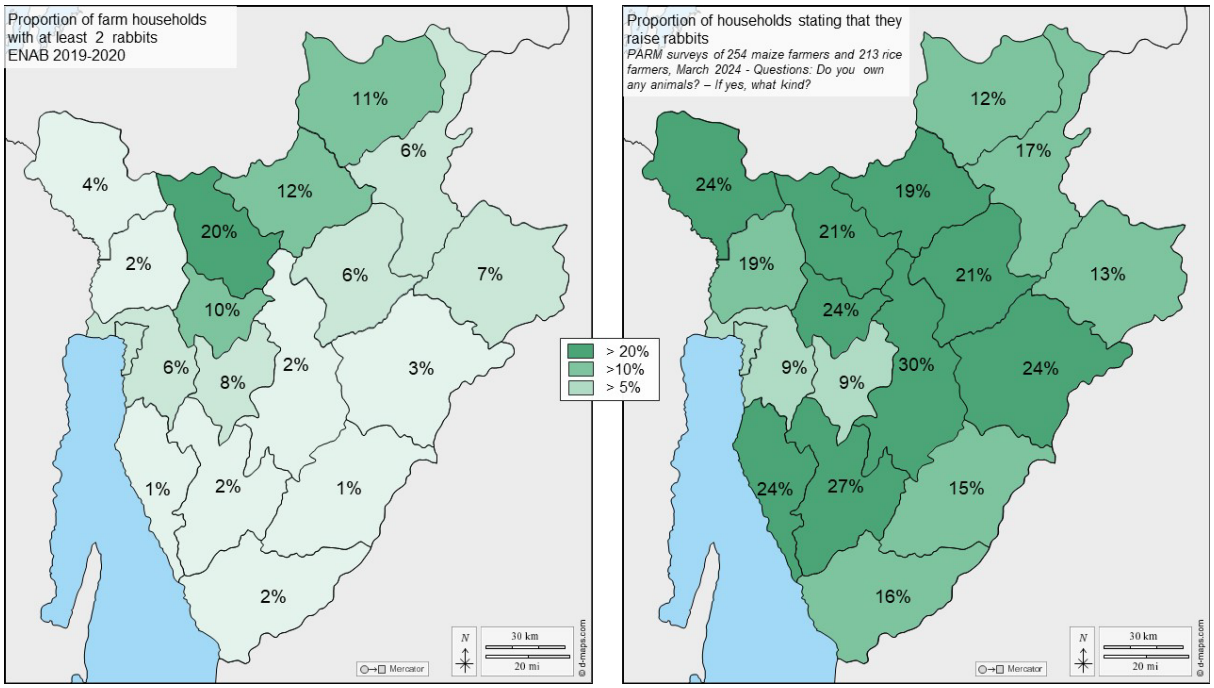


Figure 17: Comparison of the percentage of rural households that raised rabbits in 2019-2020 and 2023-2024 by region

This small-scale rabbit farming does not require labour outside the family and entails a low initial investment and limited operating expenses.

Breeder bunnies are purchased in the neighbourhood or market at BIF 5,000-10,000 per head. Inputs for the operation are limited to fodder from crop waste and gleanings from uncultivated areas, or more rarely, specific fodder crops such as alfalfa. Concentrated/granulated feed and veterinary care are virtually non-existent.

[53] These surveys sought to identify the risks in the two cereal value chains, and the question posed was only about animal ownership. They cannot claim the same degree of representativeness as the ENABs but can show the growth of rabbit farming in the country.

Waste is used as fertilizer on farms. Most of the meat is for household consumption, but this type of rabbit farming is also a tool for saving: one or several rabbits are sometimes sold to meet an urgent financial need.

When live rabbits, or more rarely, carcasses, are sold, it occurs in the neighbourhood, the local market or even on the roadside, often by the farmer or a family member.

Some farmers also sell breeder bunnies to their neighbourhood. The importance of the income from rabbit sales varies from household to household but can sometimes represent a substantial portion of their income-generating activities (up to 80 per cent of the income of traditional rabbit farmers owning around 10 breeder does).

Limited access to inputs probably affects performance (carcass weight) but also keeps down production costs and market dependence for the success of the activity.

Figure 18: Sale of live rabbits on the roadside (Source: Authors)

These operations are generally less subject to disease outbreaks than specialized operations are but more subject to predation and stock theft.

Figure 19: Traditional rabbit farmer who owns 15 rabbits and his home-made hutch in Karunga, Bujumbura Rural

4.2.5. Specialized farmers

Specialized farmers have herds of several dozen, or even hundreds of, adult rabbits. Rabbit farming may be their main economic activity or an important secondary one (after crop farming or some other type of animal husbandry). The largest operations hire labour, especially to manage fodder, and have a small building devoted to raising rabbits, even a hangar with hutches.

Our interviews were conducted with 10 of them, and a subsequent meeting with nine members of the National Platform for Rabbit Farmers enabled us to consolidate our observations. Of the 10 operations visited:

- Seven are owned by an individual:
    - They own an average of 150 head (60-300) ;

    - Those with fewer than 150 head generally have a side activity, agricultural or not.
- Three operations are run by a cooperative:
    - Two for which rabbit farming is the only livestock operation: Terimbere Mukenyezi and the cooperative of Gitega employees who raise rabbits;
    - The Mutoyi cooperative (see Selection operations and multiplier breeding centres, p. 256), which raises other livestock, notably poultry and laying hens;

The President, in fact, wishes to promote the model for cooperative and collective rabbit raising among other groups that we have been unable to find, as is the case with: the Jimbere Mukenyezi Women's Association and its farm in Muyebe, the Cooperative of Young Working Entrepreneurs of Bubanza (COJEEBU) and others.

Several of those interviewed informed us that they had obtained loans, mainly from PAEEJ, to help them get started or expand their operations.

All of them generally have access to inputs:

- The breeds mentioned by the farmers, mainly Fauve de Bourgogne, New Zealand, Californian and Lionhead, show that they have been able to supply their operation from breeding centres that import bunnies (often, the Mutoyi cooperative, more or less directly). These breeds are often cross-bred.
- They gather fodder (with labour hired for this purpose) and supplement it with the purchase of feed, whether granulated or not, and even concentrates to enrich fodder-based feed.
- They regularly use veterinary services, mostly provided by veterinary input vendors.

Figure 20: Specialized rabbit farming operation owned by Mr. Vumvuhore in Gitega with a capacity of 150 rabbits.

They average six to seven bunnies per litter, and their performance in terms of mortality is highly variable (from 0-30 per cent, or even 70 per cent in the event of a disease).

Meat rabbits are sold live or as carcasses in the local market or even to members of the cooperative, as the case may be. Operations near urban centres are sometimes connected with supermarkets, restaurants or even butcher shops. Currently, however, most of them appear to sell breeder bunnies due to their popularity, making them de facto multiplier centres.

Depending on the degree of specialization, rabbit urine and manure are used on the farm or by members of the cooperative to fertilize their fields or sell. Half the specialized farmers found sold rabbit waste in the market. Skins and viscera have no takers at the moment.

4.2.6. Dealers and butchers

Up to now, rabbit meat has not been widely consumed, and its distribution circuit remains undeveloped. Traditional rabbit farmers consume much of their production themselves and sell live rabbits largely in their neighbourhood, on the roadside or on weekly market days.

The bottleneck is mainly specialized farmers, whose volumes are larger and thus, harder to channel to short supply chains.

The surge in the demand for breeder bunnies is currently being met by the growth of the herd. Once rural households obtain breeder bunnies, the consumption of rabbit meat and its distribution circuit will become highly strategic issues.

Because the rabbit meat network appears to be fairly unstructured at the moment

- butchers focus mainly on the meat from large animals (cattle, sheep, pigs), whose value-added lies mainly in their butchering and the retail sale of all subproducts that exceed the purchasing power of a single household.
- venders of live poultry who have begun to sell rabbits in their stalls are rare; during our inquiries, we found that they only supply rabbit at the customers' request.
- distributors who market the butchered and chilled meat of small animals rarely keep a supply of rabbit in their refrigerators.

4.2.7. Restaurants

Rabbit meat is not (yet) part of the customary diet of most urban Burundians. Up to now, restauranteurs have been reluctant to offer it on their menus, despite the critical role they could play in popularizing it. In Benin, rabbit meat is largely eaten braised or grilled and sold by street vendors. Some restaurants offer it on their menus, asking customers to order it the day before so they can honour the request.

Worth noting are the efforts of the Jimbere Mukenyezi Women's Association, which raises rabbits on its farm in Muyebe (Mwaro province) and offers the delivery of dishes prepared with rabbit meat.[54]

4.2.8. Slaughterhouse (planned)

Under the government's recent policy on rabbit farming, construction of a slaughterhouse will commence in Gasunu *colline* (Gitega commune) in early 2024. The facility will be managed by the SOPRAGRIE (Solidarity for the promotion of crop farming and livestock raising) cooperative. The purpose of this infrastructure project is, among other things, to be able to reach the export markets of neighbouring countries.

Its announced slaughter capacity is 1,000-2,000 rabbits per hour. We have no data on its cold chain management capacity.

The site will also include a modern hutch facility and a rabbit farming training centre.

[54] https://www.instagram.com/jimberewoman/ / https://twitter.com/JimbereWoman/status/1703463163545453003

4.3 . Support services

4.3.1. National Platform for Rabbit Farmers

Created in October 2023, this very new platform has already attracted 69 specialized farmers (each with 100 or more head) and has a steering a committee made up of 12 farmers. Its mission is advocacy and the mobilization of financing to develop the value chain.

4.3.2. Directorate of Livestock (DGE)

Attached to MINEAGRIE, the DGE's missions are to:

- Gather and publish statistics on herd sizes (number of cattle, goats, sheep, pigs, poultry, rabbits)
- Manage or support programmes and projects designed to boost the productivity of livestock farming (genetic improvement, animal health, nutrition, etc.)
- Collaborate with partners such as FAO, the International Livestock Research Institute (ILRI) and IFAD on training and projects related to livestock operations
- Provide technical coaching and training for farmers, particularly through the Producer Coaching Centres (CEP)

The DGE has three departments:[55]

- Department of Animal Health
- Department for the Promotion of Livestock Value Chains
- Department for the Promotion of Fishery Value Chains

The DGE is supported by the 17 Provincial Directorates of Agriculture and Livestock (DPAE) through the provincial livestock services and then organized into municipal services. Burundi's communes are divided into DPAE intervention areas. These areas are an intermediate level between the communes and the *collines*.

The DPAE in each province is fully equipped with a hutch (at its offices) and receives hands-on training in semi-intensive rabbit farming for almost a year.

With respect to rabbit farming, the DGE is also piloting the current drafting of a national strategy.

4.3.3. Department of Animal Health (DSA)

Attached to the DGE, the DSA:

- coordinates the activities of the National Veterinary Laboratory (LABOVET) and veterinary and quarantine centres;
- plans and conducts epidemiological surveillance of animal and zoonotic diseases;
- prepares and monitors implementation of the national policy on the production, stocking, distribution, transport and use of veterinary products;
- oversees, in collaboration with the Burundi Authority for the Regulation of Veterinary Products, Pesticides and Feed (ABREVPA), adherence to quality standards in veterinary public health and veterinary products;
- prepares and oversees monitoring of the implementation of zoosanitary legislation;
- oversees the day-to-day management of livestock farming inputs;
- supports the Provincial Environment, Agriculture and Livestock Offices (BPEAE) during their missions to support actors in the crop and livestock value chains (capacity building and upgrading, the delivery of specialized services, etc.).

This department is also charged with monitoring veterinary product marketing circuits.

[55] http://www.abctaxa.be/burundi/chm-burundais/pfinstitut/elevage

In theory, veterinary services in each of the 17 Provincial Directorates of Agriculture and Livestock (DPAE) should be provided by a veterinarian; in the communes, by a veterinary technician; and in each zone by a veterinary nurse's aide with an equipped veterinary centre and dip tank. In reality, however, their numbers are fewer (in Bubanga province, 4 veterinary technicians were available for 15 zones in February 2024). What is more, this personnel does not necessarily have an in-depth knowledge of rabbit farming. Veterinarians to coach the technicians are also lacking.

4.3.4. National Veterinary Laboratory (LABOVET)

LABOVET is a service of the Directorate of Agriculture and Livestock, Outreach and Mobilization for Independent Development (DGAEVMA) formerly the Department of Animal Health (DSA), which itself is under the Directorate of Livestock (DGE).[56] It is attached to MINEAGRIE and is directly under the DGAEVMA.

Its missions are to:

- screen for and diagnose animal diseases, including their vectors
- study and exercise quality control of drugs, vaccines and other products for veterinary use
- launch and coordinate the activities of provincial and regional veterinary laboratories
- conduct animal health research
- exercise quality control of livestock feed
- monitor food products of animal origin using laboratory techniques
- contribute to capacity building for veterinary professionals and paraprofessionals
- prepare and execute the laboratory's annual work plans and budgets (AWPB)

Our investigations, however, have not identified its activities and competencies specific to rabbit farming.

4.3.5 Youth Economic Empowerment and Employment Programme (PAEEJ)

The PAEEJ is a tool deployed by the government to fight youth unemployment. Financed primarily by the State, it also receives financial support from the African Development Bank.[57] It has a presence in 10 provinces, with 36 local branches. It offers professional upgrading and online courses, an Internet platform to connect jobseekers with recruiters and a techno-hub devoted to innovation among youth and support for entrepreneurship.[58] It also grants financing for entrepreneurial activities at both the individual level and the collective level in particular.

The PAEEJ is heavily involved in the current policy to promote rabbit farming, engaging in a variety of activities:

- A rabbit farming training event (November 2023) with 46 participants;
- A project to distribute rabbits and rabbit farming equipment in Muramvya and Muyinga provinces;
- Financing for the specialized operations of both individuals and cooperatives through credit;
- Financing of the planned breeding centre in Cibitoke.

4.3.6 Institute of Agronomic Sciences of Burundi (ISABU)

ISABU's objectives are to:[59]

- Promote agronomic and zootechnical research by making performing animal and plant material and improved agropastoral techniques available to farmers;
- Develop technologies and innovations that promote sustainable integrated management of natural resources for agricultural production;

[56] Decree No.100/066 of 18 April 2024 on the amendment of Decree No. 100/091 of 28 October 2020 on the organization of the Ministry of the Environment, Agriculture and Livestock

[57] https://www.afdb.org/fr/news-and-events/press-releases/burundi-plus-de-20-millions-de-dollars-du-groupe-de-la-banque-africaine-de-developpement-pour-developper-le-secteur-agro-pastoral-en-faveur-des-jeunes-et-des-femmes-55699

[58] https://www.paeej.bi/

[59] https://isabu.bi/presentation-de-lisabu/

- Foster interaction among key rural development actors by promoting value chains to add value to research results;
- Strengthen the capacity and competencies of human and material resources for competitive agropastoral research.

ISABU plays a key role in disseminating agronomic information through its technical fact sheets[60] and quarterly agronomic research bulletins.[61]

While its activities appear to focus primarily on crops (especially seed selection), occasionally fodder crops and the selection of cattle genotypes, it can be observed in regard to rabbit farming that:

- in its quarterly agronomic research bulletin No. 8 (T3 2015),[62] it provides a comparative analysis of the various rabbit farming systems and of their benefit to farm households
- its station in Kigarika will welcome a selection centre for "grandparent" breeder rabbits that will import purebred rabbits from abroad[63]
    - This centre will then supply breeding centres with breeder bunnies
- it will publish handbooks and practical guides on rabbit farming and distribute them to farmers we were unable to interview

4.3.7 Other institutions

- The International Livestock Research Institute is present in Burundi but at the moment, visibly without activity connected with rabbit farming, despite the trials conducted on this type of activity in the past.
- The Institute for Agronomic and Zootechnical Research (IRAZ), created in 1979 by the East African Economic Community of Great Lakes Countries (CEPGL), comprised of the Democratic Republic of the Congo, Rwanda and Burundi, has lost much of its economic and human resources due to the armed conflict in the subregion and is now closed.[64]

[60] https://isabu.bi/fiches-techniques/
[61] https://isabu.bi/bulletins-scientifiques/
[62] https://isabu.bi/wp-content/uploads/2021/09/Bulletin-nper centC2 per centB08.pdf
[63] https://rtnb.bi/fr/art.php?idapi=7/1/170 and interview with the Director General of ISABU
[64] Source: MINEAGRIE (2018), Stratégie Agricole Nationale 2018-2027

5 Assessment of risks in the Burundi rabbit value chain

5.1. Summary of risks

For the risk assessment, we have chosen to include actors that play a marginal or even non-existent role in the rabbit value chain (especially veterinary services, feed suppliers, selectors and multipliers, butchers, slaughterhouses and restauranteurs). Based on the public authorities' desire to develop the value chain and anticipating the significant growth in production described earlier, we considered the risks in the value chain as it might be structured in the coming years, inspired by the example of more structured value chains such as those of the European Union and Benin.

Sixteen major risks were identified as particularly impactful in Burundi's rabbit value chain. The diagram below lists these risks and the actors they would most directly impact.

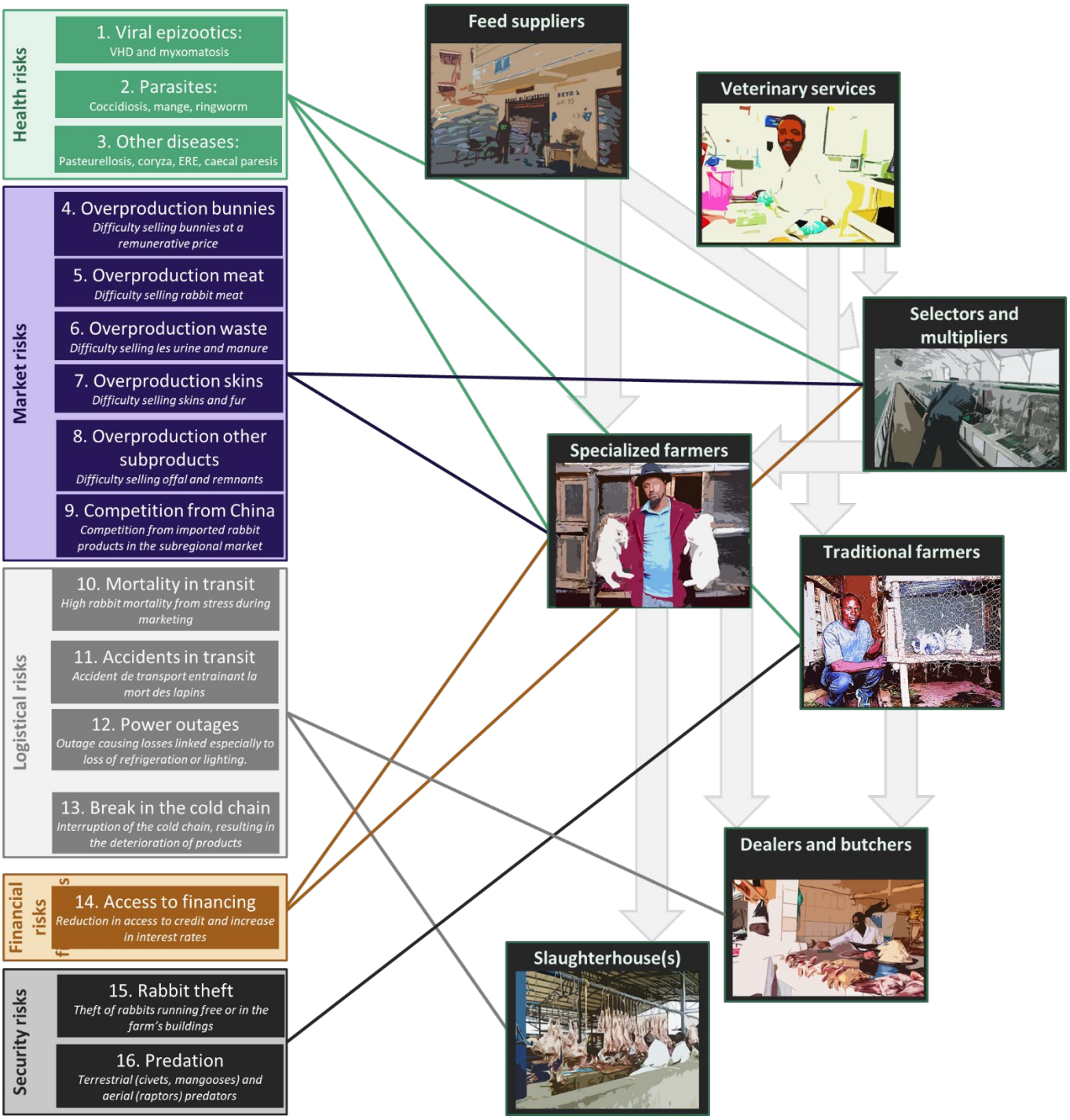


Figure 21: Diagram of the main risks identified and their direct links to the actors in the rabbit value chain (Source: Authors)

Health risks primarily affect selectors/multipliers and rabbit farmers, but epizootics can seriously impact the entire value chain, since they can cause mass mortality throughout it and thus, supply disruptions and substantial losses in sales revenue for all actors in the chain.

Market risks primarily affect specialized farmers, who depend on a well-functioning market to get their important production to the market. The income of other upstream actors (veterinarians, feed suppliers, multipliers and traditional rabbit farmers) can also be seriously affected, as difficulties moving the rabbits along the value chain can substantially reduce their sales.

Logistical risks primarily affect actors downstream in the value chain (dealers/butchers, slaughterhouses, restauranteurs), who are those responsible for most of the transport and preservation of rabbit carcasses and rabbit meat. They can also seriously impact veterinary services, especially eventual vaccination campaigns, which require cold chain maintenance.

Financial risks primarily affect operations whose activities rely entirely or partially on financing from banks. These are actors whose activity is more formal – that is, selectors, specialized rabbit farmers, dealers, butchers and slaughterhouses.

Security risks, such as theft and predation, primarily affect traditional rabbit farming operations, which are less able to protect their stock from animal and human predation. Theft, however, can affect the activities of all actors in the value chain.

The PARM methodology was used to assess the risks identified in terms of their frequency (probability score), average intensity for each of the affected actors (average impact score) and extreme impact when their intensity reaches its highest level (maximum impact).

Frequency of the risk			Intensity of the risk		
Category	Criteria	Score	Category	Criteria	Score
High probability	Once every 7 years or more	3	Catastrophic	> 50% drop in income Impact on more than 50% of actors in the value chain Greater Impact on women and youth	5
Medium probability	Once every 15 years or more	2	Critical	30-50% drop in income Impact on more than 30% of actors in the value chain Greater Impact on women and youth	4
Low probability	Less than once every 15 years	1	Substantial	15-30% drop in income Impact on more than 20% of actors in the value chain Greater Impact on certain women and youth	3
			Moderate	5-15% drop in income Impact on more than 10% of actors in the value chain Greater Impact on certain women and youth	2
			Negligible	Less than a 5% drop in income Impact on less than 10% of actors. Limited impact on women and youth	1

Figure 22: PARM method for scoring the frequency and intensity of agricultural risks

In the paragraphs below, the risks are assessed for each category of actor and then the entire rabbit value chain.

5.2 Main risks to veterinary services

Veterinary services have little exposure today to the risks associated with rabbit farming, as it accounts for **only a marginal share of their activities.**

However, if a growing number of them offer diagnostic services and sell treatments to the rabbit value chain, they could become more sensitive to a number of specific risks in the rabbit value chain.

The most serious risk is a **break in the cold chain,** which for certain treatments (especially vaccines) can cause enormous losses from the spoilage of an entire lot of vaccines, rendering them unusable. This risk is not specific to the rabbit value chain and applies to the transport and distribution of vaccines for other livestock

value chains as well. It is a strategic challenge for the overall effectiveness of Burundi veterinary services. The stability of the electric power grid clearly impacts this risk as well.

Another serious risk is viral epizootics. While at first, these diseases can increase access to veterinary services, an uncontrolled VHD or myxomatosis epizootic can lead to mortality that could cause many farmers to give up the activity and mass disinvestment among the actors. This would lead to a very high loss in revenue for the veterinary services most involved in the value chain. In terms of frequency, even if this type of event does not reoccur in Burundi, we based our analysis on the history of epizootics in the countries where the rabbit value chain is most developed, finding that such catastrophes occur more than once every 15 years.

The other serious risks to veterinary services specializing in rabbit farming are those linked with the flow of rabbit products and subproducts. In fact, all systemic market risks that can contribute to a structural reduction in the purchasing power and investments of rabbit farmers will indirectly affect veterinary services' volume of business.

Veterinary services		Frequency	Intensity		Risk ranking	
No	Risks	Frequency score (F)	Average impact score (Iave)	Maximum impact score (Imax)	Final score: ((F*Iave*0.75) + (Imax*0.25)	Remarks
13	**Break in the cold chain**	**3**	**2**	**4**	**5.50**	Cold chain maintenance is essential for proper preservation of certain pharmaceutical products, especially vaccines.
1	**Viral epizootics**	**2**	**2**	**5**	**4.25**	Although at first, an epizootic can benefit service providers and veterinary input suppliers, its uncontrolled spread can also lead to a substantial reduction in the size of the value chain and thus, the actors' market.
4	**Overproduction of bunnies**	**2**	**2**	**3**	**3.75**	While not directly affected by problems in the flow of rabbit products, veterinary services that decide to increase services to the rabbit value chain could find themselves heavily impacted by a drop in the income and investment of actors in the value chain due to overproduction.
5	**Overproduction of meat**	**2**	**2**	**3**	**3.75**	
6	**Overproduction of manure and urine**	**2**	**2**	**3**	**3.75**	
7	**Overproduction of skins**	**2**	**2**	**3**	**3.75**	
8	**Overproduction of other subproducts**	**2**	**2**	**3**	**3.75**	
12	**Power outages**	**3**	**1**	**3**	**3.00**	Veterinary pharmacy services need electricity for lighting and the proper preservation of pharmaceuticals, especially vaccines.
11	**Transport accidents**	**1**	**2**	**4**	**2.50**	Accidents in transit, whether or not merchandise is involved, are rare but pose significant risks.
14	**Trouble obtaining credit**	**2**	**1**	**3**	**2.25**	Veterinary services generally have preferential access to bank credit and little need for working capital. However, their ability to provide phytopharmaceutical inputs can be affected by a decrease or increase in the credit supply.
9	**Competition from Chinese exports**	**1**	**2**	**3**	**2.25**	Competition from Chinese rabbit products in the subregional market could indirectly reduce rabbit farmers' investments in the procurement of phytopharmaceutical inputs and impact the income of veterinary services.
2	**Parasites**				**0.00**	Greater opportunity than risk
3	**Bacterial diseases**				**0.00**	Greater opportunity than risk
10	**Rabbit mortality in transport**				**0.00**	No direct link with the activity
15	**Rabbit theft**				**0.00**	
16	**Predation**				**0.00**	

5.3 Main risks to feed suppliers

Like veterinary services, feed suppliers today have limited exposure to the risks associated with rabbit farming, which represents only a very marginal share of their business. For this link as well, the risks are therefore assessed for the eventuality of heavier specialization among certain suppliers.

Like all actors in the value chain, feed suppliers are particularly sensitive to the risk of epizootics. The suppliers found stressed that their main business downturns in recent years have been associated with epizootics in other livestock value chains (pigs, poultry, cattle). Their sales could be equally impacted by other health risks that affect producer purchasing power and investment. Since these risks are not systemic, their impact on the business of feed suppliers is minor.

Due to the use of one or more electric crushing, grinding, mixing and granulating machines in the production of animal feed, feed suppliers are highly sensitive to the risk of power outages, which can significantly slow the pace of their activities.

As suppliers, they are also sensitive to market problems that by affecting farmers' income, can substantially reduce their sales volumes.

Feed suppliers		Frequency	Intensity		Risk ranking	
No	Risks	Frequency score (F)	Average impact score (Iave)	Maximum impact score (Imax)	Final score: ((F*Iave)*0.75) + (Imax*0.25)	Remarks
1	**Viral epizootics**	2	3	5	5.75	A severe uncontrolled epizootic that affects a substantial part of the feed supplier's intervention area could lead to a complete shut-down of the value chain.
12	**Power outages**	3	2	3	5.25	Feed suppliers use electrical equipment (mills, crushers, mixers, compactors) to manufacture feed and granulate. Frequent lengthy power outages reduce their production capacity and thus, their income, and increase their production costs.
4	**Overproduction of bunnies**	2	2	3	3.75	All market risks can substantially reduce the volume of feed suppliers' sales of rabbit feed by reducing farmers' purchasing power and investments.
5	**Overproduction of meat**	2	2	3	3.75	
6	**Overproduction of manure and urine**	2	2	3	3.75	
7	**Overproduction of skins**	2	2	3	3.75	
8	**Overproduction of other subproducts**	2	2	3	3.75	
2	**Parasites**	3	1	2	2.75	Coccidiosis, still common in Burundi, strikes bunnies particularly in February-March and October-November. The emergence and spread of other parasites, which is likely with the development of rabbit farming, could reduce the size of the herd.
11	**Transport accidents**	2	1	4	2.50	Accidents in transit, whether or not merchandise is involved, are rare but pose significant risks.
14	**Trouble obtaining credit**	2	1	3	2.25	Feed suppliers generally have access to different types of financing through banks or in the form of deferred payments. For small businesses with little security to offer, the conditions and higher costs of credit in a period of economic, financial or political crisis could result in less available cash and thus, a substantial drop in their volume of business.
9	**Competition from Chinese exports**	1	2	3	2.25	Competition from Chinese rabbit products in the subregional market could indirectly reduce rabbit farmers' investments in the procurement of phytopharmaceutical inputs and impact the income of feed suppliers.
3	**Bacterial diseases**	1	1	2	1.25	The prevalence of bacterial diseases (pasteurellosis, coryza, *E. coli* infection, salmonellosis) is currently low, but their communicability could lead to significant losses among specialized operations, which are feed suppliers' main customers.
10	**Rabbit mortality in transport**				0.00	No direct link with the activity
13	**Break in the cold chain**				0.00	
15	**Rabbit theft**				0.00	
16	**Predation**				0.00	

5.4 Main risks to selectors and multipliers

As both specialized farmers and suppliers of inputs to farmers specializing in fattening, farmers and operations that specialize in selection and/or multiplication will be subject to risks similar to those of specialized farmers, with higher exposure than the others to disruptions in the smooth operation of the entire value chain. They are even more exposed to risks in the rabbit value chain, as they probably specialize more than all the other in rabbit farming.

They will be particularly affected by viral epizootics, which, apart from the effect on their own operation, could heavily impact all their marketing outlets. Moreover, bacterial diseases and parasites impact young rabbits more heavily than those that have reached the fattening stage. Finally, the importation of purebred bunnies from abroad also entails the risk of importing viral, bacterial or parasitic diseases.

Thus, as bunny suppliers, they are structurally more sensitive to the overproduction of bunnies than other producers. More generally, market risks that can affect the entire value chain have a significant impact on their activities.

Breeding centres		Frequency	Intensity		Risk ranking	
No	Risks	Frequency score (F)	Average impact score (Iave)	Maximum impact score (Imax)	Final score: ((F*Iave)*0.75) + (Imax*0.25)	Remarks
1	**Viral epizootics**	2	4	5	7.25	VHD and myxomatosis are not currently present in Burundi, but there is a high risk that development of the rabbit value chain will expose farmers to this risk in the future. There is a high risk to rabbit farmers who obtain most of their income from this activity. Moreover, the purchase of imported purebred bunnies exposes them even further to this risk.
4	**Overproduction of bunnies**	2	3	5	5.75	Recently, with the keen interest in rabbit farming spurred by the presidential announcements, a good number of specialized rabbit farming operations have largely sold breeder bunnies instead of rabbits for slaughter. Once rural households have been supplied, the demand will irreversibly fall. "Historical" breeding centres like the Mutoyi Union of Cooperatives, known for their ability to provide European breeds selected for their productivity, will be affected as well but could also capitalize on the quality of their breeder bunnies.
3	**Bacterial diseases**	2	3	5	5.75	The prevalence of bacterial diseases (pasteurellosis, coryza, *E. coli* infection, salmonellosis) is currently low, but their communicability could lead to heavy losses in breeding centres and specialized farming operations, which are their main customers.
2	**Parasites**	3	2	4	5.50	Coccidiosis, still common in Burundi, strikes bunnies particularly in February-March and October-November.
5	**Overproduction of meat**	2	2	4	4.00	Rabbit is not currently part of the customary diet of most Burundians, despite their protein deficit. Attempting to increase the domestic demand for rabbit meat is therefore a gamble. The goal of making it an export value chain is an additional challenge. Should this effort fail, breeding centres will see a drop in the demand for breeder bunnies.
14	**Trouble obtaining credit**	2	2	4	4.00	Access to financing is very rarely a condition for engaging in agricultural activities. It is more for improving conditions for the farming that Burundians engage in at this stage. With the development of financing for the agriculture sector, however, it is important to consider that in the future, access to financing could become a source of risk for farms accustomed to financing part of their factors of production with credit.
13	**Break in the cold chain**	3	1	2	2.75	Should certain breeding centres specialize in the sale of fresh rabbit sperm for artificial insemination as in certain major producing countries, they will become highly sensitive to cold chain risks.
10	**Rabbit mortality in transport**	2	1	3	2.25	Poor transport conditions can lead to high mortality among breeder bunnies during their transfer from the breeding centre to the farming operation.
11	**Transport accidents**	2	1	3	2.25	Accidents in transit, whether or not merchandise is involved, are rare but pose significant risks.
16	**Predation**	2	1	3	2.25	During our inquiries, a good number of specialized farmers and breeders noted an increase in bunny losses from rodent attacks.
6	**Overproduction of manure and urine**	2	1	2	2.00	

Breeding centres		Frequency	Intensity		Risk ranking	
7	Overproduction of skins	2	1	2	2.00	Material balance currently relies solely on the sale of breeder bunnies to fuel the rabbit meat value chain. In time, failure to capitalize on other subproducts will affect the competitiveness of the Burundi value chain.
8	Overproduction of other subproducts	2	1	2	2.00	
12	Power outages	2	1	2	2.00	Breeding centres are not entirely dependent on the power supply. However, they do need electricity for lighting, which is essential for the daily monitoring of caged rabbits.
9	Competition from Chinese exports	1	1	2	1.25	The potential impact of imported Chinese rabbit meat in the subregion, in terms of volume and price, is hypothetical at the moment, especially upstream in the Burundi value chain.
15	Rabbit theft	1	1	2	1.25	During our interviews, no breeder complained of rabbit theft, unlike backyard rabbit raisers. This is simply because backyard rabbits often run free, while specialized operations keep them in hutches.

5.5 Main risks to traditional rabbit farmers

While, as mentioned earlier, rabbit farming may account for a substantial portion of their income, **traditional rabbit farmers are generally less exposed than other types of farmers to risks in the rabbit value chain.** Due to heavy household consumption of their production and short-circuit proximity marketing, they are less subject to the risks of overproduction.

They are very sensitive to **health risks**, but on the whole, will be less heavily impacted by viral epizootics, since their rabbits will be less likely to come into contact with viruses. They are far more exposed, however, to the risk of parasites that are not specific to rabbits and easily circulate through other animals.

A particular feature of traditional rabbit farmers is their **sensitivity to security risks,** which include **theft** (by humans) and **attacks by terrestrial predators** (servals, civets, mongooses, genets) or birds of prey (raptors). Because the rabbits are not raised in a secured area, these events can result in major losses.

Traditional rabbit farmers		Frequency	Intensity		Risk ranking	
No	Risks	Frequency score (F)	Average impact score (Iave)	Maximum impact score (Imax)	Final score: ((F*Iave)*0.75) + (Imax*0.25)	Remarks
2	**Parasites**	3	3	4	7.75	Coccidiosis, still common in Burundi, strikes bunnies particularly in February-March and October-November.
1	**Viral epizootics**	2	3	5	5.75	VHD and myxomatosis are not currently present in Burundi, but there is a high risk that development of the rabbit value chain will expose farmers to this risk in the future. There is a moderate risk to traditional farmers.
3	**Bacterial diseases**	2	3	5	5.75	The prevalence of bacterial diseases is currently low.
15	**Rabbit theft**	2	2	5	4.25	Farmers raising just a few rabbits who were questioned during our interviews often complained of rabbit theft or predators (rodents mainly, but we could imagine raptors or wild canids/felids). Distinguishing between the two types of predations is not easy on farms where the rabbits run free.
16	**Predation**	2	2	5	4.25	
5	**Overproduction of meat**	2	2	4	4.00	Rabbit is not currently part of the customary diet of most Burundians, despite their protein deficit. Attempting to increase the domestic demand for rabbit meat is therefore a gamble. Traditional rabbit farmers, however, have the advantage of consuming part of their production.
10	**Rabbit mortality in transport**	2	2	3	3.75	Poor transport conditions can lead to high mortality among breeder bunnies or live rabbits taken by farmers for sale.
11	**Transport accidents**	2	1	4	2.50	Accidents in transit during the farmer's travels, whether or not rabbits are present, are rare but pose significant risks.
9	**Competition from Chinese exports**	1	2	3	2.25	If successful, exporting rabbit meat to the subregion will first involve specialized farming operations, probably through the slaughterhouse under construction in Gitega. Traditional operations will only be affected by international competition if it seriously drives down prices, including in Burundi's local market.
14	**Trouble obtaining credit**	2	1	3	2.25	Access to financing is very rarely a condition for engaging in agricultural activities. It is more an improvement in the conditions of the farming that Burundian farmers engage in at this stage. With the development of financing for the agriculture sector, however, it is important to consider that in the future, access to financing could become a source of risk to farms accustomed to financing some of their factors of production with credit.
7	**Overproduction of skins**	2	1	2	2.00	The sale of skins and other subproducts could certainly serve as supplementary income but something that rural households do not count on.
8	**Overproduction of other subproducts**	2	1	2	2.00	
4	**Overproduction of bunnies**				0.00	Overproduction by breeding centres could be an opportunity for rabbit raisers, which could expect to gain access to purebred rabbits at a lower cost, although they currently obtain their supply in their neighbourhood. However, it risks being accompanied by a report on the meat market indicating a drop in prices.
6	**Overproduction of manure and urine**				0.00	Manure and urine are used on the farm; not a major issue in resale.

Traditional rabbit farmers		Frequency	Intensity		Risk ranking	
12	**Power outages**				**0.00**	Rural households do not have (uninterrupted) access to electricity, but backyard operations do not require it.
13	**Break in the cold chain**				**0.00**	Rural households largely sell live rabbits.

5.6 Main risks to specialized rabbit farmers

Because of their specialization and zootechnical practices, specialized rabbit farming operations, which are much more dependent on other actors in the value chain, are particularly exposed to risks in the value chain.

Due to the intensification of their operations, they are especially vulnerable to health risks. Their steady procurement of new breeder bunnies heavily exposes them to epizootic risks that could wipe out their entire herd. Bacterial and parasitic diseases can also result in major losses to their operations if not controlled.

With little on-farm consumption and significant production to be marketed, they are often highly exposed to market risks. Their profits in the medium and long term are highly dependent on both the capacity to move rabbit meat through the value chain and its sale price. While in the current situation, many of these operations concentrate on the sale of bunnies, the sustainability of their business rests primarily with the development of a market for rabbit meat and to a lesser extent, the promotion of subproducts (manure, skins, offal).

By specializing, these operations will become increasingly sensitive to risks associated with access to financing. In fact, access to credit is structurally necessary to finance investment in a farming operation that raises rabbits in "batches" and to smooth out variations in the profitability of different batches.

Investors in mechanized processes, buildings with mechanized ventilation, transport and even rabbit slaughter will also be exposed to logistical risks.

Specialized rabbit farmers		Frequency	Intensity		Risk ranking	
No	Risks	Frequency score (F)	Average impact (Iave)	Maximum impact score (Imax)	Final score: ((F*Iave)*0.75) + (Imax*0.25)	Remarks
1	**Viral epizootics**	**2**	**4**	**5**	**7.25**	VHD and myxomatosis are not present right now in Burundi, but there is a high risk that development of the rabbit value chain will expose farmers to this risk in the future. There is a high risk to specialized farmers. Moreover, the purchase of imported breeds of bunnies further exposes them to this risk.
3	**Bacterial diseases**	**2**	**3**	**5**	**5.75**	The prevalence of bacterial diseases (pasteurellosis, coryza, *E. coli infection,* salmonellosis) is currently low, but their communicability can result in heavy losses for specialized operations.
2	**Parasites**	**3**	**2**	**4**	**5.50**	Coccidiosis, still common in Burundi, strikes bunnies particularly in February-March and October-November. Specialized operations are generally better informed and, in a position, to improve hygiene and feed to prevent losses.
5	**Overproduction of meat**	**2**	**3**	**4**	**5.50**	Rabbit is not currently part of the customary diet of most Burundians, despite their protein deficit. Attempting to increase the domestic demand for rabbit meat is therefore a gamble. The goal of creating an export value chain is an additional challenge.
4	**Overproduction of bunnies**	**2**	**2**	**4**	**4.00**	Recently, with the keen interest in rabbit farming spurred by the presidential announcements, a good number of major rabbit farmers have largely sold breeder bunnies instead of rabbits for slaughter. Once rural households have been supplied, the demand will irreversibly fall.
6	**Overproduction of manure and urine**	**2**	**2**	**3**	**3.75**	In specialized operations, rabbit manure and urine production often exceed the farm's fertilizer needs. Few farms currently market the surplus: in time, this lack of earnings could affect the international competitiveness of the value chain.
14	**Trouble obtaining credit**	**2**	**2**	**3**	**3.75**	Access to financing is very rarely a condition for engaging in agricultural activities. It is more an improvement in the conditions for the farming that Burundian farmers engage in at this stage. The intensification of specialized operations, however, will oblige them to have access to credit to finance their investments. In the future, access to financing could become a source of risk for farms.
7	**Overproduction of skins**	**2**	**2**	**2**	**3.50**	Capitalizing on co-products is essential for material balance. Through our field interviews, we learned about the sale of shoes made of rabbit-skin in Cibitoke but nowhere else. This lack of earnings undermines the price competitiveness of rabbit farming's main product: rabbit meat.
8	**Overproduction of other subproducts**	**2**	**2**	**2**	**3.50**	Idem: To date, the viscera, fur and even head of rabbits have not been marketed.
12	**Power outages**	**3**	**1**	**3**	**3.00**	Specialized rabbit farming operations are not wholly dependent on the power supply. However, they do need lighting, which is essential for the daily monitoring of caged rabbits.
13	**Break in the cold chain**	**3**	**1**	**2**	**2.75**	Specialized operations primarily sell live rabbits. They can incur losses in carcass sales when the carcasses are stored in an unrefrigerated location.
10	**Rabbit mortality in transport**	**2**	**1**	**3**	**2.25**	Poor transport conditions can lead to high mortality among live bunnies or rabbits destined for the market.
11	**Transport accidents**	**2**	**1**	**3**	**2.25**	Accidents in transit during the farmer's and his employees' travels, whether or not rabbits are present, are rare but pose significant risks.

Specialized rabbit farmers		Frequency	Intensity		Risk ranking	
16	Predation	1	1	3	1.50	During our interviews, the majority of specialized farmers spoke of bunny losses from rodent attacks.
9	Competition from Chinese exports	1	1	3	1.50	The goal of the current policy to support rabbit farming is to make it an export value chain, especially in the subregion. Massive success of rabbit meat would undoubtedly attract other actors, beginning with China, the world's largest exporter of rabbit meat. In time, their competition, especially in coastal countries, could have an impact on volumes and prices.
15	Rabbit theft	1	1	2	1.25	During our inquiries, unlike backyard farmers, no specialized farmer complained about rabbit theft. That is because backyard rabbits often run free, while specialized operations keep them in hutches.

5.7 Main risks to slaughterhouses

As previously noted, no slaughterhouse is currently operating in the rabbit value chain, but **one is currently under construction.**

This slaughterhouse will be heavily exposed to risks associated with **breaks in the cold chain** downstream from the slaughter of the rabbits. It will also be highly sensitive to **power outages,** which will structurally affect the pace of its work and its capacity to cover its fixed expenditures and facilities.

It may be affected by the risk of epizootics due to its specialization and the enormous impact of an epizootic on its entire supply.

Finally, it will be highly sensitive to market risks for meat, its main product, as well as skins, offal and other subproducts, which will reduce its margins in the absence of marketing outlets.

Slaughterhouse		Frequency	Intensity		Risk ranking	
No	Risks	Frequency score (F)	Average impact score (Iave)	Maximum impact score (Imax)	Final score: ((F*Iave)*0.75) + (Imax*0.25)	Remarks
13	**Break in the cold chain**	3	3	5	8.00	The goal of the slaughterhouse is to sell rabbit carcasses to distant locations. Breaks in the cold chain can result in production losses. If frequent, the ability of the slaughterhouse to supply its markets, and thus its profitability, will be seriously affected.
1	**Viral epizootics**	2	4	5	7.25	A severe uncontrolled epizootic impacting a substantial portion of the slaughterhouse's collection area could lead to a total shutdown of the value chain.
5	**Overproduction of meat**	2	3	5	5.75	Rabbit is not currently part of the customary diet of most Burundians, despite their protein deficit. Attempting to increase the domestic demand for rabbit meat is therefore a gamble right now. The goal of creating a supplementary export value chain is an additional challenge.
12	**Power outages**	3	2	4	5.50	Electricity is essential for the continuous good operation of the slaughterhouse. Without lighting or refrigeration, a significant portion of the carcasses can spoil.
7	**Overproduction of skins**	2	2	4	4.00	While demand for meat is the greatest risk for a slaughterhouse, the presence or absence of outlets for skins and the other subproducts of slaughtering equally impacts the facility's profitability.
8	**Overproduction of other subproducts**	2	2	4	4.00	
2	**Parasites**	3	1	2	2.75	Coccidiosis, still common in Burundi, strikes bunnies particularly in February-March and October-November. With the growth of the domestic herd, other parasitic diseases could spread in the future.
14	**Trouble obtaining credit**	1	2	4	2.50	The construction of a slaughterhouse in Giheta by the SOPRAGRIE cooperative is benefitting from diverse financing. The risk lies in access to financing in the event of problems on the farm and failure to meet the objectives and indicators of the initial business plan.
9	**Competition from Chinese exports**	1	2	3	2.25	The goal of the current policy to support rabbit farming is to make it an export value chain, especially in the subregion. Massive success of rabbit meat would undoubtedly attract other actors, beginning with China, the world's largest exporter of rabbit meat. In time, their competition, especially in coastal countries, could have an impact on volumes and prices.
10	**Rabbit mortality in transport**	2	1	3	2.25	Poor transport conditions can lead to high mortality among live rabbits taken to the slaughterhouse.
11	**Transport accidents**	2	1	3	2.25	Accidents in transit, whether or not rabbits are present, are rare but pose significant risks.
3	**Bacterial diseases**	2	1	2	2.00	The prevalence of bacterial diseases (pasteurellosis. coryza. *E. coli* infections, salmonellosis) is currently low.
4	**Overproduction of bunnies**				0.00	Not applicable.
6	**Overproduction of manure and urine**				0.00	A material balance that currently relies solely on the sale of meat and not co-products represents a lack of earnings for the farmer that has repercussions for buyers. However, the impact of this risk is negligible.
15	**Rabbit theft**				0.00	Marginal risk to the slaughterhouse.
16	**Predation**				0.00	Not applicable.

5.8 Main risks to dealers and butchers

As previously noted, the trade and sale of rabbits in butcher shops is still in its infancy in Burundi. However, developing the value chain could result in the growing inclusion of rabbits in the business of poultry dealers and the diversification of butcher shops with the sale of rabbit meat.

Once again, epizootics can drastically reduce the rabbit supply, which could seriously affect the activities of the actors most specialized in the sale and butchering of rabbits. Other health risks can also have a marginal but potential impact, especially during the reception, transport and housing of live rabbit stock prior to slaughter.

Logistical risks as a whole can affect these actors when they handle the transport, processing and/or stocking of rabbits and the products of rabbit slaughtering themselves.

Finally, the constraints to or higher cost of access to financing can hurt these actors, who often rely on credit to finance their cash flow.

Dealers and butchers		Frequency	Intensity		Risk ranking	
No	Risks	Frequency score (F)	Average impact score (Iave)	Maximum impact score (Imax)	Final score: ((F*Iave)*0.75) + (Imax*0.25)	Remarks
1	**Viral epizootics**	**2**	**4**	**5**	**7.25**	By structurally affecting the rabbit supply, epizootics can seriously impact the activities of dealers and butchers who include the sale of rabbits in their business.
13	**Break in the cold chain**	**3**	**2**	**4**	**5.50**	Meat that is not quickly consumed and not kept cold during an outage spoil and goes to waste.
12	**Power outages**	**3**	**1**	**3**	**3.00**	Electricity is essential, especially to maintain the cold chain (refrigerator) but also to provide lighting for business.
14	**Trouble obtaining credit**	**2**	**1**	**3**	**2.25**	Dealers and butchers generally have access to different types of financing, banking or deferred payments. For small businesses with little security, however, the terms and higher cost of credit during economic, financial or political crises can lead to a reduction in their available cash and thus, a substantial drop in their volume of business.
10	**Rabbit mortality in transport**	**2**	**1**	**2**	**2.00**	Poor transport conditions can lead to high mortality among live rabbits being brought to market.
11	**Transport accidents**	**2**	**1**	**2**	**2.00**	Accidents in transit during the travels of dealers and their employees, with or without merchandise, are rare but pose significant risks.
2	**Parasites**	**2**	**1**	**2**	**2.00**	Bacterial and parasitic diseases can marginally affect the activities of the dealers and butchers who purchase infected live rabbits, resulting in mortality before they can use the animals
3	**Bacterial diseases**	**2**	**1**	**2**	**2.00**	
4	**Overproduction of bunnies**				**0.00**	An opportunity for merchant to purchase rabbit meat at a lower cost.
5	**Overproduction of meat**				**0.00**	
6	**Overproduction of manure and urine**				**0.00**	A material balance that relies solely on use of the meat and not the co-products represents a loss of earnings for the farmer, which has repercussions for buyers. However, the impact of this risk is currently negligible.
7	**Overproduction of skins**				**0.00**	
8	**Overproduction of other subproducts**				**0.00**	
9	**Competition from Chinese exports**				**0.00**	An opportunity for the merchant to obtain rabbit meat at a lower cost.
15	**Rabbit theft**				**0.00**	Not applicable
16	**Predation**				**0.00**	

5.9 Risks to the entire value chain

As the analyses by actor clearly demonstrates, the most significant risks to the value chain are:

- Health risks, and in particular, epizootic risks, which can result in catastrophic harm to all actors in the value chain.
- Market risks, with a significant risk of overproduction in the short term and more generally as in many value chains involving highly prolific animals, the risk of regular overproduction (see pig cycle[65]).
- To a lesser extent, logistical risks associated with cold chain maintenance, appropriate transport and animal housing and meat storage conditions.

Main risks in the rabbit value chain

	Category	Risks	Veterinary services	Feed suppliers	Breeding centres	Traditional farmers	Specialized farmers	Slaughterhouses	Dealers - butchers	Value chain
1	HEALTH	Viral epizootics	4.3	5.8	7.3	5.8	7.3	7.3	5.5	**6.1**
5	MARKET	Overproduction of meat	3.8	3.8	4.0	4.0	5.5	5.8		**4.5**
2	HEALTH	Parasites		2.8	5.5	7.8	5.5	2.8	2.0	**3.8**
3	HEALTH	Bacterial diseases		1.3	5.8	5.8	5.8	2.0	2.0	**3.2**
12	INFRA & LOGIST	Power outages	3.0	5.3	2.0		3.0	5.5	3.0	**3.1**
10	INFRA & LOGIST	Rabbit mortality during transport			2.3	3.8	2.3	2.3	4.0	**2.9**
4	MARKET	Overproduction of bunnies	3.8	3.8	5.8		4.0			**2.9**
13	INFRA & LOGIST	Break in the cold chain	5.5				2.8	8.0	3.3	**2.8**
14	FINANCIAL	Trouble accessing financing	2.3	2.3	4.0	2.3	3.8	2.5	2.3	**2.8**
11	INFRA & LOGIST	Accidents in transit	2.5	2.5	2.3	2.5	2.3	2.3	4.0	**2.6**
6	MARKET	Overproduction of manure & urine	3.8	3.8	2.0		3.8			**2.2**
7	MARKET	Overproduction of skins	3.8	3.8	2.0	2.0	3.5			**2.1**
8	MARKET	Overproduction of subproducts	3.8	3.8	2.0	2.0	3.5			**2.1**
9	MARKET	Chinese export competition	2.3	2.3	1.5	1.5	1.5	2.3		**1.9**
16	SECURITY	Predation			2.3	4.3	1.5			**1.1**
15	SECURITY	Rabbit theft			1.3	4.3	1.3			**1.0**
		Average by actor	**2.6**	**2.7**	**3.1**	**3.1**	**3.6**	**2.5**	**2.0**	

Figure 23: Ranking of the main risks to actors and the entire rabbit value chain in Burundi (Source: Authors, based on the PARM methodology)[66]

In terms of risk exposure, the actors with the highest exposure are logically those most specialized in rabbit farming – that is, specialized rabbit farmers, selectors and multipliers and slaughterhouses.

Traditional rabbit farmers have substantially lower, but still significant, risk exposure.

[65] https://www.tdg.ch/le-cycle-du-porc-vous-vous-souvenez-932571791547

[66] N.B.: The score for the value chain is the average of the scores of the five categories of actor. Ideally, this overall score should have been calculated using a weighted average of the importance (value added) of each actor category. However, the lack of data on their volumes and economic performance did not allow for that level of detail. Moreover, this average by type of risk takes into account null values for the categories of actor for whom the risk is non-existent.

For didactic purposes, below is a graph of the major and significant risks by actor category:

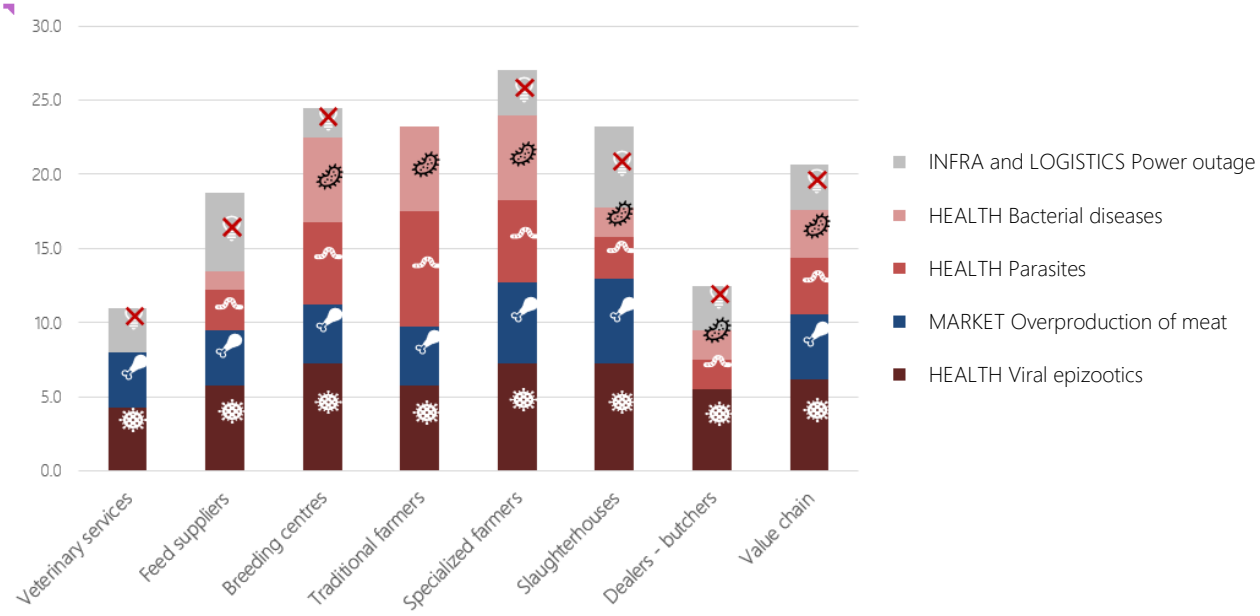


Figure 24: Graph illustrating cumulative risks in the rabbit value chain by actor (Source: Authors)

6 Capacity to manage risks in the rabbit value chain.

6.1 Actors' capacity to manage risks

The activities of most of the current actors in the rabbit value chain lean more towards diversification (of outlets, of sources of meat or of activities) than towards rabbit farming as the main activity.

However, rapid development of the value chain and major investments by the State (breeding centres, slaughterhouse) could lead in the coming years to the emergence of a growing number of specialized actors who could have problems relying on diversification to manage risks in the rabbit farming sector. Therefore, the actors whose capacity to manage risks will be most limited are specialized farmers, selectors and multipliers and specialized slaughterhouses.

In the current context, the supply of breeds, feed, equipment, information, advisory services and diagnostics for rabbit farming is extremely limited, as is individual actors' capacity to manage risks.

Internet searches for information are currently the main source of knowledge for actors in the value chain who tend to specialize, but their ability to judge the reliability and value of the available advice remains limited – all the more so because much of the available information refers to contexts very different from that of Burundi.

Likewise, in the face of market risks, actors have few options but to promote rabbit consumption among their direct contacts.

In the face of logistical risks, the main challenge lies in continuing to market live rabbits up to the end consumer.

Overall, the capacity of all actors to manage risks is extremely limited, as seen below.

6.2 Institutional capacity to manage risks

Since the vitality of the value chain is very recent, the capacity of the State and its technical and financial partners to manage the rabbit farming risks is currently very limited.

In the same vein, up to now the ability to promote the use of rabbit products has been confined to messages in the national media that reach very few actors.

We note, however, the important role of the National Veterinary Laboratory (LABOVET), a Department of Animal Health entity.[67]

6.2.1 National Veterinary Laboratory (LABOVET)

LABOVET was the object of an external assessment by the World Organisation for Animal Health (WOAH) (formerly the International Office of Epizootics [OIE]) in 2007, using the OIE tool for assessing the performance of veterinary services (PVS). In March 2012, a mission was deployed to study variations in PVS, followed by a legislation identification mission conducted by the Veterinary Legislation Support Programme (PALV) in April of that year at the request of the Government of Burundi.[68] These studies highlighted the following issues, which are not specific to rabbit farming.

a) Insufficient human and financial resources

The PALV largely confirmed the PVS's observations, finding that veterinary legislation is very incomplete, and its domestic and external quality poor.

[67] See. above 4.3.3. Department of Animal Health (DSA) and 4.3.4. National Veterinary Laboratory (LABOVET)

[68] Sources: OIE (2007), Rapport d'analyse PVS au Burundi / OIE (2012), Programme d'appui à la législation vétérinaire – mission d'identification pour la législation vétérinaire au Burundi / OIE (2012), Rapport d'analyse des écarts PVS au Burundi

The PALV mission found that lack of human and financial resources allocated to veterinary services is the greatest constraint.[69] Thus, allocating human resources is a prerequisite for any attempt to introduce quality veterinary legislation. This lack of human resources results in some incoherent practices: (i) a central office staffed by two people that, naturally, is unable to carry out design and guidance missions; (ii) the resources are absorbed by service missions (services and care) instead of monitoring functions, leading to a loss of their independence.

The 2012 mission to analyse PVS deficiencies – that is, 5 years after the PVS analysis of 2007 – found that: (i) the number of veterinarians had fallen, keeping those who remained from working in the field: half of them are employed by projects at the ministry level; (ii) veterinary services remain largely dependent on external financing and have become disorganized by the break in the chain of command between the central and provincial level (DGE/DSA and BPEAE, respectively).

b) Deficient legislative and regulatory arsenal

The mission to analyse PVS deficiencies found that the legislative framework is inadequate or non-existent, as are the procedures, documentation and data management system. The same held true for the PALV mission, which found that veterinary legislation is quantitatively poor. The following texts refer to veterinary services:

- Decree of 27 November 1934 on animal protection, annex 13
- Law No.1/28 of 24 December 2009 on domestic animal, wildlife, fishery and bee health police
- Law No,1/06 of 21 March 2011 on the regulation of veterinary practice
- Bill on the sanitary inspection of food products of animal origin
- Draft decree on the regulation of veterinary pharmaceuticals in Burundi;
- Draft ordinance on establishing the regulatory framework for the activities of communal animal health agents in Burundi

The veterinary services do not have a specialized database, and there is no codification of veterinary legislation.

c) Inadequate technical competencies among field workers

This finding comes from a quality assessment and an internal and external evaluation of veterinary services. The OIE PALV mission found that the regulations governing veterinary services are not only obsolete but poorly enforced and not respected in the field. "*Controls at the national level are not standardized. Certain provinces put specific controls in place that are not followed in neighbouring province, leading to a lack of understanding among beneficiaries of the measures adopted.*"

[69] The IWACU online journal reports that the 20 July 2022 Council of Ministers deplored the glaring lack of veterinarians. This lack of animal health professionals stems from the fact that the country's existing training facilities do not cover veterinary medicine. People who wish to enter this discipline go abroad. Given the modest nature of veterinarians' salaries, these individuals often switch professional schools or remain abroad. Thus, the creation of a school of veterinary medicine at the University of Burundi with sufficient equipment was one of the Council of Ministers' recommendations.

6.3 Capacity and vulnerability

6.3.1 Risk management options and calculation of capacity by option

The targeted risk management options for each of the risks identified in the rabbit value chain are analysed. In addition to the targeted options, cross-cutting options, such as diversification, that entail several risks are also analysed. The options analysis is based on two estimates:

- **Effectiveness.** This analysis examines the option in terms of reducing the impact of the risk when it is adopted. It is rated on a scale of 1 of 3, based on the methodology presented below.
- **Implementability.** This analysis examines the conditions of access to the option. If access is extremely limited due to cost, the technicality of implementing it or its availability along the value chain, the score is low. If, on the contrary, access to the option is simple and common in the value chain, the score is high. This score ranges from 1 to 4, based on the methodology presented below.

Effectiveness of the risk management options			Implementability of the risk management options		
Category	Criteria	Score	Category	Criteria	Score
Major effect	Reduction of or compensation for at least 50% of losses	3	Implementable	Widespread or common access to this option	4
Moderate effect	Reduction of or compensation for at least 25% of losses	2	Sometimes implementable	Access by more than half the group of actors to this option	3
			Hard or expensive to implement	Limited access by some actors because of high cost or sophisticated technology	2
Minor effect	Reduction of or compensation for less than 25% of losses	1	Not implementable or hard to implement	Unavailability of the option in the value chain or prohibitive cost	1

Figure 25: PARM methodology for quantifying the capacity to manage risks

Note that the entire value chain's capacity to manage risks **is analysed**. In each actor category, certain more vulnerable populations, such as women, youth, internally displaced persons and refugees or even newly created enterprises may have a capacity to manage risks that is clearly inferior to that of the majority of actors in each link in the value chain. In the design of the risk management programme, it will be important to include **specific approaches for these more vulnerable actors** in each value chain.

In the table below, we have analysed the effectiveness and implementability of **27 risk management options (**tools, strategies, public policies) in Burundi's rabbit value chain. Each option mitigates or compensates for one or more risks. Certain options are not applicable to all actors: in that case, no score is assigned to that actor category.

As we can see, the most diversified actors – that is, veterinary services, feed suppliers, dealers and butchers – are those with the greatest capacity to manage risks.

The most specialized actors are those with the least capacity.

N°	Options		Risk	Veterinary services			Feed suppliers			Breeding centres			Traditional farmers			Specialized farmers			Slaughterhouses			Merchants and butchers		
				Effectiveness (1-3)	Implementability (1-4)	Capacity (1-12)	Effectiveness (1-3)	Implementability (1-4)	Capacity (1-12)	Effectiveness (1-3)	Implementability (1-4)	Capacity (1-12)	Effectiveness (1-3)	Implementability (1-4)	Capacity (1-12)	Effectiveness (1-3)	Implementability (1-4)	Capacity (1-12)	Effectiveness (1-3)	Implementability (1-4)	Capacity (1-12)	Effectiveness (1-3)	Implementability (1-4)	Capacity (1-12)
1	Ban on imports of lagomorphs	1	Epizooties virales							3	1	3	3	1	3	3	1	3	3	1	3	3	1	3
2	Vaccines	1	Epizooties virales	3	1	3				3	1	3	3	1	3	3	1	3	3	1	3	3	1	3
3	Control and quarantine of lagomorph imports	1 2 3	Epizooties virales Parasites Maladies bactériennes							3	2	6	3	2	6	3	2	6	3	2	6	3	2	6
4	Health surveillance mechanism	1 2 3	Epizooties virales Parasites Maladies bactériennes	2	2	4	2	2	4	2	2	4	2	2	4	2	2	4	2	2	4	2	2	4
5	Information and guidance on rabbit diseases	1 2 3	Epizooties virales Parasites Maladies bactériennes	2	2	4	2	2	4	2	2	4	2	2	4	2	2	4	2	2	4	2	2	4
6	Hardy breeds	2 3 10	Parasites Maladies bactériennes Mortalité des lapins au	2	2	4	2	2	4	2	2	4	2	2	4	2	2	4	2	2	4	2	2	4
7	Information and guidance on rabbit nutrition	2 3	Parasites Maladies bactériennes	2	2	4	2	2	4	2	2	4	2	2	4	2	2	4	2	2	4	2	2	4
8	Preventive care	2 3	Parasites Maladies bactériennes	2	1	2				2	1	2	2	1	2	2	1	2	2	1	2	2	1	2
9	Curative care	2 3	Parasites Maladies bactériennes	2	2	4				2	2	4	2	2	4	2	2	4	2	2	4	2	2	4
10	Quality rabbit feed appropriate for each stage	2 3	Parasites Maladies bactériennes	2	2	4	2	2	4	2	2	4	2	2	4	2	2	4	2	2	4	2	2	4
11	Information and guidance on rabbit farming facilities	2 3 15 16	Parasites Maladies bactériennes Vol de lapins Prédatio	2	2	4	2	2	4	2	2	4	2	2	4	2	2	4	2	2	4	2	2	4
12	Adapted metal hutch suppliers	2 3 15 16	Parasites Maladies bactériennes Vol de lapins Prédatio	2	1	2				2	1	2	2	1	2	2	1	2	2	1	2	2	1	2
13	Information and guidance on rabbit markets	4 5 7 8 9	Tous les risques de marché	2	1	2	2	1	2	2	1	2	2	1	2	2	1	2	2	1	2	2	1	2
14	Promotion of rabbit meat consumption	5 8	Surproduction viande Surproduction autres sous-produ	2	2	4	2	2	4	2	2	4	2	2	4	2	2	4	2	2	4	2	2	4
15	Reference market network	4 5 7 8	Tous les risques de marché (sau concurrence chinoise)	2	1	2	2	1	2	2	1	2	2	1	2	2	1	2	2	1	2	2	1	2
16	Market studies for neighbouring countries	4 5 7 8 9	Tous les risques de marché	2	2	4	2	2	4	2	2	4	2	2	4	2	2	4	2	2	4	2	2	4
17	Promotion of the use of rabbit waste	6	Surproduction fumier & de l'urine	3	2	6	3	2	6	3	2	6	3	2	6	3	2	6	3	2	6	3	2	6
18	Promotion of the use of rabbit skins	7	Surproduction peaux	2	1	2	2	1	2	2	1	2	2	1	2	2	1	2	2	1	2	2	1	2
19	Rabbit transport cage suppliers	10	Mortalité des lapins au transport	3	1	3	3	1	3	3	1	3	3	1	3	3	1	3	3	1	3	3	1	3
20	Transport insurance	11	Accident de transport	3	2	6	3	2	6	3	2	6			0	3	2	6	3	2	6	3	2	6
21	Marketing of live rabbits	12 13	Coupure d'électricité Rupture de la chaîne du froid	3	4	12	3	4	12	3	4	12	3	4	12	3	4	12	3	4	12	3	4	12
22	Independent solar power kit	12 13	Coupure d'électricité Rupture de la chaîne du froid	3	2	6	3	2	6	3	2	6				3	2	6	3	2	6	3	2	6
23	Microcredit and credit	tous		2	3	6	2	3	6	2	3	6	2	2	4	2	3	6	2	3	6	2	3	6
24	Secured, liquid and interest-bearing savings	tous		2	3	6	2	3	6	2	3	6	2	2	4	2	3	6	2	3	6	2	3	6
25	Diversification of value chains	tous		3	4	12	3	4	12	3	2	6	3	4	12	3	3	9	3	3	9	3	4	12
26	Diversification of activities	tous		3	4	12	3	4	12	3	3	9	3	4	12	3	2	6	3	1	3	3	4	12
he r	Filet de sécurité pour les plus vulnérables	tous		2	1	2	2	1	2	2	1	2	2	1	2	2	1	2	2	1	2	2	1	2
	Average capacity by actor					5.1			5.5			4.5			4.4			4.5			4.4			5.0

Once each risk management option's capacity to manage risks is defined, the capacity to manage risks is calculated for each risk using the average of the scores of all options related to the same risk. This yields a score for the 12 risks indicated below. Risks not applicable to an actor are left blank. For that indicator, the lower the score, the more limited the capacity to manage the risk identified. Once again, we see that producers and processors are those with the most limited capacity to manage risks.

Risk management capacity of players in the rabbit value chain

N°	Category	Risks	Veterinary services	Feed suppliers	Breeding centres	Traditional farmers	Specialized farmers	Slaughterhouses	Dealers - butchers	Value chain
1	**Health**	Epizooties virales	6.1	6.6	4.9	5.4	4.9	4.6	5.8	5.5
2	**Health**	Parasites		5.6	4.5	4.8	4.5	4.3	5.1	4.8
3	**Health**	Bacterial diseases		5.6	4.5	4.8	4.5	4.3	5.1	4.8
4	**Marché**	Overproduction of bunnies	6.3	6.3	5.0		5.0			5.6
5	**Marché**	Overproduction of meat	6.0	6.0	4.9	5.5	4.9	4.5		5.3
6	**Marché**	Overproduction of manure & urine	8.4	8.4	6.6		6.6			7.5
7	**Marché**	Overproduction of skins	5.8	5.8	4.6	5.3	4.6			5.2
8	**Marché**	Overproduction of subproducts	5.8	5.8	4.6	5.3	4.6			5.2
9	**Marché**	Chinese export competition	6.7	6.7	5.2	6.0	5.2	4.7		5.7
10	**Infra & logistique**	Rabbit mortality during transport			5.1	5.9	5.1	4.7	6.4	5.5
11	**Infra & logistique**	Accidents in transit	7.3	7.3	5.8	5.7	5.8	5.3	7.3	6.4
12	**Infra & logistique**	Power outages	8.0	8.0	6.7		6.7	6.3	8.0	7.3
13	**Infra & logistique**	Break in the cold chain	8.0				6.7	6.3	8.0	7.3
14	**Financier**	Trouble accessing financing	7.6	7.6	5.8	6.8	5.8	5.2	7.6	6.6
15	**Sécurité**	Rabbit theft			5.0	5.7	5.0			5.2
16	**Sécurité**	Predation			5.0	5.7	5.0			5.2
		Average by actor	6.9	6.6	5.2	5.6	5.3	5.0	6.7	

Based on these s scores, in the next section we can calculate the vulnerability score for each risk to the actors and the entire value chain.

6.3.2 Calculations of vulnerability

The vulnerability score is calculated by weighting **the risk score by 60 per cent** and the **score for the capacity to manage risks by 40 per cent**. A moderate risk but one for which an actor category has no management capacity can therefore result in higher vulnerability to it than for actors with significant management capacity.

In the Burundi rabbit value chain, the risks to which it is currently (and in the coming years) most vulnerable are clearly **health risks,** especially **viral epizootics**.

Regarding the **risks of overproduction of the two main products of rabbit farming (rabbit meat and bunnies),** the value chain is also highly vulnerable.

The value chain is **least vulnerable to logistical risks but** mitigating them will heavily influence modernization and diversification downstream in the value chain (especially the promotion of meat and offal).

Risk vulnerability of players in the Rabbit value chain

N°	Category	Risks	Veterinary services	Feed suppliers	Breeding centres	Traditional farmers	Specialized farmers	Slaughterhouses	Dealers - butchers	Value chain	
1	HEALTH	Viral epizootics	4.9	5.6	7.2	6.1	7.2	7.3	5.8	6.3	Very high vulnerability
2	HEALTH	Parasites		4.2	6.3	7.5	6.3	4.7	4.0	5.5	
5	MARKET	Overproduction of meat	4.7	4.7	5.3	5.0	6.2	6.5		5.4	
3	HEALTH	Bacterial diseases		3.3	6.5	6.3	6.5	4.3	4.0	5.1	
4	MARKET	Overproduction of bunnies	4.5	4.5	6.3		5.2			5.1	
13	INFRA & LOGISTICS	Break in the cold chain	4.9				3.8	7.1	3.6	4.8	High vulnerability
7	MARKET	Overproduction of skins	4.8	4.8	4.2	3.9	5.1			4.5	
8	MARKET	Overproduction of other subproducts	4.8	4.8	4.2	3.9	5.1			4.5	
10	INFRA & LOGISTICS	Rabbit mortality during transport			4.1	4.7	4.1	4.3	4.6	4.4	
16	SECURITY	Predation			4.2	5.1	3.7			4.3	
12	INFRA & LOGISTICS	Power outages	3.4	4.8	3.3		3.9	5.6	3.4	4.1	
15	SECURITY	Rabbit theft			3.6	5.1	3.6			4.1	
11	INFRA & LOGISTICS	Accidents in transit	3.4	3.4	3.8	4.0	3.8	4.0	4.3	3.8	Moderate vulnerability
14	FINANCIAL	Trouble accessing financing	3.1	3.1	4.9	3.4	4.7	4.2	3.1	3.8	
6	MARKET	Overproduction of subproducts	3.7	3.7	3.4		4.4			3.8	
9	MARKET	Chinese export competition	3.5	3.5	3.6	3.3	3.6	4.3		3.6	
		Average by actor	4.1	4.2	4.7	4.9	4.8	5.2	4.1		

Figure 26: Vulnerability to the main risks to actors and the entire rabbit value chain in Burundi (Source: Authors, based on the PARM methodology)[70]

To conclude, it appears strategic to address the two groups of major risks, health and market risks, to permit sustainable long-term development of the rabbit value chain.

In the next section, we will propose some approaches for the design of an agricultural risk management programme capable of reducing the vulnerability of value chain actors to these priority risks.

[70] N.B.: The score for the value chain is the average of the scores of the five actor categories. This overall score should ideally have been calculated using a weighted average of the importance (value added) of each actor category. However, the lack of data on their volumes and economic performance did not allow for that level of detail. Moreover, this average by vulnerability does not take actors not considered vulnerable to this risk into account.

For didactic purposes, the following is a graph of the risks to the most vulnerable actors:

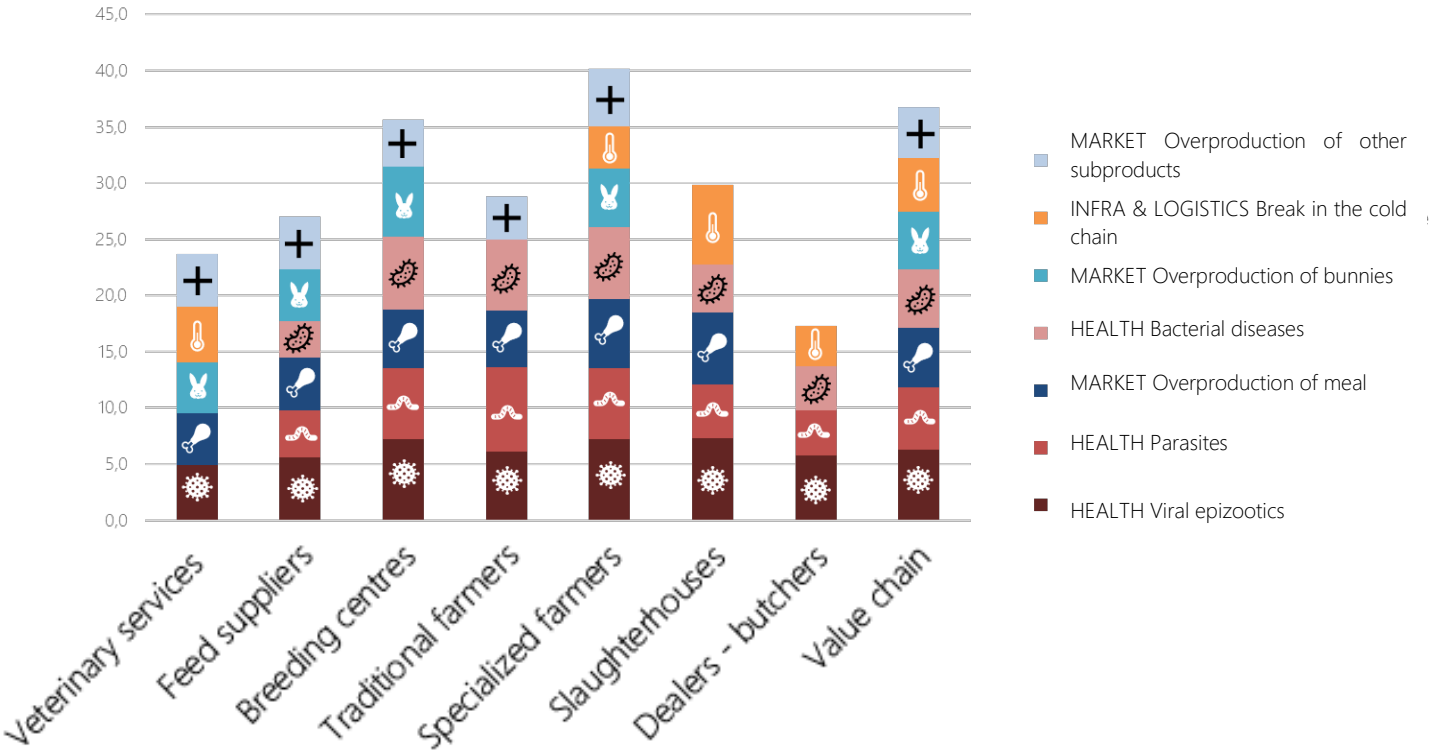


Figure 27: Graph illustrating the risks to the most vulnerable actors in the rabbit value chain

7 Strategies and action plan for agricultural risk management in the Burundi rabbit value chain

Rabbit farming has been practiced in Burundi since the 1980s, under the impetus of Italian missionaries who helped found the Mutoyi Union of Cooperatives in Bugendana in Gitega province. The decision of Burundi's President in late 2022 to make it a strategic value chain to advance the country's food security and development has injected a robust dynamic into this value chain, with rapid growth in the number of rabbit farming operations, the professionalization of certain farmers and the introduction of major projects to construct a modern value chain oriented in part towards exports (breeding centres, Gitega slaughterhouse).

The fact that the construction and growth of the value chain are of recent vintage (less than two years in the making) and in the process of implementation does not allow for an assessment of the historical frequency and intensity of risks unlike the rice and maize value chains. To assess the risks in this developing value chain, the experts relied on:

- an assessment of the risks of the 26 farmers interviewed who engage in traditional or specialized rabbit farming,
- an estimate of the risks to the modern value chain, segmented by professional group (service providers and input suppliers, breeders, farmers, slaughterhouse operators, dealers and butchers), based on the risks observed in the European and Beninese rabbit value chains. The diagram below recaps the two main groups of risks identified (health and market risks) and the actors affected by them, as well as seven proposed actions under the programme for risk management in the rabbit value chain.

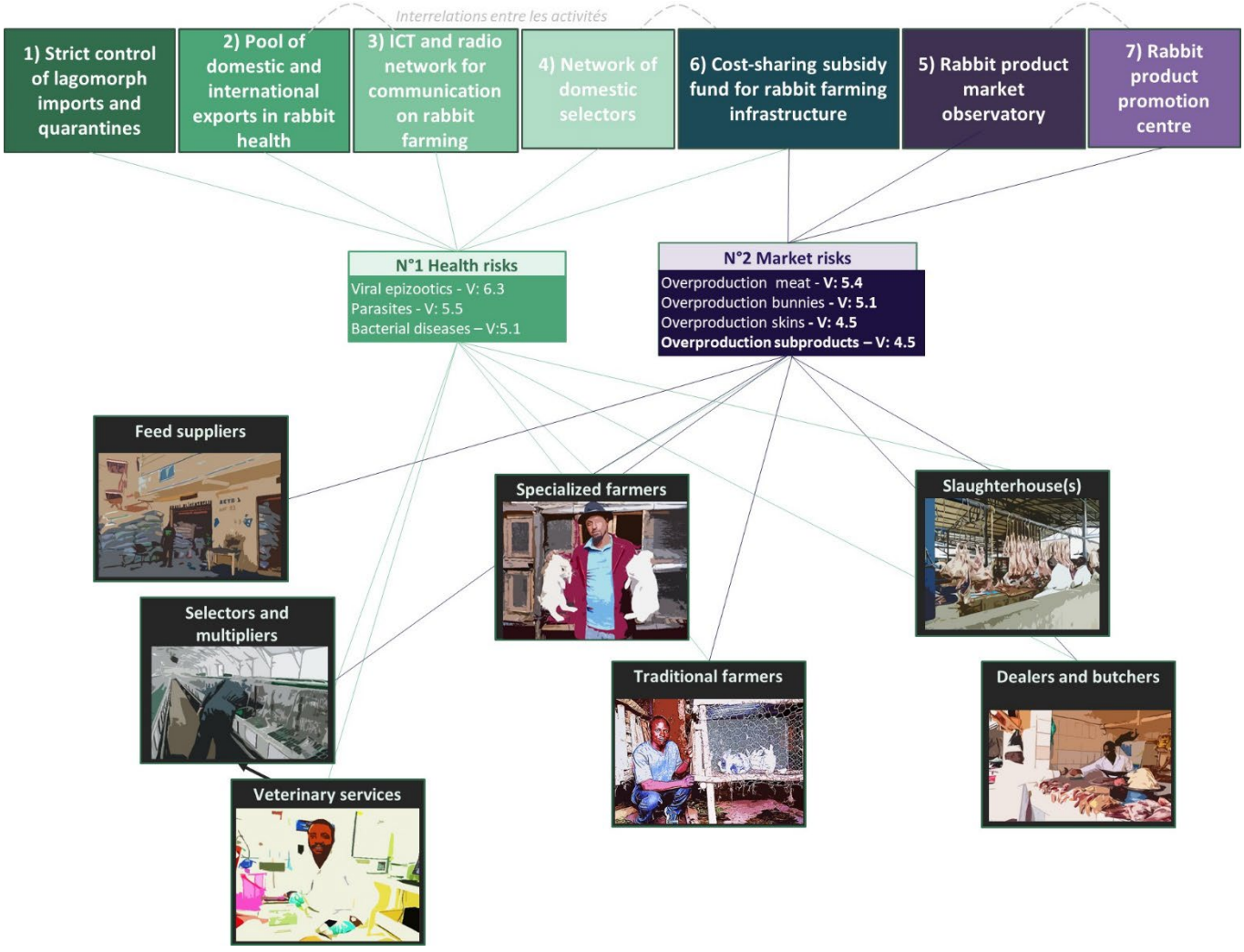


Figure 28: Diagram recapping the risks to which the rabbit value chain is most vulnerable, and the seven priority actions proposed under a risk management programme

It should be noted that the current dynamic surrounding Burundi rabbit farming, as well as the aid provided by the State and its agencies, is moving towards the **development of an intensive specialized value chain:** breeding centres, specialized operations (notably collective, through cooperatives), a slaughterhouse and potential exports in the subregion. These in fact are the actors who will be able to make the necessary investments in developing the value chain and making it profitable – investments that, in turn, can benefit traditional farmers: specialized veterinary consults, prophylaxis and vaccination for rabbit farming.

Notwithstanding, we believe it essential to **make it a priority to implement a strategy that specifically targets traditional rabbit farming operations,** which today cumulatively account for most of the domestic herd. As noted in the President of Burundi's declarations, rabbit farming can be an attractive source of income and/or protein for household consumption.

Our study also shows that traditional operations, while less performing, are exposed to fewer risks than specialized operations, making them attractive to rural households interested in diversifying their livelihoods.

In other words, our recommendation is to **first and foremost, support the development of a supply of services and expertise in small-scale traditional rabbit farming or specialized operations** to increase resilience and develop Burundian expertise, particularly in selection, the diagnosis and treatment of diseases and rabbit nutrition, before supporting an increase in the productivity of the value chain and downstream development (slaughterhouse, promotion of subproducts, etc.) in a second stage

The value chain will be much more resilient if the upstream risks are managed first and downstream development and intensification are staggered in a second stage.

7.1 Major health risks and very limited capacity to manage risks

As in many livestock value chains, the main risks in rabbit farming are health risks. Rabbit farming in Burundi faces numerous constraints (the formulation and tailoring of feed to age category and purpose; for breeders and fatteners, genetic renewal and diversification, hutch design), but other than health risks, it is not so much a matter of risks as structural constraints that the value chain must remove to develop in the coming years.

According to the rabbit farmers, **health risks – especially parasitic, bacterial and viral diseases – are still a serious problem.** However, in the current **absence of a veterinary system specializing in rabbit farming** in Burundi, they are rarely identified and are hard to treat.

Certain parasitic diseases common to other livestock, such as coccidiosis and mange,[71] were identified by some rare studies and certain farmers and technicians we encountered. However, **most causes of death in Burundi rabbits today remain unidentified.** No distinction is made between causes linked to the conditions in farming operations (temperature, humidity, injuries, stress), the quality of feed, genetics and pathologies. Many farmers consider genetics (frequent reference to the problem of consanguinity) the main cause of death among their animals, while observation of the phenotypes, conditions in the operation and discussions with actors in the value chain about their techniques for raising rabbits and formulating feed led to the conclusion that the lack of genetic diversity is likely an underestimated constraint.

Feeding and health issues are very likely responsible for most of the current losses in the value chain. However, two factors above all are contributing to a probable increase in health risks in the coming years:

- First, **the rapid increase in the rabbit population** (all the more rapid, as rabbits are exceedingly prolific) and **the multiplication of trade between rabbit farmers proportionally increases the potential for the proliferation of viral, bacterial and parasitic diseases**;
- Second, **the temptation of inexperienced rabbit farmers in search of genetic performance to illegally import foreign breeder specimens is extremely strong.** However, the vast majority of modern rabbit farming operations in Europe and Asia are infected with two extremely virulent viruses: the myxoma

[71] Nahimana, Etat des lieux des systèmes d'élevage des lapins dans la commune Mabanda, Université du Burundi, ISA, 208 and Mbuya-Mimbanga, Essai de traitement à l'ivermectine de la gale sarcoptique du lapin. Revue Eh. Méd. vét. Pays trop., 1988, 41 (1): 55-5 – study on rabbit farming operations conducted in the city of Lubumbashi in the south of the DRC.

virus and the rabbit haemorrhagic disease virus (commonly known as VHD). There have been major epizootics of these two viruses, whose harm in the major rabbit-producing countries has been mitigated by mass vaccination of the animals, but at a very high cost and with constraints to its administration (cold chain). Moreover, a mutation in the VHD virus has created resistance to the initial vaccine, and the new vaccines marketed to combat the VHD2 strain are sold at a very high price, motivating rabbit farmers to vaccinate only breeder rabbits.

The risk of importing a viral epizootic therefore appears to be very high in the context of Burundian rabbit farming, which is marked by:

i. a very limited supply of veterinary services,[72]
ii. veterinary and zootechnicians that are very inexperienced in the diagnosis and treatment of rabbits,
iii. a very expensive cold chain for the importation and distribution of vaccines that is hard to guarantee, in the context of energy shortages,
iv. farmers' limited purchasing power, given the cost of eventually importing vaccines.

To tackle the risk of epizootics (which already have repeatedly hit other Burundi livestock value chains, particularly the cattle, pig and poultry value chains) and, more generally, viral, bacterial and parasitic health risks, the following actions are proposed as part of a health risk management programme in the rabbit value chain:

- A total ban on the importation of lagomorphs by entities other than selection centres – (enforcing an extremely strict series of health controls) and mass communication (including among NGOs and development agencies[73]) about the risks of importing lagomorphs from other countries, especially those where the value chain is highly developed and the prevalence of VHD and myxomatosis is highly probable.
- Strengthening of capacities at the National Veterinary Laboratory (LABOVET), not only to confirm veterinary diagnoses as soon as possible but to create antibiograms to detect/prevent bacterial strains from developing resistance.
- Training to create a pool of domestic experts in rabbit diseases and their diagnosis and treatment, supported by a pool of international experts (qualified veterinarians);
- Support for the development of a network of domestic selectors/breeders capable of developing a diversified supply of hardy breeds tailored to the Burundi context, based on the genetic resources already available in the country.
- The creation of a communications network and training videos on the prevention, diagnosis and treatment of rabbit diseases.

7.2 Major commercial risks associated with rapid growth of the value chain

With the scaling-up of the value chain, many historical rabbit farmers have switched production models.

- On the one hand, farmers specializing in the sale of meat have switched to the sale of bunnies to meet the demand from new farmers. A speculative quasi-bubble has emerged that already appears to have resulted in an oversupply of bunnies in certain areas.
- On the other, the rapid growth in the supply has not yet been accompanied by growth in demand, either for rabbit meat or the co-products of rabbit farming (manure, skins, offal, remnants).[74]

Traditional rabbit farming, mainly for household consumption of meat and the use of manure and their sale in short marketing circuits (neighbourhood, rural community or city area), rarely has to contend with this

[72] There is a manifest lack of veterinary technicians and no training in veterinary medicine in Burundi at this time: https://www.iwacu-burundi.org/la-medecine-veterinaire-un-metier-delaisse/
[73] Many breeder rabbits from Europe have been introduced in Burundi by development actors
[74] It should be noted that in Burundi, rabbit urine is not yet approved and standardized as a fertilizer and biopesticide. Trials are under way at ISABU to determine the efficient dose.

problem. In contrast, the numerous modern farming operations that are beginning to emerge throughout the country and have hundreds of breeder rabbits or bunnies for fattening must all contend with the **problem of outlets for anything that does not involve the sale of bunnies or manure.** Absorbing dozens or even hundreds of kilograms of rabbit meat, offal and skins requires the professionalization of certain actors (dealers, butchers, restauranteurs, tanners, livestock feed producers) in the value chain and the development of marketing networks, which are currently lacking in the value chain.

In time, the overproduction that is beginning to emerge in modern rabbit farming could even impact some traditional farming operations by causing a drop in prices in their nearby distribution networks.

Since the profitability of specialized rabbit farming is highly dependent on the promotion of all the subproducts of rabbit farming (sales of manure, liquid fertilizer and skins account for some 30-60 per cent of the income of modern rabbit farming operations in Europe and Asia[75]), tackling these serious risks to the development of the value chain is urgent.

To develop a marketing outlet, the government also expects to develop export markets and has already begun the construction of a slaughterhouse in Gitega to reach that market. However, rabbit meat still has a very marginal place in the customary diet of neighbouring countries, while there is stiff competition from Chinese rabbit operations in the global market. These latter benefit from a market for rabbit fur (rabbit wool) and skins (rabbit leather), making rabbit meat a co-product of certain types of operations.

Furthermore, Burundi risks being at a significant comparative disadvantage in terms of its cold chain and logistical costs if it intends to export fresh rabbit meat.

Given the major market risks that can threaten the income of actors across the value chain in the short and medium term, the risk management programme in the rabbit value chain should include a second component on market risk management. This could include:

- A **domestic, regional and international observatory for the rabbit and rabbit subproducts market;**
- An **organization to promote rabbit products** in potential markets (domestic and subregional in particular) for: rabbit meat, rabbit fur, rabbit manure, rabbit skins, meal from rabbit offal for fish food, rabbit claws for jewellery, etc.
- **Support for investment in risk management equipment and the diversification of outlets for actors downstream in the value chain** (shared subsidies for independent solar panels + converter + battery for electricity generation, the procurement of cold chambers and containers for transporting live rabbits [stackable transport crates] and launching activities to promote subproducts).

The design phase of the agricultural risk management programme that will follow this study can specify the amounts and institutional arrangements for the various activities.

7.3 Strategy for traditional rabbit farming operations

Traditional rabbit farming is less exposed to risks than specialized operations. If fact, it has the following advantages:

- Low start-up investments (no hutches; home-made hutches);
- Little or no use of inputs (selected breeder bunnies, rabbit sperm, granulates);
- Household consumption and proximity marketing do not require a cold chain or electricity.

Traditional farmers, however, suffer from a lack of veterinary advice on raising rabbits and rabbit nutrition, and while less exposed, may find themselves bankrupted by diseases or even epizootics.

These farming operations have a **key role to play, especially in Burundians' consumption of rabbit meat**, not only because they themselves will eat it but because their geographic distribution throughout the country can lead to the rapid development of proximity distribution circuits that popularize rabbit meat. For

[75] In Burundi, co-product sales also appear to generate more than 50 per cent of revenues but with full use of rabbits apparently low in terms of value added.

example, in Benin, rabbits supplied by traditional farming operations are eaten braised or grill in *maquis* and cafés throughout the country.

In addition, we believe it important **to promote traditional rabbit value chains alongside more "professional" value chains** and support the synergies that they could provide each other.

	Specialized rabbit value chain	Traditional rabbit value chain
Origin of breeder bunnies	Breeding centres	Specialized operations in the neighbourhood
Veterinary services, health risk management	Development of specialized services and prevention programmes: specialized operations include them	Benefit indirectly from the professionalization of agricultural services in rabbit farming, facilitated by the growth of specialized operations
Marketing circuit	Slaughterhouse(s) → urban centres, even exports	Proximity circuits: • Live rabbits sold in the market or on the roadside • Local *maquis* and cafes

In this regard, the following are some ideas on recommendations for the national rabbit farming development strategy targeting traditional rabbit operations:

- **Training for DPAE agents and all agronomists and agricultural monitors in Burundi on how to run small-scale rabbit farming operations and methods to improve them** so that they in turn can support rural households;
- **With specialized operations** still playing a bridging role (sale of breeder bunnies) for traditional farming operations, their role as a hub or even a service provider or input suppler could be enhanced: dissemination of good rabbit-raising practices, nutritional counselling, the sale of feed supplements, particularly for nursing does and weaning bunnies, the sale of improved hutches, even the collection of skins if a value chain emerges;
- **Promotion of rabbit meat in nearby restaurants:** communal cooking competitions and even a rabbit festival to promote innovative ways to prepare rabbit and rabbit-based recipes and support demand;
- **Promotion of the selection of hardy domestic breeds** adapted to the conditions of traditional rabbit farming;
- **Promotion of initiatives to promote subproducts** in local markets through a provincial or even communal system to award prizes for innovative rabbit offal recipes, tannery and shoemaking with rabbit leather, the manufacture of rabbit-based fish food, etc.
- **Promotion of hardy plants requiring little investment that can be used in rabbit feed** to put uncultivated areas (parcel boundaries, rice dikes, home gardens, etc.) to use.

7.4 Annex 1: Action plan for a risk management programme for three value chains: rabbit, rice and maize

The proposed action plan envisions the design of a 5-year agricultural risk management programme for the maize, rice and rabbit value chains in Burundi.

The general objective of the agricultural risk management programme could be the following:

Support sustainable growth of the maize, rice and rabbit value chains in Burundi by developing the supply of facilities, agricultural risk management and partnerships with all actors upstream and downstream.

The programme would have three specific objectives:

- SO1: Increase the resilience of the three value chains through strategic infrastructure and inclusive territorial governance
- SO2: Strengthen production advisory and support services through a risk prevention approach
- SO3: Improve production and information sharing in the value chains to improve the ability to anticipate, mitigate and regulate risks

The logical framework below proposes a reorganization of the actions proposed in the agricultural risk analysis for the three value chains, structuring them around the three specific objectives and proposing actions (in chronological order of implementation) and outcome indicators for each of the actions envisaged.

This action plan will be specific, budgeted and detailed in the design phase that will follow validation of the three agricultural risk analysis reports.

SO	Strategic lines of action	Actions	Expected outcomes
SO1: Increase the resilience of the three value chains through strategic infrastructure and inclusive territorial governance.	**Develop facilities and infrastructure for collective water management in the countryside and river basins**	- Identification of two strategic river basins for collective improvement of water management - Production of a participatory territorial river basin study. This study would be underpinned by technical analyses of the physical setting and its features (topography, soil, waterways, natural resources, degraded areas, risk exposure, soil use and its history), socioeconomic analyses and inclusive dialogue with river basin users. A map of stakeholders (communities, water users' associations, producers' organizations and mutual societies) and their role will also be necessary. - Production of a schematic for development of the river basin (or its equivalent, based on the available tools in the target communities) that will include the components of the study and focus part of the issue of (drinking and productive) water management on identifying the challenges and development projects to undertake. - Feasibility study on the development projects indicated in the river basin development schematic, including technical works (dams, irrigation channels, access roads, distribution network) and works in the countryside (protection of river banks, fluvial plains, forest massifs) in cooperation with users of the agricultural area to integrate their constraints and water risk management modalities (use of their know-how) - Implementation of development projects and user training, including a significant social engineering component. - Monitoring of the development plan's implementation and training for the different stakeholders - Search for additional financing for the other components of the development plan (education, health)	- 2 pilot river basins are developed using a systemic approach (including all river basin use and space and not just the wetlands) that integrates the farmers know-how. - 50,000 river basin users (farmers and residents) are positively impacted by these pilot projects and benefit from better water management.
	Support trade and cereal processing through the establishment of dedicated clusters	- Identification of strategic commercial hubs for the creation of 10 cereal clusters, - Identification of operators (dealers, processors, cooperatives, input suppliers, SFD, banks, equipment suppliers) located near (commune) the hub and their interest/investment capacity to access higher quality, reorganized marketing and processing infrastructure - Production of economic and technical feasibility studies for each of the 10 clusters, including the choice of location, the layout of buildings and other infrastructure (parking, traffic routes, drying areas, retail sales areas, waste disposal areas) and energy self-sufficiency (solar panels), as well as any additional services (warrantage/collateral management, repairs/maintenance/sale of machinery), spaces for agrifood activities other than cereal processing (other dried grains in particular). - Identification of the clusters' governance structure (users' association/cooperative, local	-10 cereal clusters of 5,000 m^2 are established in strategic locations; they are energy independent and have a minimum of 200 specialized operators in the cereal value chains

		community) and the clusters' maintenance and development financing structure (rentals, charges proportional to electricity use); - construction and promotion of clusters	
	Subsidize investments in rabbit farming infrastructure	- Identification of a list of priority infrastructure and equipment for risk reduction in the rabbit value chain (hutches, transport crates, manure collection system, insemination equipment, etc.) - Definition of the modalities for selecting candidates, awarding subsidies and justifying expenses. - Implementation of a fund to subsidize rabbit farming infrastructure and equipment	- 1,000 operators in the rabbit value chain benefit from a cost-sharing subsidy for procuring equipment for their activities in the value chain.
	Promote the use of rabbit products	- Identification of the competencies of the agency hosting the centre for the promotion of rabbit products - Recruitment and/or training of centre personnel - Support for the production of marketing studies in Burundi and the subregion - Support for communication on the use of rabbit products - Incubator for start-ups in the use of rabbit products - Competition and prize for innovation (with different segments: gastronomy, use of offal, manure, skins and fur, etc.)	- 1 promotion centre is up and running - 10 marketing studies on rabbit products are produced and published. - 50 enterprises that utilize rabbit products are supported by the centre and have boosted their sales revenues by more than 30% with this support.

SO2: Strengthen production, advisory and support services through a risk prevention approach	Support research-action on comprehensive cereal crop protection	- Create a national public-private working group (comprising an ISABU-type research institute, the Ministry of Agriculture, deconcentrated State services, input suppliers, NGOs active among farmers). This working group will develop a national research-action strategy in agricultural areas. The national strategy will identify the priority issues and potential means to address them, particularly through the comprehensive protection of cereal crops, which could include the recommendations of the risk analysis report (preventive action, curative action, multidimensional approach targeting parcels and the countryside) - Implementation of pilot projects consistent with the national strategy. Depending on the capacities of the actors in the working group, the pilot projects will be implemented in rural areas to test agroecological innovations for comprehensive crop protection - Evaluation, capitalization on and dissemination of the outcomes of the pilot projects to agricultural research and advisory agencies in Burundi	- 1 national strategic document on comprehensive crop protection - At least 10 pilot projects implemented by the public and private sectors to promote integrated action.
	Strengthen the technical competencies of advisory services through an approach centred on crop resilience	- Production of a study on the competencies of active nearby advisory services in Burundi - Design of a training programme on theory and practice in upgrading nearby advisory services - Provision of practical advice to 4,000 crop farms (if possible, in connection with the river basin), - Support for counsellors through technical assistance from advisory services to integrate the approach centred on the resilience of crop farming systems - Evaluation of the mechanism	- 1 training course is established - 200 counsellors are trained - 4,000 family farms are assisted
	Develop domestic expertise to support rabbit farming operations	- Identification of 6 international experts in rabbit farming and the organization of a mission that will enable them to produce a study on rabbit farming in Burundi and the main pathologies present. - Identification of 18 future domestic experts (with a minimum of 6 farmers and 6 private veterinary service providers) - A programme in which the 6 international experts train 18 domestic experts - Design of diagnostic protocols for rabbit pathologies and the formulation of rabbit feed - Publication of the list of domestic experts, their contact information and their specialties in every commune in Burundi	- 6 international and 18 domestic experts are identified and trained and regularly share information on risk management and development of the rabbit value chain - 20 fact sheets on the diagnosis of rabbit pathologies and rabbit farming in Burundi are produced and available online

	Prevent the importation and spread of rabbit pathogens	- Confirmation by the international experts of rabbit breeders' interest in importing breeder animals to develop the value chain - If their interest is confirmed: the identification of competent laboratories certified in the detection of potential infections in breeder rabbits prior to their importation, issue of a decree establishing monitoring and quarantine regulations (especially for the identification of healthy pregnant animals) before any importation of a lagomorph in Burundi; dissemination of the decree and enforcement at every border station in the country;	- A report on the relevance and requirements for the importation of lagomorphs in Burundi is public and available online - Myxomatosis, VHD and their variants are not present in Burundi
SO3: : Improve production and information sharing in the value chains to improve the ability to anticipate, mitigate and regulate risks	**Build up a supply and network for sharing information on meteorological, phytosanitary and market risks in the rice, maize and rabbit value chains**	- Identification of regular, reliable and up-to-date reactive sources of information on meteorological, phytosanitary and market risks in the three value chains - Identification of the organization(s) hosting the information collection and sharing unit - Recruitment and training by international experts of the teams responsible for collecting and sharing information - Identification of the most effective and sustainable communication channels (from the standpoint of recurrent costs) for sharing information with and among actors (community radio, SMS, WhatsApp and Facebook communities, etc.) - Regular dissemination of reliable up-to-date information to actors in the value chain, consideration of their questions and the sharing of information with the unit	- A unit for producing and regularly disseminating information (monthly at a minimum) on risks in the three value chains is up and running - 300 fact sheets on risks have been distributed to actors in the three value chains - 60,000 actors in the three value chains have received at least two messages from the unit with information on agricultural risks
	Support the implementation of a network of domestic rabbit selectors	- Creation by the expertise unit of a matrix evaluating farmers' selection competencies - A mission to identify the most experienced selectors - Training of 40 selectors to monitor populations and mitigate consanguinity risks - Organization of biannual meetings of these rabbit farmers - Creation of a WhatsApp group for selectors - Creation and annual updating of a catalogue of rabbit characteristics indicating the availability and contact information of selectors - Organization of 4 annual rabbit fairs to bring together selectors and fatteners from different provinces	- At least 40 selectors are identified and trained - At least 16 fairs are held and have enabled selectors to display their breeder rabbits and their characteristics and interact with each other. - 4 successive editions of the rabbit breeders' catalogue are published and available online
	Conduct economic studies on the development of the fertilizer sector and farmer insurance	- Production of an economic study on the development of the domestic fertilizer supply within a competitive framework - Production of an economic study on the demand of agricultural actors for insurance products, the profitability of insurance products and the technical feasibility of supporting the development of a supply tailored to the rural insurance context, inspired by international examples.	- 3 studies are published and available online - 3 workshops to operationalize the results of the studies are shared with all private actors and institutions

	products and the strengthening of ANGESSA'S mandate and technical capacity.	- Production of an economic and technical study on regulation of the cereal market through public intervention by ANAGESSA in the purchase and sale of cereals at critical points, including the modalities for triggering interventions and ANAGESSA's need for infrastructure, equipment (CAPEX) and long-term financing (OPEX)	involved and result in a roadmap for implementation of the necessary reforms and investments.

7.5 Annex 2: Methodology

The study on agricultural risks in the maize, rice and rabbit value chains in Burundi is based on the PARM methodology described in the practical guide *Assessing value chain risks to design agricultural risk management strategies*.

1) An initial **start-up** report produced in January and validated in February 2024 made it possible **to target the main risks in the three value chains** designated by the government, namely: rice, maize and rabbits.[76]
2) Following this report, a phase for the study of **agricultural risks** in all three targeted value chains was launched in January and February 2024, resulting in the creation of a risk scoring matrix;
3) A study on **vulnerability to agricultural risks** was simultaneously conducted that listed the tools, mechanisms and agricultural risk management competencies already in place and/or planned in the targeted value chains in Burundi;
4) Following these risk and vulnerability analyses, a risk map was drawn up in March-April 2024, making it possible to prioritize the risks with the highest vulnerability rate. This prioritization was presented, discussed and adapted with the Burundi government and the institutions operating in the value chain through workshops held from 23 to 24 May 2024 aimed at leading to the final stage: the drafting of an action plan for implementing agricultural risk management tools and policies.[77]
5) The fifth and final stage that will follow in the coming months will involve drafting an action plan for implementing agricultural risk management tools and policies in Burundi in the three targeted value chains, addressing the risks with the highest vulnerability rate. It will be presented and validated in a workshop.

To gather information on risks (frequency, intensity) and the capacity to manage risks, the consultants produced interview guides for each link, which are available below.

During the first interviews and focus groups with maize, rice and rabbit farmers, the experts from PARM spoke with 3 feed suppliers, 3 rice husking units, 3 mills, 3 cereal dealers, 3 input suppliers, the agriculture officers of 3 banks, 3 veterinary supply stores, 2 commune SGs, 6 commune monitors and agronomists, ANAGESSA, the BESD and the MINEAGRIE TC.

Following these exchanges, it was decided to conduct a short quantitative survey to define the indicators for the frequency and intensity of risks with rice and maize farmers.

A total of 254 maize farmers and 213 rice farmers in all the producing provinces were interviewed using a digital ODK Collect interview form. The breakdown of the interviews is presented in the table below. A chart also shows the geographic distribution of the interviews. The qualitative interview guides and interview questionnaires are presented next.

The following methodology was used to select the producers to interview:

- Conduct the interviews in at least two different *collines*, one of which is not located on a paved route;
- Prioritize interviews of smallholders cultivating parcels of less than 2 ha;
- Interview a minimum (not a maximum) of five women rice farmers and 5 women maize farmers;
- Conduct the Interviews "in the field" – that is, on or near the parcels cultivated by the farmer.
- Activate the GPS of the interviewer's mobile phone before and throughout the interview.
- Use the ODK form provided by Nitidae, asking the farmers all the questions;
- If an interview was not conducted properly, note that at the end of the questionnaire (self-evaluation of the interview – Q56) and explain why in the free comments section (Q58).

[76] Rice and maize are two commodities already targeted by the Burundi COMPACT for Food and Agriculture, along with pigs and poultry. The targets for the score for production, exportable surplus, potential income generated and jobs created have been defined in this document. Rabbits, in contrast, are an emerging priority of Burundi's President and have caught the attention of MINEAGRIE, which considers this value chain as important as the poultry and pig value chains.

[77] The first workshop had 34 participants and the second, 72.

- When the interviews are conducted without an Internet connection using the ODK app, the results should be transferred on return home or where a connection is available;
- Note all relevant information in the comments section at the end of the questionnaire to understand any agricultural risks and risk management strategies that could not be captured through the questions;
- Finalize and validate the questionnaire immediately following the interview.

Figure 29: Producers and rabbit farmers interviewed by region and sex.

Provinces	Female maize farmers	Male maize farmers	Female rice farmers	Male rice farmers	Rabbit farmers
Bubanza	5	8	9	4	
Bujumbura	12	3	8	10	8
Bururi	15	10			
Cankuzo	10	2	8	4	
Cibitoke	7	10	10	6	
Gitega	11	8	12	12	8
Karuzi	5	7	7	5	3
Kayanza	8	5	10	3	5
Kirundo	6	7	8	6	
Makamba	12	4	9	6	
Muramvya	10	2	8	4	
Muyinga	6	6	10	2	
Mwaro	18	6			3
Ngozi	5	8	12	2	
Rumonge	6	6	8	5	
Rutana	7	7	4	9	
Ruyigi	7	5	6	6	
Total	**150**	**104**	**129**	**84**	**27**

Figure 30: Map of interviews with producers and farmers.

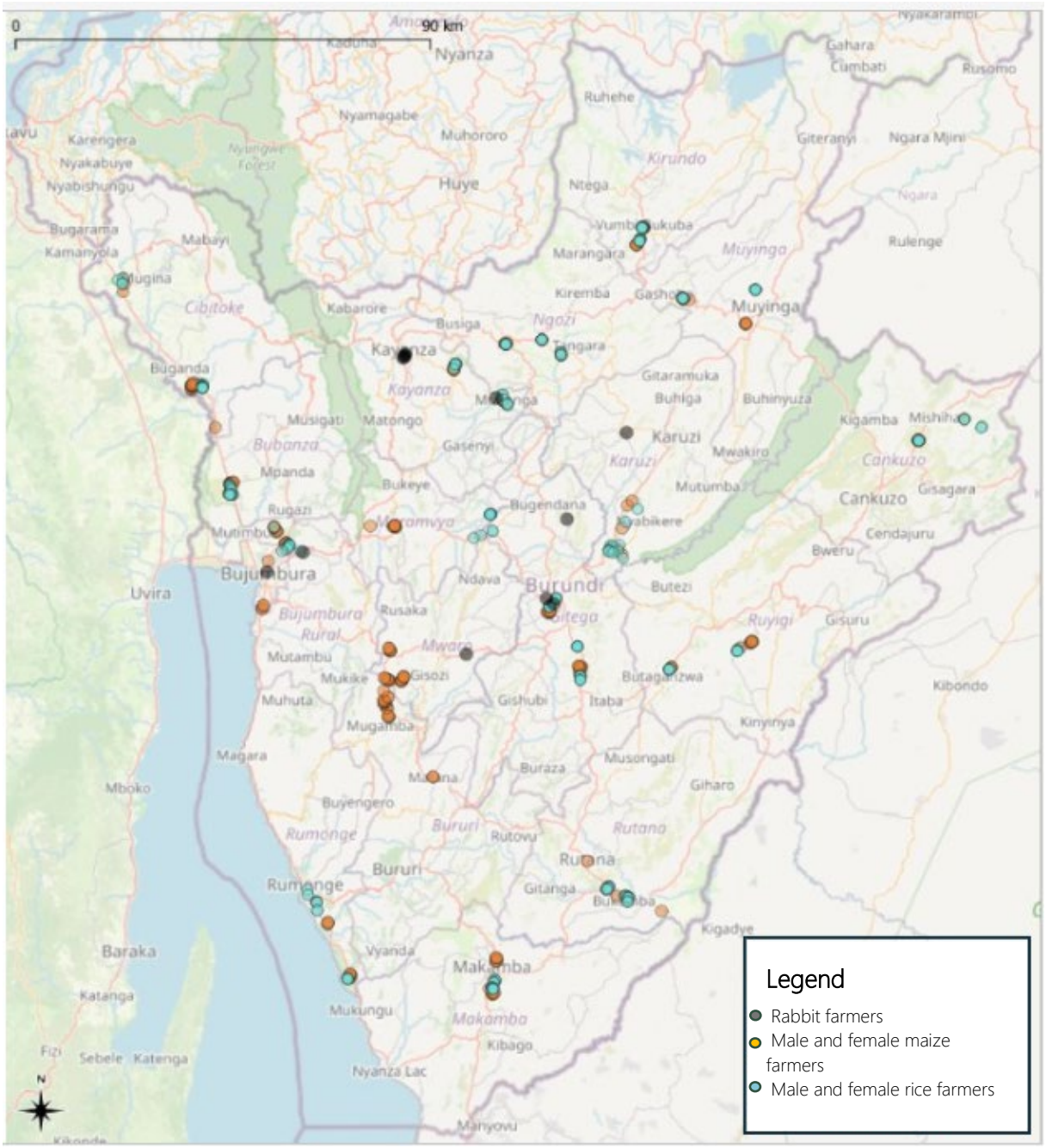


Figure 31: Rabbit farmer interview guide

Description of the farm: Status, location, activities other than rabbit farming and the share of rabbit farming in its activities (in terms of labour and revenue), type of rabbit farming practiced (enclosure, outdoor hutches, indoor hutches, free-range, dedicated building?)

Engagement in rabbit farming: Year begun and reasons, number of breeder rabbits, origin of the rabbits, breeds and interest in breed differences, production and activities schedule, time devoted to rabbit farming, normal mortality, excessive mortality, reasons for excessive mortality?

Cost of rabbit farming: Investments in farming infrastructure (cost of a hutch for a certain number of rabbits), inputs (feed, veterinary products, breeder bunnies and/or rabbits, other), facilities and facility maintenance, other expenses. Variations in costs at certain times of the year?

Marketing of rabbits and co-products: Sales locations, marketing periods/peaks (in terms of the market or cash requirements), sales planning? Sale price as a function of period, sales location and weight and breed criteria. Year (and possibly month) in which sale prices have been highest in the farmer's experience; explanation for that year? Year (and possibly month) in which sale prices have been the lowest in the farmer's experience; explanation for that bad year? Other reasons for price fluctuations?

Main constraints in rabbit farming: Allow the producer to respond freely; encourage him or her to rank and explain the constraints

Risks "Very bad experiences": Worst experiences in rabbit farming? Allow the producer to describe them and explore the reasons (for the memo: disease, theft, predation, flood [hutch/pen destruction], soaring feed prices, inability to find feed, inability to find another essential input, lack of buyers when there is a need to sell, drastic drop in the sale price). Frequency, intensity/value of losses?

Adaptation strategy: How did you extricate yourself from this situation?

Mitigation strategy: What are you doing to prevent this situation from recurring?

Support: Have you already received support or technical assistance for rabbit farming? From whom (a company, customer, other rabbit farmers, NGO, State services, other)?

Outlook: Would you like to engage more in rabbit farming? Less? Would you prefer to invest in other activities? If yes, which ones? Do you feel that the demand is continuing to grow or stagnating? Why in your opinion?

How to support the value chain? Free response …

Figure 32: Interview guide for private actors upstream and downstream in the value chain

Role of the action taken, relationship with other actors (opportunistic, contractual, etc.)?

Cost of the activity: Main objectives of one or the three value chains (maize, rice, rabbit)?

Main constraints in the value chain: Allow the interviewee to respond freely; encourage him or her to rank and explain the constraints?

Risks "Very bad experiences": Worst years for the value chain? Reason for these worst years?

Mitigation strategy: What are you doing to prevent this situation from recurring?

Documentation: Do you have any documents describing the value chain, its constraints or its risks?

Databases: Do you have databases that can help you quantify the intensity (impact) and frequency of the risks in one or more of the three value chains?

Outlook: What future do you see for the value chain? What are the priorities for the coming years?

Exploratory survey on the rabbit value chain (VC) in Burundi conducted prior to the mission:

The purpose of this exploratory survey is to identify the key actors in Burundi's rabbit value chain in order to determine, through networking, the actors in the value chain and their roles. The survey will make it possible to map the production basins (main rabbit farming areas, farming systems, breeds raised, constraints, risks incurred and potential losses), consumption basins, flows between actors in the value chain and transactions between direct actors in the value chain. Informed consent must be obtained.

Interviewer's name & code:

N°	Identification data	Name	Code
B0	Interviewer's name		
B1	Interviewer's code		|___|___|

Module C –Geographic location of the rabbit farm

N°	Identification data	Name	Code
C0	Date (DD/MM/YY) and interview start time (HH/MM)		|___|___||___| |___|___|
C1	Name & code of the *colline*		|___|
C2	Household GPS coordinates	Latitude (S)	|___||___||___|
		Longitude (E)	|___||___||___|

Module D – Production link

N°	Identification data	Name		Code/comments
D0	Respondent's name			
D1	Respondent's status	|___|Owner |___|Manager ||___|Employee		|___|
D2	Experience in rabbit farming (how many years of experience in rabbit farming) ?			|___|
D3	What breeds are raised and how many of each breed?	Breeds	Name of breed	|___| |___| |___| |___| |___|
		1		
		2		
		3		
		4		
		5		
D3.1	Origin of the animals raised (bunnies)	#Breeds	Source of the animals	
		1	|___|Purchase/Local market	
		2	|___|Purchase/Breeding centre	
		3	|___|Distribution/project	
		4	|___|Distribution/CSCA	
		5	|___|Gifts	
D4	*Discuss the zootechnical parameters, fertility of the different breeds and herd dynamic*			
D4.1	Age at first pregnancy and length of gestation	#Breeds	Age at first pregnancy	Length of gestation	Specific comments
		1	|___|	|___|	
		2	|___|	|___|	
		3	|___|	|___|	
		4	|___|	|___|	
		5	|___|	|___|	
D4.2	Age at weaning and second pregnancy	#Breeds	Age at weaning	Age at second pregnancy	Specific comments

<table>
<tr><td>Nº</td><td>Identification data</td><td colspan="3">Name</td><td>Code/comments</td></tr>
<tr><td></td><td></td><td>1</td><td>|____|</td><td>|____|</td><td></td></tr>
<tr><td></td><td></td><td>2</td><td>|____|</td><td>|____|</td><td></td></tr>
<tr><td></td><td></td><td>3</td><td>|____|</td><td>|____|</td><td></td></tr>
<tr><td></td><td></td><td>4</td><td>|____|</td><td>|____|</td><td></td></tr>
<tr><td></td><td></td><td>5</td><td>|____|</td><td>|____|</td><td></td></tr>
<tr><td>D4.3</td><td>Average litter size and mortality rate</td><td># Breeds</td><td>Litter size</td><td>Mortality rate</td><td></td></tr>
<tr><td></td><td></td><td>1</td><td>|____|</td><td>|____|</td><td></td></tr>
<tr><td></td><td></td><td>2</td><td>|____|</td><td>|____|</td><td></td></tr>
<tr><td></td><td></td><td>3</td><td>|____|</td><td>|____|</td><td></td></tr>
<tr><td></td><td></td><td>4</td><td>|____|</td><td>|____|</td><td></td></tr>
<tr><td></td><td></td><td>5</td><td>|____|</td><td>|____|</td><td></td></tr>
<tr><td>D5</td><td colspan="5">Discuss transaction prices in the value chain</td></tr>
<tr><td>D5.1.</td><td>What is the price of the animals raised? Specify the age and average weight</td><td>#Breeds</td><td>Names</td><td>Price (BIF/head)</td><td></td></tr>
<tr><td></td><td></td><td>1</td><td>|____|</td><td>|____|</td><td></td></tr>
<tr><td></td><td></td><td>2</td><td>|____|</td><td>|____|</td><td>Comments</td></tr>
<tr><td></td><td></td><td>3</td><td>|____|</td><td>|____|</td><td></td></tr>
<tr><td></td><td></td><td>4</td><td>|____|</td><td>|____|</td><td></td></tr>
<tr><td></td><td></td><td>5</td><td>|____|</td><td>|____|</td><td></td></tr>
<tr><td>D5.2</td><td>Price of other inputs for rabbit farming/raising</td><td># Input</td><td>Name</td><td>Price (BIF/unit)</td><td></td></tr>
<tr><td></td><td></td><td>1 Fodder and additives</td><td>|____|</td><td>|____|</td><td></td></tr>
<tr><td></td><td></td><td>2 Veterinary care</td><td>|____|</td><td>|____|</td><td></td></tr>
<tr><td></td><td></td><td>3 Semen/pregnancy</td><td>|____|</td><td>|____|</td><td></td></tr>
<tr><td></td><td></td><td>4 Electricity</td><td>|____|</td><td>|____|</td><td></td></tr>
<tr><td></td><td></td><td>5 Other (specify)</td><td>|____|</td><td>|____|</td><td></td></tr>
<tr><td>D6</td><td>What are the current constraints in rabbit farming?</td><td colspan="3">1. Consanguinity
2. Insufficient fodder
3. Disease and predators
4. High mortality
5. Other (specify)</td><td>|____|
Allow the respondent to speak freely</td></tr>
<tr><td>D7</td><td>What risks are associated with these constraints?</td><td colspan="3">1. Drop in income
2. Ongoing theft of rabbits
3. Zoonoses
4. Conflicts with neighbours
5. Other (specify)</td><td>|____|
|____|
|____|
|____|</td></tr>
<tr><td>D8</td><td>Have you had epidemics of disease on your farm in the past (10) years?
If "no", skip to</td><td colspan="3">|____| Yes
|____| No</td><td>|____|</td></tr>
<tr><td>D8.1</td><td>Which?</td><td colspan="3"></td><td></td></tr>
<tr><td>D8.2</td><td>How many times did they occur during this period?</td><td colspan="3"></td><td></td></tr>
<tr><td>D8.3</td><td>What losses have they caused in your operation?</td><td colspan="3">Quantify these losses
Dead animals |____|
Lost income |____|</td><td>|____|
|____|</td></tr>
</table>

Nº	Identification data	Name	Code/comments
D8.4	How did you handle this situation?		
D9	Have you received support from an agricultural development intervention (project or programme)?	If yes, which one? What support have you received from this project?	|____| |____|
D10	The Government is very keen on promoting rabbit raising in all farm households and administrative entities that can do so. Is this a constraint or an opportunity for you?	Allow the respondent to speak freely	

Module D – Marketing link /post-production use

Nº	Identification data	Name	Code/observations
E1	Do you sell live animals or slaughtered carcasses?	Live animals |____| Carcasses |____|	
E2	To whom do you sell your products?		|____|
E3.1	What is the unit price of:	An adult rabbit for slaughter A kilogram of meat	|____| |____|
E3.2	What determines this price? Is there seasonality in pricing? Competition from other protein sources?		
E4	Average weight of an adult rabbit		|____|
E5	Slaughter yield (carcass weight /live animal weight)		
E6	Do you transport your operation's products to your customers yourself?		
E6.1	What are constraints do you encounter in transport?	Allow the respondent to speak freely	
E6.2	Are the risks you run in transport shared with your customers? Explain		
E7	Do you have a sales counter or do you look for customers?		
E8	What use do you make of co-products (manure, etc.)?		
E8.1	Average amount of manure per year per animal?		|____|
E8.2	Average price of manure (BIF/kg)		|____|
Module F – Other farm expenses			
F1	Do you receive subsidies for your various operations (production, marketing)?		
F2	What taxes do you pay?		
F3	Do you insure your farm? If yes, what risks are covered by the insurance premium?		

Nº	Identification data	Name	Code/observations
	Module G – Outlook for the future		
G1	What is your impression of the outlook for this value chain (marketing opportunities, competition with intermediate consumption, economic risk associated with oversupply, etc.)		

Notes

Notes

Managing risks to improve the livelihoods of producers

Platform for Agricultural Risk Management

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