

**Role of pastoralism in Burkina Faso:
Contribution to revenue, food security, and
resilience**

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1. Introduction

Livestock production is undoubtedly an important part of the economy in Burkina Faso. National statistics indicate that agriculture, forestry, and fisheries account for 28% of gross national product (World Bank, 2020). Livestock alone represents 11-13% of gross national product (MRA, 2011). However, these figures understate the importance of the sector because it is a major source of revenue for the poor. Our household survey indicates that 96% of rural households raise livestock and that livestock ownership is particularly important among the rural poor. Thus, livestock production is an important source of livelihood in rural areas.

Pastoralism has been defined in many ways, but most definitions focus on the extensive production of ruminant animals by having them graze on pasture (Blench, 2001; African Union, 2010; CNT, 2015; Dong, 2016; FAO, 2018; Nyariki and Awata, 2019). Some definitions specify that pasture must account for the bulk of the animals feed, excluding intensive feeding of animals (CNT, 2015). Other definitions specify that the animals are moved, either randomly or seasonally, to take advantage of changing availability of pasture and water (FAO, 2018). When used to classify households, some definitions specify that livestock must account for at least a minimum share of gross or net revenue (FAO, 2002).

Pastoral livestock production is generally characterized by the following features:

- It is generally located in arid and semi-arid zones where crop production is difficult or possible. The FAO (2002) classifies arid zones as those with less than 500 mm/year and semi-arid zones as those with 500-1000 mm/year. They also state that in areas with less than 400 mm/year, crop production is almost impossible, so pastoralism is dominant. In areas with 400-1000 mm/year, sorghum and millet can be grown in agro-pastoral systems.
- The movement of livestock may be irregular in the case of nomadic pastoralists or seasonal in the case of transhumance. Seasonal movement of livestock may be horizontal, between high and low rainfall areas or vertical between valleys and highlands in mountainous areas.
- In many countries, the focus is on the production of cattle, goats, and sheep, though other animals may be involved depending on the region, including camels, buffaloes, yaks, and alpacas (Blench, 2001).
- The people involved in pastoral livestock production are often ethnic minorities, who may be marginalized politically and/or economically (Dong, 2016).
- Pastoralists are vulnerable to climate change because they live in arid and semi-arid areas where rainfall is already sporadic (Zampaligre et al, 2020).
- Pastoralists are also vulnerable to various types of conflict, partly because they live in remote, sparsely-populated areas where it is difficult to maintain control. Conflict may occur among pastoralists as well as between farmers and pastoralists over access to land and water. In addition, pastoralists may be victims of conflict between the government and anti-government forces, who are attracted to areas that are hard to control (De Haan et al., 2016).

Many of these global patterns apply to Burkina Faso:

- In Burkina Faso, only the northeast corner would be classified as arid, while the rest of the country would be semi-arid, except the southwest corner where the rainfall is above 1,000 mm/year. In the Sahelian zone, pastoralism is the main source of revenue, with crop production being limited by the low rainfall. In the North and South Sudanian zone, crop production is more important, though most households also participate in pastoral livestock production.
- In Burkina Faso, the movement of livestock is generally horizontal and seasonal, toward the south in the dry season and back north in the rainy season. The movement usually occurs between January and June, when the rainy season begins. In addition, there are internal flows of livestock from

production zones toward Ouagadougou and other urban centers, as well as international flows from Burkina Faso to markets in the coastal countries in the south (FEWSNET, 2017).

- Pastoral livestock production in Burkina Faso is dominated by cattle, goats, and sheep. There are an estimated 9.8 million cattle, 15.6 million goats, and 10.4 million sheep in the country (FAO, 2020).
- The Fulani or Peul are an ethnic group accounting for somewhat less than 10% of the population of Burkina Faso that have traditionally been migratory pastoralists. At the same time, it is important to keep in mind that many Fulani have become sedentary agro-pastoralists and that almost all rural households in Burkina Faso participate in livestock production.

In previous decades, pastoralism was sometimes seen as an impediment to agricultural development. Pastoralists were accused of over-grazing and contributing to loss of vegetation and desertification. Being largely outside the monetary economy, it was either difficult or impossible to collect taxes from them. Pastoralists were seen as stuck in a traditional lifestyle with little opportunity to increase productivity or contribute to the national economy (Blench, 2001; Dong, 2016).

More recently, views of pastoralism have changed, resulting in a more positive assessment. There is greater awareness that pastoral livestock production makes good use of land that has few alternative opportunities for production. There are clear benefits from the mutually beneficial relationship between herders and farmers, where farmers supply crop residues and receive manure to increase crop yields. In addition, pastoral production can be an important source of export revenue as animals from the interior countries of West Africa supply the growing coastal cities with meat, hides, and other animal products (Dong, 2016; De Haan et al., 2016).

This shift in attitudes toward pastoralists is reflected in a document by African Union (AU) that urges governments to “abandon biased perceptions that pastoralism is an archaic livestock production system and pastoralist suffering is self-inflicted, because pastoralists choose to pursue an obsolete traditional lifestyle.” In addition, the AU calls for governments to recognize the contributions of pastoralism, to involve pastoralists in the policy development process, to provide needed social and veterinary services, and to involve them in poverty reduction programs (African Union, 2010).

In Burkina Faso, the « Loi d’Orientation Agro-sylvo-pastorale, Halieutique et Faunique » establishes the objectives and guidelines of a policy framework to support the sector. It commits the government to support equal access to natural resources, to create conditions favorable to productive investment in the sector, to invest in high-yield varieties and improved animal breeds, and to protect food safety. With regard to livestock production, it says the state will create « les conditions nécessaires pour une transition progressive des systèmes de production pastoraux extensifs vers des systèmes intensifs de production à travers une incitation à la sédentarisation. » In addition, the state affirms for pastoralists « le droit à la sécurisation et à l’aménagement des espaces pastoraux, le droit d’accès aux espaces pastoraux et aux ressources pastorales ainsi que le droit à la mobilité sécurisée du troupeau. »

At the same time, pastoralists face unprecedented challenges to their livelihoods.

- Climate change poses a long-term threat to pastoral livelihoods. It is expected to increase the average temperature and reduce rainfall in West Africa. Perhaps more seriously, climate change is expected to increase the year-to-year variation in rainfall, making weather less predictable and more extreme (Zampaligre et al., 2020).
- In addition, since 2015, Burkina Faso has experienced an increase in insecurity, marked by attacks by armed groups on military and civilian targets in the northern portion of the country. These rebel groups generally stage attacks from across the borders. As of the end of 2018, the government had declared a state of emergency in one third of its provinces. Pastoral communities have suffered

from both the attacks and government efforts to pursue these groups (De Haan et al., 2016; Eizenga, 2019).

- Third, in the past, herders have been able to move their cattle south in the dry season, making use of grazing lands and crop residues. Conflicts between sedentary farming communities and migratory herders have increased as a result of population growth, cultivation on former pastures, and the breakdown of traditional arrangements. This has made it more difficult for herders to find pasture for grazing in the dry season (De Hann et al., 2016).
- Finally, the outbreak of the Covid-19 pandemic has further constrained the ability of pastoralists and other rural households to maintain their livelihoods. The country has experienced several dozen deaths, including several Ministers, and close to one thousand infections so far. In addition, the closed international border and other quarantine measures are affecting economic activity, including livestock production (Mednick, 2020).

In this context, the SNV Voices for Change Partnership works on three themes in Burkina Faso: food and nutrition security, pastoral resilience, and renewable energy. This study is carried out by the pastoral resilience theme, which seeks to gather information about the challenges facing pastoralists in Burkina Faso in order to inform policymakers and advocate for greater support for pastoral producers.

The objective of this report is to describe the characteristics of pastoral production in rural Burkina Faso. In particular, the report seeks to address the following questions:

- What is the contribution of pastoral livestock production to rural livelihoods in Burkina Faso?
- What are the characteristics of households involved in pastoral production compared to other households?
- What are the production methods used by pastoralists, particularly related to feed and veterinary services?
- What are the patterns of moving livestock during the dry season in search of better pasture?
- How are livestock and livestock products marketed and how important is marketed output?
- What is the food security status of households involved in pastoral livestock production?
- How much access do pastoralists have to livestock support services such as extension, veterinary services, and subsidized inputs?
- What are the main constraints faced by pastoralists and how are these problems changing over time?

This report provides answers to these questions based on a survey of 1,000 randomly selected rural households. The report is organized as follows. In section 2, we briefly describe the methods used to collect and analyze the data. In section 3, we describe the results of the surveys, covering crop production, livestock production, non-farm revenue, livelihoods, food security, and the perceptions of rural households. In section 4, the results are summarized, and some implications for policy are discussed.

2. Methods

2.1. Survey methods

This report is based on the results from the 2019 Household Survey on Rural Resilience, carried out by AfricSanté under the guidance of the International Food Policy Research Institute (IFPRI) and SNV within the Voices for Change Partnership (V4CP). The survey used a three-stage stratified random sample. In the first stage, 25 provinces were randomly selected, stratified to ensure roughly equal numbers in the three agro-ecological zones of Burkina Faso: Sahelian, North Sudanese, and South Sudanese. In the

second stage, four villages were randomly selected from each province. In the third stage, 10 rural households were randomly selected from lists maintained at the village level. Where lists were not available, a complete list of households in the village was prepared, from which ten were randomly selected to interview. Thus, the total sample was 1,000 rural households. The questionnaire consisted of 9 modules spanning the equivalent of 20 pages.

Tableau 1 lists the provinces selected to be included in the sample, along with the number of villages and the number of households in each. The last column gives the agro-ecological zone in which each province is found.

Tableau 1. Liste des provinces échantillonnées

Province	Nbr. de villages	Nbr. de ménages	Zone agro-écologique
Bam	4	40	Sahélienne
Gnagna	4	40	Sahélienne
Oudalan	4	40	Sahélienne
Passore	4	40	Sahélienne
Sanmatenga	4	40	Sahélienne
Seno	4	40	Sahélienne
Sourou	4	40	Sahélienne
Yatenga	4	40	Sahélienne
Zondoma	4	40	Sahélienne
Banwa	4	40	Nord-Soudanienne
Bazega	4	40	Nord-Soudanienne
Boulgou	4	40	Nord-Soudanienne
Boulkiemde	4	40	Nord-Soudanienne
Gourma	4	40	Nord-Soudanienne
Mouhoun	4	40	Nord-Soudanienne
Sanguie	4	40	Nord-Soudanienne
Zoundweogo	4	40	Nord-Soudanienne
Bale	4	40	Sud-Soudanienne
Houet	4	40	Sud-Soudanienne
Kenedougou	4	40	Sud-Soudanienne
Koulpelogo	4	40	Sud-Soudanienne
Noumbiel	4	40	Sud-Soudanienne
Poni	4	40	Sud-Soudanienne
Tapoa	4	40	Sud-Soudanienne
Ziro	4	40	Sud-Soudanienne
Total	100	1,000	

Source: Enquête auprès des ménages ruraux sur la résilience, 2019

The rural household survey was implemented by a team of 32 enumerators hired and managed by AfricSanté. The two questionnaires were programmed onto tablets using SurveyCTO software. The program was designed to perform basic quality control checks, ensuring that all responses were within the correct range and skipping over some questions depending on the responses to earlier questions. The enumerator training took place in April 2019, and the data collection occurred from May 18 to June 22.

2.2. Data analysis

The analysis was carried out by IFPRI in consultation with the SNV team in Burkina Faso of the Voices for Change Partnership. The analysis consists mainly in calculating descriptive statistics, including averages

and percentages, from the data collected in the survey. The analysis was carried out using Stata statistical software.

2.2.1. Sampling weights

Sampling weights were calculated based on information collected in the process of drawing the stratified random sample. The sampling weight is the inverse of the probability of selection of each individual households. Because the sample was a three-stage design, the sampling weights are the product of three terms:

$$w_v = \frac{P_s}{SP_s} \frac{V_p}{SV_p} \frac{H_v}{SH_v}$$

where w_v is the sampling weight for all the households in village v
 P_s is the total number of provinces in each stratum (agro-ecological zone)
 SP_s is the number of selected provinces in each stratum
 V_p is the total number of villages in each province
 SV_p is the number of selected villages in each province
 H_v is the total number of households in each village
 SH_v is the number of selected households in each village.

All results were calculated using the sampling weights to compensate for over-sampling and under-sampling of different regions. The sampling weights are also used to extrapolate from the sample to estimate national totals.

The analysis presents the results of each section of the questionnaire. In some cases, we present results for different types of households. For this purpose, we classify households in three ways: by agro-ecological zone, by revenue quintile, and by occupations category.

2.2.2. Agro-ecological zones

Burkina Faso is usually divided into three agro-ecological zones based on rainfall and the length of the growing season: the Sahelian zone, the North Sudanese zone, and the South Sudanese zone (MEDD, 2012). We classified the provinces among the three agro-ecological zones, as shown in Tableau 1. As shown in Tableau 2, the Sahelian zone is characterized by rainfall under 600 mm per year and less than 45 days of rain per year. The North Sudanian zone has intermediate rainfall (600-1000 mm per year) and more days of rain (50-70 days per year). And the South Sudanian zone receives more than 1000 mm per year and has 85-100 days of rain. The differences in average temperature are small, but there are significant differences in seasonal variation. In the Sahel, the temperature differences across seasons are much greater than in the South Sudanian zone.

Tableau 2. Caractéristique des zones agroécologiques

	Soudanienne Sud	Soudanienne Nord	Sahélienne
Pluviométrie annuelle	<1000 mm	600 à 1000 mm	<600 mm
Nombre de jours de pluie	85-100 jours	50-70 jours	<45 jours
Température annuelle moyenne	27°C	28°C	29°C
Variation de température saisonnière	5°C	8°C	11°C

Source : MEDD, 2012.

2.2.3. Quintile of per capita revenue

The second way we classify households is by revenue quintile. Household net revenue is calculated as the sum of crop revenue, livestock revenue, and non-agricultural revenue. Crop revenue is estimated based on information collected on 31 crops and crop categories. Crop revenue is the value of agricultural production (whether marketed or not) over the past 12 months minus the cash costs of production including fertilizer, seed, labor, and other costs. The value of crop production is estimated using the average sale price of the same commodity in the same province, when possible, or the national average price if necessary. Livestock revenue is estimated based on information collected on eight types of animals. It is calculated as the sum of the value of animal sales, the value of animals slaughtered for home consumption, and the value of by-products minus the cost of animal purchases and livestock inputs such as feed, veterinary services, and labor over the past 12 months. Non-agricultural revenue is based on the respondent's estimate of the net monthly revenue from each of 25 activities multiplied by the number of months during the year that the household earned revenue from this source over the past 12 months. Per capita revenue is net revenue per household divided by the household size. Income quintiles are generated by sorting households by per capita revenue and dividing them into five groups of equal size, taking the sampling weights into account. For example, the first quintile includes the poorest 20% of rural households as measured by per capita revenue, while the fifth quintile includes the richest 20% of rural households. More information on these calculations is provided in Section 6.3.

2.2.4. Professional category

The third classification used in this report is occupational category. We divide the sample households into four groups: pastoral households, agro-pastoral households, agricultural households, and non-agricultural households. Because almost all rural households in Burkina Faso grow crops and produce animals, these categories are defined in terms of the share of revenue from three sources: pastoral production (cattle, sheep, and goats), other agricultural production (crops and non-ruminant animals), and non-agricultural revenue (primary activities, businesses, salaries, and assistance).

- Pastoral households are those that earn more than 50% of their revenue from pastoral and other agricultural production and earn at least twice as much from pastoral production as from other agricultural production.
- Agro-pastoral households are those that earn more than 50% of their revenue from pastoral and other agricultural production and both pastoral revenue and other agricultural revenue account for at least one-third of the sum of these two sources.
- Agricultural households are those that earn more than 50% of their revenue from pastoral and other agricultural production and earn twice as much from other agricultural production than pastoral production.
- Non-agricultural households are those for which non-agricultural revenue represents more than half of net revenue.

More information on the calculation of these occupational categories is provided in Section 6.3.

3. Results

3.1. Characteristics of rural households

This section describes the size, composition, and characteristics of rural households according to the survey. The average household has 7.3 members, with little variation across zones. Similarly, the

average age of the head of household is about 44 years. About 5% of the households are female headed, though the proportion is higher in the North Sudanian zone than in the other two zones (see Tableau 1).

Females represent slightly more than half (53%) of the rural population. This reflects both a slightly higher share of females in the overall population of Burkina Faso as well as the fact that men are more likely to migrate out of rural areas, either to urban areas or to other countries.

Among those 6 years or older, about half are illiterate. The proportion is higher in the Sahelian zone (53%) than in the North and South Sudanian zones.

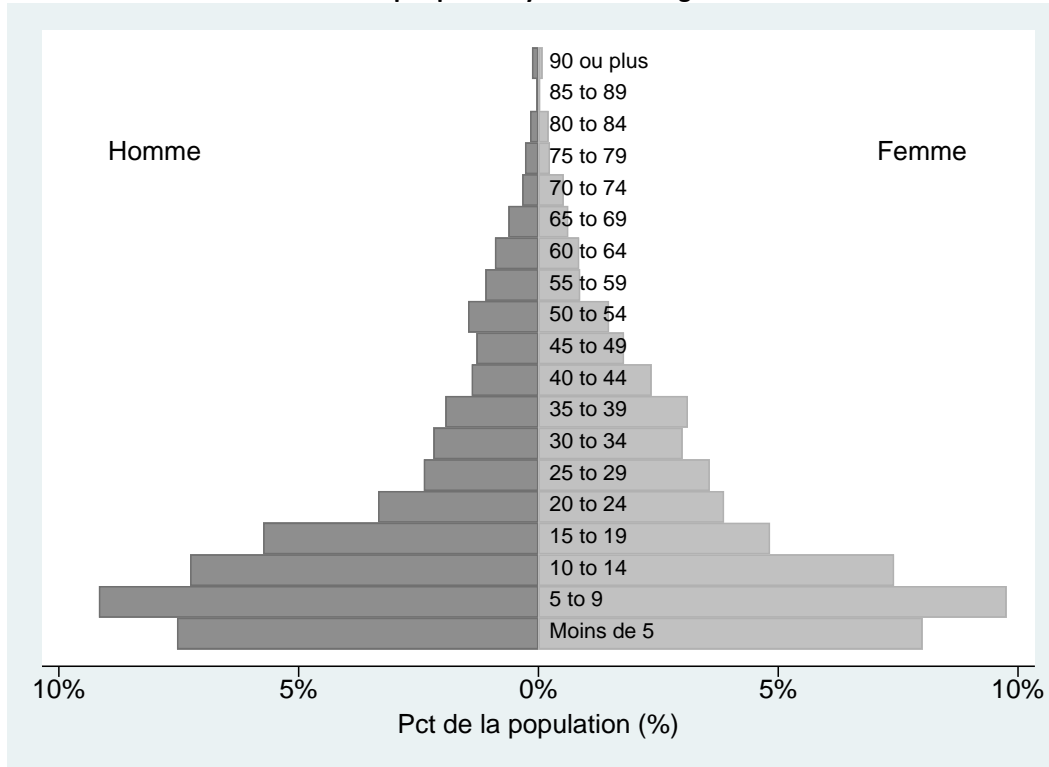
Tableau 3. Caractéristiques des ménages ruraux par zone

	Zone			Total
	Sahélienne	Nord-soudanienne	Sud-soudanienne	
Taille de ménage	7.3	7.0	7.8	7.3
Age du chef de ménage	44.9	44.8	42.7	44.3
Chefs féminins (%)	3.9%	7.6%	4.0%	5.1%
Femme (%)	52%	52%	54%	53%
Non-alphabètes (%)	53%	48%	47%	49%

Source : Analyse de l'Enquête auprès des ménages ruraux sur la résilience, 2019.

Information on the age and sex composition of the rural population can be summarized in the population pyramid, shown in Graphique 1. The left side shows the proportion of females and the right side shows the proportion of males. The age distribution is visible on the vertical axis, highlighting the fact that a large portion of the population is relatively young. According to the survey, 51% of the rural population in Burkina Faso is less than 16 years old. This type of population pyramid, with a wide base and narrow top, is typically for a low-revenue country with a relatively rapid rate of population growth.

Graphique 1. Pyramide des âges



Source : Analyse de l'Enquête auprès des ménages ruraux sur la résilience, 2019.

The survey also provides information on the level of education of the rural adult population (we include only people 20 years of age or older). Roughly two-thirds of the rural adults are illiterate, meaning that they have no education (see Tableau 3). Just 8% of adults in rural areas have secondary education or superior education. Tableau 3 also reveals a substantial gap between men and women. Just 52% of adult men are illiterate, while 78% of adult women are.

Tableau 4. Composition par niveau d'éducation par genre

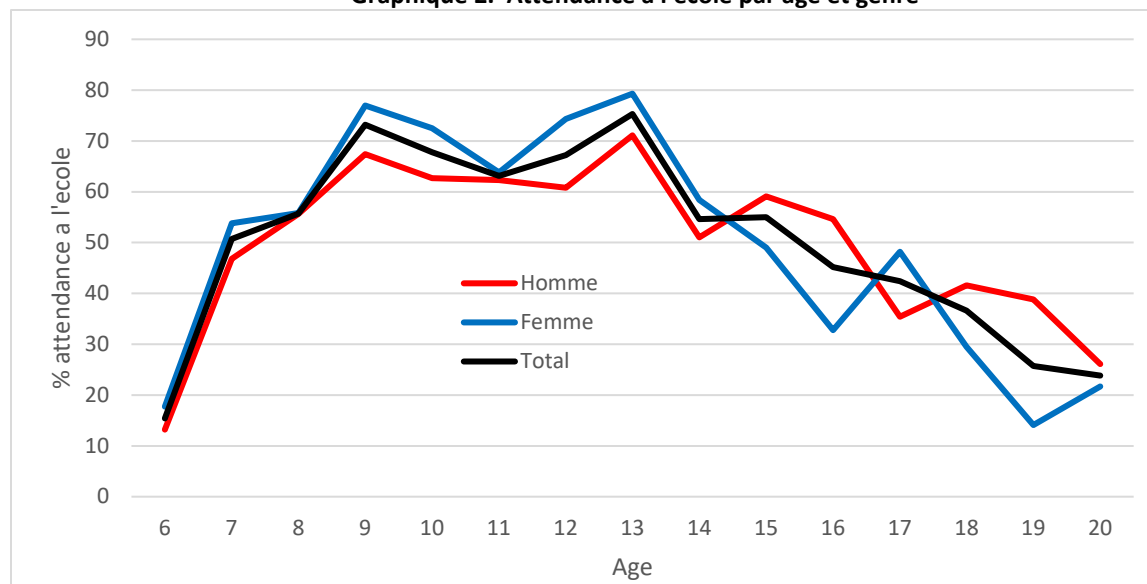
Education	Genre		Total
	Homme	Femme	
Non-alphabètes	52	78	66
CP	2	2	2
THIS	6	2	4
CM	6	3	4
Secondaire 1	8	6	7
Secondaire 2	2	1	1
Superieur	0	0	0
Alphabetise	6	4	5
Ecole koranique	18	4	10
Total	100	100	100

Source : Analyse de l'Enquête auprès des ménages ruraux sur la résilience, 2019.

Graphique 2 shows the rate of school attendance by age and by gender. School attendance is low (less than 20%) among six-year-olds, but it rises sharply to more than 50% among seven-year-olds. School attendance peaks among children 9-13 years old, for whom the rate varies between 63% and 75%. After the age of 13, the rate of school attendance drops. The gender pattern shows that girls have higher rates

of school attendance up to the age of 14. However, starting at the age of 15, boys are more likely to be in school than girls. In summary, although the level of education among adults is low, school attendance is relatively high, suggesting that the next generation will be better educated.

Graphique 2. Attendance à l'école par âge et genre



Source : Analyse de l'Enquête auprès des ménages ruraux sur la résilience, 2019.

3.2. Housing and asset ownership

The survey asked questions about the housing and asset ownership of rural households. This information is useful in understanding the standard of living of these households. In fact, we combine the asset and housing indicators together to create a wealth index, that is used to categorize households into quintiles, that is, five equal-sized wealth categories. In addition, assets are a useful measure of household resilience because households with greater wealth are able to tolerate negative shocks associated with weather or economic conditions.

3.2.1. Housing

The main characteristics of the housing are summarized in Tableau 4. Three-quarters of the roofs in rural areas are made of corrugated metal. The proportion of metal roofs is lower in the Sahelian zone (60%), where clay and straw roofs are relatively more common. The same table also shows the main material of the walls. About 80% of the respondents report that the walls are [banco ou brique en banco]. In the Sahelian zone, the proportion is even higher (91%). Permanent walls (brick and cement) are more common in the North Sudanian and South Sudanian zones than in the Sahelian zone. With regard to floors, about two-thirds of the houses in the North and South Sudanian zones have cement floors. In contrast, in the Sahelian zone the main floor materials are [terre battue] (47%), cement (28%), and [sol naturel] (26%). The average number of rooms used for sleeping ranges from 2.7 in the Sahelian zone to 3.9 in the South Sudanian zone. Finally, very few houses (1.1%) have electricity in rural areas. In summary, the Sahelian zone tends to have fewer rooms and more temporary materials for the roof, walls, and floors. However, there is substantial variation in housing quality within each zone.

Tableau 5. Caractéristiques du logement par zone

	Zone			Total
	Sahélienne	Nord-soudanienne	Sud-soudanienne	
Type de toit				
Toile	60	86	85	75
Paille	14	8	9	11
Terre battue	25	5	7	14
Autre	1	1	0	1
Total	100	100	100	100
Type de mur				
Briques/ciment/béton	3	25	15	13
Banco/brique en banc	91	66	78	80
Paille	2	1	1	2
Bois/banco	4	4	4	4
Autre	0	3	2	2
Total	100	100	100	100
Type de sol				
Ciment	28	68	66	51
Terre battue	47	31	29	37
Sol naturel	24	1	4	11
Autre	1	0	1	0
Total	100	100	100	100
Nbr. de salle à coucher	2.6	2.9	3.9	3.1
Electricity (%)	0.8	1.6	0.9	1.1

Source : Analyse de l'Enquête auprès des ménages ruraux sur la résilience, 2019.

3.2.2. Asset ownership

The proportion of households owning each type of asset is shown in Tableau 5. Almost 90% of rural households own a mobile phone, evidence of rapid growth in phone ownership in recent years. For example, according to the Demographic and Health Survey of 2010, just 51% of rural households owned a mobile phone. Bicycles are almost as common, being owned by almost 88% of rural households. Roughly half of rural households own each of the following: a solar panel, a radio, and a motorbike. Televisions are less common, being owned by just 13% of rural households. In almost all cases, the share of households owning each asset is lowest in the Sahelian zone, indicating that in general households in this zone are poorer.

Tableau 6. Propriété des actifs par zone

	Zone			Total
	Sahélienne	Nord-soudanienne	Sud-soudanienne	
Panneau solaire	48.3	54.4	55.9	52.7
Radio	39.7	56.9	52.2	49.2
Television	10.0	14.7	15.3	13.2
Telephone mobile	86.7	90.9	89.7	89.0
Telephone fixe	0.0	0.3	0.0	0.1
Velo	79.2	96.6	88.8	87.8
Moto	41.7	55.0	52.8	49.5
Tricycle motorise	1.9	3.1	6.9	3.9
Voiture ou camion	0.3	0.3	0.9	0.5

Source : Analyse de l'Enquête auprès des ménages ruraux sur la résilience, 2019.

Tableau 7 shows differences in asset ownership across professional categories. Pastoral households are less likely to own a solar panel, television, or motorcycle than other rural households. None of the assets are substantially more widely owned by pastoral households than others.

Tableau 7. Propriété des actifs par catégorie professionnelle

	Categorie professionnelle				Total
	Pastorale	Agro-pastorale	Agricole	Non-agricole	
Panneau solaire	39.4	54.3	53.3	58.7	52.7
Radio	47.5	52.5	48.6	44.6	49.2
Television	6.1	13.1	14.0	16.3	13.2
Telephone mobile	87.9	91.1	87.7	91.3	89.0
Telephone fixe	0.0	0.4	0.0	0.0	0.1
Velo	86.9	91.5	87.3	80.4	87.8
Moto	44.4	53.9	48.6	46.7	49.5
Tricycle motorise	4.0	3.5	3.8	5.4	3.9
Voiture ou camion	1.0	0.4	0.4	1.1	0.5

Source : Analyse de l'Enquête auprès des ménages ruraux sur la résilience, 2019.

3.2.3. Asset index

Following the approach of Filmer and Pritchett (2001), we create an index of asset ownership using principal component analysis to combine the housing characteristics and asset ownership into a single index. Principal components analysis derives a set of components, each of which is a linear combination of the variables which minimizes unexplained variance. In our analysis, we use 24 housing and asset indicators in the principal component analysis and construct the asset index using the coefficients of the first component (see Appendix 1 for a list of the asset indicators and their coefficients for the first component). The output of the principal component analysis does not have any natural units, so we convert it to a percentile index, with 0 representing the household with the fewest assets and 100 representing the household with the most assets.

Tableau 8 shows the average asset index for each type of household. The first part of the table shows that households in the Sahelian zone are relatively poor in terms of their ownership of assets (including housing). The average value of the index is at the 35th percentile. Households in the North Sudanian

zone are, on average, close to the middle in terms of asset ownership, while those in the South Sudanian zone are at the 64th percentile in asset ownership.

The second part of the table shows the relationship between asset ownership and per capita income. As expected, there is a positive relationship in which households in the low-income quintiles have fewer assets and those in higher income quintile have more assets.

The third part of the table indicates the asset ownership for different professional categories. Pastoral households have fewer assets than average, and non-agricultural households have more assets than average. On the other hand, the average asset ownership of agro-pastoral households and agricultural households is very close to the average for all rural households.

Tableau 8. Indice d'actif pour différents types de ménages

		Indice de richesse (centile)
Zone	Sahélienne	35
	Nord-soudanienne	58
	Sud-soudanienne	64
	Total	50
Catégorie de revenu	Le plus pauvre	34
	2ième	49
	3ième	53
	4ième	55
	Le plus riche	61
	Total	50
Catégorie professionnelle	Ménages pastorales	42
	Ménages agropastorales	50
	Ménages agricoles	50
	Ménages non-agricoles	58
	Total	50

Source : Analyse de l'Enquête auprès des ménages ruraux sur la résilience, 2019

3.3. Crop production and sales

In this section, we describe some of the patterns for crop production. Although the primary focus of this report is pastoralist production, in order to understand its importance as a source of revenue for rural households, it is necessary to also gather information to calculate revenue from crop production and non-farm activities. To estimate net revenue from crop production, the survey collected data on the quantity of crops produced, the quantity and value of crop sales, and the cost of four types of inputs for each of 31 crops and crop categories. These were later collapsed to 16 crops and crop categories, each with at least 50 observations.

3.3.1. Crop production

The results of the survey indicate that almost all rural households grow at least some crops. As shown in the upper portion of Tableau 9, the proportion of households growing crops ranges between 95% in the South Sudanian zone to 100% in the other two zones. These results suggest that very few rural households are pure pastoralists in the sense that they earn all of their revenue from cattle, goats, and sheep and have no crop production. The upper portion of the table also shows the average area cultivated, which ranges from 3.7 hectares in the Sahelian zone to 7.0 hectares in the South Sudanian zone, the average being 5.1 hectares.

The lower part of the table indicates that almost all rural household grow crops, regardless of income category. In addition, there is a positive correlation between the category of revenue and farm size, as expected. As will be shown later, however, the difference between the income of poor and rich households is much greater than the difference in farm size. The estimates of farm size should be interpreted with caution as the raw data contained some unrealistically high and low values, perhaps related to some respondents being unable to accurately estimate the area being cultivated.

Tableau 9. Proportion de ménages ruraux qui produisent les cultures et emploient des intrants

		Proportion qui produisent des cultures (%)	Superficie moyenne cultivée (ha)
Zone agro-écologique	Sahélienne	100	3.7
	Nord-soudanienne	100	5.1
	Sud-soudanienne	95	7.0
	Total	99	5.1
Catégorie de revenu par tête	Le plus pauvre	99	3.2
	2ième	100	3.8
	3ième	100	5.4
	4ième	97	5.0
	Le plus riche	97	8.1
	Total	99	5.1

Source : Analyse de l'Enquête auprès des ménages ruraux sur la résilience, 2019.

In order to estimate the economic importance of crop production, it is necessary to estimate the value of production. Given the fact that a large portion of crop production is not sold, we need to estimate the value of crop production using the price at which crops are sold. When possible, we use sales of the same crop in the same village where the farmer lives, but there must be at least 10 sales to ensure a reliable average. If not, we use the average sale price in the province where the farmer lives, but again there must be at least 10 sales. If not, we resort to using the national average price for the commodity. Less than 1% of the valuations are able to use village-level prices, 35% use province-level averages, and the remaining 65% use national averages.

Tableau 10 provides information on the share of rural households growing each crop and the average value of crop production per household. The first column shows that sorghum is the most widely grown crop, produced by 81% of rural households. Other crops grown by the majority of rural households are maize (69%), cowpeas (68%), millet (62%), and groundnuts (58%). Among the cash crops, sesame is grown by about one-third of rural households (34%) and cotton by one-fifth (20%).

The average value of crop production is FCFA 979 thousand per household¹. The two most valuable crops grown by Burkina households are maize, which represents 22% of the value of crop production, and sorghum, which accounts for 16%. Although cotton is an important export crop, it is the third most important crop, representing 10% of the value of crop production. Millet contributes 9% of the value of crop production.

The importance of each crop varies by agro-ecological zone. Tableau 11 shows the proportion of rural households growing each crop in each zone. Maize is grown by almost all households (90%) in the South Sudanian zone but less than half in the Sahelian zone. In contrast, sorghum is grown by more than 80% of households in the two northern zones and just 70% in the South Sudanian zone. Finally, millet is produced by three-quarters of the households in the Sahelian zone, but just 41% in the South Sudanian

¹ The crop-level averages include zeroes for households that do not produce the crop.

zone. This reflects the higher rainfall in the south and the fact that sorghum and particularly millet are more drought-tolerant than maize. Cowpeas and groundnuts are grown by a majority of all rural households, but the proportion of farmers growing it is highest in the Sahelian zone. In contrast, cotton, tomatoes, fruit, and other vegetables are more widely grown in the South Sudanian zone.

Tableau 10. Valeur de la production par culture

Culture	Proportion de ménages qui cultivent (%)	Valeur de la production (FCFA par ménage)	Proportion de la valeur de la production (%)
Maïs	69	218,086	22
Sorgho	81	155,970	16
Millet	62	84,864	9
Riz	20	28,467	3
Niébé	68	45,936	5
Arachides	58	52,740	5
Vouandzou (pois de terre)	19	8,544	1
Haricots mung beans	4	1,725	0
Gombo	46	15,840	2
Tomates	12	40,643	4
Autres légumes	11	68,246	7
Fruit	3	13,720	1
Autres cultures vivrières	7	84,312	9
Coton	20	98,490	10
Sésame	34	66,277	7
Autres cultures de rente	6	4,416	0
Total	99	988,276	100

Source : Analyse de l'Enquête auprès des ménages ruraux sur la résilience, 2019.

Tableau 11. Proportion de ménages ruraux qui produisent chaque culture par zone

Culture	Zone			Total
	Sahélienne	Nord-soudanienne	Sud-soudanienne	
Maïs	47	79	90	69
Sorgho	84	87	70	81
Millet	74	67	41	62
Riz	10	25	28	20
Niébé	78	61	63	68
Arachides	64	58	51	58
Vouandzou (pois de terre)	18	19	21	19
Haricots mung beans	4	5	3	4
Gombo	44	53	41	46
Tomates	6	9	23	12
Autres légumes	2	16	17	11
Fruit	1	2	7	3
Autres cultures vivrières	1	2	21	7
Coton	0	29	39	20
Sésame	27	41	38	34
Autres cultures de rente	0	8	12	6

Source : Analyse de l'Enquête auprès des ménages ruraux sur la résilience, 2019.

3.3.2. Crop marketing

Many small farmers in Burkina Faso and elsewhere grow food for their own consumption as well as producing crops for sale to meet cash needs. The Survey of rural households on resilience collected information on the quantity and value of crop sales for two reasons. First, we use the price at which crops were sold to estimate the value of crop production. Second, crop sales provide useful information on sources of cash revenue and the degree of integration into the market economy.

We calculate two measures of crop commercialization:

- The proportion of production that is sold. This is calculated as the total value of crop sales divided by the total value of crop production. This measure gives greater weight to household with more crop production. Since larger farmers have a higher rate of commercialization, this weighting gives a higher percentage.
- The average commercialization rate. This is calculated as the value of sales divided by the value of production for each household, which is then averaged across households. This measure gives equal weight to each household and tends to yield a smaller percentage.

Tableau 10 provides information on the patterns of commercialization for each crop. The first two columns give the average value of crop production and crop sales per household (including zeroes²). The third column gives the proportion of total production that is sold, calculated as the second column divided by the first column. The bottom row indicates that, overall, almost half of the value of crop production is sold. This may seem high given that most farmers have small farms and produce largely for own-consumption. However, as mentioned above, this figure is disproportionately affected by larger farmers who sell a relatively large share of their output. Later, we will show that the average rate of commercialization across households is just 29%.

The marketed share varies substantially across crops. For maize, sorghum, and millet, around one-fifth of production is marketed. This proportion is typical for a staple grain crop. At the other extreme, 97% of cotton and 80% of sesame is marketed. Most other crops are in between. For example, in the cases of groundnuts, beans, okra, and fruit, around 40-60% of production is sold.

The last column of the table describes the composition of crop sales. Not surprisingly, cotton is the most important source of cash revenue among crops, accounting for 20% of total crop sales. Although cotton is the single crop that most contributes to cash revenue, it is interesting to note that vegetables as a category (including okra, tomatoes, cabbage, and others) represent 22% of crop sales. Similarly, although most cereals are considered non-commercial subsistence crops, the sale of maize, sorghum, millet, and rice accounts for 20% of total sales, equal to the cash revenue from cotton.

Tableau 13 shows crop marketing patterns for different types of households. In the first part of the table, results are given for each of the three agro-ecological zones. The value of crop sales per household is relatively small in the Sahelian zone, more than three times greater in the North Sudanian zone, and 12-times greater in the South Sudanian zone. This reflects both the larger value of crop production per household in the south as well as the larger share of production that is sold.

² The crop-level average value of production and sales include zeroes for households that do not produce or do not sell the crop.

Tableau 12. Caracteristiques des ventes de culture par culture

Culture	Valeur de la production végétale (FCFA par ménage)	Valeur des ventes de cultures (FCFA par ménage)	Proportion de la production qui est vendue (%)	Proportion de la valeur totale de ventes (%)
Maïs	218,086	45,708	21	9
Sorgho	155,970	27,485	18	6
Millet	84,864	14,821	17	3
Riz	28,467	10,442	37	2
Niébé	45,936	12,803	28	3
Arachides	52,740	27,778	53	6
Vouandzou	8,544	1,719	20	0
Haricots mung beans	1,725	730	42	0
Gombo	15,840	8,822	56	2
Tomates	40,643	28,945	71	6
Autres légumes	68,246	67,267	99	14
Fruit	13,720	8,392	61	2
Autres cultures vivrières	84,312	79,396	94	16
Coton	98,490	95,657	97	20
Sésame	66,277	53,089	80	11
Autres cultures de rente	4,416	3,471	79	1
Total	988,276	486,525	49	100

Source : Analyse de l'Enquête auprès des ménages ruraux sur la résilience, 2019.

The third column indicates that the share of production that is sold rises from 22% in the Sahelian zone to 60% in the South Sudanian zone. As noted above, this measure gives greater weight to large farmers. The fourth column shows the average rate of commercialization, calculated as the share of production that is sold for each household and then averaged across households. The average rate of commercialization is 29%, though it varies across zones from 16% in the Sahelian zone to 46% in the South Sudanian zone.

Tableau 13. Commercialisation de cultures par type de ménage

		Valeur de la production végétale (FCFA par ménage)	Valeur des ventes de cultures (FCFA par ménage)	Proportion de la production qui est vendue (%)	Taux de commercialisation moyen (%)
Zone agro-écologique	Sahélienne	458,660	99,833	22	16
	Nord-soudanienne	775,395	344,400	44	34
	Sud-soudanienne	1,990,071	1,203,106	60	46
	Total	988,275	486,528	49	29
Catégorie de revenu	Le plus pauvre	283,156	45,595	16	14
	2ième	462,401	138,686	30	22
	3ième	716,863	281,813	39	28
	4ième	898,347	400,787	45	39
	Le plus riche	2,593,415	1,574,456	61	46
	Total	988,275	486,528	49	29

Source : Analyse de l'Enquête auprès des ménages ruraux sur la résilience, 2019

The lower portion of Tableau 13 gives the results by revenue category. Not surprisingly, the higher-revenue households tend to have much greater crop production and crop sales. For example, the households in the highest per capita revenue category produce about nine times the value in crop production and generate more than 30 times the crop sales compared to the poorest households. Furthermore, the marketed share of crop production rises consistently across revenue categories according to both measures of commercialization, as shown in the last two columns.

3.3.3. Net revenue from crop production

In order to calculate the net revenue from crop production, we need information on the costs of production. The survey collected data on the cost of purchased seed, fertilizer, labor, and other expenses for each crop grown by the household. The “Other” category could include land rental, hired plowing services, and the cost of irrigation. We calculate net revenue from crop production as the value of crop production minus these four cost items. The “cost” of family labor and family-owned land is not included in the cost of production, so the net revenue can be considered the returns to family land and labor.

Tableau 14 shows the value of production, the cost of production, and the net revenue for each crop. The fourth column gives the intensity of agricultural inputs, which we define as the costs of production as a percentage of the value of production. Overall, the costs of production represent about 17% of the value of crop production. This rate is normal for an agricultural system dominated by small-scale semi-subsistence farmers. Cotton is the most input-intensive crop, with the cost of purchased inputs representing 43% of the value of production. Maize, rice, tomatoes, and other cash crops have input intensity ratios above 20%, while the ratio for beans, sesame, and sorghum have ratios of 10% or higher.

The last column of the table gives the share of net crop revenue from each crop. Maize and sorghum are the most important contributors to the total net revenue from crops, followed by millet. Although cotton is the most important source of cash revenue, it accounts for just 7% of the overall net revenue from crop production. Together, maize, sorghum, millet, cotton, and sesame represent 60% of the net revenue from crop production.

Tableau 15 gives information on the value of crop production, the costs of crop production, and the net revenue from crop production for different types of households. In the upper part of the table, households are broken down by agro-ecological zone. There are sharp differences across zones, with the value of net revenue per household from crop production being almost four times higher in the South Sudanian zone than in the Sahelian zone. This is largely related to the higher rainfall in the south, resulting in better agro-ecological conditions for crop production. The intensity of input use is lower in the Sahelian zone (7%) compared to the other two zones (20% and 19%).

The lower part of the table gives the same information for households in different categories of per capita revenue. Not surprisingly, there is a clear relationship between the revenue category and the net revenue from crop production. The net revenue per household rises from FCFA 236 thousand in the poorest category to FCFA 2,144 thousand in the richest. Finally, the intensity of input use rises across the wealth categories, from 13% in the poorest category to 20% in the richest category.

Tableau 14. Valeur de la production, les coûts de production, et le revenu net par culture

Culture	Valeur de la production (FCFA par ménage)	Coûts de production (FCFA par ménage)	Revenu net de cultures (FCFA par ménage)	Intensité des intrants agricoles (%)	Proportion du revenu net total (%)
Maïs	218,086	53,905	164,181	25	20
Sorgho	155,970	15,293	140,677	10	17
Millet	84,864	8,038	76,826	9	9
Riz	28,467	5,910	22,557	21	3
Niébé	45,936	3,913	42,023	9	5
Arachides	52,740	3,167	49,573	6	6
Vouandzou	8,544	489	8,055	6	1
Haricots mung beans	1,725	237	1,488	14	0
Gombo	15,840	1,063	14,777	7	2
Tomates	40,643	8,092	32,551	20	4
Autres légumes	68,246	8,790	59,456	13	7
Fruit	13,720	770	12,950	6	2
Autres cultures vivrières	84,312	9,059	75,253	11	9
Coton	98,490	42,833	55,657	43	7
Sésame	66,277	7,394	58,883	11	7
Autres cultures de rente	4,416	983	3,433	22	0
Total	988,276	169,936	818,340	17	100

Source : Analyse de l'Enquête auprès des ménages ruraux sur la résilience, 2019.

Tableau 15. Valeur de la production, les coûts de production, et le revenu net par type de ménage

	Valeur de la production (FCFA par ménage)	Coûts de production (FCFA par ménage)	Revenu net de cultures (FCFA par ménage)	Intensité des intrants agricoles (%)
Sahélienne	458,660	31,807	426,853	7
Nord-soudanienne	775,395	152,209	623,186	20
Sud-soudanienne	1,990,071	388,956	1,601,115	19
Total	988,275	169,935	818,340	16
Le plus pauvre	283,156	46,535	236,621	13
2 ^{ème}	462,401	83,613	378,788	16
3 ^{ème}	716,863	132,380	584,483	14
4 ^{ème}	898,347	140,454	757,893	17
Le plus riche	2,593,415	449,022	2,144,393	20
Total	988,275	169,935	818,340	16

Source : Analyse de l'Enquête auprès des ménages ruraux sur la résilience, 2019.

3.4. Livestock production

The survey included a wide range of questions regarding livestock production including current herd size, herd size a year ago, inflows and outflows of animals, quantity and value sold, animal by products, costs of production, use of [guardiennage], and perceived constraints. As in the case of crop production, we use prices calculated from the sales data to estimate the value of in-kind flows such as own consumption of animals. Net revenue is calculated as the value of own consumption and the sale of animals and by-products minus the cost of purchasing animals and costs of production, including feed, veterinary expenses, hired labor, and other.

3.4.1. Ownership

Almost all rural households in Burkina Faso own livestock. As shown in Tableau 16, 96% of rural households own some type of animals, including cattle, sheep, goats, donkeys, horses, camels, and poultry. The proportion owning livestock hardly varies across agro-ecological zones and across wealth categories. Furthermore, 91% of rural households own ruminants, which include cattle, goats, and sheep. As before, there is little variation by zone and revenue category, though the proportion appears to be slightly higher in the Sahelian zone.

Combined with the results in Section 3.3.1, the survey indicates that hardly any rural households (1%) do not grow crops and very few (4%) do not raise livestock, which implies that almost all rural households grow crops *and* raise livestock. This means that if we simply define the livelihoods based on what the household produces, almost all rural households would be classified as agro-pastoralist. This classification would not be very useful, suggesting that a useful classification of livelihoods must be based on the importance of each activity as a source of revenue for the household, where revenue is defined broadly to include the value of non-marketed output.

Tableau 16. Proportion de menages ruraux qui possédant des animaux

		Proportion des ménages possédant des animaux (%)	Proportion des ménages possédant des ruminants (%)
Zone agro-écologique	Sahélienne	96	94
	Nord-soudanienne	96	88
	Sud-soudanienne	96	89
	Total	96	91
Catégorie de revenu par tête	Le plus pauvre	95	90
	2ième	94	85
	3ième	98	94
	4ième	97	92
	Le plus riche	97	92
Total		96	91

Source : Analyse de l'Enquête auprès des ménages ruraux sur la résilience, 2019.

The survey collected information on ownership of animals at the time of the survey, in June 2019, and one year earlier, based on recall by the respondent. Tableau 17 shows the proportion of households owning each type of animal and the average number of animals owned in 2018 and 2019. The average number owned refers only to households owning that type of animals, so it excludes the zeroes of non-owners. Overall, three-quarters of rural households have poultry (most commonly guinea fowl) and a similar share has goats. Cattle and sheep are only somewhat less common, each being owned by about 60% of rural households. Slightly more than half own donkeys, while pig ownership is limited to 11% of the households.

Tableau 17. Possession d'animaux en 2018 et 2019

Type d'animal	2018		2019	
	% avec des animaux	Nombre possédés	% avec des animaux	Nombre possédés
Bovins	62	11.2	60	10.0
Chèvres	75	11.4	74	8.5
Moutons	61	10.3	60	7.6
Anes	55	2.1	53	1.7
Porc	11	6.7	11	6.5
Volailles	78	32.8	75	18.3

Source : Analyse de l'Enquête auprès des ménages ruraux sur la résilience, 2019.

According to Tableau 17, both the proportion of households owning animals and the average number of animals appear to have declined between 2018 and 2019. The proportion owning each type of animal fell between 1 and 3 percentage points, except for pigs which remained roughly constant. And the average number of animals owned fell 11-26% for cattle, goats, and sheep. One possible explanation is that livestock producers may have under-estimated their current herd size or over-estimated their previous herd size, though it is difficult to see what motive they would have. Another possible explanation is that the increasing level of insecurity in the country has caused rural households to reduce their herd sizes.

Tableau 18 shows that there are some regional patterns in animal ownership, though they are not too strong. Cattle, pigs, and poultry are somewhat more widely owned in the south, while sheep and donkeys are somewhat more common in the north.

Tableau 18. Proportion de ménages possédant chaque type d'animale par zone

Type d'animal	Zone			Total
	Sahélienne	Nord-soudanienne	Sud-soudanienne	
	(pourcentage de ménages)			
Bovins	54	61	68	60
Chèvres	75	75	70	74
Moutons	65	59	54	60
Anes	55	58	46	53
Porc	5	20	11	11
Volailles	65	79	84	75

Source : Analyse de l'Enquête auprès des ménages ruraux sur la résilience, 2019.

Tableau 19 shows the average number of animals owned in each agro-ecological zone (the zeroes are excluded), while Graphique 3 shows the distribution of households according to the number of animals owned (in both cases, the zeroes of non-owners are excluded).

The average number of cattle owned is 10, though the average is higher in the south than in the north. Graphique 3a indicates that two-thirds of cattle-owning households (66%) have five or fewer cattle. The average is higher because a few households have large herds. For example, 3% of these households own more than 50 cattle.

The average number of goats owned is 9, with little variation by zone. According to Graphique 3b, few goat owners have just one animal and few have large herds. Most have medium-sized herds; 85% of

households own between 2 and 19 goats. The herd sizes of sheep are quite similar. The average is 8 sheep and 86% of owners have between 2 and 19 sheep.

Donkeys show a different pattern. A majority of households with donkeys (58%) have just one and almost all (99%) have five or fewer. This reflects the fact that donkeys are used primarily for transport, so there is little need for more than one or two.

Tableau 19. Nombre d'animaux possédés par zone

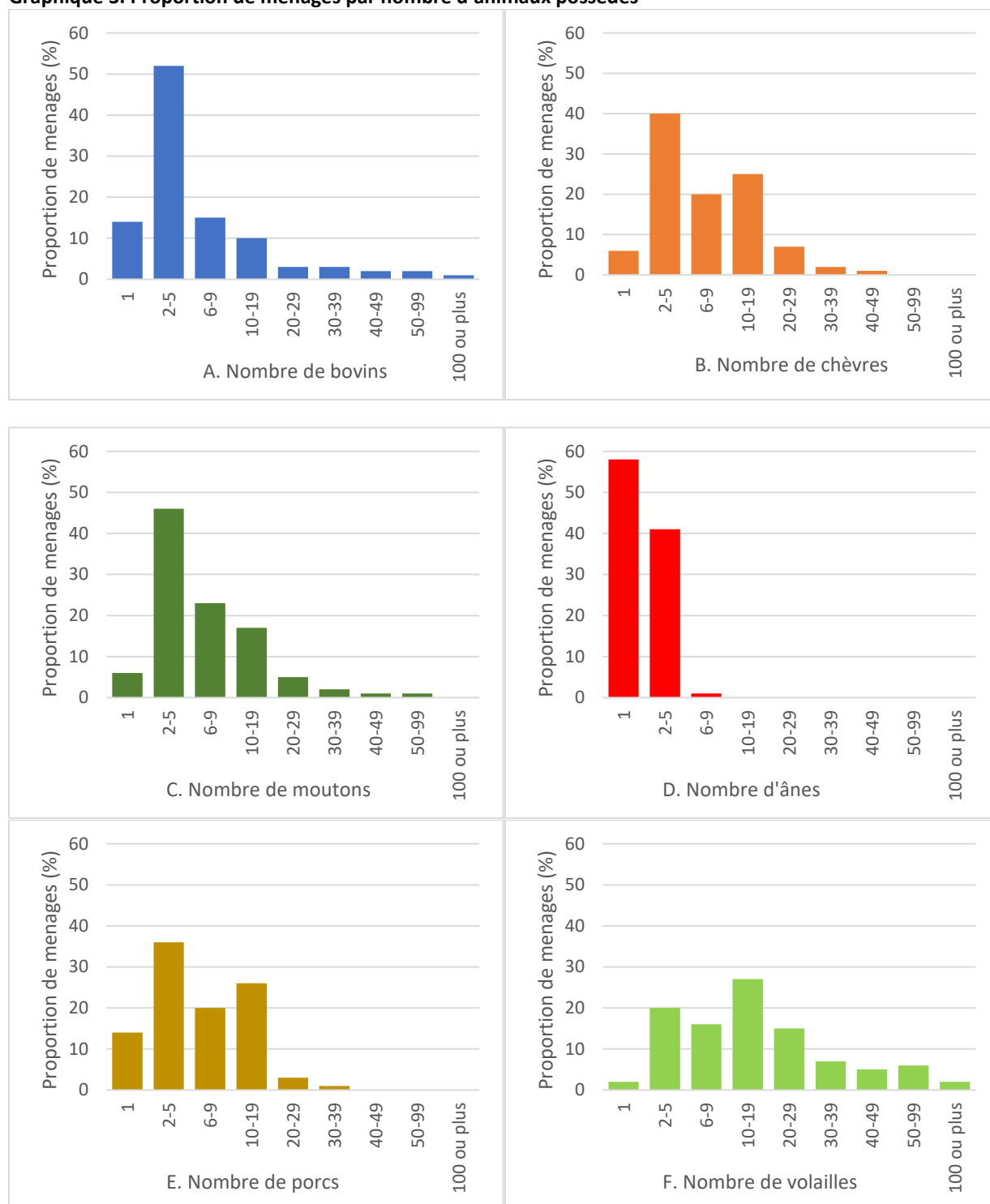
Type d'animal	Zone			Total
	Sahélienne	Nord-soudanienne	Sud-soudanienne	
	(nombre d'animaux possédés)			
Bovins	5	9	17	10
Chèvres	8	9	8	9
Moutons	6	9	10	8
Anes	1	2	2	2
Porc	7	6	7	7
Volailles	13	22	21	18

Source : Analyse de l'Enquête auprès des ménages ruraux sur la résilience, 2019.

Only 11% of households own pigs, but among those that do, the herd sizes are similar to goats and sheep. The average number owned is seven and 82% of owners have between 2 and 19 animals.

Regarding poultry, the average size of a flock is 18 and 35% of households have 20 or more birds. This reflects the fact that poultry are relatively inexpensive to purchase and maintain.

Graphique 3. Proportion de ménages par nombre d'animaux possédés



Source : Analyse de l'Enquête auprès des ménages ruraux sur la résilience, 2019.

3.4.2. Inflows and outflows of animals

In this section, we describe the inflows and outflows of animals during the course of a year. Tableau 20 shows the average number of animals gained by a household per year. The averages refer to households owning each type of animal. For example, among households owning cattle, an average of 1.4 cattle are born per year. The results indicate that the most common way to acquire an animal is by birth, which account for more than three-quarters of the newly acquired animals. The second-most important source of animals is purchases. Very few animals are received as gifts or as payment for [gardiennage].

Tableau 20. Entrées d'animaux et le prix moyen d'achat

Type d'animal	Recus pour				Total
	Naissances	Cadeaux recus	le gardiennage	Achetés	
	(nombre d'animaux qui entrent par ménage dans l'année passé)				
Bovins	1.4	0.0	0.0	0.4	1.8
Chèvres	4.2	0.1	0.0	0.3	4.6
Moutons	3.0	0.1	0.0	0.5	3.6
Anes	0.3	0.0	0.0	0.1	0.4
Porc	5.2	0.1	0.0	0.2	5.5
Volailles	23.2	0.4	0.0	1.2	24.8

Source : Analyse de l'Enquête auprès des ménages ruraux sur la résilience, 2019.

Tableau 21 indicates the outflow of animals measured by the average number of animals leaving the household per year, among those owning each type of animal. The most important way in which animals “leave” the household is death. The mortality rate for cattle in this study is 9.8%, which is higher than average for sub-Saharan Africa. The fact that more animals die than are sold is a reflection of the risks associated with livestock production and the importance of veterinary care.

The number of animals slaughtered for home consumption is relatively small. For example, according to the survey results, more than twice as many animals are sold than are slaughtered for home consumption. Very few animals are used for in-kind payments or given as gifts.

It is worth noting that the number of average animals leaving the household through death, sales, or other reasons is greater than the number of animals entering the household through births, purchases, or other reasons. For example, over the course of 2018-19, the average household acquired 1.8 cattle but lost 2.4 cattle.

Tableau 21. Sortie d'animaux par type d'animal

Type d'animal	Paie-						Total
	Morts	Donnés comme cadeau	ment en espèces	Abbatus	Perdus	Vendus	
	(nombre d'animaux qui sortent par ménage dans l'année passé)						
Bovins	1.1	0.0	0.1	0.0	0.1	1.1	2.4
Chèvres	2.8	0.2	0.0	0.8	0.5	2.1	6.4
Moutons	2.1	0.1	0.0	0.4	0.3	1.3	4.2
Anes	0.6	0.0	0.0	0.0	0.0	0.0	0.6
Porc	2.1	0.2	0.0	0.3	0.2	1.3	4.1
Volailles	16.4	1.8	0.1	3.6	2.3	7.9	32.1

Source : Analyse de l'Enquête auprès des ménages ruraux sur la résilience, 2019.

The mortality rate is defined as the number of deaths in a year divided by the number of animals alive at the beginning of the year. The first three columns of Tableau 22 show the calculation of the mortality rate from our survey. The last two columns give the average mortality rate in a review of studies of

pastoral systems in arid and semi-arid zones of sub-Saharan Africa carried out by the FAO (2002). Each percentage is based on an average of between 5 and 13 studies. The comparison shows that the mortality rate in Burkina Faso is substantially higher than the average for pastoral systems in arid and semi-arid zones of sub-Saharan Africa.

Tableau 22. Comparaison du taux de mortalité au Burkina Faso et dans d'autres pays Africains

Type d'animal	Nombre possédés par ménage en 2018 (nombre)	Morts par ménage par an (nombre)	Taux de mortalité au Burkina Faso (%)	Taux de mortalité dans les systèmes pastoral en Afrique selon FAO (2002)	
				Arid	Semi-arid
Bovins	11.2	1.1	10%	8.2%	7.6%
Chèvres	11.4	2.8	25%	16.2%	12.4%
Moutons	10.3	2.1	20%	12.4%	14.3%
Anes	2.1	0.6	29%		
Porc	6.7	2.1	31%		
Volailles	32.8	16.4	50%		

Source : Analyse de l'Enquête auprès des ménages ruraux sur la résilience 2019 ; FAO (2002).

3.4.3. Livestock marketing

One common measure of the degree of integration of livestock producers into markets is the rate of commercialization, defined as the number of animals sold in a year as a proportion of the number of animals in the herd at the beginning of the year. The Survey of Rural Household on Resilience collected information on the number of animals sold over the previous 12 months and the size of the herd 12 months before the interview. Tableau 23 shows these two averages as well as the commercialization rate for different species. The rate of commercialization varies across species, being just 10% for cattle, 13-19% for goats, sheep, and pigs, and 24% for poultry. The rate of commercialization is inversely related to the lifespan of the species. Very few owners of donkeys (4%) reported sales, so the rate of commercialization is close to zero.

Tableau 23. Comparaison du taux de commercialisation au Burkina Faso et dans d'autres pays Africains

Type d'animal	Nombre possédés par ménage en 2018 (nombre)	Animaux vendus par ménage par an (nombre)	Taux de commercialisation au Burkina Faso (%)	Taux de commercialisation dans les systèmes pastoral en Afrique selon FAO (2002)	
				Arid	Semi-arid
Bovins	11.2	1.1	10%	11.7%	12.3%
Chèvres	11.4	2.1	18%	30.2%	17.2%
Moutons	10.3	1.3	13%	22.6%	20.6%
Anes	2.1	0.0	0%		
Porc	6.7	1.3	19%		
Volailles	32.8	7.9	24%		

Source : Analyse de l'Enquête auprès des ménages ruraux sur la résilience 2019 ; FAO (2002).

The FAO (2002) reviewed studies of pastoral production systems in sub-Saharan Africa. The last two columns of Tableau 23 give the average rate of commercialization for cattle, goats, and sheep in arid and semi-arid zones. In the case of cattle and sheep, the rate of commercialization in our study of

Burkina Faso is below the average of the FAO studies from other countries. In the case of goats, the rate in Burkina Faso is toward the lower figure given by the FAO.

The survey also collected information on the prices at which animals were purchased and sold. As shown in Tableau 24, the average sale price tends to be higher than the average purchase price, except in the case of donkeys where they are similar. This is because many households buy young animals and sell older ones. If all purchases and sales were among households, we would expect the two averages to be similar, but some purchases are from breeders and some sales are to traders.

Tableau 24. Prix moyen d'achat et de vente

Type d'animal	Prix d'achat (FCFA)	Prix de vente (FCFA)	Difference (%)
Bovins	130,220	169,590	30%
Chèvres	12,564	13,492	7%
Moutons	21,543	25,156	17%
Anes	43,476	42,265	-3%
Porc	7,720	16,196	110%
Volailles	1,948	2,150	10%

Source : Analyse de l'Enquête auprès des ménages ruraux sur la résilience 2019

The survey also collected information on the location of animal purchases and sales. As shown in Tableau 25, 40% of all animal purchases took place at a farm, which could be the respondent's farm or the seller's farm. Another 34% of the purchases took place at a village market and the remaining 27% of purchases at larger markets or elsewhere. Almost all pig purchases (93%) and most chicken purchases (59%) took place at a farm.

Tableau 25. Endoit de l'achat des animaux

Type d'animal	Ferme	Marché du village	Marché de la commune	Marché du province	Marché regional	Autre	Total
Bovins	44	26	16	8	5	1	100
Chèvres	35	37	19	9	0	0	100
Moutons	21	39	21	13	5	1	100
Anes	12	44	33	11	0	0	100
Porc	93	7	0	0	0	0	100
Volailles	59	34	4	1	2	0	100
Total	40	34	15	8	3	1	100

Source : Analyse de l'Enquête auprès des ménages ruraux sur la résilience 2019

The location of animal sales is shown in Tableau 26. Over half (59%) of sales take place at the farm, 19% at village markets, and 12% at communal markets. There is some variation across animal types. Once again, pig sales take place almost entirely outside of markets, and two-thirds of poultry sales take place at the farm. For cattle, goats, and sheep, just over half of sales take place at the farm, and most market sales occur at village and communal markets. The implication is that livestock markets play an important role in the purchase and sale of animals, but it is important to keep in mind that roughly half of transactions occur outside of markets, primarily at the farm. In addition, among the purchases and sales by farmers at markets, about half of these occur at small-scale village markets rather than the more formal markets at the commune and province level.

Tableau 26. Endoit de la vente des animaux

Type d'animal	Ferme	Marché du village	Marché de la commune	Marché du province	Marché regional	Autre	Total
Bovins	50	17	12	17	3	2	100
Chèvres	53	21	14	10	1	1	100
Moutons	53	19	16	9	2	1	100
Anes	53	26	4	14	3	0	100
Porc	98	0	0	1	0	0	100
Volailles	66	21	9	3	0	1	100
Total	59	19	12	8	1	1	100

Source : Analyse de l'Enquête auprès des ménages ruraux sur la résilience 2019

3.4.4. Movement and guarding of animals

Livestock production in West Africa has long relied on transhumance, a system of moving cattle and other animals seasonally in search of better pasture. In the West African context, this usually means moving them south in the dry season to higher-rainfall areas where pasture and crop residue can be found. With increasing population density and cultivation of former fallow land, this practice has led to conflict between migratory herders and local farmers.

Closely associated with transhumance is the practice of [gardienage], in which herders watch livestock owned by another households. This [gardienage] may be done throughout the year or the owners may keep their own herds during the rainy season and then contract a herder to take them south during the dry season.

The survey asked whether the respondents moved their animals during the dry season. The question was, "Est-ce que vous avez déplacé les [type d'animal] de votre ménage ou les [type d'animal] que vous garder au cours de cette saison sèche?" As shown in Tableau 27, 14% of the households owning cattle reported displacing their animals during the dry season, but only 1% of goat owners and 3% of sheep owners did. Although only 14% of the owners move their cattle, they tend to have herds that are larger than average, so the proportion of cattle that are moved is almost one third (32%). Overall, 9% of rural households have ruminants that are moved during part of the year, either by members of the household or professional herders.

Tableau 27. Proportion de ménages et d'animaux déplacés pendant la saison sèche

Type d'animale	Proportion de ménages qui déplacent leur animaux (%)	Proportion d'animaux qui sont déplacés (%)
Bovins	14	32
Chèvres	1	2
Moutons	3	5
Total	9	13

Source : Analyse de l'Enquête auprès des ménages ruraux sur la résilience 2019.

Because of the small numbers of respondents reporting that their goats and sheep were displaced in the dry season (12 and 16 respectively), the analysis below focuses on cattle.

Tableau 28 shows the proportion of cattle owners that move their cattle during the dry season for different types of households. Overall, 14% of cattle owners move their animals. The upper part of the table gives the proportions in each agro-ecological zone. Somewhat surprisingly, the proportion is highest in the South Sudanian zone (19%) and lowest in the Sahelian zone (9%).

The middle part of the table gives the same information by revenue category. Very few cattle owners in the poorest category (4%) move their cattle, but the proportion rises steadily across the income categories. In the richest income category, almost one-quarter (24%) move their cattle.

The lower part of the table indicates that pastoralists are somewhat more likely to move their cattle than other professional categories, but the difference is not large. About 17% of pastoralists move their cattle, compared to 10% of agro-pastoralists. The number of non-agricultural households owning cattle is too small (19) to generate a reliable percentage.

The last part of the table gives the proportion of owners moving their cattle by the size of the herd. Just 6% of households with small herds of five cattle or less move their animals during the dry season. In contrast, one-fifth (20%) of the owners with 6-14 cattle reported moving their cattle during the dry season. Among cattle owners with 15 or more cattle, almost half (49%) of them move their animals. A likely explanation is that small herds can be fed crop residues during the dry season, but large herds need to be moved south to find better pasture. This may also explain why households in the Sahelian zone are less likely to move their cattle than those in the other two zones; as shown earlier, the average size of cattle herd is three times larger in the South Sudanian zone compared to the Sahelian zone.

Tableau 28. Proportion d'éleveurs qui déplacent leur bovins

		Proportion de ménages (%)
Zone	Sahélienne	9
	Nord-soudanienne	15
	Sud-soudanienne	19
	Total	14
Catégorie de revenu	Le plus pauvre	4
	2ième	6
	3ième	11
	4ième	14
	Le plus riche	24
	Total	14
Catégorie professionnelle	Ménages pastorales	17
	Ménages agropastorales	15
	Ménages agricoles	10
	Ménages non-agricoles	--
	Total	14
Taille de troupeau	1 a 5	6
	6 a 14	20
	15 ou plus	49
	Total	14

Source : Analyse de l'Enquête auprès des ménages ruraux sur la résilience, 2019

The survey also asked about the destination of the animals being displaced. Overall, two-thirds of the respondents said their cattle were moved within the same province, 23% to another province, and 11% to another country (see Tableau 29). However, there is substantial variation across agro-ecological zones. Over half of the respondents in the Sahelian zone (57%) who moved their cattle said they were moved to another province. In contrast, respondents in the South Sudanian zone were most likely to move their cattle within the same province (80%), but also more likely to move cattle into another country. These results are consistent with the fact that households in the Sahelian zone need to move their cattle further south to find pasture, while those in the south are more likely to find good pasture

within the same province. They are also closer to neighboring countries to the south that generally have better pasture in the dry season.

Tableau 29. Destination du déplacement de bovins

Destination	Zone			Total
	Sahélien	Nord-soudanienne	Sud-soudanienne	
Même province	43	64	80	66
Autre province	57	26	1	23
Autre pays	0	9	19	11
Total	100	100	100	100

Source : Analyse de l'Enquête auprès des ménages ruraux sur la résilience 2019

Finally, the survey asked who was responsible for the household's cattle when they were moved. In almost two-thirds of the cases (64%), it was a member of the household who accompanied the cattle during displacement. A salaried herder was responsible in about one-third of the cases, though this is more common in the South Sudanian zone.

Tableau 30. Personne qui garde les bovins pendant le déplacement

	Zone			Total
	Sahélien	Nord-sou	Sud-soud	
Membre du ménage	70	73	54	64
Berger salarié	30	22	41	32
Combinaison	0	5	5	4
Total	100	100	100	100

Source : Analyse de l'Enquête auprès des ménages ruraux sur la résilience 2019

The survey also included several questions regarding the practice of [gardienage]. One question asked, "Au cours des 12 derniers mois, est-ce que votre ménage a fait le gardienage des [type d'animal] qui appartiennent aux autres ménages?" Because [gardienage] is rare for non-ruminants, the results focus on cattle, goats, and sheep. Among cattle owners, 5% of the respondents said that they watch cattle owned by other households. The percentage was close to zero in the case of other animals. Overall, 6% of rural households provide [gardienage] of animals belonging to other households.

Tableau 31. Proportion de ménages qui fait le gardienage

Type d'animal	Proportion de ménages qui fait le gardienage de chaque type d'animale (%)
Bovins	5
Chèvres	0
Moutons	1
Anes	0
Porc	0
Total	6

Source : Analyse de l'Enquête auprès des ménages ruraux sur la résilience 2019

Because the number of households in the sample that reported guarding other types of animal was so small (less than 5 each), the results below focus on those guarding cattle. In Tableau 32, we examine the

results of several follow-up questions related to guarding cattle. The average duration of guarding the cattle was 10 months. In 88% of the cases, it was for a full year (12 months).

On average, the household took care of 16 cattle owned by other households. The number of cattle guarded by a household ranged from 1 to 80, with half the households guarding 6 or fewer.

Most respondents who guarded cattle (62%) reported that they were paid in kind, while 30% were paid in cash, and 8% in a combination of cash and in-kind. Among those being paid in cash, the average payment was FCFA 13,627 per month. Among those paid in kind, the survey asked what form the payment took, allowing for multiple responses. A large majority (85%) were paid in by-products, which in the case of cattle would be milk. About 30% of those paid in kind were paid in animals, typically one or more calves (this implies that some were paid both in cash and in-kind). And another 20% reported other in-kind payments.

Tableau 32. Caracteristiques de gardiennage de bovins

Proportion de ménages qui a fait le gardiennage (%)	5
Durée moyenne de gardiennage (mois)	10
Nombre moyen d'animaux gardés	16
Type de paiement reçu	
En espèces	30%
En nature	62%
Combinaison	8%
Total	100%
Paiement si en espèces (FCFA/mois)	13,627
Type de paiement si en nature	
Animale	30%
Sous-produit	85%
Autre	20%
Total	100%

Source : Analyse de l'Enquête auprès des ménages ruraux sur la résilience 2019

3.4.5. Costs of production

The survey collected information on four types of inputs used in producing livestock: feed, veterinary services (including medicine), labor for guarding animals, and other. As shown in Tableau 33, a large majority of cattle owners (82%) report expenses for feeding their cattle, but the proportion is much lower for sheep (41%) and goats (22%). Even higher proportions of herders purchase veterinary services and medicine for their cattle (92%), goats (61%), and sheep (70%). On the other hand, relatively few herders have cash labor costs associated with watching their animals: 18% for cattle and less than 5% for each other type of animal. This implies that most labor used to watch livestock is provided by family members. Roughly one-third of cattle owners reported other costs associated with production, but less than 15% of owners reported other costs associated with other types of animals. Overall, 98% of cattle owners reported some cash costs of production. The proportion for other animals ranged from 61% to 83%.

Tableau 33. Proportion d'éleveurs ayant chaque type de coûts de production

	Aliments	Services veterinaires	Main d'oeuvre	Autres	Total
(% d'éleveurs ayant ce coût)					
Bovin	82	92	18	35	98
Chèvres	22	61	4	13	73
Mouton	41	70	4	14	83
Anes	18	54	1	7	65
Porc	69	42	1	12	81
Volailles	16	51	2	6	61

Source : Analyse de l'Enquête auprès des ménages ruraux sur la résilience 2019

In order to examine the patterns across agro-ecological zones, the upper portion of Tableau 34 gives the proportion of livestock producers with any livestock input costs. It suggests that there are few differences between livestock producers in the three agro-ecological zones in terms of the proportion of households purchasing inputs. For example, the proportion of cattle producers purchasing inputs ranges from 97% to 99% across zones. Only in the case of goats and poultry producers do we see fewer households purchasing livestock inputs in the Sahelian zone compared to the South Sudanian zone.

The lower portion of the table gives the proportion of livestock producers purchasing animal feed. We focus on animal feed because it is the most costly input and one of the mostly widely purchased inputs. In cattle and goat production, herders are more likely to purchase feed in the north than in the south, probably reflecting the greater difficulty in finding good pasture in the Sahelian zone during the dry season. In the case of donkeys, pigs, and poultry, producers in the South Sudanian zone are more likely to purchase feed than those in other zones. In the case of pigs and poultry, this may be related to the larger scale of operation and more commercial orientation in the south.

Tableau 34. Proportion d'éleveurs ayant coûts de production et coûts d'aliments par zone

	Zone			Total
	Sahélien	Nord- soudanienne	Sud- soudanienne	
(% avec les coûts de production)				
Bovin	97	99	98	98
Chèvres	70	71	78	73
Mouton	81	83	86	83
Anes	63	66	70	65
Porc	80	82	78	81
Volailles	48	67	72	61
(% avec les coûts d'aliments)				
Bovin	86	88	73	82
Chèvres	28	18	16	22
Mouton	44	31	49	41
Anes	18	16	23	18
Porc	59	72	68	69
Volailles	7	16	26	16

Source : Analyse de l'Enquête auprès des ménages ruraux sur la résilience 2019

Tableau 35 is similar to the previous table, but shows the patterns across professional categories. The top half shows the proportion of producers purchasing any livestock inputs. Almost all producers purchase inputs for cattle production and three-quarter do for goat production, though there is little difference across professional categories. For other types of animals, non-agricultural households are the most likely to purchase inputs, while pastoral households are the least likely to. For every animal type and every category, more than half of producers purchase inputs.

The lower part of the table gives the proportion of producers purchasing feed for their animals. Across animal types, non-agricultural households are most likely to purchase feed for their animals. This is probably because non-agricultural households have relatively small farms and modest crop production, forcing many of them to rely on purchased feed for their animals, particularly in the dry season.

Tableau 35. Proportion d'éleveurs ayant coûts de production et coûts d'aliments par catégorie professionnelle

	Catégorie professionnelle				Total
	Pastorale	Agro-pastorale	Agricole	Non-agricole	
(% avec les coûts de production)					
Bovin	97	98	98	93	98
Chèvres	69	72	73	74	73
Mouton	84	80	83	95	83
Anes	62	65	66	66	65
Porc	51	79	82	82	81
Volailles	53	58	65	62	61
(% avec les coûts d'aliments)					
Bovin	85	87	75	93	82
Chèvres	20	20	22	29	22
Mouton	41	41	38	62	41
Anes	17	17	17	47	18
Porc	51	71	68	72	69
Volailles	13	13	15	30	16

Source : Analyse de l'Enquête auprès des ménages ruraux sur la résilience 2019

Tableau 36 shows the composition of the costs of production for each type of animal. As before, the figures represent the average value per household owning that type of animal. The most important costs are feed and purchase of animals, which account for more than half of the total. Veterinary services (which includes the cost of medicine) generally accounts for 10-20% of costs, though for poultry it is almost one-third of the total. [Gardiennage] is a relatively small share of the total, reaching a maximum of almost 10% in the case of cattle.

Tableau 36. Coûts de production par type d'animale

	Aliments	Services vétérinaires	Gardiennage	Autres	Achats des animaux	Coûts totales
(FCFA par ménage par an)						
Bovin	59,562	21,494	14,439	3,981	49,312	148,788
Chèvres	3,726	3,123	803	585	3,719	11,955
Mouton	10,142	3,916	1,341	629	9,951	25,979
Anes	3,258	1,853	55	288	3,155	8,609
Porc	14,323	2,815	102	1,435	1,221	19,895
Volailles	3,709	3,146	24	336	2,452	9,667

Source : Analyse de l'Enquête auprès des ménages ruraux sur la résilience 2019

In the next section, we combine information on the gross revenue and the cost of production to estimate the net revenue from livestock production.

3.4.6. Net revenue from livestock production

How much do households earn from owning livestock? We calculate the net revenue from livestock ownership as the gross revenue minus the cost of production. Gross revenue includes the sale of animals, the value of animals slaughtered for own consumption, the value of by-products such as milk and manure. The costs of production include the cost of purchased feed, veterinary services, medicine, labor for watching the animals (particularly if they are displaced), the purchase of animals, and other expenses.

Tableau 37 gives the average value of each component of gross revenue among those that own each type of animal. Among households owning cattle, the average gross revenue is FCFA 552 thousand. More than half of this is in the form of by-products, including milk, manure, and labor such as plowing services. The sale of cattle represents about one-third of gross revenue, while own consumption (the slaughter of cattle for meat) represents a tiny share of gross revenue (less than 2%). The gross revenue from goats and sheep (among households that own each) is less than one-tenth that of cattle. Part of the explanation is that goats and sheep are much less valuable: the average sale price of goats is 8% that of cattle, while the sale price of sheep is 15% that of cattle. Another explanation is that they generate much less in by-products compared to cattle. On the other hand, goats and sheep are much more likely to be slaughtered for home consumption; this represents 20-25% of the gross revenue for these animals. Donkeys generate very little revenue, although it is important to keep in mind that we are not able to measure the value of the transportation services that donkeys provide. It is interesting to note that for all six animal types, sales are more important than home consumption.

Tableau 37. Valeur de la production par type d'animale

	Valeur de l'auto- consommation	Ventes des animaux	Valeur des sous- produits	Revenu brut
	(FCFA par ménage par an)			
Bovin	7,793	179,304	311,642	551,795
Chèvres	10,715	27,985	4,239	42,938
Mouton	8,126	28,772	136	37,033
Anes	0	1,584	0	1,584
Porc	5,262	21,825	0	27,087
Volailles	7,685	16,944	18,209	42,839

Source : Analyse de l'Enquête auprès des ménages ruraux sur la résilience 2019

Tableau 38 combines the gross revenue in Tableau 37 with the costs in Tableau 36 to calculate the net revenue. Again, all figures are expressed in FCFA per household that raises that animal. The dominance of cattle as a source of livestock revenue is apparent. Net revenue from cattle among cattle producers is nine times greater than that of poultry and ten times greater than that of goats. Although the gross revenue from goats and sheep is similar, sheep appear to be more costly, so the net revenue from goats is several times greater. Donkeys appear to have a negative net revenue. As mentioned earlier, this is due to the fact that it is not easy to estimate the value of transportation services provided by donkeys to their owners.

Tableau 38. Revenu net par type d'animale parmi les éleveurs

	Revenu brut	Coûts	Revenu net	Costs as share of gross revenu
	(FCFA par ménage par an)			(%)
Bovin	551,795	148,788	340,728	27
Chèvres	42,938	11,955	32,560	28
Mouton	37,033	25,979	12,662	70
Anes	1,584	8,609	-5,545	543
Porc	27,087	19,895	9,447	73
Volailles	42,839	9,667	36,281	23

Source : Analyse de l'Enquête auprès des ménages ruraux sur la résilience 2019

Tableau 38 gives the net revenue among producers of each type of animal. In contrast, Tableau 39 gives the average net revenue across all households. In other words, Tableau 38 only includes the revenue per grower, while Tableau 39 also takes into account the proportion of all households that grow each type of animal. This allows us to calculate the total gross and net revenue of livestock production per rural household. Cattle represent more than four-fifths of the net revenue from livestock production in rural households in Burkina Faso. Poultry is second at 9% of the total, followed by goats at 8%. Although pig production produces a substantial revenue for households growing them (see Tableau 38), only 11% of rural households raise pigs, so the average revenue across all rural households is much smaller.

Tableau 39. Revenu net par type d'animale parmi tous les ménages ruraux

	Revenu brut	Coûts	Revenu net	Propotion du total
	(FCFA par ménage par an)			(%)
Bovin	348,701	94,025	257,854	81
Chèvres	33,623	9,362	25,496	8
Mouton	23,768	16,673	8,126	3
Anes	902	4,905	-3,159	-1
Porc	3,288	2,415	1,147	0
Volailles	35,007	7,900	29,648	9
Total	445,289	135,280	319,112	100

Source : Analyse de l'Enquête auprès des ménages ruraux sur la résilience 2019

3.5. Non-farm activities

Section 3.2 described the patterns of crop production and revenue, while Section 3.3 discussed livestock production and revenue. In this section, we consider the third and last category, non-agricultural sources of revenue. This includes non-agricultural enterprise revenue, wage revenue, other revenue, transfers such as remittances, and aid from government programs and non-government organizations. As shown in Tableau 40, the most common non-farm sources of revenue are the collection of shea nuts (33% of rural households), "other commerce" (20%), mining (17%), and collection of forest products (14%). Almost 9% are involved in trading of agricultural products and 8% in trading of livestock. Roughly 7% of rural households are involved in the sale of services, such as repair, and 6% receive assistance from a family member (remittances).

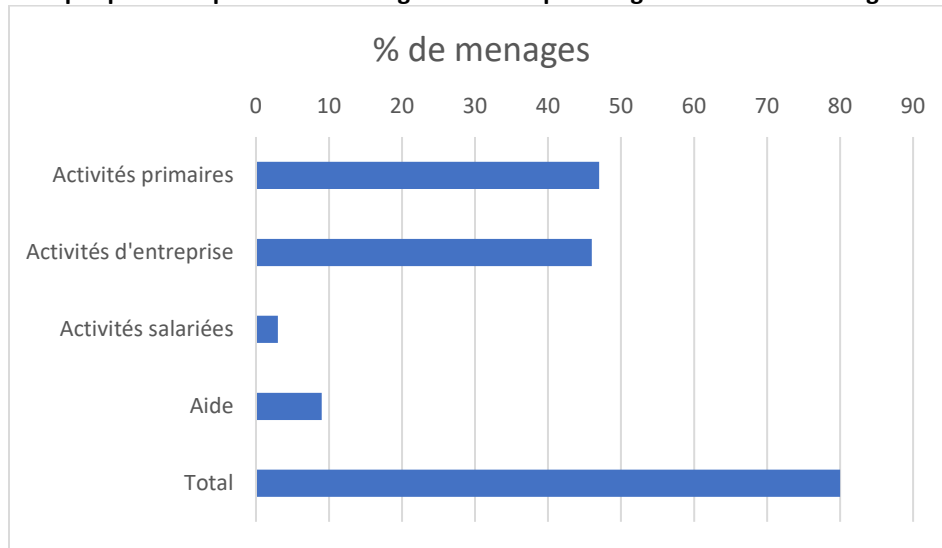
Tableau 40. Proportion de menages avec chaque type d'activité non-agricole

Type d'activité	Proportion de ménages (%)
Collecte de noix de karité	33.2
Collecte de fourrage	1.2
Pêche et aquaculture	3.5
Apiculture	1.1
Chasse	0.8
Collecte de bois / charbon	4.8
Collecte produits forestiers	14.1
Exploitation minière	16.9
Commerce des cultures	8.6
Commerce d'animaux	8.0
Commerce non agricole	20.4
Mouture des céréales	1.7
Brassage de la bière locale et Produits dérivés du lait	4.9
Autre transformation de produits	2.3
Autre fabrication	1.7
Vente de services (réparation, etc)	2.1
Salariat agricole	7.2
Employés du secteur public	0.7
Autres salarié	0.8
Pension mensuelle	2.3
Aide monétaire de famille	0.0
Aide monétaire des ONGs	6.3
Autre aide	1.0
Autre	0.5
	5.3

Source : Analyse de l'Enquête auprès des ménages ruraux sur la résilience 2019

Graphique 4 shows the proportion of rural households with at least one non-agricultural activity within each broad category. Slightly less than half (47%) of rural households earn revenue from primary activities, including hunting, fishing, and gathering shea nuts. A similar proportion (46%) have revenue from small-scale enterprises owned by the household such as retail shops, repair work, tailoring, and milling. Just 3% of rural households report salaried activities, referring to any work which is paid by the day, month, or year. And 9% of households receive aid, including remittances from family members and transfers from NGOs or government programs.

Graphique 4. Proportion de ménages avec chaque catégorie d'activité non-agricole



Source : Analyse de l'Enquête auprès des ménages ruraux sur la résilience 2019

Tableau 41 shows the proportion of households receiving revenue from any non-agricultural activity. The proportion varies by agro-ecological zone, being highest in the South Sudanian zone (89%) and lowest in the Sahelian zone (72%). The proportion of households with at least one non-farm activity also varies by revenue category, being lowest among the poorest category (64%) and highest among the richest category (90%).

As shown in Tableau 41, 76% of pastoral households have non-agricultural revenue, similar to the proportion of agro-pastoral and agricultural households with non-agricultural revenue. By definition, all non-agricultural households have non-agricultural revenue.

Tableau 41. Proportion des ménages avec au moins une activité non-agricole

		Proportion de ménages (%)
Zone	Sahélienne	72
	Nord-soudanienne	83
	Sud-soudanienne	89
	Total	80
Catégorie de revenu	Le plus pauvre	64
	2ième	75
	3ième	83
	4ième	90
	Le plus riche	90
	Total	80
Catégorie professionnelle	Ménages pastorales	76
	Ménages agropastorales	78
	Ménages agricoles	78
	Ménages non-agricoles	100
	Total	80

Source : Analyse de l'Enquête auprès des ménages ruraux sur la résilience 2019

In order to maintain a minimum number of observations for each type of activity, subsequent tables will use a classification in which the 25 categories in Tableau 40 have been collapsed to 14 categories. For example, fishing, aquaculture, and hunting are combined into “other primary activities”, the three salaried categories are combined into one, and the three aid categories are combined. Each of the resulting 14 categories represents at least 50 households in our sample, except for salaried employment which represents 33 households.

The questionnaire asks which member of the household has primary responsibility for each non-farm activity. The results in Tableau 42 indicate that there are some activities generally carried out by the head of household (usually male) and some generally carried out by the spouse (usually female). For example, the head of household is generally responsible for mining, crop trading, livestock trading, services, and wage employment. On the other hand, the spouse is most often responsible for the collection of shea nuts, the collection of wood and making of charcoal, the brewing of beer, and “other manufacturing” activities.

Tableau 42. Membre du ménage responsable pour chaque activité non-agricole

Type d'activité	Chef (%)	Epouse (%)	Autre (%)	Total (%)
Collecte de noix de karité	6	81	13	100
Collecte de bois / charbon	26	62	12	100
Collecte produits forestiers	7	74	20	100
Exploitation minière	79	8	14	100
Autre activité primaire	92	2	6	100
Commerce des cultures	75	11	14	100
Commerce d'animaux	93	3	4	100
Commerce non agricole	50	35	15	100
Brassage de la bière locale	12	59	29	100
Autre fabrication	35	48	17	100
Vente de services	81	1	19	100
Salarie	77	2	21	100
Aide	88	9	3	100
Autre	61	35	4	100

Source : Analyse de l'Enquête auprès des ménages ruraux sur la résilience 2019

Many non-farm activities are seasonal. For example, a household may operate a small enterprise during the off season when they are not occupied with crop production. The questionnaire asks how many months of a typical year the household operates each non-farm activity. The average seasonal duration of these activities is 5.3 months. Only 18% of them operate for a full 12 months, and 71% operate for 6 months or less.

As shown in Tableau 43, the collection of shea nuts takes place during an average of 2.2 months of the year, corresponding to the seasonal availability. Similarly, the collection of non-wood forest products occurs over an average of 2.2 months per year. At the other extreme, some activities are carried out more than 8 months per year, including “other commerce”, beer brewing, and sale of services. Some of the households that carried out these activities may have operated them all year. The remaining activities occur over an average of 5-7 months of the year.

Tableau 43. Nombre de mois par an de l'activité

Type d'activité	Nombre de mois
Collecte de noix de karité	2.2
Collecte de bois / charbon	6.3
Collecte produits forestiers n	2.2
Exploitation minière	5.4
Autre activité primaire	6.9
Commerce des cultures	5.2
Commerce d'animaux	5.8
Commerce non agricole	8.3
Brassage de la bière locale	8.6
Autre fabrication	6.7
Vente de services	8.2
Salarié	6.8
Aide	5.3
Autre	6.2

Source : Analyse de l'Enquête auprès des ménages ruraux sur la résilience 2019

The net revenue for each non-farm activity is shown in Tableau 44. The first column gives the average annual revenue among households participating in that activity. Most of the activities yield FCFA 100 to 200 thousand per household involved in that activity, though the average is lower for the collection of shea nuts and the collection of non-wood forest products and higher for mining, other primary activities, commerce in animals, and non-agricultural commerce.

The second column gives the average net revenue across all rural households, taking into account that many rural households are not involved in each activity, and the last column shows the composition of non-farm revenue. All non-farm activities generate an average net revenue of about FCFA 252 thousand per rural household per year.

The non-farm activity that generates the most net revenue for rural households is mining, which accounts for 24% of all non-farm revenue. The second most important non-farm activity is non-agricultural commerce, which includes enterprises buying and reselling non-agricultural products and represents 21% of non-farm revenue. "Other primary activities" includes fishing, aquaculture, and hunting and accounts for 12.5% of the total.

Tableau 44. Revenu net d'activités non-agricoles

Type d'activité	Revenu net parmi les participants de chaque activité (FCFA/an)	Revenu net parmi tous les ménages ruraux (FCFA/an)	Proportion du revehnu net non- agricole (%)
Collecte de noix de karite	34,426	11,413	4.5
Collecte de bois / charbon	104,820	5,025	2.0
Collecte produits forestiers	25,390	3,590	1.4
Exploitation minière	357,683	60,526	24.1
Autre activite primaire	480,662	31,370	12.5
Commerce des cultures	152,105	13,134	5.2
Commerce d'animaux	235,585	18,859	7.5
Commerce non-agricole	261,262	53,200	21.2
Brassage de la bière locale	120,255	5,909	2.4
Autre fabrication	165,775	11,118	4.4
Vente de services	185,288	13,307	5.3
Salarie	173,380	6,631	2.6
Aide	141,044	10,637	4.2
Autre	124,071	6,577	2.6
Total		251,296	100.0

Source : Analyse de l'Enquête auprès des ménages ruraux sur la résilience 2019

3.6. Contribution of pastoral production to household revenue

In this section, we use the results of the Survey of Rural Households on Resilience to describe the contribution of pastoralism to rural livelihoods. First, we discuss various definitions of pastoralism and adopt one for the analysis. Then, we examine the contribution of pastoral production to the revenue of rural households. Finally, we use revenue data to classify households into four livelihood categories: pastoral households, agro-pastoral households, agricultural households, and non-farm households. Survey data are used to explore the differences between these categories.

3.6.1. Definition of pastoral production

As discussed in the introduction, pastoralism has been defined many ways. Tableau 45 summarizes the range of different definitions of pastoralism in the literature. Most definitions focus on production of livestock in an extensive manner, meaning grazing them in pastures rather than providing them with feed. The focus is usually on ruminants because they have a digestive system that ferments the cellulose in grass to extract nutrients from it. Poultry and monogastric animals such as pigs cannot digest cellulose and must be fed grain or other types of nutrient-rich feeds. Horses, donkeys, and camels have a limited ability to digest cellulose, but are not considered ruminants.

One of the prominent characteristics of pastoralism is the movement of animals in search of pasture and water. Since pastoralism tends to be the dominant livelihood in regions that are arid or semi-arid, the animals are often moved seasonally in search of pasture and water. However, the definitions of pastoralism generally do not include movement as an essential part of the definition. Indeed, some sources distinguish between nomadic pastoralism, seasonal pastoralism, and sedentary pastoralism.

Tableau 45. Définitions du pastoralisme

Definition	Source
“Pastoralism [is] the use of extensive grazing in rangelands for livestock production”	Blench, 2001
“A pastoral production system has been defined as one in which 50 percent or more of household gross revenue (the total value of marketed production plus the estimated value of subsistence production) comes from livestock or livestock-related activities, or where more than 20 percent of household food energy is directly derived from livestock or livestock-related activities”	FAO, 2002
“Pastoralism is a way of life based primarily on raising livestock, particularly small ruminants, cattle and camels... in Africa’s vast arid and semi-arid areas.”	African Union, 2010
Le pastoralisme est “toute activité d’élevage consistant à assurer l’alimentation et l’abreuvement des animaux par l’exploitation directe des ressources naturelles sur des espaces déterminés et impliquant la mobilité des animaux”	CNT, 2015
“Pastoralism is animal husbandry, the branch of agriculture concerned with the care, tending, and use of grazing livestock in dry or cold rangeland areas.”	Dong, 2016
“Pastoral communities ... depend on extensive livestock production, mainly cattle, camels, sheep and goats, as their most important source of livelihood, food security, nutrition, revenue and well-being. Pastoral livestock production involves varying degrees of seasonal movement to access natural resources”	FAO, 2018
“Pastoralism is a livestock production system which takes advantage of the characteristic instability of rangeland environments, where key resources such as nutrients and water for livestock become available in short-lived and largely unpredictable concentrations”	Nyariki and Amwata, 2019

In this report, we adopt the definition in the Loi d’Orientation Agro-sylvo-pastorale, Halieutique et Faunique au Burkina Faso, in which pastoralism is “toute activité d’élevage consistant à assurer l’alimentation et l’abreuvement des animaux par l’exploitation directe des ressources naturelles sur des espaces déterminés et impliquant la mobilité des animaux” (CNT, 2015). We interpret this to mean that the animals are fed primarily by grazing in pasture rather than being given feed. Thus, this definition excludes intensive commercial production where a high proportion of the feed is purchased grain that is fed to animals in feedlots. By saying « impliquant la mobilité », the definition suggests that mobility may be an important part of pastoralism but seems to indicate that pastoral production does not necessarily involve migratory movement of animals.

Thus, for the purposes of this report, we consider pastoralism to be the production of cattle, goats, and sheep by rural households. Given the small amounts spent by rural households on feed, it is safe to assume that the ruminant production in our sample of rural households are grazed for most of the year and thus, would not be considered intensive livestock production.

3.6.2. Net revenue

Gathering estimates of net revenue from Section 3.2, 3.3, and 3.4, Tableau 46 shows the composition of net revenue of rural households in Burkina Faso. The monetary values refer to the average net revenue across all households, including those that do not receive revenue from that source. For example, the low value for pig production reflects the fact that only 11% of rural households produce pigs.

Almost 60% of the average net revenue of rural households is derived from production of crops, with maize, sorghum, millet, and cotton accounting for more than half of the total. About 22% of the average net revenue comes from livestock production. Net revenue from livestock production is dominated by cattle, which account for 18% of total net revenue and 81% of revenue from livestock production.

Tableau 46. Composition du revenu net

Source	Revenu net (FCFA/ménage/an)	Proportion du total (%)
Revenu d'élevage	308,927	22.4
Bovins	249,624	18.1
Chèvres	24,682	1.8
Moutons	7,867	0.6
Anes	-3,058	-0.2
Porcins	1,110	0.1
Volaille	28,702	2.1
Revenu de production végétale	818,340	59.3
Revenu non-agricole	253,180	18.3
Revenu net total	1,380,448	100.0

Source : Analyse de l'Enquête auprès des ménages ruraux sur la résilience 2019

As discussed in Section 3.3, net revenue from donkey production is negative. This is because donkey ownership necessarily involves some costs in the form of feed and veterinary services, but rarely generates any cash revenue. Given that more than half the rural households own at least one donkey, it is safe to assume that the value they contribute exceeds their cost, so the negative net revenue reflects the difficulty of measuring the value of their output, particularly their work in carrying loads and pulling carts.

Non-agricultural activities include wage employment, non-farm enterprises, remittances, and various types of transfers such as government assistance. The net revenue from these activities accounts for about 18% of the total.

We can calculate net revenue per capita and then create quintiles, that is, five categories of revenue per capita with equal numbers of households. Tableau 47 shows the distribution of households by revenue category and by zone. By definition, 20% of all rural households are in each revenue category, but more than 20% of Sahelian households are in the poorest category, and relatively few Sahelian households are in the richest category (10%). This indicates that households in the Sahelian zone tend to be poorer than average. In contrast, just 8% of South Sudanian households are in the poorest category, and more than one-third of South Sudanian households are in the richest category (36%). This is consistent with the patterns seen with the asset index, in which Sahelian households have less permanent houses and fewer assets compared to those in the North Sudanian and South Sudanian zones (see Tableau 5 and Tableau 6).

Tableau 47. Distribution des ménages ruraux selon la catégorie de revenu et la zone

Catégorie de revenu net par tête	Zone			Total
	Sahélienne	Nord- soudanienne	Sud- soudanienne	
Le plus pauvre	34	13	8	20
2ième	20	21	18	20
3ième	22	22	15	20
4ième	13	26	23	20
Le plus riche	10	18	36	20
Total	100	100	100	100

Source : Analyse de l'Enquête auprès des ménages ruraux sur la résilience, 2019.

3.6.3. Share of net revenue from pastoral production

Because of our focus on pastoral production, it is useful to reorganize the revenue categories somewhat. We create a new category for pastoral production that includes revenue from the production of cattle, goats, and sheep. The revenue from other animals is combined with crop production in a category called “other agriculture”. The non-agricultural revenue remains the same. It is worth noting that this is a relatively small change because there is not much difference between net revenue from livestock production and net revenue from pastoral production among rural households in Burkina Faso. More specifically, we are reclassifying revenue from donkeys, pigs, and poultry, which account for just 2% of total net revenue.

Tableau 48 shows the average net revenue per household per year from each type of activity. The second column shows the percentage of total rural revenue derived from each type of activity. As such, it gives greater weight to high-revenue households than low-revenue households. Based on this measure, pastoral production, that is, production of cattle, goats, and sheep, accounts for 20.4% of total revenue earned by rural households.

Other agricultural production (including crops and non-ruminant animals) represents 61% of total revenue. Revenue from crop production represents almost all of this amount, but it also includes net revenue from non-ruminant animals. Non-agricultural activities account for the remaining 18%, the same as in the previous table. Using the sampling weights, we can estimate the aggregate value of pastoral production at the national level as FCFA 768 billion per year.

The last column in the table shows the average contribution of each type of activity, based on the average of the shares for each household. Thus, it gives equal weight to each household. Based on this measure, on average pastoral production represents 23% of net revenue, and other agricultural production contributes about 58%. Non-agricultural activities represent 19% of net revenue on average.

Tableau 48. Composition du revenu net (revised)

Source	Revenu net (FCFA/ménage/an)	Proportion du total (%)	Contribution moyenne (%)
Revenu de la production pastorale	282,173	20.4	23.2
Bovins	249,624	18.1	19.4
Chèvres	24,682	1.8	3.0
Moutons	7,867	0.6	0.8
Revenu d'autre production agricole	845,094	61.2	57.7
Production végétale	818,340	59.3	54.9
Anes	-3,058	-0.2	-0.5
Porcins	1,110	0.1	0.1
Volaille	28,702	2.1	3.1
Revenu non-agricole	253,180	18.3	19.2
Revenu net total	1,380,448	100.0	100.0

Source : Analyse de l'Enquête auprès des ménages ruraux sur la résilience 2019

3.6.4. Variation in the contribution of pastoral income across households

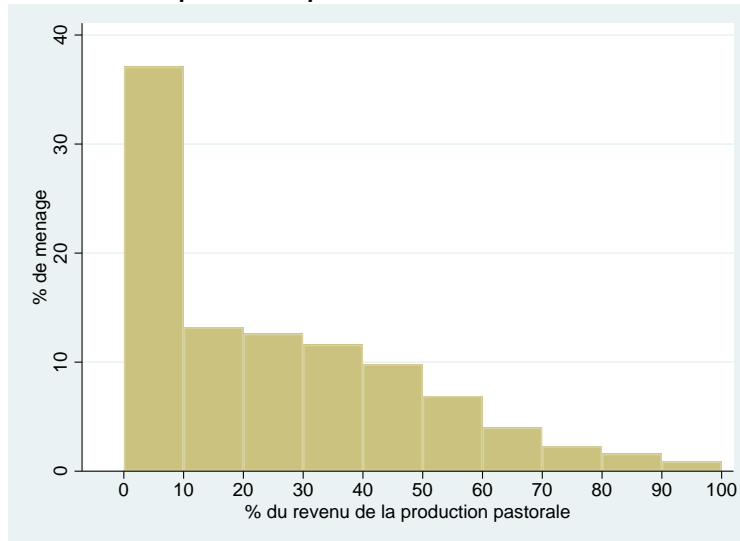
The previous section focused on the *average* contribution of pastoral production to rural income. We are also interested in how the importance of pastoral production varies across households. For example, taking two extremes, do all households earn 20-25% of their revenue from pastoral production or do 20-25% of rural households earn all their revenue from pastoral production? Also, how does the contribution of pastoral income vary across different types of households?

In order to examine the importance of pastoral production for different households, we need to address the problem of negative revenue. About 23% of the households in our sample have negative livestock revenue. This may be due to errors in recall by the respondent, data entry errors, or actual negative revenue. True negative revenue is caused by costs of production (animal purchases, feed, veterinary services, labor, or other) exceeding gross revenue (animal sales, own consumption, and by products) over the past 12 months. Negative revenue for a given year is not too surprising given that livestock production often involves a multi-year investment, where costs and revenue do not necessarily occur in the same year. For example, if a household had five cattle over the course of the year and sells them after the interview, the survey records the costs during the year but has no way to record the sale.

To address this problem, we replace calculated net revenue by *estimated* net revenue for each animal type, where the estimated net revenue is the predicted value from a regression analysis. The regression analysis finds an equation that predicts net revenue based on the number of animals owned and the number squared. The average value of estimated net revenue is equal to the average value of the original net revenue for each type of animal. However, the regression analysis eliminates both positive and negative outliers from the general pattern. As a result, estimated net revenue from pastoral production is negative for only two households in our sample.

Graphique 5 shows the repartition of rural households according to the contribution of pastoral production. The tall bar on the left indicates that 38% of rural households earn between 0% and 10% of their revenue from pastoral production. This includes some (9% of rural households) with no pastoral production and others (28%) for whom pastoral production contributes 1-10%. On average, these households own roughly one cow, four goats, and two sheep. At the other extreme, about 13% of rural households earn more than half their revenue from pastoral production. On average, these households own 20 cattle, 12 goats, and 10 sheep. The short bars on the right side of the graph indicate that few households depend on pastoral production for more than 70% of their revenue.

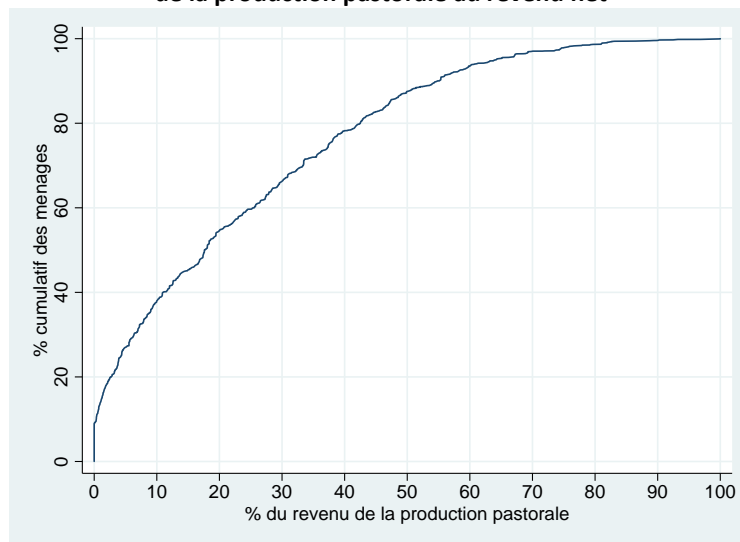
Graphique 5. Répartition des ménages selon la contribution de la production pastorale au revenu net



Source : Analyse de l'Enquête auprès des ménages ruraux sur la résilience 2019

Graphique 6 shows similar results but provides the *cumulative* share of rural households earning less than a given percentage of their revenue from pastoral production. It shows that 87% of rural households earn less than half their revenue from pastoral production, which implies that the remaining 13% of them earn more than half their revenue from pastoralism. Similarly, about two-thirds (66%) of rural households earn less than 30% of their revenue from pastoral production.

Graphique 6. Répartition cumulative des ménages selon la contribution de la production pastorale au revenu net

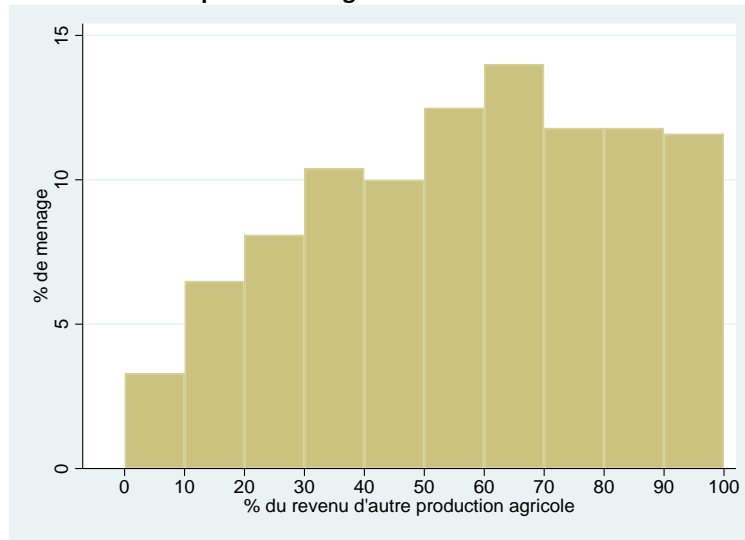


Source : Analyse de l'Enquête auprès des ménages ruraux sur la résilience 2019

Graphique 7 shows the repartition of households according to the share of total household revenue coming from other agricultural production, defined as the production of crops and non-ruminant animals (donkeys, pigs, and poultry). As discussed above, this category is dominated by crop production, as non-ruminants are a small share of revenue. The graph shows that a large proportion of households

earn more than half of their revenue from other agricultural production. About 13% of households earn 60-70% of their revenue from other agricultural activities and another 12% earn 50-60%.

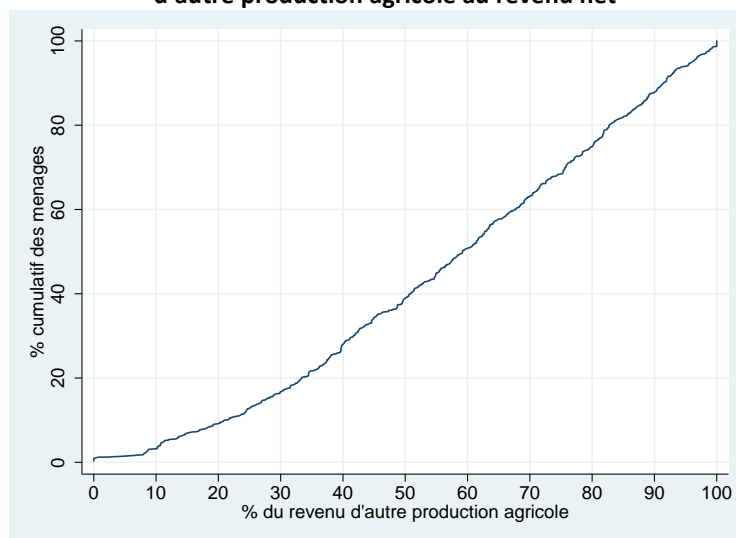
Graphique 7. Répartition des ménages selon la contribution d'autre production agricole au revenu net



Source : Analyse de l'Enquête auprès des ménages ruraux sur la résilience 2019

Graphique 8 shows the cumulative percentage of households earning less than a certain percentage of their revenue from other agricultural activities. Just 39% of rural households earn less than half their revenue from other agricultural production, implying that 61% earn more than half of their revenue from these activities.

Graphique 8. Répartition cumulative des ménages selon la contribution d'autre production agricole au revenu net

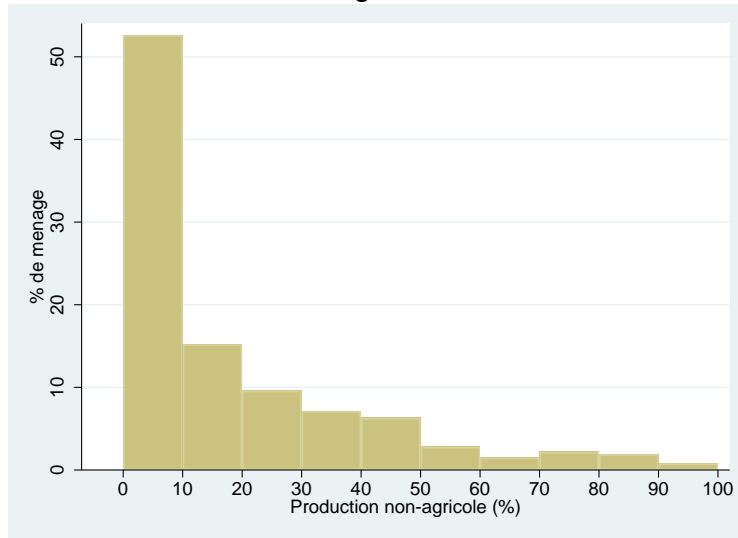


Source : Analyse de l'Enquête auprès des ménages ruraux sur la résilience 2019

Graphique 9 shows the repartition of rural households according to the share of revenue coming from non-agricultural production. Slightly more than half of rural households earn 0-10% of their revenue from non-agricultural activities. Roughly one-fifth of all rural households (21%) have no revenue from

non-agricultural activities, while another 30% earn 1-10% of their revenue from these activities. The small bars to the right of the graph indicate that few rural households earn a majority of their revenue from non-agricultural activities.

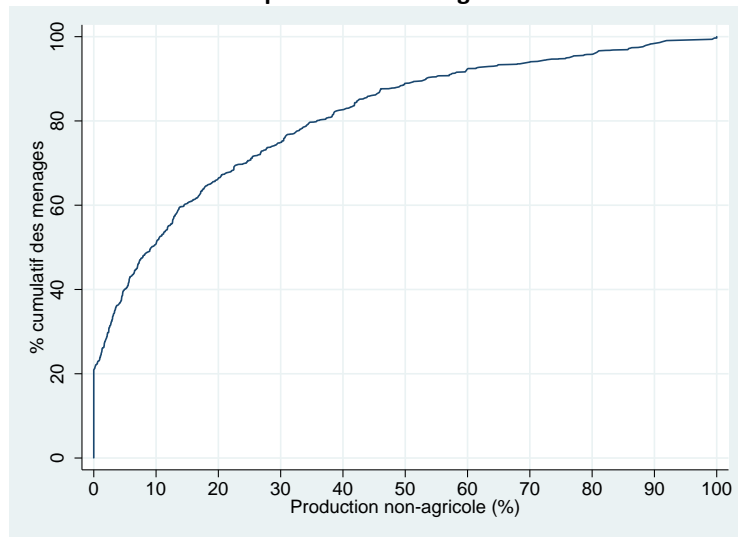
Graphique 9. Répartition des ménages selon la contribution de la production non-agricole



Source : Analyse de l'Enquête auprès des ménages ruraux sur la résilience 2019

Graphique 10 provides the cumulative repartition of rural households earning less than a given percentage of their revenue from non-agricultural activities. About 89% of all rural households earn less than half of their revenue from non-agricultural activities, implying that 11% earn more than half of their revenue from this source. This graph confirms that for most rural households in Burkina Faso, non-agricultural activities make a relatively small contribution to overall revenue.

Graphique 10. Répartition cumulative des ménages selon la contribution de la production non-agricole



Source : Analyse de l'Enquête auprès des ménages ruraux sur la résilience 2019

The data also allow us to show the composition of revenue for different types of households. Tableau 49 shows the average share of revenue from each source for households in each agro-ecological zone. The contribution of pastoral production is lowest in the South Sudanian zone, as expected given the higher rainfall and greater opportunities for crop production. The contribution of non-agricultural activities is highest in the South Sudanian zone, perhaps reflecting the higher revenue in this zone which generates demand for non-food consumer goods. It is somewhat surprising to see that the importance of pastoral production in the Sahelian zone is barely greater than the national average. In other words, the survey data do not indicate that households in the Sahelian zone are more dependent on pastoral production than average. Furthermore, the importance of crop production in the Sahelian zone is roughly equal to the national average, in spite of the low rainfall in this zone.

The last two rows of the table give the average net revenue per household and per capita in each zone. We focus on per capita revenue in the last row since it is a measure of standard of living. The Sahelian zone has the lowest average per capita revenue of the three zones. Households in the North Sudanian zone have average revenues about 50% higher than in the Sahelian zone, while those in the South Sudanian zone have average revenues almost double those of the North Sudanian zone. This geographic pattern was also found in the asset index, as shown in Tableau 8.

Tableau 49. Composition du revenu net par zone (% moyen)

	Zone			Total
	Sahélienne	Nord-soudanienne	Sud-soudanienne	
Production pastorale (%)	23.9	28.0	16.6	23.2
Bovins (%)	19.1	24.4	14.2	19.4
Chèvres (%)	3.8	2.9	1.9	3.0
Moutons (%)	1.0	0.7	0.5	0.8
Autre production agricole (%)	58.3	55.0	59.9	57.7
Activité non-agricole (%)	17.8	17.0	23.5	19.2
Total (%)	100.0	100.0	100.0	100.0
Revenu net (FCFA/ménage/an)	797,443	1,226,795	2,394,956	1,380,991
Revenu net par tête (FCFA/tête/an)	136,544	204,348	350,385	217,901

Source : Analyse de l'Enquête auprès des ménages ruraux sur la résilience 2019

Tableau 50 shows the composition of revenue by revenue category. As discussed in Section 3.2, the revenue categories are based on per capita revenue, including crop production, livestock revenue, and non-agricultural revenue, with each category including 20% of the households. The contribution of pastoral production is highest in the middle revenue category (27%) and lower among both poor and richer categories. The contribution of other agricultural production (including crops and non-ruminants) is highest among the poorest category but does not show a consistent pattern otherwise. Finally, the contribution of non-agricultural activities is lowest in the poorest revenue group (11%) and highest in the two richest categories (23% and 22%).

Of course, the average net revenue per household and per capita rises steadily across the revenue categories. The richest 20% of rural households have per capita revenues that are, on average, 13 times greater than those of the poorest 20% of rural households.

Tableau 50. Composition du revenu net par quintile (% moyen)

	Catégorie de revenu par tête					Total
	Le plus pauvre	2ième	3ième	4ième	Le plus riche	
Production pastorale (%)	19.9	24.0	27.2	24.8	19.8	23.2
Bovins (%)	12.7	20.1	23.8	22.2	18.2	19.4
Chèvres (%)	5.7	3.2	2.7	2.0	1.2	3.0
Moutons (%)	1.5	0.6	0.7	0.5	0.5	0.8
Autre production agricole (%)	68.8	56.2	53.3	52.2	58.1	57.7
Activité non-agricole (%)	11.3	19.8	19.5	23.0	22.1	19.2
Total (%)	100.0	100.0	100.0	100.0	100.0	100.0
Revenu net (FCFA/ménage/an)	389,668	695,965	1,110,798	1,445,175	3,277,955	1,380,991
Revenu net par tête (FCFA/tête/an)	44,778	91,332	137,424	229,311	589,436	217,901

Source : Analyse de l'Enquête auprès des ménages ruraux sur la résilience 2019

3.6.5. Economic returns to pastoral production

Is pastoral production profitable? One measure of profitability is the rate of return on investment, that is, the annual revenue from an economic activity as a percentage of the value of assets required to carry out the activity. In the case of livestock, this is calculated as the annual net revenue from animal production as a percentage of the value of the animals.

We can calculate the rate of return in two ways. The first method is to calculate the ratio of the annual net revenue per animal to the average value of the animal. As described earlier, the annual net revenue is the sum of animal sales, the value of by-products, and the value of animals slaughtered for home consumption minus the value of animals purchased and the cost of inputs. The annual net revenue is divided by the number of animals owned to get the annual net revenue per animal across households who own that type of animal, shown in the second column of Tableau 51. The value of each animal is calculated as the average of the purchase price and sale price from Tableau 24, as shown in the first column of Tableau 51. The ratio of the two numbers is given in the third column of Tableau 51.

The second method uses the regression analysis described in section 3.6.4. The regression analysis gives us a quadratic equations describing the relationship between net revenue from each type of animal and the number of animals owned. The slope of this line is the marginal net revenue, that is, the increase in net revenue associated with a one unit increase in ownership. The slope can be calculated from the regression coefficients. The marginal return is shown in the fourth column of Tableau 51 and the ratio of the marginal return and the value per animal is in the last column.

How do we interpret these rates of return? The answer depends partly on the level of risk of the investment and partly on the alternative investments that are available. But in general, a return of 1-4% is considered low, 5-9% is considered moderate, and 10% or above is considered quite good. Based on the average rate of return in Tableau 51, cattle and goats are very good investments with returns much higher than almost any alternative investment. On the other hand, the average rate of return of sheep is positive, but barely moderate. Looking at the marginal rate of return in the last column, cattle and goats are again quite good investments, while sheep generate only moderate returns.

Tableau 51. Taux de rendement de la production pastorale

Type d'animal	Valeur par animal (FCFA)	Revenu moyen par animal (FCFA)	Taux moyen de rendement (%)	Rendement marginal (FCFA/animal)	Taux marginal de rendement (%)
Bovins	149,905	118,669	79%	14,432	10%
Chèvres	13,028	3,431	26%	3,634	28%
Moutons	23,350	1,177	5%	1,123	5%

Source : Analyse de l'Enquête auprès des ménages ruraux sur la résilience 2019

3.7. Pastoral and agro-pastoral households

In this section, we use survey information to classify households into different categories depending on their source of livelihood. In particular, we are interested in identifying households that are pastoralists and agro-pastoralist in order to examine how they are different from other households.

3.7.1. Definition of pastoral and agro-pastoral households

In Section 3.6.1, we adopted the definition of “pastoralism” expressed by the Conseil National Transitoire (2015): “toute activité d'élevage consistant à assurer l'alimentation et l'abreuvement des animaux par l'exploitation directe des ressources naturelles sur des espaces déterminés et impliquant la mobilité des animaux.” However, we still need to establish criteria to define *pastoral households*, since classifying households by livelihood strategy is one of the objectives of this report. Tableau 52 uses the survey data to indicate the proportion of the population that fits under various definitions of a pastoral household. As shown in the first row, if we define pastoralists broadly as any household with livestock production, then 96% of rural households in Burkina Faso would be considered pastoralist (see first row of Tableau 45). However, this definition is clearly too broad, as it would even include households growing crops who also have some guinea fowl.

If we narrow the definition to include only households owning ruminants (cattle, goats, and/or sheep), excluding households with poultry and pigs, then 91% of rural households would still qualify as “pastoralists” (see second row of Tableau 45). As before, this definition is too inclusive, as it would cover households who earn most of their livelihood from crops, but also own a few goats.

If we further narrow the definition to households owning ruminants whose animals are displaced during the dry season, either by a member of the household or a salaried herder, then just 9% of rural households would qualify. Similarly, if we focus on households who bring their animals in the seasonal migration, then the proportion drops to less than 6% of rural households. Similarly, the proportion of households that provide services of [gardienage] to livestock belonging to other households is slightly above 6% (see rows 3-5 of Tableau 45).

Finally, if we define pastoralists narrowly to be households owning ruminants with no crop production, then just 1% of rural households would be considered pastoralists. Because almost all rural households in Burkina Faso (99%) grow crops and almost all (91%) produce ruminants, any practical definition of pastoralists and agro-pastoralists needs to be based on the contribution of each activity to household revenue.

Tableau 52. Proportion de ménages ayant différent niveau de participation a la production pastorale

Déscription	Proportion de ménages ruraux (%)	Nombre estimé de ménages ruraux (million)	Nombre estimé de personnes (million)
Ménages possédant des animaux	96	2,63	19.6
Ménages possédant des ruminants	91	2.48	18.7
Ménages possédant des ruminants qui sont déplacés	9.0	0.24	1.80
Ménages qui possèdent y déplacent leur ruminants	5.7	0.16	1.17
Ménages qui réalisent le gardiennage des ruminants d'autres ménages	6.4	0.18	1.48
Ménages qui possèdent des ruminants et qui ne produisent pas de récoltes	1.1	0.03	0.12

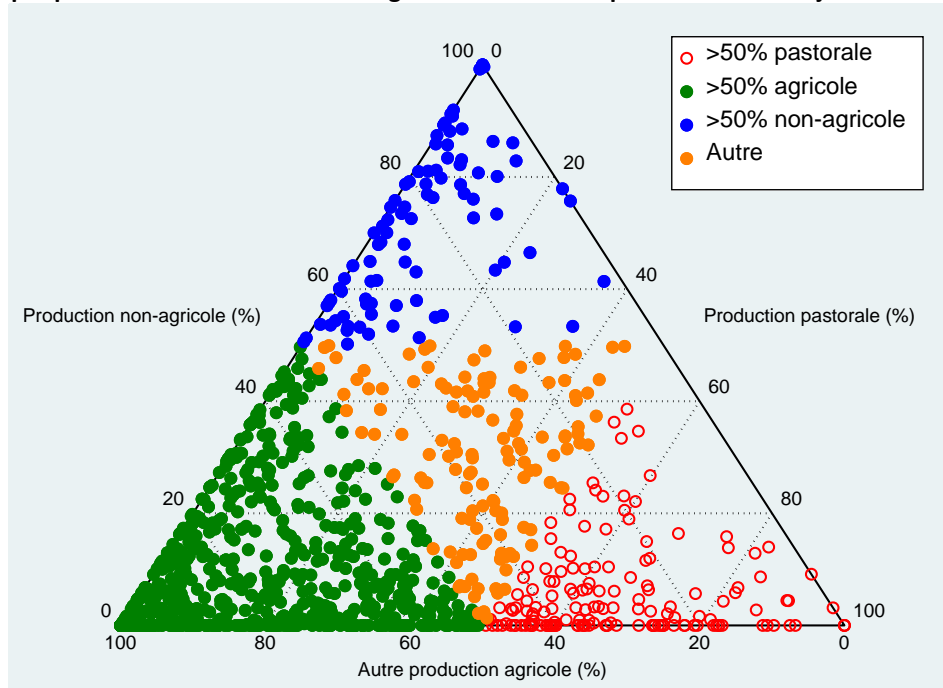
Source : Analyse de l'Enquête auprès des ménages ruraux sur la résilience 2019

We will classify households into livelihood categories based on the contribution of the three types of net revenue discussed in Section 3.6: pastoral production, other agricultural production, and non-agricultural activities. The composition of net revenue for each household can be represented using a triangular graph, as shown in Graphique 7. Each household in the sample is represented by a dot and the location on the triangle indicates the composition of revenue. The lower right corner represents 100% pastoral production revenue, the lower left corner represents 100% other agricultural revenue, and the top corner represents 100% non-agricultural revenue. The colors of the dots reflect the classification system.

One classification system would be to define each livelihood category based on the activity that generates the *majority* of net revenue. For example, FAO (2002) defines pastoral production systems as one in which the gross revenue from livestock production represents more than 50% of the total. Here, we use a somewhat different definition because we are using net revenue (not gross) and focusing on ruminant production rather than all livestock production.

In Graphique 7, the red circles in the lower right corner are households with at least 50% of net revenue derived from pastoral production, the green dots are those with a majority of revenue from other agricultural production, and the blue dots are those relying mainly on non-agricultural revenue. The orange dots in the center of the triangle are households for which none of the three sources of revenue reaches 50%. From the graph, it is clear that the density of dots is greater in the lower left corner, reflecting the fact that most rural households in Burkina Faso get most of their revenue from other agricultural production, which consists mainly of crop revenue plus small amounts of non-ruminant revenue.

Graphique 11. Classification de ménages selon la source qui contribue la majorité de revenu



Source : Analyse de l'Enquête auprès des ménages ruraux sur la résilience 2019

Tableau 53 shows the proportion of households in each of the four livelihood categories according to the classification system in Graphique 11. About 61% of households are classified as “agricultural households,” defined as those receiving most of their revenue from crops and non-ruminant animals (it would be more precise to call them “households of other agricultural production” but this is cumbersome). These are identified as green dots on the graph. Another 12.5% of rural households would be considered pastoral households (represented by the red circles), 11% would be non-agricultural households (blue dots), and the remaining 15% would be households of mixed revenue (orange dots).

Tableau 53. Proportion de ménages selon la source majoritaire de revenu

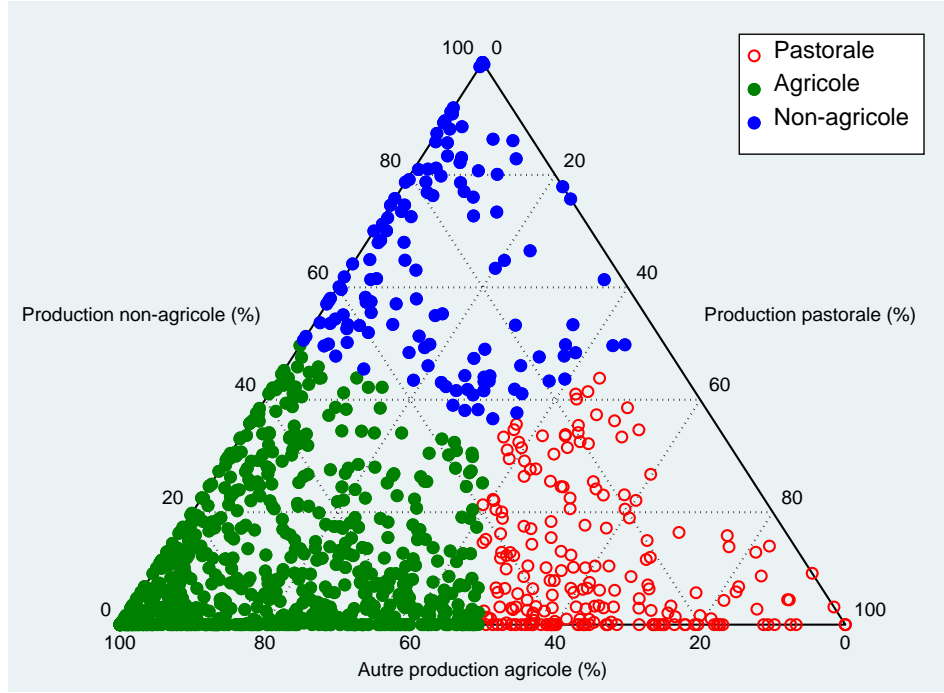
Source de revenu qui représente la majorité du total	Proportion de ménages (%)
Production pastorale	12.5
Autre production agricoles	61.1
Production non-agricoles	11.1
Production mixte (aucune source majoritaire)	15.3
Total	100.0

Source : Analyse de l'Enquête auprès des ménages ruraux sur la résilience 2019

A second option for classifying households would be to assign each household to a category depending on the revenue source that is the *most important* of the three, regardless of whether it contributes a majority of revenue. Graphique 12 shows the triangle graph with dots (households) in the same location, but some have changed color representing reclassification. As before, the red circles in the lower right corner represent pastoral households, the green dots represent agricultural households, and the blue dots represent non-agricultural households. In this classification system, there is no “mixed

revenue” category. All the households that were in this category have been reclassified depending on the source that has the largest contribution to the total, even though the contribution may be less than 50%.

Graphique 12. Classification de ménages selon la source la plus importante de revenu



Source : Analyse de l'Enquête auprès des ménages ruraux sur la résilience 2019

Tableau 54 gives the percentage of rural households in each category in Graphique 12. Pastoral households account for 17.5% of the total, other agricultural households for 67%, and non-agricultural households for 15% of the total.

Tableau 54. Proportion de ménages selon la source la plus importante de revenu

Source de revenu la plus importante	Proportion de ménages (%)
Production pastorale	17.5
Autre production agricole	67.3
Production non-agricole	15.2
Total	100.0

Source : Analyse de l'Enquête auprès des ménages ruraux sur la résilience 2019

However, these two classification systems are not ideal because they do not include a category for agro-pastoral households. There is wide-spread recognition that many households rely on both crop and animal production, taking advantage of the complementarities such as the use of animal manure on crops and the use of crop residues for animals. The Loi d'Orientation includes a separate definition for agro-pastoralism: "l'ensemble des systèmes et des techniques d'utilisation des terres intégrant les productions animales et végétales » (CNT, 2015).

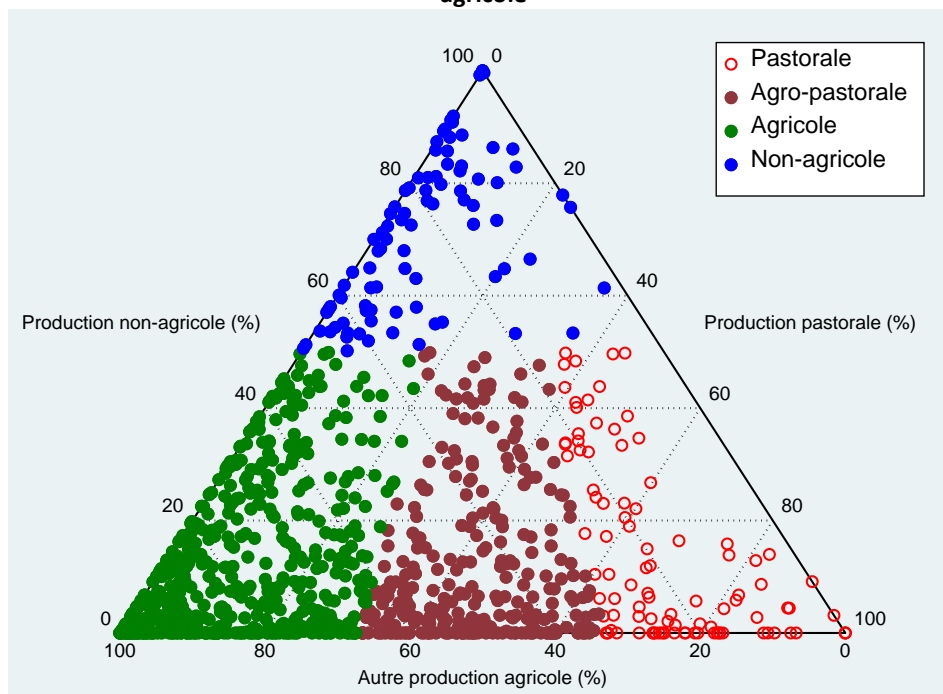
In the third classification system, we add a category for agro-pastoral households. The definitions of each category are as follows:

- Pastoral households are those for which a) the sum of pastoral and other agricultural revenue is greater 50% of the total and b) pastoral revenue is at least twice as large as revenue from other agricultural production.
- Agro-pastoral households are those for which a) the sum of pastoral and other agricultural revenue is greater than 50% of the total and b) neither pastoral revenue nor other agricultural revenue is twice as large as the other.
- Agricultural households are those for which a) the sum of pastoral and other agricultural revenue is greater 50% of the total and b) revenue from other agricultural production is at least twice as large as revenue from pastoral production.
- Non-agricultural households are those for which non-agricultural revenue represents at least 50% of the total.

Another way to understand the definitions of pastoral, agro-pastoral, and agricultural households is to consider the case of a household that has less than 50% of its revenue from non-agricultural activities (this implies that the household is the lower half of the triangle diagram). If pastoral revenue is more than one-third of combined agro-pastoral revenue, the household is classified as pastoral; if pastoral revenue is between one-third and two-thirds of this total, the household is considered agro-pastoral; and if pastoral revenue is less than one-third, the household is defined as agricultural.

The result of these definitions is shown in Graphique 13. Again, the red circles represent pastoral households, the green dots are agricultural households, and the blue dots are non-agricultural households. Agro-pastoral households, the new category, are the maroon dots in the lower center of the graph, in between the pastoral and agricultural households.

Graphique 13. Classification des ménages pastorale, agro-pastorale, agricole, et non agricole



Source : Analyse de l'Enquête auprès des ménages ruraux sur la résilience 2019

Tableau 55 shows the proportion of households in each category using the system of classification in Graphique 13. The proportion of pastoral households is now slightly under 8%, less than in the two

previous classification systems because some of the pastoral households have been reclassified as agro-pastoral. Similarly, the share of agricultural households is reduced to about 53%. The new agro-pastoral category includes more than one-quarter of rural households (28%). The proportion of non-agricultural households is 11%, the same as in Tableau 53, which used the same definition for non-agricultural households. Applying the weighting factors from the survey, we estimate that there are 1.38 million people living in rural pastoral households and 6.05 million people in rural agro-pastoral households.

Tableau 55. Proportion et nombre de ménages selon la catégorie professionnelle

Catégorie professionnelle	Proportion de ménages (%)	Nombre de ménages (million)	Nombre de personnes (million)
Ménages pastoraux	7.9	0.22	1.38
Ménages agro-pastoraux	27.7	0.75	6.05
Ménages agricoles	53.3	1.45	11.05
Ménages non-agricoles	11.1	0.30	1.44
Total	100.0	2.72	19.92

Source : Analyse de l'Enquête auprès des ménages ruraux sur la résilience 2019

This third system of classification seems to correspond best to the definitions in the Loi d'Orientation (CNT, 2015), as well as the implicit definitions of these terms in Burkina Faso. For this reason, we will adopt this system of classification. In the next section, we examine the characteristics of pastoral and agro-pastoral households compared to agricultural households and non-agricultural households in rural Burkina Faso.

3.7.2. Characteristics of pastoralist and agro-pastoralist households

In this section, we examine differences between households using the professional categories defined in the previous section: pastoral households, agro-pastoral households, agricultural households, and non-agricultural households. In Tableau 56, we show basic characteristics of the households in the four professional categories. Non-agricultural households are distinctive in having relatively small households (4.8 members) and a high proportion of female-headed households (12%). Pastoral households are the only category with fewer women than men (though the margin is small), and they also have higher rates of illiteracy (63%) compared to the other categories (47-51%). The last row shows that pastoral households have relatively small cultivated areas (2.6 ha) compared to the average (5.1 ha). As expected, agricultural households have the largest cultivated area (6.1 ha) and non-agricultural households have the smallest (2.0 ha).

Tableau 56. Caractéristiques des ménages ruraux par catégorie professionnelle

	Catégorie professionnelle				Total
	Pastorale	Agro-pastorale	Agricole	Non-agricole	
Taille de ménage	6.4	8.0	7.6	4.8	7.3
Age du chef de ménage	45.0	46.1	45.1	34.9	44.3
Chefs féminins (%)	4.8	1.3	5.7	12.0	5.1
Femme (%)	49	52	54	51	53
Non-alphabètes (%)	63	50	47	51	49
Superficie cultivée (ha.)	2.6	5.2	6.1	2.0	5.1

Source : Analyse de l'Enquête auprès des ménages ruraux sur la résilience, 2019.

The patterns of crop production for each professional category is shown in Tableau 57. Although pastoral households are defined as those for which pastoral revenue is at least twice as large as crop revenue, almost all of them (100% in our sample) grow crops. In fact, the proportion of pastoral households growing maize, sorghum, and millet is similar to the proportion of other rural households growing these crops. On the other hand, pastoral households are less likely to grow cowpeas, groundnuts, vouandzou, okra, tomatoes, cotton, and sesame. In general, it seems that pastoral households focus on staple grains, but are less likely to grow cash crops than other rural households. The crop mix of agro-pastoral households is similar to that of agricultural households.

Tableau 57. Proportion de ménages ruraux qui produisent chaque culture par catégorie professionnelle

	Categorie professionnelle				Total
	Pastorale	Agro-pastorale	Agricole	Non-agricole	
Maïs	73	69	71	56	69
Sorgho	79	88	81	65	81
Millet	62	75	64	26	62
Riz	10	24	22	8	20
Niébé	41	68	76	52	68
Arachides	35	50	68	51	58
Vouandzou (pois de terre)	8	17	25	4	19
Haricots mung beans	8	5	4	1	4
Gombo	29	48	53	19	46
Tomates	4	6	18	5	12
Autres légumes	4	5	17	2	11
Fruit	0	1	5	0	3
Autres cultures vivrières	5	1	11	1	7
Coton	6	25	23	8	20
Sésame	8	42	39	11	34
Autres cultures de rente	0	6	8	0	6
Total produisant de cultures	100	100	100	88	99

Source : Analyse de l'Enquête auprès des ménages ruraux sur la résilience, 2019

Tableau 58 explores the value of crop production and marketing across occupational categories. The value of crop production among pastoral households is small, about one-quarter of the average value in rural areas. In fact, the value of crop production among agro-pastoral households is 2.5 times as much as among pastoral households, and agricultural households produce almost 6 times as much. Pastoral households are also much less market oriented in their crop production. They sell 24% of the total value of crop production, compared to 37% for agro-pastoral households and 53% for agricultural households. The average marketed share (calculated at the household level and then averaged) is smaller but follows the same pattern across occupational categories.

Tableau 58. Commercialisation de cultures par catégorie professionnelle

Catégorie professionnelle	Valeur de la production végétale (FCFA par ménage)	Valeur des ventes de cultures (FCFA par ménage)	Proportion de la production qui est vendue (%)	Taux de commercialisation moyen (%)
Pastorale	244,209	59,507	24	16
Agro-pastorale	632,602	232,222	37	27
Agricole	1,431,144	764,031	53	34
Non-agricole	280,586	93,409	33	24
Total	988,275	486,528	49	29

Source : Analyse de l'Enquête auprès des ménages ruraux sur la résilience, 2019.

Almost all rural households in Burkina Faso own livestock, but ownership is even more widespread among pastoral and agro-pastoral households. As shown in Tableau 59, cattle are owned by 60% of all rural households but 99% of pastoral households. Similar differences appear in the proportion of households owning goats and sheep. On the other hand, pastoral households are less likely to own donkeys and pigs and equally likely to own poultry compared to other rural households. As expected, non-agricultural households are considerably less likely to own each type of livestock compared to the average. By definition, all pastoral and agro-pastoral households own livestock in general and ruminants in particular.

Tableau 59. Proportion de ménages possédant chaque type d'animale par catégorie professionnelle

Type d'animal	Categorie professionnelle				Total
	Pastorale	Agro-pastorale	Agricole	Non-agricole	
	(pourcentage de ménages)				
Bovins	99	99	44	15	60
Chèvres	89	82	71	52	74
Moutons	66	74	54	49	60
Anes	44	65	56	21	53
Porc	2	12	13	10	11
Volailles	79	75	78	55	75
Total possédant un animal	100	100	96	87	96
Total possédant un ruminant	100	100	88	74	91

Source : Analyse de l'Enquête auprès des ménages ruraux sur la résilience, 2019.

To give an idea of the scale of livestock production, Tableau 60 gives the average number of each type of animal owned among owners. For example, pastoral households have an average of 32 cattle, while households in the other three professional categories have 5-7 cattle on average. The same pattern is followed in the ownership of goats and sheep. However, in the case of donkeys, pigs, and poultry, there is little difference in the herd size among owners of each type of animal.

Tableau 60. Nombre d'animaux possédés par catégorie professionnelle

Type d'animal	Categorie professionnelle				Total
	Pastorale	Agro-pastorale	Agricole	Non-agricole	
	(nombre d'animaux possédés parmi les propriétaires)				
Bovins	32	7	6	5	10
Chèvres	13	9	8	7	9
Moutons	12	9	6	6	8
Anes	1	2	2	2	2
Porc	4	7	6	7	7
Volailles	18	20	18	17	18

Source : Analyse de l'Enquête auprès des ménages ruraux sur la résilience, 2019

The composition of net revenue by professional category is shown in Tableau 61. Since the professional categories are defined by the importance of each source of revenue, it is not surprising that there are sharp differences in composition across categories. Pastoral production accounts for an average of 23% of net revenue across all rural households, but among pastoralists it represents almost two-thirds (65.5%) of the total. In contrast, pastoral production represents just 42% of the net revenue of agro-pastoral households, 11% for agricultural households, and 4% among non-agricultural households. In addition, cattle production dominates pastoral production among pastoral and agro-pastoral households, accounting for 90% of the value of pastoral production. In contrast, goats and sheep are relatively more important among agricultural and non-agricultural households.

For agro-pastoral households, pastoral production and other agricultural production contribute similar amounts to net revenue, 42% and 45%, respectively. Among agricultural households, other agricultural production represents more than three-quarters (77%) of the net revenue of the household. Similarly, among non-agricultural households, non-agricultural activities contribute almost three-quarters (73%) of net revenue.

The last line in the table shows the average value of per capita net revenue, a measure of the standard of living. The average per capita revenue is roughly 25% lower among pastoral and agro-pastoral households compared to agricultural and non-agricultural households in rural areas.

Tableau 61. Composition du revenu net par catégorie professionnelle

	Catégorie professionnelle				Total
	Pastorale	Agro-pastorale	Agricole	Non-agricole	
Production pastorale (%)	65.5	41.9	11.1	4.2	23.2
Bovins (%)	59.3	38.1	7.4	1.9	19.4
Chèvres (%)	4.4	2.9	3.0	1.9	3.0
Moutons (%)	1.8	0.8	0.7	0.4	0.8
Autre production agricole (%)	19.5	45.2	77.2	22.7	57.7
Activité non-agricole (%)	14.9	13.0	11.8	73.1	19.2
Total (%)	100.0	100.0	100.0	100.0	100.0
Revenu net (FCFA/ménage/an)	1,049,223	1,149,332	1,591,935	1,182,890	1,380,991
Revenu net par tête (FCFA/tête/an)	184,262	181,149	235,873	247,287	217,901

Source : Analyse de l'Enquête auprès des ménages ruraux sur la résilience 2019

In later sections, we provide other tables that compare pastoral and agro-pastoral households to other rural households on topics relating to food security, diet diversity, use of government services, and perceptions about constraints on livestock production.

3.8. Food security and diet diversity

The government of Burkina Faso adopts the FAO definition of food security : “assurer à toute personne, à tout moment, un accès physique et économique à une nourriture suffisante, saine et nutritive lui permettant de satisfaire ses besoins énergétiques et ses préférences alimentaires pour mener une vie saine et active » (CNT, 2015). To measure food security, we use a common indicator: whether or not the household has experienced food shortages. More specifically, the survey asked respondents “over the course of the last 12 months, has your household experienced a period of food shortage?” Overall, 27% of the rural households said that they had experienced a period of food insecurity. As shown in Tableau 62, the proportion is highest in the Sahelian zone (41%) and lowest in the North Sudanian zone (14%).

As expected, the proportion of households experiencing food shortage varies strongly with per capita revenue. Among the poorest households, almost half (48%) have experienced food insecurity. The proportion declines to just 8% in the highest-revenue category. These results show the close relationship between food security and per capita revenue.

About 22% of pastoral and agro-pastoral households report experiencing a food shortage over the previous 12 months, which is slightly below the average for rural households (27%). The most food insecure category is agricultural households. The most food secure households are non-agricultural households, presumably because this category includes higher-revenue households who own non-agricultural enterprises and earn wage revenue.

Tableau 62. Proportion de ménages ayant connu une période d'insecurité alimentaire

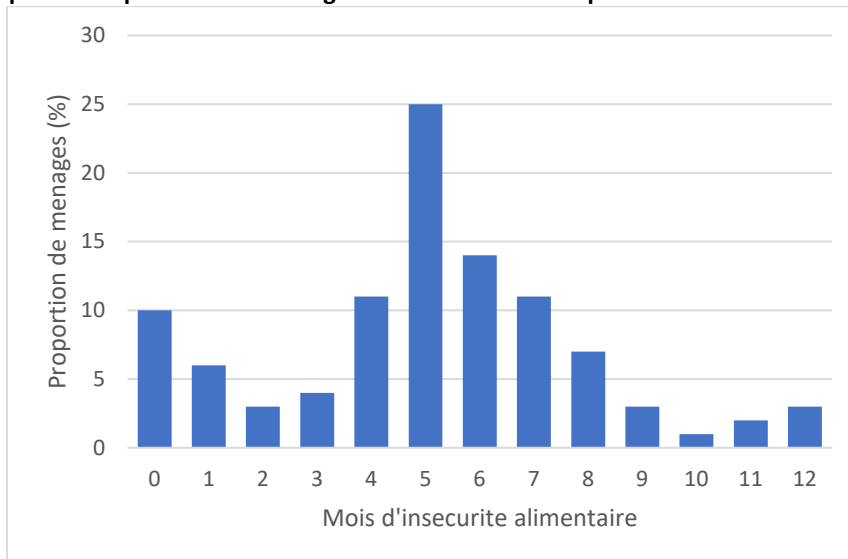
		Proportion de ménages (%)
Zone	Sahélienne	41.1
	Nord-soudanienne	13.9
	Sud-soudanienne	21.5
	Total	27.0
Catégorie de revenu	Le plus pauvre	48.4
	2ième	37.3
	3ième	20.9
	4ième	20.5
	Le plus riche	8.0
	Total	27.0
Catégorie professionnelle	Pastorale	21.7
	Agro-pastorale	22.1
	Agricole	31.9
	Non-agricole	19.9
	Total	27.0

Source : Analyse de l'Enquête auprès des ménages ruraux sur la résilience 2019

Another dimension of food security is the duration of the periods of food shortage. Since the definition of food security refers to access to food “at all moments”, a period of six months of food shortage is more serious than a period of just one month. Among the 244 households who experience a period of food shortage, the period lasts an average of 5.1 months. As shown in Graphique 14, about 16% of these

households report that the period of food shortage lasts one month or less, while 5% say it lasts 11 or 12 months. About half of the households report that the period is 4-6 months.

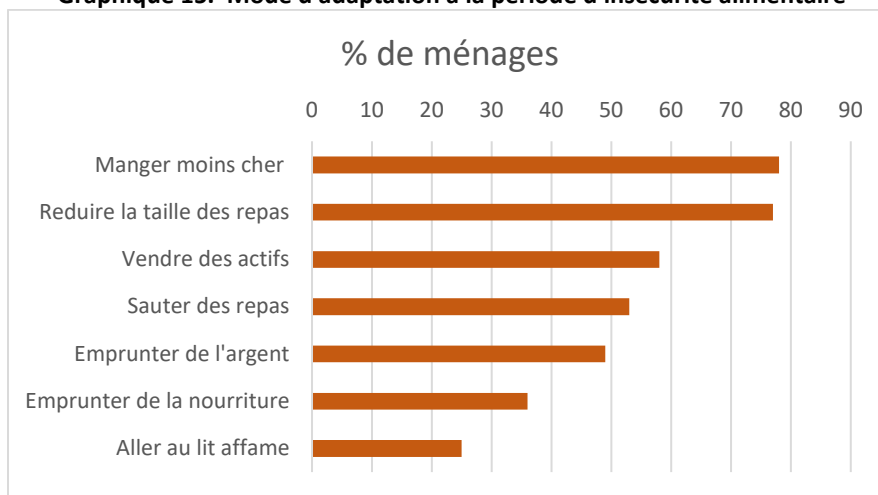
Graphique 14. Repartition de ménages selon la durée de la période d'insecurité alimentaire



Source : Analyse de l'Enquête auprès des ménages ruraux sur la résilience 2019

The survey also asked about the modes of adaptation to these periods of food insecurity, allowing multiple responses. As shown in Graphique 15, the two most common types of adaptation, reported by more than three-quarters of the respondents who experienced food security, were eating less expensive types of food (78%) and reducing the size of meals (77%). Eating less expensive food presumably refers to increasing the share of basic staple grains such as sorghum, millet, and maize, while decreasing the share of meat, fish, fruits, and vegetables. Roughly half of the respondents said that they sold assets, skipped meals, and borrowed money to cover expenses. Fewer households reported borrowing food (36%) and going to bed hungry (25%).

Graphique 15. Mode d'adaptation à la periode d'insecurite alimentaire



Source : Analyse de l'Enquête auprès des ménages ruraux sur la résilience 2019

Another dimension of food security is diet diversity. Food insecure households are forced to focus their diet on the least expensive sources of calories, namely staple grains and roots. Food secure households

are able to consume a more diverse diet including animal products, pulses, vegetables, and fruit. This is consistent with the results above in which many households eat less expensive foods in response to food shortages. For this reason, diet diversity can be considered a measure of diet quality and food security. Arimond and Ruel (2004) use data from the Demographic and Health Surveys in eleven countries to demonstrate that greater diet diversity is associated with better nutritional status of children.

Tableau 63 shows the proportion of households reporting consumption of each type of food over the previous 24 hours. The most commonly consumed items are green leaves (87%), sugar or honey (76%), “other food” (65%), and sorghum (61%). The proportion consuming animal products was much smaller. For example, 18% reported consuming meat, 27% fish, and 12% milk or other dairy products.

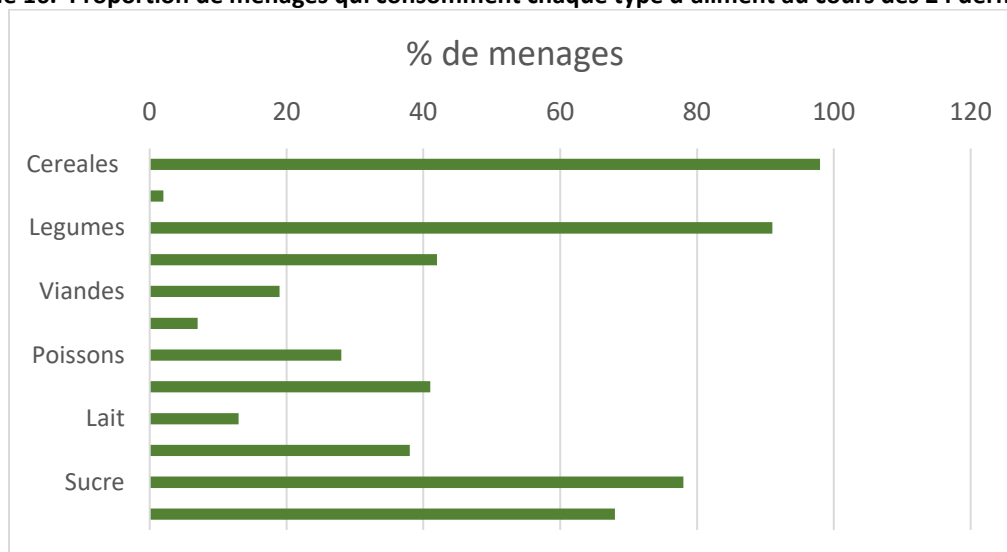
Tableau 63. Aliments consommés au cours des 24 dernières heures

	Proportion de ménages (%)
Riz	32
Mais	44
Sorgho etc	61
Manioc etc	1
Feuilles vertes	87
Legumes oranges	4
Autres legumes	13
Fruits oranges	44
Autre fruits	10
Legumineuses	40
Viandes	18
Poisson	27
Insectes	1
Des oeufs	8
Lait etc.	12
Huiles et gras	37
Sucre et miel	76
Autres aliments	65

Source : Analyse de l'Enquête auprès des ménages ruraux sur la résilience 2019

Graphique 16 shows the proportion of households reporting consumption of each category of food over the last 24 hours. For example, when we combine sorghum, millet, maize, rice, and other cereals into one category, we see that almost all households (98%) report consuming at least one cereal. Similarly, 91% say they consumed at least one type of vegetable over this period.

Graphique 16. Proportion de ménages qui consomment chaque type d'aliment au cours des 24 dernière heures



Source : Analyse de l'Enquête auprès des ménages ruraux sur la résilience 2019

Tableau 64 and Tableau 65 show the proportion of households consuming each category of food by agro-ecological zone and by revenue category, respectively. There is little variation across agro-ecological zones in the share of households consuming cereals, roots, vegetables, and vegetable oil. However, fruit, meat, fish, and eggs are consumed more widely in the south than in the north.

The last row of the table gives the average number of food categories consumed out of the 12 listed. This is a standard measure of diet diversity called Household Dietary Diversity Index Score (HDDS), developed by the Food and Agriculture Organization (FAO, 2010). In the Sahelian zone, an average rural household consumes food from 4.8 categories in a day, while in the North Sudanian and South Sudanian zones, the average is 5.5. This suggests that diets are less diverse in the Sahelian zone than in the two southern zones.

Tableau 64. Catégorie d'aliments consommés au cours des 24 dernières heure par zone

	Zone			Total
	Sahélienne	Nord-soudanienne	Sud-soudanienne	
	% de ménages			
Cereales	96.9	98.4	98.1	97.8
Racines	1.7	1.6	1.6	1.6
Legumes	89.7	93.8	89.1	90.8
Fruits	30.3	48.4	50.0	42.4
Viandes	11.1	22.2	23.4	18.6
Ouefs	5.3	7.2	8.8	7.0
Poissons	25.6	22.8	34.4	27.5
Legumineuses	30.8	53.1	38.8	40.5
Lait	15.0	7.5	15.3	12.7
Aceite	36.1	39.7	37.2	37.6
Sucre	85.3	74.4	71.9	77.5
Autre	66.1	73.4	63.8	67.7
Nombre moyen	4.8	5.5	5.5	5.2

Source : Analyse de l'Enquête auprès des ménages ruraux sur la résilience 2019

Tableau 65 shows the same information for each revenue category. Once again, the proportion of households consuming cereals and vegetables is fairly high across all types of households. However, there is more variation in fruit and animal products. For example, households in the wealthiest category are twice as likely to consume fruit and pulses in a given day, three times as likely to consume fish, and six times as likely to consume eggs compared to households in the poorest category. One exception to this pattern is milk, which is equally likely to be consumed by poor and wealthy households. This may reflect the fact that some poor households raise cattle and obtain milk from them.

The last row of the table gives the average number of categories consumed by a household within 24 hours. As expected, wealth households have more diverse diets than poor households. The diet diversity rises consistently across revenue categories, from 4.3 types of food among the poorest households to 5.7 types of food among the richest. This indicates that income is a good predictor of diet diversity.

Tableau 65. Catégorie d'aliments consommés au cours des 24 dernières heure par catégorie de revenu

Catégorie d'aliment	Catégorie de revenu					Total
	Le plus pauvre	2ième	3ième	4ième	Le plus riche	
	% de ménages					
Cereales	96.7	96.7	98.1	99.0	98.8	97.8
Racines	0.9	1.9	1.4	2.0	1.8	1.6
Legumes	88.8	90.5	94.3	91.3	88.7	90.8
Fruits	28.0	43.3	48.1	42.3	52.4	42.4
Viandes	10.3	17.1	20.3	19.4	28.0	18.6
Ouefs	3.7	5.7	7.5	7.7	11.3	7.0
Poissons	19.2	31.0	22.6	27.0	40.5	27.5
Legumineuses	35.0	41.0	39.2	44.4	44.0	40.5
Lait	9.8	10.0	14.6	14.3	15.5	12.7
Aceite	32.2	41.4	41.0	34.7	38.7	37.6
Sucre	69.6	77.1	79.7	82.7	79.2	77.5
Autre	61.2	72.4	66.5	69.4	69.6	67.7
Nombre moyen	4.3	5.2	5.4	5.4	5.7	5.2

Source : Analyse de l'Enquête auprès des ménages ruraux sur la résilience 2019

Tableau 66 shows the proportion of households consuming each type of food over the previous 24 hours across professional categories. As expected, almost all households consumed cereals and vegetables, but few households consumed more expensive and nutrient-rich foods such as meat, fish, and eggs. Pastoral households are slightly less likely to consume fish than the average for rural households, but more likely to consume milk. About 38% of pastoral households consumed milk over the past 24 hours compared to just 13% among rural households in general. The last row gives the average number of food categories consumed by households in each professional category, where higher numbers indicating better diet diversity. On average, pastoral households consumed food from 5.6 categories compared to 5.2 among rural households in general, indicating that their diet is somewhat more diverse than the average for rural areas.

Tableau 66. Catégorie d'aliments consommés au cours des 24 dernières heures par catégorie professionnelle

	Catégorie professionnelle				Total
	Pastorale	Agro-pastorale	Agricole	Non-agricole	
	(% de ménages)				
Cereales	94.9	97.9	98.1	98.9	97.8
Racines	2.0	1.1	1.9	1.1	1.6
Legumes	96.0	92.9	89.2	88.0	90.8
Fruits	41.4	42.9	40.8	51.1	42.4
Viandes	18.2	20.9	17.5	18.5	18.6
Ouefs	11.1	8.5	5.3	7.6	7.0
Poissons	24.2	20.2	30.9	33.7	27.5
Legumineuses	35.4	41.1	41.7	37.0	40.5
Lait	38.4	15.6	6.3	13.0	12.7
Aceite	41.4	41.5	35.3	34.8	37.6
Sucre	77.8	79.8	75.1	83.7	77.5
Autre	72.7	70.2	63.6	78.3	67.7
Nombre moyen	5.6	5.3	5.1	5.3	5.2

Source : Analyse de l'Enquête auprès des ménages ruraux sur la résilience 2019.

3.9. Perceptions des ménages ruraux

This section describes the results of the Survey of rural households on resilience regarding the perceptions of rural households. It includes four subsections: access to extension services, access to veterinary services, subsidized livestock inputs, and perceived constraints to livestock production.

3.9.1. Extension services

One of the main points of contact between the government and rural households is the extension system. The survey asked respondents whether any member of the household had any contact with an extension agent, including meetings, over the previous 12 months. As shown in Tableau 67, 38% of rural households reported contact with an extension agent, though there was considerable variation by agro-ecological zone. The proportion was lowest in the Sahelian zone (29%) and highest in the South Sudanese zone (48%). Among those reporting contact, the average number of visits per year was 2.5, with some modest variation by zone.

The second part of the table provides the same information for households in different income quintiles. Although the pattern is not uniform, low-income households were less likely to have contact with an extension agent than higher-income households. For example, in the poorest two quintiles, less than one-third of the households had contact with an extension agent, whereas the proportion was close to 41% in the third and fourth quintile and 50% in the richest quintile. The number of visits did not show any relationship with income.

The third part of the table indicates the degree of extension contact for households in each professional category. Over half (51%) of the pastoral households reported contact with an extension agent over the previous year, compared to 44% among agro-pastoralists, 35% among agricultural households, and 31% among non-agricultural households.

Tableau 67. Accès aux services de vulgarisation par type de ménage

		Proportion de ménages visités par un agent de vulgarisation au cours de l'année passée (%)	Nombre de visites par un agent de vulgarisation parmi les ménages visités au cours de l'année passée (nombres)
Zone	Sahélienne	29	2.1
	Nord-soudanienne	42	3.0
	Sud-soudanienne	48	2.4
	Total	38	2.5
Catégorie de revenu	Le plus pauvre	33	2.2
	2ième	27	2.8
	3ième	42	2.3
	4ième	40	2.6
	Le plus riche	50	2.5
	Total	38	2.5
Catégorie professionnelle	Ménages pastoraux	51	2.1
	Ménages agropastoraux	44	2.6
	Ménages agricoles	35	2.5
	Ménages non-agricoles	31	2.4
	Total	38	2.5

Source : Analyse de l'Enquête auprès des ménages ruraux sur la résilience 2019

Households may receive extension information in various forms. Tableau 68 shows the proportion of rural households that received extension information from various sources over the previous 12 months. Respondents were allowed to indicate receiving information from more than one source or from none. As noted above, 38% received information from an extension agent. In addition, 27% received information from a radio program, 27% from a friend or neighbor, and 7% from a vendor of agricultural inputs. Very few households received extension information from television or video (4%), printed documents (2%), or the internet (0%). Overall, households in the Sahelian zone were least likely to receive extension information from any source, while those in the South Sudanian zone were most likely to receive extension information.

Tableau 68. Proportion de ménages recevant des informations de chaque source par zone

Source	Zone			Total
	Sahélienne	Nord-soudanienne	Sud-soudanienne	
Agent de vulgarisation	24	46	50	38
Brochures, affiches, autre document	2	2	0	2
Émission de radio	19	32	35	27
Télévision ou vidéo	0	4	8	4
Vendeur d'intrants agricoles	0	11	12	7
l'Internet	0	0	0	0
Ami ou un voisin	19	32	32	27

Source : Analyse de l'Enquête auprès des ménages ruraux sur la résilience 2019

Tableau 69 gives the same information but for different professional categories. Somewhat less than one-half of pastoral and agro-pastoral households reported receiving information from an extension

agent, but the proportion was just one-third among agricultural and non-agricultural households. Radio emissions were reported by roughly one-quarter of the respondents in all four professional categories. Similarly, 27% reported receiving extension information from a friend or neighbor, the proportion being highest among pastoral households (34%).

Tableau 69. Proportion de ménages recevant des informations de chaque source par catégorie professionnelle

Source	Catégorie professionnelle				Total
	Pastorale	Agro-pastorale	Agricole	Non-agricole	
Agent de vulgarisation	45	46	34	33	38
Brochures, affiches, autre document	0	1	2	0	2
Émission de radio	28	27	28	24	27
Télévision ou vidéo	1	2	5	1	4
Vendeur d'intrants agricoles	9	6	7	11	7
l'Internet	0	0	0	1	0
Ami ou un voisin	34	25	25	33	27

Source : Analyse de l'Enquête auprès des ménages ruraux sur la résilience 2019

The survey also asked about the main type of information received from each source of information. Tableau 70 shows the results, excluding printed documents and internet for which there are too few observations. The table indicates that most of the extension information received (62%) concerned crop production, and another one-third (32%) focused on animal production. Very little of the extension information was about crop sales, animal sales, or weather. These patterns are fairly similar across information sources.

Tableau 70. Type d'information reçu selon la source d'information

Source	Type d'information					Total
	Production végétale	Commer-cialisation végétale	Production d'animaux	Commer-cialisation d'animaux	Météo	
Agent de vulgarisation	61	4	35	0	0	100
Émission de radio	66	4	25	2	2	100
Télévision ou vidéo	49	11	39	0	1	100
Vendeur d'intrants	85	10	4	0	0	100
Ami ou un voisin	55	3	36	4	1	100
Total	62	4	31	2	1	100

Source : Analyse de l'Enquête auprès des ménages ruraux sur la résilience 2019

The survey also asked about the quality of the information received from each source. Overall, the quality was rated highly, as shown in Tableau 71. Overall, more than one-third (37%) said the information was “very good” and over half (57%) said it was “good”, with only 6% saying it was “average”, “weak”, or “very weak”. Information from extension agents was the highest rated, with almost half the respondents (47%) saying the quality was “very good”. Information from television and video was lowest rated, with only 17% saying it was “very good”, but even in this case, 79% said the information was “good”.

Tableau 71. Qualité des informations reçues selon la source d'information

Source	Qualité					Total
	Très bonne	Bonne	Moyenne	Faible	Très faible	
Agent de vulgarisation	47	49	4	0	0	100
Émission de radio	31	63	5	1	0	100
Télévision ou vidéo	17	79	4	0	0	100
Vendeur d'intrants	38	54	5	3	1	100
Ami ou un voisin	34	57	7	1	1	100
Total	37	57	5	1	0	100

Source : Analyse de l'Enquête auprès des ménages ruraux sur la résilience 2019

3.9.2. Veterinary services

The survey also asked about veterinary services (see Tableau 72). For example, cattle owners were asked whether any of their animals had received artificial insemination over the previous years. Of the 597 respondents that were asked, none reported receiving artificial insemination services.

On the other hand, almost half of all rural households reported getting veterinary services in the previous 12 months. This proportion was higher in the South Sudanian zone (59%) than in the other two zones (45% and 47%). Among those reporting veterinary services, the average was 1.9 times. The average number of contacts was somewhat lower in the Sahelian zone (1.5 times) compared to the other two zones (2.2 times). These results suggest that access to veterinary services is lowest in the Sahelian zone and highest in the South Sudanian zone, though this could be related to availability or ability to pay.

Tableau 72. Accès et perception des services vétérinaires par zone agro-écologique

	Zone			Total
	Sahélienne	Nord-soudanienne	Sud-soudanienne	
Proportion de producteurs de bétail recevant d'insémination artificielle au cours de l'année passée (%)	0	0	0	0
Proportion de producteurs de bétail recevant des services vétérinaires au cours de l'année passée (%)	45	47	59	49
Fréquence de services vétérinaire (fois/an)	1.5	2.2	2.2	1.9
Type de service vétérinaire (%)				
Gouvernement	83	77	70	77
Fournisseur privé	15	23	28	22
Je ne sais pas	1	0	1	1
Total	100	100	100	100
Perception des services vétérinaires				
Très bonne	34	50	44	42
Bonne	57	45	50	51
Moyenne	8	5	5	6
Faible	2	0	1	1
Total	100	100	100	100

Source : Analyse de l'Enquête auprès des ménages ruraux sur la résilience 2019.

Among those receiving veterinary services, the government was the most common source of these services, accounting for more than three-quarters of all cases (see Tableau 72). The proportion of government-provided veterinary services was greatest in the Sahelian zone (83%) and lowest in the South Sudanian zone (70%). Conversely, private-sector veterinarians were almost twice as common in the South Sudanian zone compared to the Sahelian zone, though they represented less than one-third of the total in all three zones.

Finally, the quality of the veterinary services was rated highly: 42% rated it “very good” and another 51% rated it “good”. Just 7% rated the services “average” or “weak”. This positive rating of veterinary services was consistent across all three agro-ecological zones.

Tableau 73 summarizes information regarding access to veterinary services and perceptions of the quality of those services. The first row indicates that none of the cattle owned by the respondents in our sample received services of artificial insemination. On the other hand, about half (49%) the livestock owners received veterinary services. The proportion was higher for pastoralists, two-thirds of whom received veterinary services for their livestock. By comparison, the proportion for other occupational categories ranged from 36% for non-agricultural households to 55% for agro-pastoral households. The number of visits per year among those receiving visits did not vary substantially across categories.

Tableau 73. Accès et perception des services vétérinaires par zone agro-écologique

	Catégorie professionnelle				Total
	Pastorale	Agro-pastorale	Agricole	Non-agricole	
Proportion de producteurs de bétail recevant d'insémination artificielle au cours de l'année passée (%)	0	0	0	0	0
Proportion de producteurs de bétail recevant des services vétérinaires au cours de l'année passée (%)	67	55	47	36	49
Fréquence de services vétérinaire (fois/an)	1.8	2.0	1.9	1.9	1.9
Type de service vétérinaire (%)					
Gouvernement	86	82	76	54	77
Fournisseur privé	13	17	23	46	22
Je ne sais pas	01	2	0	0	1
Total	100	100	100	100	100
Perception des services vétérinaires					
Très bonne	37	55	34	49	42
Bonne	62	44	57	42	51
Moyenne	0	5	8	9	6
Faible	1	1	1	0	1
Total	100	100	100	100	100

Source : Analyse de l'Enquête auprès des ménages ruraux sur la résilience 2019.

The government was the main supplier of veterinary services according to more than three-quarters (77%) of those receiving services. The proportion was even higher (86%) among pastoralists. Non-agricultural households were the most likely to use private veterinary services (46%) among occupational categories.

The quality of the veterinary services was rated highly, with 93% of respondents saying they were “very good” or “good”. Among pastoralists, almost all (99%) rated the veterinary services as “very good” or “good”, but the proportion saying they were “very good” was lower than average.

3.9.3. Support for livestock producers

Various programs provide inputs to assist livestock producers. The survey asked all rural households if they had received any feed, forage, equipment, or other inputs over the course of the past 12 months. As shown in Tableau 74, few households received any livestock inputs. Less than 2% of rural households reported receiving feed, fodder, or other, and 2.7% said they received equipment. The distribution of fodder and equipment seems somewhat higher in the South Sudanian zone, but the proportions are small across all three zones. Although the proportions are small, the total number may be substantial. For example, after extrapolating to the national level using sampling weights, we estimate that more than 70,000 households received livestock equipment over the 12 months before the interview.

Tableau 74. Proportion de ménages ayant reçu des intrants pour l'élevage par zone

	Zone			Total
	Sahélienne	Nord-soudanienne	Sud-soudanienne	
Aliments	1.1	0.6	1.6	1.1
Botte de foin	0.3	0.3	0.9	0.5
Équipement	1.4	2.2	4.7	2.7
Autre	0.8	0.6	0.3	0.6

Source : Analyse de l'Enquête auprès des ménages ruraux sur la résilience 2019

Tableau 75 shows the proportion of households in each professional category that received each input. Pastoral households may be slightly more likely to receive equipment and forage, but all the proportions are quite low and similar across categories.

Tableau 75. Proportion de ménages qui ont reçu des intrants pour l'élevage

	Catégorie professionnelle				Total
	Pastorale	Agro-pastorale	Agricole	Non-agricole	
Aliments	0.0	1.4	1.1	1.1	1.1
Botte de foin	1.0	0.4	0.4	1.1	0.5
Équipement	3.0	2.5	2.7	3.3	2.7
Autre	0.0	1.1	0.4	1.1	0.6

Source : Analyse de l'Enquête auprès des ménages ruraux sur la résilience 2019

Another type of assistance provided to livestock producers is collective support, that is, investments which benefit many households. The survey asked all respondents if they had benefited from water points, vaccination parks, or other forms of collective support. According to Tableau 76, 3.9% of respondents said they made use of water points, the proportion being higher in the two southern zones compared to the Sahelian zone. In addition, 6.3% of households reported making use of vaccination parks, again the proportion being higher in the south than in the north. Less than 1% reported benefiting from other types of collective support for livestock production. In interpreting these figures, it is important to keep in mind that these services mainly benefit cattle producers, who represent 60% of rural households. In particular, the water points benefit those who move their cattle, who represent 14% of owners of cattle or 8% of rural households.

Tableau 76. Proportion de ménages ayant bénéficié de l'appui collectif par zone

	Zone			Total
	Sahélienne	Nord-soudanienne	Sud-soudanienne	
Point d'eau	1.9	5.0	5.0	3.9
Parc de vaccination	2.5	7.2	9.7	6.3
Autre	0.0	1.3	0.3	0.5

Source : Analyse de l'Enquête auprès des ménages ruraux sur la résilience 2019

We can also look at use of collective livestock services by professional category. Contrary to expectations, pastoral households were somewhat less likely to make use of vaccination parks than livestock owners in other categories. On the other hand, agro-pastoral households were somewhat more likely to use these services.

Tableau 77. Proportion de ménages ayant bénéficié de l'appui collectif par catégorie professionnelle

	Catégorie professionnelle				Total
	Pastorale	Agro-pastorale	Agricole	Non-agricole	
Point d'eau	3.0	5.0	3.4	4.3	3.9
Parc de vaccination	2.0	7.4	6.5	6.5	6.3
Autre	1.0	0.7	0.4	0.0	0.5

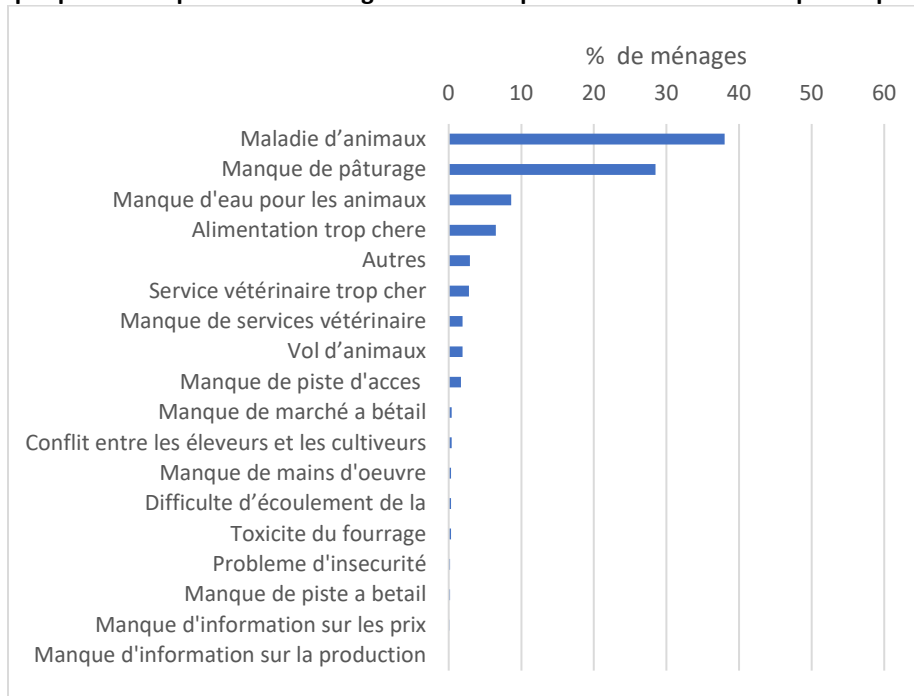
Source : Analyse de l'Enquête auprès des ménages ruraux sur la résilience 2019

3.9.4. Perceived constraints on livestock production

The survey asked livestock producers (96% of the sample) about the top four constraints related to animal production. Tableau 78 shows the proportion of respondents citing each constraint as the most important one. By far the two most important constraints on animal production, according to livestock owners, are animal diseases, cited by 38% of rural households, and lack of pasture, cited by 29%. Other constraints include lack of water for animals (9%), the high cost of feed (6%), and the high cost of veterinary services (3%). It is somewhat surprising to see that insecurity and conflict between livestock producers and cultivators were each cited by less than 2% of livestock producers as the most important constraint.

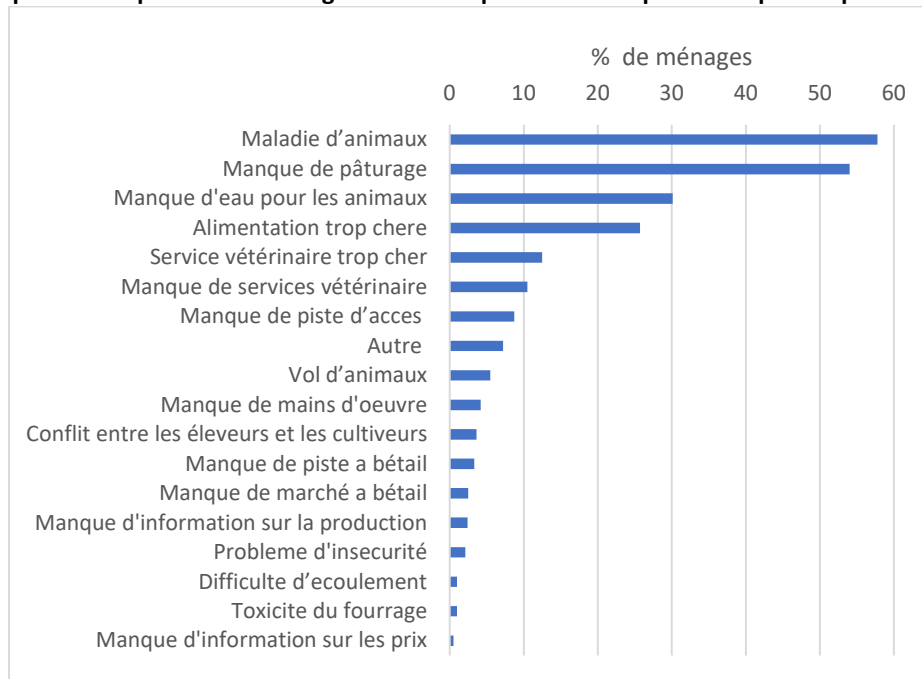
Graphique 18 shows the proportion of households citing each constraint as one of the top four constraints, so of course the percentages for each are higher. For example, 58% of the respondents said that animal disease was one of the top four constraints they face in livestock production. The order of the constraints is quite similar to those shown in Graphique 17, with animal disease, lack of pasture, lack of water, and costly feed being the most frequently cited constraints in both.

Graphique 17. Proportion de ménages citant chaque contrainte comme le plus important



Source : Analyse de l'Enquête auprès des ménages ruraux sur la résilience 2019

Graphique 18. Proportion de ménages citant chaque contrainte parmi les quatre plus importants



Source : Analyse de l'Enquête auprès des ménages ruraux sur la résilience 2019

There is some variation in the most important constraints across agro-ecological zones. Tableau 78 shows the proportion of households citing each constraint as one of the four most important ones for each agro-ecological zone. The table indicates that animal disease, lack of veterinary services, and

shortages of labor seem to be a more serious problem in the south, while costly feed and lack of pasture are somewhat more frequently cited problems in the north. Note that the table excludes constraints mentioned by fewer than 30 respondents because the comparison across zones would not be reliable.

Tableau 78. Proportion de ménages citant chaque contrainte comme le plus important par zone

Contraintes	Zone			Total
	Sahélienne	Nord-soudanaïenne	Sud-soudanaïenne	
Maladie des animaux	45	66	67	58
Manque de pâturage	56	54	52	54
Manque d'eau pour les animaux	30	32	27	30
Alimentation trop chère	33	24	17	26
Service vétérinaire trop cher	10	12	17	13
Manque de services vétérinaire	9	8	17	11
Manque de piste d'accès	7	6	14	9
Vol des animaux	3	7	7	5
Manque de mains d'oeuvre	2	1	10	4
Conflit entre les éleveurs et	1	3	8	4
Manque de marché à bétail	1	3	4	3
Manque de piste à bétail	2	5	3	3

Source : Analyse de l'Enquête auprès des ménages ruraux sur la résilience 2019

Tableau 79 shows the proportion of households citing each constraint as one of the four most important ones for each professional category. Compared to other rural households, pastoral and agro-pastoralist households were more likely to cite lack of pasture, lack of water, and the high cost of feed as problems. This probably reflects the fact that pastoral households have larger herds, so finding sufficient pasture, water, and feed become larger issues. Conflict between herders and farmers was also cited more often by pastoral households, which is not surprising since they are more likely to use seasonal migration to find pasture for their animals.

Tableau 79. Proportion de ménages citant chaque contrainte comme le plus important par zone

Contraintes	Catégorie professionnelle				Total
	Pastorale	Agro-pastorale	Agricole	Non-agricole	
Maladie des animaux	57	51	61	65	58
Manque de pâturage	60	70	46	44	54
Manque d'eau pour les animaux	40	42	24	19	30
Alimentation trop chère	31	30	22	29	26
Service vétérinaire trop cher	3	13	14	10	13
Manque de services vétérinaire	10	9	11	13	11
Manque de piste d'accès	12	9	6	16	9
Vol des animaux	3	5	6	6	5
Manque de mains d'oeuvre	4	1	6	1	4
Conflit entre les éleveurs et agriculteurs	7	4	3	1	4
Manque de marché à bétail	2	6	1	0	3
Manque de piste à bétail	7	4	3	0	3

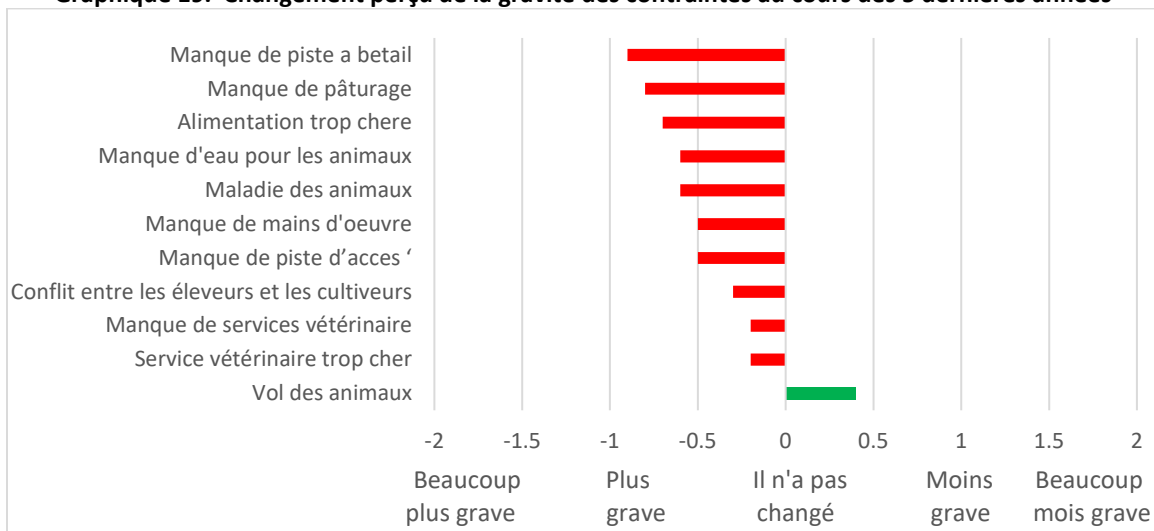
Source : Analyse de l'Enquête auprès des ménages ruraux sur la résilience 2019

For each of the four constraints mentioned by respondents, the survey also asked whether the problem had become more serious, less serious, or no change over the past five years. The average score for

each constraint is shown in Graphique 19, where -2 means “much more serious”, 0 means “no change”, and 2 means “much less serious”. The red bars indicate the constraints that have become more serious to some degree, while the green bar is used to indicate those that have become less serious, as perceived by the respondents.

The most notable feature of the graph is that almost all the constraints are seen as getting worse on average. The constraint that is most widely cited as getting worse is the lack of paths for cattle, referring to the routes used to take cattle to better grazing areas in the dry season. Others include the lack of pasture, the high cost of feed, the lack of water for animals, and animal diseases. The only constraint seen as getting less serious over time is the theft of animals. Note that the graph only shows constraints mentioned by at least 30 respondents. Thus, it excludes “problems of insecurity” and “toxicity of forage” which were mentioned by too few respondents to give a reliable score in this graph.

Graphique 19. Changement perçu de la gravité des contraintes au cours des 5 dernières années



Source : Analyse de l'Enquête auprès des ménages ruraux sur la résilience 2019

4. Summary and implications

4.1. Summary

This report was prepared under the theme of Pastoral Resilience within the Voices for Change Partnership between SNV, the International Food Policy Research Institute (IFPRI), and various civil society organizations based in Burkina Faso. The report summarizes the results of a survey carried out in June 2019 using a stratified random sample of 1,000 rural households from 25 provinces and 100 villages. The sample is nationally-representative of the rural areas of Burkina Faso. The questionnaire focused on pastoral livestock production and marketing, but it also included modules on household composition, assets, housing, crop production, non-agricultural income, food security, and respondents' access to government services and perceived constraints.

As described in the introduction, the study was designed to address eight key questions regarding pastoral production and the households that rely on it for their livelihoods.

What is the contribution of pastoral livestock production to rural livelihoods in Burkina Faso?

Pastoral production, which we define as the raising of cattle, goats, and sheep based primarily on grazing, contributes to the income of 91% of rural households in Burkina Faso or 18.7 million people.

Pastoral production generates income of FCFA 282 thousand per household per year, which is equivalent to FCFA 768 billion at the national level. It is important to note that this reflects household-level production alone and does not include activities in the supply chain after animals are sold such as marketing, transport, slaughter, and retailing. Pastoral production represents more than half of the revenue for 12.5% of rural households. It represents the most important source of revenue for 17.5% of rural households. Based on our definitions, pastoral households account for 7.9% of rural households, while agro-pastoral households represent almost 28% of rural households. Together, they comprise 7.4 million people.

What are the characteristics of households involved in pastoral production compared to other households?

As mentioned above, 91% of all rural households participate in pastoral production by raising cattle, goats, and/or sheep. However, we define pastoral households as those who earn more than half their income from agricultural and pastoral production where the pastoral revenue is more than two thirds of the agro-pastoral revenue. Surprisingly, pastoral households are not concentrated in the Sahelian zone. The proportions of pastoral and agro-pastoral households are similar in all three zones. The main difference is that non-agricultural households are more common in the South Sudanian zone. Pastoral households have higher rates of illiteracy (63%) compared to other rural households (around 50%), and they tend to be poor in terms of assets (at the 42nd percentile).

Almost all pastoral households grow crops, particularly staple grains such as maize, sorghum, and millet, but they are less likely to grow fruits, vegetables, or cash crops such as cotton and sesame. However, they have smaller farms, cultivating about half the area of the average rural household. Given the smaller farms and the focus on staple grains, it is not surprising that the marketed share of crop production among pastoral households is about half that of the average rural households.

Pastoral households own larger herds of cattle, goats, and sheep than other rural households. For example, the average pastoral household has 32 cattle compared to 5-6 cattle for the average agricultural or non-agricultural household. They earn almost two-thirds of their income from pastoral production compared to 42% for agro-pastoral households, 11% for agricultural households, and just 4% for non-agricultural households. Pastoral and agro-pastoral households are poorer than the average rural household, with per capita income about 25% below that of agricultural and non-agricultural households.

What are the production methods used by pastoralists, particularly related to feed and veterinary services?

Almost all cattle producers and a large majority of goat and sheep producers purchase inputs for their animals. The most common inputs for cattle are feed (purchased by 82% of cattle producers) and veterinary services (92%). Much less common are labor costs (18%) and other costs of production (35%). About 83% of sheep producers purchase inputs, the most common purchases being veterinary services and feed. Almost three-quarters of goat producers (73%) purchase inputs, mostly veterinary services and only occasionally feed. Feed purchases for cattle and goats are more common in the Sahelian zone than in the south, presumably because of the scarcity of pasture in the dry season. The proportion of pastoral households purchasing inputs for their ruminants is similar to the proportion of agro-pastoral and agricultural households doing so. However, non-agricultural households are more likely to purchase feed, perhaps because they have smaller farms and less crop residue.

In considering the costs of livestock production, we consider both inputs and animal purchases. In general, the cost of feed and the purchase of animals are the two most important component of costs, each representing roughly one-third of the total cost. The remainder is composed of veterinary services,

labor, and other inputs. In the case of cattle and goats, the costs of production represent slightly more than one-quarter of the gross value of production. In the case of sheep, the costs of production are close to 70% of the gross value of production.

What are the patterns of moving livestock during the dry season in search of better pasture?

Most livestock are not moved seasonally in search of better pasture. Fewer than 3% of goat and sheep owners report moving their animals in the dry season. Among cattle owners, 14% move their cattle in the dry season. The proportion is higher in the south than in the north, higher among high-income households, and higher among those with large herds. For example, almost half the households with 15 cattle or more move them in the dry season compared to just 6% of those having 1 to 5 cattle. Few households own large herds so overall, about one-third of the cattle are displaced during the dry season.

How are livestock and livestock products marketed and how important is marketed output?

The rate of commercialization in livestock production is defined as the number of animals sold per year as a percentage of the herd size. The average cattle owner sells 1.1 cattle per year from a herd of 11.2, so the rate of commercialization is about 10%. The average rate is 18% for goats and 13% for sheep. These rates of commercialization are somewhat lower than the averages in sub-Saharan Africa cited by FAO (2002).

However, most livestock output is sold rather than being slaughtered for own consumption or given as a gift. For example, a bovin is 20 times more likely to be sold than slaughtered for own consumption or given as a gift. The ratio is smaller in the case of goats and sheep, whose size makes them more suitable for home consumption, but more than twice as many goats and sheep are sold compared to slaughtered for own consumption or given as gifts.

About half of the sales of cattle, goats, and sheep take place on farms, with village markets accounting for another 17-21% of sales. Less than one-third of ruminant sales take place at other markets such as those at the commune and province level.

By-products are not very important for goats and sheep, but they are the main source of value addition in cattle production. Animal traction and milk are mainly for household use rather than sale, but a significant portion of manure is sold.

What is the food security status of households involved in pastoral livestock production?

Although pastoral and agro-pastoral households have fewer assets and somewhat lower income compared to other rural households, their food security seems to be similar or perhaps somewhat better. The proportion of pastoral and agro-pastoral households reporting periods of food shortages in the previous 12 months was somewhat below average (22% compared to 27%). In addition, the diet diversity of pastoral households is somewhat better than the rural average (5.6 compared to 5.2). This is partly because they are more likely to consume milk than other rural households. The most common response to food shortages is to switch to less costly types of food (more staple grains and less fruits, vegetables, and animal products) and to reduce the size of meals. Skipping meals is the third most common response to food shortages.

How much access do pastoralists have to livestock support services such as extension, veterinary services, and subsidized inputs?

About half of the pastoral households had access to an extension agent over the 12 months before the survey interview, a higher proportion than among rural households in general (38%). Higher-income households and those in the south also had more access. Other important sources of extension information were friends and neighbors and radio emissions. Input vendors, television, and printed

materials were less often used. Most extension material focused on methods for crop production, but about one third of the messages were on production of animals. The quality of extension information was rated highly, particularly information from extension agents.

Almost half of animal producers received veterinary services for their animals, with the proportion rising to two-thirds among pastoral households. These services were generally provided by the government (77%), but private services were used as well (22%). Among pastoral households, 37% rated these services as “very good” and 62% said “good.” On the other hand, no households in the sample received artificial insemination services for their animals, less than 2% received feed or forage, and just 3% received equipment. Less than 4% made use of a point of water, and about 6% used a vaccination park.

What are the main constraints faced by pastoralists and how are these problems changing over time?

In the survey, livestock producers (which represents almost the entire sample) were asked about the top four constraints to animal production. Animal diseases and lack of pasture were each cited by more than half of the respondents (58% and 54%, respectively). Lack of water and the high cost of feed were each cited by more than a quarter of the respondents. The high cost of veterinary services and lack of veterinary services were each listed by more than 10% of the respondents. Among pastoralists (for whom pastoral production is a major source of revenue), the responses were quite similar except that the lack of water and pasture were cited more often and the high cost of veterinary services was mentioned much less often. It was somewhat surprising that very few respondents cited theft of animals (4%), conflict between herders and farmers (4%), and general insecurity (2%).

Almost all the constraints were seen by respondents as having worsened over the last five years. The constraints most widely cited as deteriorating were lack of paths for livestock and lack of pasture. The only constraint said to be improving over time was the theft of animals.

4.2. Implications

The importance of pastoral production to the rural economy and to poor households suggests that the government should invest in the sector through the provision of public goods. Pastoral production accounts for 20% of rural household income and represents the most important source of income for 18% of rural households. This implies that roughly one-fifth of support to the agricultural sector should be for pastoral production.

Economic theory suggests that government support should focus on public goods, that is, goods and services which generate benefits, but these benefits cannot be easily captured by the provider. Since there are little or no incentives for the private sector to provide public goods, the government should subsidize private producers or provide these goods directly. Examples include research into breeds and livestock management, extension services, market information, vaccination services, and infrastructure such as roads and markets. Subsidized inputs (like feed and equipment) may be justified to inform producers of the benefits, but are harder to justify in the long run.

Policies and programs to support pastoral production need to recognize that economic factors are an important motivation for pastoral producers. Pastoral production undoubtedly serves social and cultural functions, but it is also a profitable activity with high rates of return on investment, particularly for cattle and goats. As such, government policies affecting the price of feed and medicine, the availability of water and pasture, the price of animals in the market, and export opportunities are likely to have an effect on the herd size and management methods.

Because pastoral production is strongly oriented toward the market, government support to the sector should include both technical assistance in production and marketing assistance. If pastoral production

were primarily oriented to subsistence production (slaughter for own use and gifts), then it would make sense to focus government support on production methods. However, a bovin is 20 times more likely to be sold than to be slaughtered for consumption or given as a gift. Goats and sheep are also more likely to be sold than slaughtered for consumption or given as gifts. However, our results indicate that extension agents, radio emissions, and other sources of information rarely provide information about livestock markets and prices. The government should help producers market their animals by providing market information through extension agents, radio emissions, and other sources. Since 89% of rural households own mobile phones, this would be another channel to provide information on animal prices in nearby markets.

Government programs must take into account the diversity of pastoral households in terms of production methods, marketing strategies, and scale of operations. Pastoralists are sometimes perceived as producers that take herds of 10-1000 cattle south for the dry season in search of water and better pasture, bringing them home again when the rains return. Our survey indicates that this type of livelihood exists, but it only accounts for 4% of rural households. Most pastoral production in Burkina Faso involves households with fewer than 5 cattle. Furthermore, most pastoral production involves feeding animals crop residues and purchased feed during the dry season rather than moving the herds to the south. In other words, large-scale herds that migrate are more visible, but small herds that remain with their owners during the dry season are more common. Government policy and programs need to cater to these two types of pastoral households. The first group needs access to roads, water points, and pasture in their dry-season destinations, while the former needs access to feed and local pastures.

Research is needed to identify the causes of the high mortality rate in ruminants and develop strategies to help farmers reduce mortality. According to our survey, the mortality rate (defined as annual deaths as a percentage of herd size) is 10% for cattle, 25% for goats, and 20% for sheep. In all three cases, the mortality rate is higher than the average for other studies in arid and semi-arid regions of Africa. In fact, the annual number of deaths is greater than the annual number of animals sold for goats and sheep, and the numbers are roughly equal for cattle.

The design of government programs can also be improved with information about the proportion of herders with access to each type of service. For example, our survey indicates that about half of pastoral producers have contact with an extension agent during the previous 12 months and they rate the services highly. On the other hand, these services are more available in the south than in the north. Although half of rural livestock producers made use of veterinary services in the previous 12 months, no one in our sample of 1,000 rural households reported receiving artificial insemination for their animals. Very few herders (1-3%) were able to obtain subsidized feed and bales of hay. Given the lack of public good justification for these services, the government may want to consider scaling these services back and reallocating the resources to investment in research, extension, and water points.

The priorities of pastoral producers should guide government investments in the sector. Based on the responses in our survey, government programs to assist pastoral producers should focus on veterinary services and medication to address animal diseases, the lack of pasture, and the lack of water. Much less serious, according to animal producers, was the cost of veterinary services, lack of access roads, animal theft, and conflict between farmers and herders. Information on the regional priorities from this study or from additional research would help target different types of assistance to each region.

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Annexe 1 : Liste des provinces et des village échantillonnés

	Province	Village	Nbr de ménages	Nbr de personnes
1	Bam	Alamini	10	66
2	Bam	Gonga	10	90
3	Bam	Namsiguia	10	79
4	Bam	Singtanga	10	89
5	Gnagna	Bilamperga-Peulh	10	59
6	Gnagna	Ganta	10	52
7	Gnagna	Moadéga	10	77
8	Gnagna	Tambiri	10	51
9	Oudalan	Dambouguél	10	70
10	Oudalan	Gozéye-Village	10	70
11	Oudalan	Ourfou-Bélél	10	47
12	Oudalan	Tollêl-Kaya	10	87
13	Passore	Bakouya	10	79
14	Passore	Kabaralé	10	53
15	Passore	Nyinsou	10	73
16	Passore	Tampouy	10	53
17	Sanmatenga	Gombré	10	73
18	Sanmatenga	Namassa	10	72
19	Sanmatenga	Songoden	10	86
20	Sanmatenga	Antoa	10	92
21	Seno	Babirka-Mango	10	46
22	Seno	Oulmasouton	10	49
23	Seno	Lêrê	10	61
24	Seno	Oulo	10	63
25	Sourou	Da	10	97
26	Sourou	Guimou	10	64
27	Sourou	Niassono	10	95
28	Sourou	Toumani	10	57
29	Yatenga	Bidi-Peulh-Todiam	10	70
30	Yatenga	Kaléhéna Yiri	10	84
31	Yatenga	Ouembatenga	10	75
32	Yatenga	Séné-Todiam	10	61
33	Zondoma	Guessere	10	79
34	Zondoma	Lêba	10	80
35	Zondoma	Rom	10	74
36	Zondoma	Zondoma	10	94
37	Banwa	Dinkiéna	10	97
38	Banwa	Kounéni	10	58
39	Banwa	Sami-Secteur 2	10	93
40	Banwa	Toukoro	10	56
41	Bazega	Bélégré	10	68
42	Bazega	Komtigré	10	42
43	Bazega	Poédogo	10	53
44	Bazega	Wardogo	10	79

45	Boulgou	Bangou	10	42
46	Boulgou	Goanen	10	94
47	Boulgou	Nama	10	74
48	Boulgou	Tengsoba	10	44
49	Boulkiemde	Dassissé	10	69
50	Boulkiemde	Kougsen	10	91
51	Boulkiemde	Pinou	10	88
52	Boulkiemde	Tatyou	10	89
53	Gourma	Boudangou	10	76
54	Gourma	Kiamou	10	56
55	Gourma	Niamanga	10	60
56	Gourma	Tansouka	10	101
57	Mouhoun	Banga	10	67
58	Mouhoun	Etouayou	10	55
59	Mouhoun	Lan	10	80
60	Mouhoun	Sodien	10	81
61	Sanguie	Baganapoun	10	79
62	Sanguie	Gabou	10	84
63	Sanguie	Markio	10	89
64	Sanguie	Sangyé	10	45
65	Zoundweogo	Banguéssom	10	60
66	Zoundweogo	Guéré	10	67
67	Zoundweogo	Manga-Est	10	55
68	Zoundweogo	Sidtenga	10	57
69	Bale	Darsalam	10	79
70	Bale	Koéna	10	68
71	Bale	Pompoi-Gare	10	68
72	Bale	Yona	10	81
73	Houet	Badala	10	55
74	Houet	Diofoloma	10	76
75	Houet	Kékélesso	10	79
76	Houet	Sandakoro	10	95
77	Kenedougou	Denso	10	72
78	Kenedougou	Kawokina	10	74
79	Kenedougou	Nyadia	10	97
80	Kenedougou	Sourou	10	86
81	Koulpelogo	Djakarga-Peulh	10	85
82	Koulpelogo	Kohogo-Peulh	10	59
83	Koulpelogo	Nyogzensen	10	74
84	Koulpelogo	Welguemsifou	10	76
85	Noumbiel	Bonfatéon	10	121
86	Noumbiel	Gapar	10	81
87	Noumbiel	Napindouo	10	69
88	Noumbiel	Tilampira	10	76
89	Poni	Baranguira	10	86
90	Poni	Gbomblora-Kpêna	10	89
91	Poni	Libira	10	92
92	Poni	Silapinéra	10	74
93	Tapoa	Bagahanba	10	75

94	Tapoa	Fouambouali	10	73
95	Tapoa	Kwotougou	10	57
96	Tapoa	Piélgou	10	57
97	Ziro	Binyéné	10	71
98	Ziro	Kada	10	71
99	Ziro	Névri	10	87
100	Ziro	Suné	10	56
	Total		1000	7275
