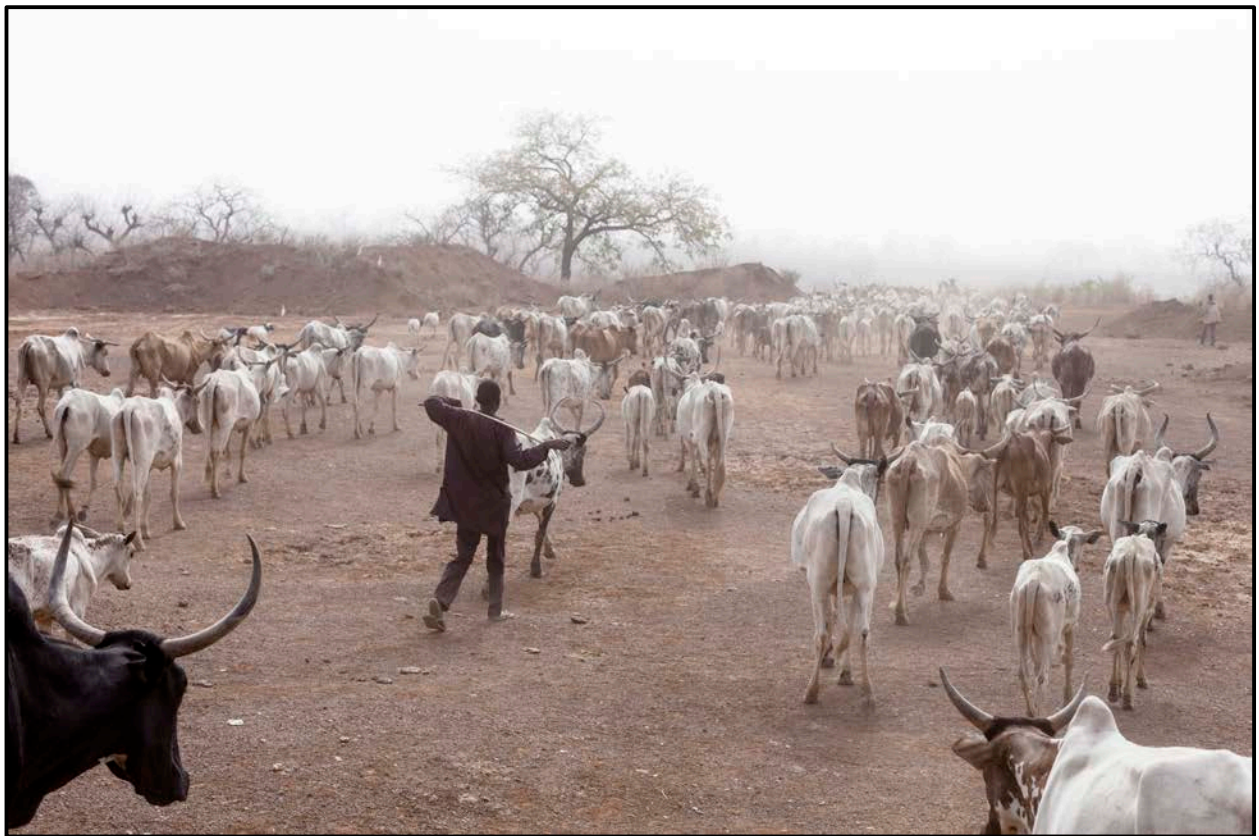
PASTORAL AND AGROPASTORAL RESILIENCE IN THE SAHEL:

Portrait of the 2014-2015 and 2015-2016 Transhumance

(Senegal, Mauritania, Mali, Burkina Faso, Niger)

Abridged version



Transhumant herd from Burkina Faso trekking through northern Togo in February, photo Gilles Coulon/Tendance Floue for AFL (2016)

Brigitte THEBAUD, Nordic Consulting Group

in collaboration with ISRA-BAM et CIRAD (Dakar)

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ACRONYMS AND ABBREVIATIONS

ACF-I	Action Contre la Faim International
ACIDEF-Mali	Association Citoyenne Pour la Défense des Droits des Enfants et des Femmes
ADENA	Association pour le Développement de Namarel et villages environnants
AFL	Acting For Life
AGHRYMET	Agrometeorology-Hydro-Meteorological Regional Centre (Niamey, Niger)
ARD	Agence Régionale de Développement (Sénégal)
ARED-Senegal	Associates in Research and Education for Development (Dakar-Senegal)
AREN-Niger	Association pour la Redynamisation de l'Élevage au Niger
BAM	Bureau d'Analyses Macro-Economiques (ISRA-Dakar)
BRACED	Building Resilience and Adaptation to Climate Extremes and Disasters Programme
CILSS	Comité Inter-Etats de Lutte contre la Sécheresse au Sahel (Ouagadougou)
CIRAD	Centre de Coopération Internationale en Recherche Agronomique pour le Développement
CISV	Comunità Impegno Servizio Volontariato (Italy)
CRUS-Burkina	Conseil Régional des Unions du Sahel
CSE	Centre de Suivi Ecologique (Dakar, Senegal)
DANIDA	Danish Agency for Development Assistance
DFID	Department for International Development
EU	European Union
FCFA	Franc CFA (West Africa)
GAJEL	GAJEL-Sudubaba (Niger)
GTZ	German bilateral cooperation for development (now GIZ)
GNAP	Groupement National des Associations de Coopératives Pastorales (Mauritanie)
ICD-Mali	Initiatives-Conseils-Développement
IIED	International Institute for Environment and Development (London)
ILRI	International Livestock Research Institute (Nairobi, Addis-Abeba)
INRA	Institut National de la Recherche Agronomique (France)
ISRA	Institut Sénégalais de Recherches Agricoles
NCG	Nordic Consulting Group (Copenhagen, Denmark)
OECD	Organisation for Economic Co-operation and Development (Paris)
OSS	Observatoire du Sahara et du Sahel (Tunis)
PRREF	Projet de Renforcement de la Résilience de l'Economie Familiale grâce à la productivité de l'élevage dans le sud et l'est de la Mauritanie (EU funding)
PSB	Programme Sahel Burkinabé
RBM-Regional	Réseau Billital Maroobé for West Africa
RBM-Senegal	Réseau Billital Maroobé for Senegal
RECOPA	Réseau de Communication sur le Pastoralisme (Burkina Faso)
TASSAGHT	« Link» in the Tamasheq language (Mali)
TLU	Tropical Livestock Unit
VSF-B	Vétérinaires Sans Frontières-Belgium

INTRODUCTION AND ACKNOWLEDGEMENTS

Since January 2015, Acting for Life (AFL), together with its partners in the field, has been implementing the "Strengthening Resilience through Livestock Mobility" Project as a part of a programme (BRACED) funded through UK-Aid, and focused on building resilience to climate change. For monitoring and evaluation purposes, the project collected information from transhumant families on an annual basis in order to monitor a number of specific resilience indicators. In addition, the monitoring system enumerated the number of people and animals moving along the livestock corridors. Other questions also had to be answered: How long does a transhumance last? Who leaves, and with which animals? Do mobile livestock herders contribute to the local economy when they are moving? How do they access information? Do they all cross international borders?

The study examined the transhumance of 2014-2015 and the following one, in 2015-2016. For both years, surveys were conducted between 3 to 7 weeks after the return of the families to their home areas. Covering 386 households, the first survey identified 60 vulnerable families from within the sample, according to the resilience indicators used by the project. The second survey focused on these 60 families. The geographical area covered by the study extends over two large cross-border territories linking, to the west, Mauritania, western Mali and northern Senegal and, to the east, northern Mali, Niger and Burkina Faso (see map on the next page).

This document provides an abridged English version of the main study (in French), available as a separate, more detailed document[1]. **The first section** reviews the climatic situation prevailing in the intervention zones during the two years of the study and summarizes the survey methodology followed. **The second section** provides an assessment of the 2014-2015 transhumance with, at the end, an analysis of the situation of women. **The third section** provides a comparative analysis between the 2014-2015 and the 2015-2016 transhumance. **The fourth section** summarizes the main results of the enumeration of people and livestock along the livestock corridors.

This study would not have been possible without the financial support of the UK-Aid BRACED Programme. Through a co-financing mechanism with the Project to Reinforce the Resilience of the Family Economy through Livestock Productivity in southern and eastern Mauritanian (PRREF), the European Union also participated in the implementation of the research protocol, particularly in western Mali and southern Mauritania. It was as a result of this combined support that a study of this magnitude was feasible.

We are grateful to CIRAD-Dakar for the enumeration activities along the livestock corridors, and to ISRA-BAM (Dakar) for the preparation of the 2014-2015 survey protocol, and the initial coding and data entry. We are also indebted to the VSF-Belgique team in Bamako and to Samba Diallo (ARED Dakar) for the survey follow-up and quality control. Support for the 2015-2016 data entry, as well as data processing was provided by Nordic Consulting Group (Dolf Noppen and Karine Kilisenko). For risk analysis, we benefited from the contributions of Sara Teillard, specialist in microinsurance at Acting for Life (Paris).

Finally, we would like to express our thanks to the project partners and to their research assistants in the field, who collected data at a steady pace. We would also like to thank all of the families who had the patience to answer our many questions. We hope that this study will be of value to them and that it provides a faithful representation of their lives.

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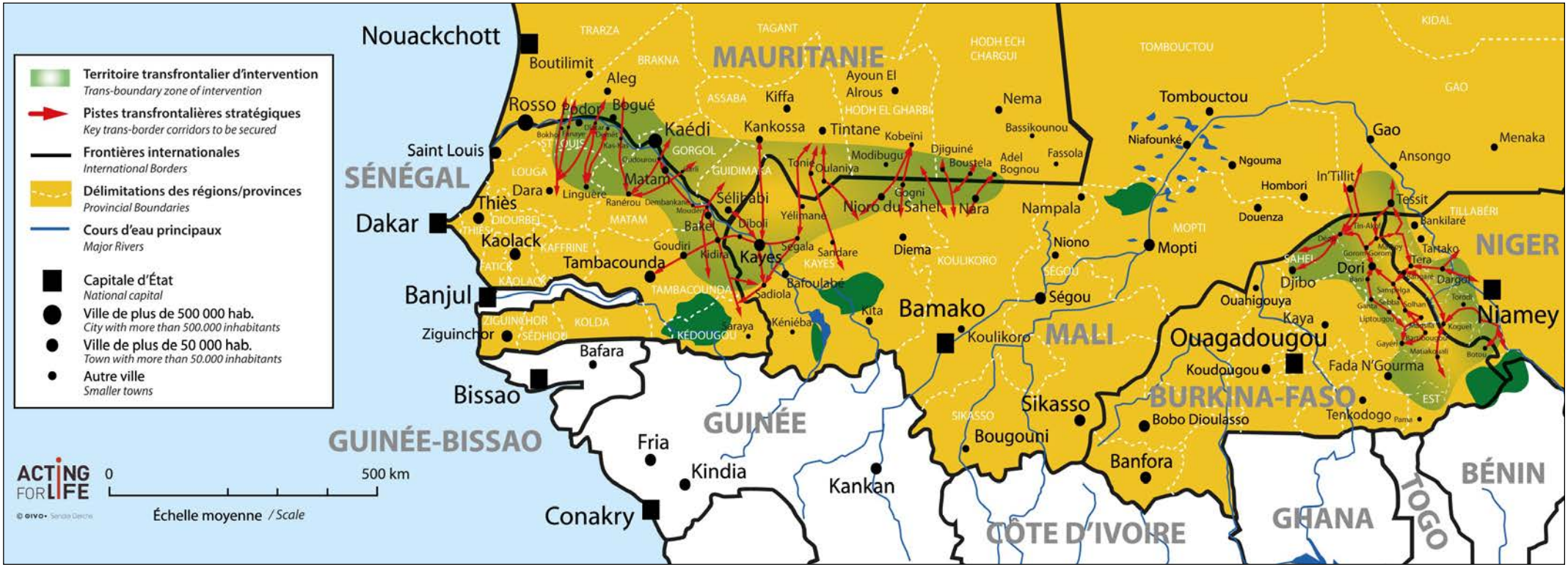
[1] **Résiliences pastorales et agropastorales au Sahel : portraits de la transhumance 2014-2015 et 2015-2016** (Sénégal, Mauritanie, Mali, Burkina Faso, Niger), **AFL-NCG, Brigitte THEBAUD**, en collaboration avec l'ISRA-BAM et le CIRAD (Dakar), juin 2017, Document complet.



Map 1 Transboundary territories covered by the AFL-BRACED Project

The AFL-BRACED Project span two major trans-boundary zones. The western territory covers strategic transhumance routes connecting southern Mauritania (Trarza, Brakna, Gorgol, Guidimaka, Hodh-el-Gharbi and Hodh-el-Chargui Provinces), with north-western Mali (Kayes, Koulikoro) and Senegal (Regions of Saint-Louis, Louga, Matam, Tambacounda). The eastern zone captures important livestock movements departing from northern Mali (Gao Region), continuing to the northern and eastern regions of Burkina (Dori, Djibo, Fada N'Gourma), after intersecting with transhumance routes originating from western Niger (Tillaberi Province).

1. CLIMATIC CONTEXT AND METHODOLOGY

1.1 BETWEEN DROUGHT AND ABUNDANCE

The climatic context in which the surveys took place provides an essential backdrop to understanding the data collected. Characterised by very scarce rainfall in several areas, the 2014 rainy season was further marked by pockets of acute drought, particularly in southern Mauritania and in northern Senegal, causing large numbers of livestock herders to move to areas further south. In the case of Senegal, the movement of northern pastoral families (from the Ferlo) towards the south-centre and south-east of the country was massive, often involving all members of the household together with the herd.

The start of the 2014 rainy season was late throughout the Sahel, with the final rainfall figures showing mixed results. Despite a better distribution of rainfall in August and September, pronounced deficits persisted in the west, particularly in Mauritania and in Senegal, as well as in some areas of Mali and in Niger.

In addition, the security situation, especially in northern Mali and at the Burkina Faso-Mali border, resulted in an increase in attacks and armed cattle thefts. Attacks by militia and Malian bandits were so widespread that they directly affected transhumant families in the Tillaberi region of western Niger.

The final assessment of the spatial distribution of the biomass available at the end of 2014's rainy season showed considerable decline compared with the previous year (2013), with severe fodder shortages due to delayed precipitation and the persistence of dry spells.

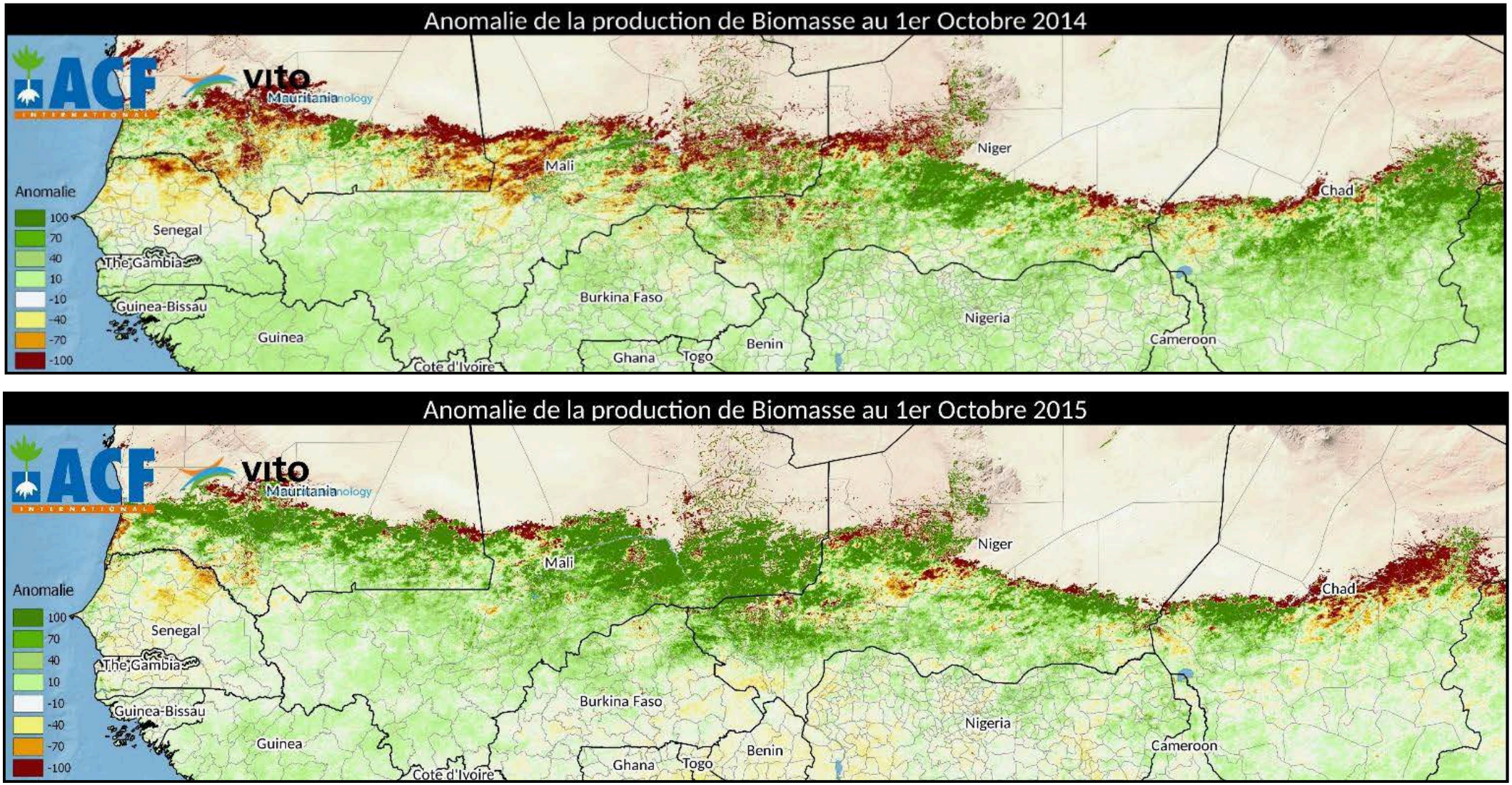
The detailed analysis, provided annually by *Action Contre la Faim International,* confirms the existence of areas in western Sahel (northern Senegal, Mauritania) as well as in northern Mali, without any rainfall at all. The biomass available in Niger and in Burkina Faso was more abundant, but drought pockets remained in several pastoral areas[1].

By contrast, the 2015 rainy season was characterized by plentiful and evenly distributed rainfall, thus providing much-anticipated respite for pastoralists and their herds. As a result, the amount and geographical distribution of primary production (biomass) improved significantly, compared to the previous year, providing livestock with abundant grazing resources for the 2015-2016 dry season.

The rainy season began late in Chad, Senegal and Burkina Faso, but was then offset by favourable rainfall throughout the entire pastoral areas. These very distinct situations were particularly evident in northern Senegal, highlighting once again the extreme inter-annual variability of pastoral resources in Sahelian regions, and, therefore, the vital importance of mobility to save animals.

The maps on the following page illustrate this permanent inter-annual disequilibrium, which constitutes a characteristic feature of the Sahel.

[1] **ACF-International**-West Africa Regional Office, Analysis of 2014 Biomass Production and Prospects for 2015, Technical Paper, Alex Merkovic-Orenstein, Regional Advisor for Disaster Risk Reduction. January 2015.



Map 2 Comparison of biomass production in the Sahel between 2014 and 2015

Source: **ACF-I, January 2015 and 2016**. The first map shows biomass deficits (1st October 2014) following the 2014 rainy season, and based on the average production for the 1998-2014 period (dark red indicates the areas with severe fodder shortages). The second map (below) shows biomass production one year later (1st October 2015), reflecting a significant improvement in grazing conditions from one year to the next.

1.2 METHODOLOGICAL CONSIDERATIONS

1.2.1 A detailed review of household economy and mobility

Focusing on the analysis of the household economy, the approach adopted benefited from lessons learned through similar work carried out in pastoral and agropastoral environments: eastern Niger in 1987 (World Bank), Yagha Province in northern Burkina Faso in 1991 (PNUD-DANIDA), Senegalese Ferlo in 1989 (CCCE-AFVP) and in 1994 (GTZ), as well as in Sahel Burkinabé in 1997 (GTZ)[1].

Conducted among a sample of 386 transhumant families, the surveys covered a wide range of subjects: the sequence of, and the events occurring during the latest transhumance; information needs; animal health; expenditure levels; livestock sales; risks faced and safety problems. A separate questionnaire was used for women within the families (a sample of 131 women were interviewed).

The surveys also explored significant developments over the last 10 years: changes in (livestock) mobility strategies; perceptions of climate and environmental changes; and changes in the livestock system.

The survey's central area of focus was on the relationship between the family and the herd. Particular attention was first paid to the structure and functioning of the family unit: did family members leave on migration? Conversely, did other families share in the management of the herd, and its products (meat, milk)? Once the family structure was clarified, the size of the family was calculated by using, as common denominator, the notion of adult-equivalent (AE), based on an equivalence of 0.75 for each child under 12 years of age.

The size and composition of the herds were studied with the same attention to detail, with the questions approached from different angles, allowing for the cross-checking of answers to verify their consistency. In order to evaluate the significance of the different animal species within the herds and to compare the number of animals against family size, the IEMVT's standard norm of Tropical Livestock Unit (TLU, defined as an animal weighing 250 kg and having completed its growth)[2] was used.

To assess the viability of a family in relation to the size of its herd, a threshold of 3.5 TLU per Adult Equivalent (AE) was chosen if the family economy depended mainly on livestock, 3 TLU for families combining livestock with minimal subsistence agriculture, and 1.7 TLU for those with a solid agricultural production base. Emerging from the results of extensive research in the Sahel since the 1980s, these thresholds are also aligned with those recommended by the World Bank[3].

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[1] **World Bank**, 1987, Livestock Management in the Diffa Department: Initial Assessment of the Main Production System and Intervention Elements, East-central Niger Livestock Development Project (PDENCE), Ministry of Animal Resources and Hydraulics, Niamey; ***Caisse Centrale de Coopération économique*** (CCCE)-AFVP, 1989, Typology of Agropastoral Production Systems in northern Senegal, Eric Granry; **PNUD-DANIDA**, 1991, Socio-economic Situation of the Sebba Department, Sahel Burkinabé Program (PSB); **GTZ**, 1994, Results of the Agro-Sylvo-Pastoral Project of Soils in Northern Senegal, German Forestry Mission, Saint-Louis; **GTZ**, 1997, Study on the domestic economy in Projet PSB/GTZ's area of intervention, in the Burkinabé Sahel.

[2] Boudet and Rivière Standard, Tropical Countries Institute of Livestock and Veterinary Medicine (IEMVT). Based on this Tropical Livestock Unit standard, the following equivalences were used: 1 TLU for a camel, 0.73 TLU for a head of cattle, 0.12 TLU for a small ruminant.

[3] **World Bank, FAO, CGIAR, African Risk Capacity**, 2015, Enhancing resilience in African Drylands: towards a shared development agenda, Rafaello Cervigni and Michael Morris.

1.2.2 The survey protocol

The choice of households to be surveyed was made according to a number of criteria. They had to be families practicing transhumance and using those livestock corridors where the project was being implemented. The principle of maintaining the same active sample over several years also required selecting families with whom the partners had already developed a relationship of trust. In the end, the sample which was surveyed covered the following:

Figure 1 Distribution of Family Sampling by Survey Area

AREA SURVEYED	Partners involved	Number of families surveyed	Number of women surveyed
Northern Senegal	RBM-Senegal	70	24
Mauritania	GNAP	70	24
Western Mali	ICD and ACIDEF	70	24
Northern Mali	TASSAGHT	35	12
Northern Burkina	CRUS	35	12
Western Burkina	RECOPA	35	11
Western Niger	GAGEL and AREN	71	24
TOTAL		**386**	**131**

The families selected provided a diversified picture of the pastoral and agropastoral environment. They included owners of large herds, for whom cross-border transhumance is an old practice, but also small-scale herders who are newer to this practice and only have a limited number of animals. Some families had a strong agricultural base, while others depended mainly on livestock for their livelihoods.

The survey was based on four successive stages: training the survey fieldworkers, the survey itself, the supervision and verification of the questionnaires at the beginning and end of the survey and, finally, the production of the database after the codification and creation of the input template and the actual data entry.

For the first survey, the 2014-2015 transhumance, the fieldwork process was supervised by ISRA-BAM and ARED. In addition, a field mission carried out in 2015 by AFL-NCG in northern Senegal made it possible to meet several families who had been part of the Year 1 survey. This mission was also preceded by fieldwork in Togo (AFL-NCG-CIRAD) in September 2015, in areas frequented by transhumant families from Burkina and Niger. For the second survey, covering the 2015-2016 transhumance, the same research assistants were used, while NCG ensured quality control, data capture and data analysis.

2. THE 2014-2015 TRANSHUMANCE (YEAR 1)

First, an important observation: the attempts to correlate key variables with the areas surveyed tended not to be successful. Although there may exist some particular traits – such as the large number of sheep in the herds of northern Senegal – there does not seem to exist any profile of a pastoral or agropastoral system unique to a certain location. The rationale of pastoral systems (whether or not associated with agriculture) is built around the family unit, and both mobility and production strategies are primarily carried out at the household level. However, it did prove important in Mali to differentiate between the north (TASSAGHT) and the west (ACIDEF, ICD), as the Gao region presents a very different context from that of the Kayes region. The same proviso applies to Burkina, with regard to its eastern (RECOPA) and northern (CRUS) zones.

2.1 THE FAMILY: STRUCTURE AND PRODUCTIVE ACTIVITIES

In total, the surveys covered 8,566 people distributed among the 386 families interviewed. On occasions, individual people (a nephew, an old uncle) added to the size of the household. Although families averaged a size of 23 people across the sample, a diversity of situations prevails from one zone to another. In addition to livestock production, other productive activities contributed to modifying the size of a household, notably agriculture, trading, and emigration. Thus, 140 families (36%) counted between 1 and 5 men who had left on migration.

Migration to other countries is clearly the most common, with 134 cases, against 97 for internal migration. Among them, the coastal countries (Benin, Guinea, Togo, Nigeria, Ivory Coast, Ghana) seem to exert a particularly strong attraction (55 cases). A large proportion of jobs held (61), even when far from home, remain linked to the livestock sector: butcher, wage-earning shepherd, and livestock trader.

Approximately one quarter of the families (102) reported not practicing any form of agriculture. However, in northern Senegal, a significant number of families live in the sylvo-pastoral gazetted zone, where agricultural production is both limited and controlled by law. Notwithstanding, there was no area-based environmental determinism that would prevent agricultural production. For instance, almost all families surveyed in the Gao region (northern Mali) practise agriculture, although they live in semi-arid areas.

Usually, families carry out several types of agricultural production simultaneously, for some as much as 8 different crops, with subsistence farming being the most widespread. Far from the image of pastoral systems only integrating agricultural as a marginal activity, most households interviewed were also crop farmers, and their livelihood systems often integrate a solid agricultural base. Within the family economy, the agricultural system is labour demanding, but must adapt to the absence of several family members for several months.

In addition, 228 families (60%) have other income-generating activities. Among these, the livestock trade occupied a dominant role, reflecting the porous border between livestock production and marketing: many herders are also livestock traders, and vice-versa. Another widespread reported activity was “small trade ” (basic necessities, textiles, sugar, tea), as well as transport (carts, bush-taxis). This diversity shows how livestock production is increasingly embedded into complex lifestyle systems.

2.2 PERCEPTION OF THE 2014 RAINY SEASON AND ITS IMPACTS

The prevailing opinion of the 2014 rainy season, in the zones covered by the survey, was that it was very poor, with low rainfall and inadequate grazing. One herder from northern Senegal pointed out that it rained only for a week, and that no pastures grew. In northern Burkina Faso, another herder noted that the Béli River, which borders Mali, completely dried up, *“which has not happened in 30 years.”*

This had a major impact on the 2014-2015 dry season: a general lack of grazing resources for the animals and a reduction in the number of ponds still available during the cold dry season. The vast majority of the families (337 out of 386) considered it to be a fully-fledged drought situation. This included almost all of the families surveyed in northern Senegal, northern Mali and Mauritania. Key strategies were followed: to leave on transhumance earlier; to move to refuge areas away from drought-stricken home area; to buy livestock feed; to destock; to take animals on transhumance that would normally not leave; to depart with the whole family and

the herd; to split the herd into several units; and to entrust some animals into the care of other herders. The requirement to fall back to the south involved early departures and border crossings before the normally scheduled dates.

Although hosting areas (mostly located in the south) have several advantages (better grazing conditions, longer rainy season), they are not free from problems, such as early rains starting towards the end of transhumance, poor distribution of pastures and the existence of wetlands prone to flooding. These disadvantages are particularly highlighted by families from eastern Burkina and western Niger leaving on transhumance to coastal countries (Benin, Togo, Ghana).

2.3 THE 2014-2015 TRANSHUMANCE

2.3.1 Which animals leave on transhumance, and with whom?

The practice of transhumance is firmly entrenched among the households surveyed. Only 33 of them (9%) reported practicing it for less than 10 years. The other families indicated that they had left on transhumance every year during the last 10 years, mostly because of an increasingly late rainy season in their home areas, as well as diminishing grazing resources as a result of the expansion of agricultural fields into the grazing areas.

Around 40,000 cattle, 1,000 camels, 47,000 sheep and 16,000 goats left on transhumance accounting for between 75 and 90% (according to animal species) of all household livestock. The number of animals leaving on transhumance compared to those kept at home was significant in all areas surveyed. This tendency was particularly clear for cattle: between 84 and 90% left, for an overall rate of 89% across all 386 households. Additional animals, but in small numbers, were also entrusted to transhumant herders by members of the extended family, farmers, traders, migrants and civil servants.

Along with cattle, small ruminants, and particularly sheep, make up an important component of transhumant herds. This is particularly the case for Senegal, Mauritania and Mali, while their number is also significant in both Burkina Faso and Niger. Far from the image of a cattle-centred West African transhumance, this illustrates that long-distance mobility brings together several species.

Transhumance is labour intensive. It draws first of all on family labour: 53% of men and 18% of women. In eastern Burkina and western Niger, however, women rarely left, because of security concerns in coastal countries. The contribution of the wage-earning herdsmen is essential, decreasing the livestock under the care of a single herdsman from 30 to 23 TLU.

2.3.2 Managing information

Information usually gathered before leaving on transhumance clearly focuses on entry points into hosting areas, and on the conditions of pastures and water points. Many sources of information are used: scouts who have left in advance; hosts ("logeurs")[1] and villagers; livestock traders; relatives, friends and other transhumant herders. During the transhumance period, the search for information covers mainly the location and the quality of grazing areas, markets and prices for cereals and basic necessities, animal health, the security situation, livestock corridors, and taxes.

[1] The French word "*logeur*" commonly used in West Africa has been translated as "host", denoting individuals in different localities with whom transhumant families have established a long-standing relationship, sometimes over several generations. The host ensures the interface between the transhumant and the local population and will often facilitate manure contracts.

Transhumant families regularly listen to the radio. A total of 221 families listened to the national radio and 125 followed community radio stations. All of the households stated having at least one cell phone, which they used on a daily basis. For 20% of the families interviewed, transhumance usually involves problems with network coverage which forces them to purchase and install local sim-cards. This is not only a problem with cross-border transhumance, since the network coverage ensured by service providers within the same country can often be uneven. Cell phones often work as multi-purpose tools: in addition to incoming and outgoing calls, they are also used to listen to radio and music, to take photos, and even as flashlights.

2.3.3 Destinations and timelines

The vast majority of families left on transhumance towards the end of the rainy season, or during the dry cold season, coming back several months later, at the start of the rainy season in their home area. The average length of the 2014-2015 transhumance was long (203 days, almost seven months), but with regional variations: 224 days in Mali, compared to 177 days in Burkina Faso, and 149 in Niger. Transhumant families from eastern Burkina and western Niger going to coastal countries are affected by the early onset of the agricultural season. In addition, some countries impose an exit date for all foreign transhumants[1].

The long duration of transhumance journeys does not mean that they systematically involve cross-border movements. In fact, among the 386 households surveyed, the distribution is more strongly skewed towards internal transhumance (203, or 53%) than cross-border transhumance (183 families, or 47%). However, again, this varies from country to country.

For Senegal, transhumance is largely internal, since only 13 families (out of 70) crossed international borders (3 families trekking as far as The Gambia and 10 families crossing to Mali, into the Kayes region). The same applies to Mali where, with the exception of a few families from the Gao area who trekked down to Burkina, in the provinces of Soum and Oudalan, transhumance took place within the country. This includes all the 70 families from western Mali. The situation is somewhat different for Burkina Faso and Mauritania where, respectively, 64% and 70% of families made cross-border journeys. The Kayes region of Mali was a favoured destination for households coming from Mauritania. For Burkina Faso, transhumance was clearly focused on coastal countries, mostly to Togo and Benin. In total, 569 crossings were reported by the 183 families who passed international borders.

The time taken for the transhumance can vary considerably, both on the outward and return journey. The average duration of an outward journey is 44 days, with the return journey taking 28 days, and with an average length of stay of 123 days at the furthest point of the journey. However, transhumance cannot be reduced to a simple trek between a point A and a point B, and livestock corridors are not just “highways” to quickly bring livestock to an area from which they will not move. The overall average was of 5 hosting areas per family, accessed along the route. For one third of them, this number varied between 7 and 27 hosting areas. Both the outward and homeward journeys can take several weeks, and can include multiple stages.

2.3.4 Types of water points used by transhumants

Overall, all of the families surveyed watered their livestock at several different types of water points during transhumance. However, a common strategy clearly emerged: to use surface water (which is less labour-intensive and less financially costly) for as long as possible, before resorting to deeper water points (wells, boreholes, etc.).

[1] For example, Togo proclaims, on an annual basis, a specific date by which time all foreign transhumant herders must have left the country.

The presence of surface water (ponds, rivers) is a fundamental element of transhumance, since one of the challenges of such movements rests on maximising the length of time during which the animals graze and drink under the best possible conditions.

The strategic role of surface water increases with the size of the herd that leaves on transhumance. For example, it is not certain that herders from Burkina Faso or Niger could leave for coastal countries with large numbers of livestock if they were forced to water their herds mainly from wells, where reduced water capacity would impose a limit on the number of animals that could be taken on transhumance.

Therefore, the timing of the transhumance is crucial and, in particular, the difficult choice of **when** to depart. If the family leaves too late, the ponds filled during the rainy season that hold water until the start of the cold dry season may already have dried up. Similarly, off-season crops around permanent ponds or along rivers may have already started in the hosting areas. Consequently, it is essential that securing access to natural ponds, river banks or dams becomes an essential part of local, national and regional plans for the management of transhumance.

2.3.5 Entry points to the hosting areas

Nearly a hundred families stated that, in their opinion, nothing has fundamentally changed over the last 10 years as regards accessing hosting areas. Furthermore, some considered that it is easier to find local hosts than before, and that the development of boreholes has greatly facilitated pastoral mobility.

For others, while the host provides transhumants with a privileged access to local grazing and water resources, several problems were raised, notably regarding the future of the hosting function. Many families underlined the increasing difficulty of finding hosts, forcing them to negotiate directly with the villagers, without the benefit of a mediator. In some cases, herders even reported that finding local hosts has become impossible, and that it is now necessary to negotiate directly with the population, local governments, municipalities, or technical services.

Another emerging trend is the loss of complementarity between the livelihood systems of transhumants and local farming communities: today, "*everybody owns livestock; everybody is a herdsman*". This results in increased competition for the same resources and in a hardening of relationships, including with their hosts. In addition, access to crop residues and manure contracts are becoming increasingly problematic, with a tightening of access conditions, for instance the obligation to dig a well for the owner of the field, or to pay for crop residues.

The development of village and local government level land use management plans – often prepared without their involvement – is also not positively perceived by transhumants. Some pointed to variations in rules from one area to another, which further complicates relationships.

Also, many of the households surveyed highlighted the numerous management committees at water points and the fact that transhumants are often made to pay more than residents. In fact, the monetization of relationships is frequently reported. Many transhumant families stated that everything now requires money, to the detriment of social relations: "*People ask for money for everything, for watering, and they even ask for animals in payment*." (Quote from Mauritanian transhumant households).

2.3.6 The use of livestock corridors

More than 40% (167) of surveyed households stated that they have not used livestock corridors during the 2014-2015 transhumance. For transhumant herders from Mauritania and northern Mali, this is mostly because these zones are still open pastoral regions, without any major obstacle. In the others zones, livestock corridors are not used either because they do not exist, or because they are in such a poor condition that it is better to bypass them. This is particularly the case in western Mali, where all of the households surveyed in the area covered by ICD declared that, where they go on transhumance, "*there are no corridors at all*."

In the area in western Mali covered by ACIDEF, other households added that: "*the corridors have become cultivated land, (and therefore) we have to go through fields or remain in the hills*." For some, the encroachment of cultivation into corridors is so critical that, "*it is better to go around them to avoid problems, in the same way that we avoid cultivated fields*."

For some transhumants, when asked about their use of a livestock corridor, a frequent reaction is to say: *what exactly are those*? The very notion of a wide, demarcated corridor that is mainly reserved for cattle is completely unknown to them, adding as a comment that they have never seen such corridors.

Where do they go then? At best, herds are trekked through the bush. This is the ideal scenario, but it is only possible during the dry season, when the harvests are completed and the fields cleared. This is not possible for a transhumance which departs towards the end of the rainy season, or returns when the agricultural season has already started. This solution also does not apply to southern areas where the agricultural calendar extends into the dry season.

Otherwise, often all that remain are bush tracks, which herders described as a last resort: "*We use very narrow and difficult tracks that must be shared with everyone*" (quote by transhumant families from northern Senegal trekking to eastern Senegal). Many families from western Niger end up concluding that: "*because there are no real livestock corridors, we use the tracks that motorcycles and cars use*."

In such a context, mobility can be a source of potential conflicts on a daily basis. Leaving aside the severe and destructive clashes (between herders and farmers) which have erupted in the past few years (and which have particularly affected the coastal countries), the relative control over such conflicts is due to the exceptional mitigation efforts made by the various populations (both transhumant and those resident in hosting areas) to weave and maintain a social capital without which many situations would explode continuously.

For the 219 families who use the corridors, the distances travelled continuously – that is to say, without leaving the corridor itself – may vary considerably. The longest (95 km) was registered with a herder from eastern Burkina Faso who left from Komondjari to go to Togo. A small group of 14 families (mainly from Burkina Faso and western Niger) also reported having travelled distances ranging from 50 to 70 km, without exiting.

The perception of the level of the equipment and infrastructure linked to the corridors used remains rather negative. This confirms the scope of the work still to be done, as well as the importance of following a broad and comprehensive approach. Marking the corridor with visible markers (such as concrete posts), is an important step to delimit the allocated space and to confirm its pastoral use. However, it is not enough. Without transit (resting) areas and watering points along the track, herds are sooner or later forced to leave the corridor. In total, 568 forced exits were reported on the outward journey and 796 on the return journey, while 14 families reported having to make between 10 and 30 exits.

2.3.7 Security problems

In total, 169 families (44%) reported having encountered security problems during transhumance (ransoms, camp attacks, road blocks, highway robbery, etc.) Although all of these problems are present across the different zones, they take place with increased frequency in northern Mali and in coastal countries.

Ransoms need to be paid to escape violence; and these can take various forms. In certain cases, the villagers appear when transhumants arrive looking for access to a grazing area and demand to be paid if they are to be allowed to stay. Camp attacks are often equated with livestock theft and hit transhumants particularly hard. Road blocks are often associated with attacks along tracks or in the bush.

2.3.8 Difficulties linked to mobility

For 292 families (76%), being mobile presents a number of problems. The main difficulties are mostly:

- Blocking corridors (147 families);
- Lack of water points on or near corridors (133);
- Conflicts over livestock entering cultivated fields (113);
- Harassment at border crossings (91);
- Having to exit corridors to access water or pasture (79);
- Other difficulties: livestock theft; ransoms; harassment by government technical services (especially the Water and Forest Department); impoundment of livestock (62);
- Exit dates to leave certain zones, imposed on transhumants (60);
- Conflicts with other users in relation to access to water points (57);
- Crossing national parks and gazetted forests (50).

Negotiation remains the basic strategy used by transhumants to solve these problems, if possible without having to pay. When payment cannot be avoided, the payment of a sum of money is often accompanied by one or more animals. The most substantial payments (nearly 6 million FCFA) are related to conflicts over fields, harassment when crossing borders (3.3 million FCFA), and crossing national parks or gazetted forests (2.25 million FCFA).

There is a high level of variation when it comes to the amount demanded. For instance, for border crossings, the payment made to a Veterinary Officer can range from 2,500 FCFA to 80,000 FCFA. Payments made to the Water and Forest Department can range from 40,000 FCFA to 150,000 FCFA for the same type of "offence".

2.3.9 Risks during transhumance

Beyond strictly drought-related climate risks – which are mostly managed and mitigated through mobility - livestock herders are faced with a multitude of other risks potentially affecting their animals: injuries, predators, brush fires, floods, broken-down boreholes, snakes, road accidents, off-season rains, cattle thefts, and drowning. These risks are compounded by livestock diseases, whose impact will be discussed below.

Out of 386 families, only 50 families (13%) declared not having been exposed to any particular risks. For the 336 families remaining, the number of risk situations are multiple, with examples reaching up to 7 risk situations for the same family. The frequency of these risks clearly shows the impact of predators (60% of incidents reported) as a major risk factor, followed by injuries (47%), cattle thefts (46%) and snake bites (44%).

Figure 2 Loss Ratio per Animal Species
(all risks except animal diseases)

Loss ratio as % of transhumant herd population	Cattle	Camels	Sheep	Goats
	3.9%	**6.8%**	**6.1%**	**16.2%**

At the family herd level, these losses can be heavy, especially if the herd-size at the start of the transhumance is small. By contrast, such losses will be more easily recouped in a large herd through natural growth. However, if the herd is smaller, particularly as regards large livestock (cattle, camels), losses will take much longer to recover from.

2.4 FAMILY HERDS AFTER THE 2014-2015 TRANSHUMANCE

2.4.1 Herd structure

The average distribution of animal species within the herd provides the following typical herd structure which underlines the numerical importance of cattle and sheep within the herd:

110 cattle, 3 camels, 129 sheep, 62 goats, 1 horse and 7 donkeys

Nonetheless, the disparities between areas surveyed are large:

Figure 3 Structure of Family Herds (by Species)
(386 families)

AREA SURVEYED	CATTLE		CAMELS		SHEEP		GOATS		HORSES		DONKEYS	
	Total	Average per family	**Total**	Average per family	**Total**	Average per family	**Total**	Average per family	**Total**	Average per family	**Total**	Average per family
Northern Senegal	7 737	**111**	2	**-**	17 965	**257**	4 825	**69**	168	**2**	751	**11**
Mauritania	10 921	**156**	235	**3**	11 977	**171**	3 441	**49**	76	**1**	306	**4**
Western Mali	10 125	**145**	0	**-**	12 399	**177**	7 202	**103**	31	**0,4**	945	**14**
Northern Mali	1 809	**52**	578	**17**	1 376	**39**	1 433	**41**	3	**-**	195	**6**
Northern Burkina	3 730	**107**	47	**1**	1 535	**44**	1 839	**53**	0	**-**	86	**2**
Eastern Burkina	3 252	**93**	0	**-**	1 202	**34**	1 270	**36**	0	**-**	79	**2**
Western Niger	4 703	**66**	137	**2**	3 472	**49**	3 914	**55**	3	**-**	265	**4**
TOTAL	42 277	**110**	999	**3**	49 926	**129**	23 924	**62**	281	**1**	2 627	**7**

The primary position of cattle within the herd structure is characteristic for all areas, with the highest average being in Mauritania (156 head) and the lowest in western Niger (66 head). Small ruminants play an important role in Mauritanian, Malian and, above all, Senegalese herds, with an average of 257 animals per herd, which again demonstrates the considerable investment of north Senegalese herders in sheep.

2.4.2 Herd differential before and after transhumance

Once livestock sales which occurred between the return from transhumance and the time of the survey (a delay of between 3 to 7 weeks) are taken into account, the difference between pre- and post-transhumance herd size reveals some major trends:

Figure 4 Differential Between Pre- and Post-Transhumance Herds (386 families)

AREA SURVEYED AND PARTNERS	CATTLE	SHEEP	GOATS
Northern Senegal	**- 354**	**- 130**	**- 314**
Mauritania (GNAP)	**- 330**	**- 915**	**- 415**
Western Mali (ACIDEF, ICD)	**- 86**	**+ 754**	**+ 212**
Northern Mali (TASSAGHT)	**+ 114**	**+ 7**	**- 34**
Northern Burkina Faso (CRUS)	**+ 34**	**- 201**	**- 57**
Eastern Burkina Faso (RECOPA)	**+ 260**	**-84**	**- 98**
Western Niger (AREN, GAJEL)	**+ 233**	**+ 160**	**+ 308**
DIFFERENTIAL FOR ALL AREAS	**- 129**	**- 409**	**- 398**

While herds seem to have decreased overall, this is only to a negligible extent, particularly if we take into account the climate crisis that occurred in three of the five countries surveyed. Thus, a loss of 129 cattle on a transhumant population of more than 43,000 is almost insignificant. It is far removed from the loss rates of 40 to 70% that were observed during the droughts of the 1970s and 1980s. Moreover, these losses are easily recoverable because of the rapidity with which small ruminants are able to reproduce and, for cattle, as a result of the excellent year (in terms of rainfall and grazing) which followed the 2014-2015 transhumance.

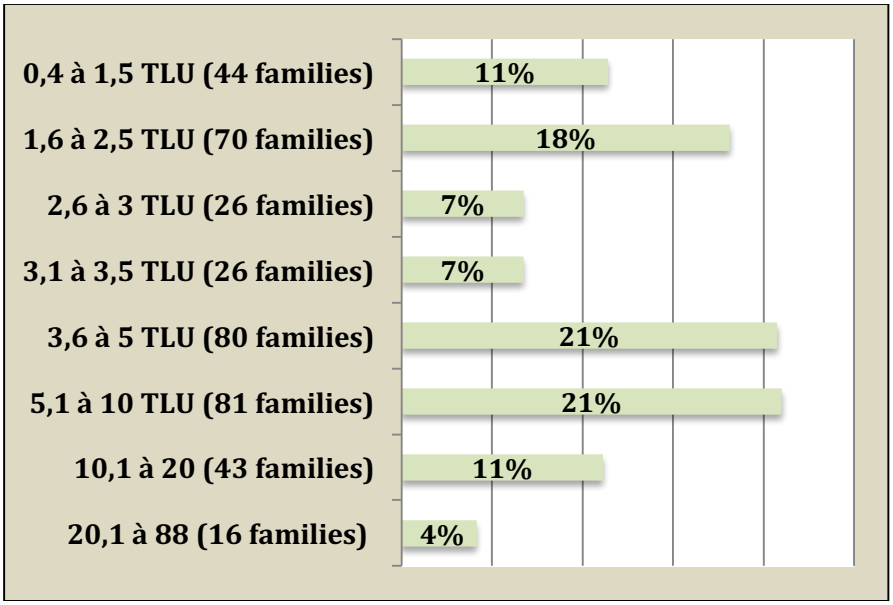
The decrease in livestock numbers recorded for Mauritania and northern Senegal remains negligible compared to the total herd on transhumance, despite the fact that both zones suffered from a severe drought in 2014. This is a direct result of livestock mobility. By leaving on transhumance to the south earlier and by taking with them the bulk of their livestock, herders were able to return (some, nearly 250 days later) with their herd size largely maintained and their livestock in good condition. Mobility acted as a factor maintaining herd resilience in the face of severe climate shocks, all while maintaining the numbers and viability of the national herd.

An increase in livestock numbers (especially cattle) is recorded for transhumant families from eastern Burkina and western Niger trekking to coastal countries. This is in line with the observations made during the AFL-NCG-CIRAD mission in September 2015 in Togo: although the final outcome for a transhumance herder coming from Burkina Faso or Niger is not always positive, and indeed sometimes loses are incurred, leaving for the coastal countries is usually the most profitable strategy. This remains the case, despite the costs involved, the cattle thefts, the livestock diseases and the animals that must be sold. Staying behind in the home areas is not an option unless there is a period of good years with adequate rainfall, and the herder has sufficient funds to buy livestock feed.

2.4.3 The viability of herds in relation to the family

On the basis of the thresholds adopted, the overall situation is rather positive, since 57% of households surveyed are situated above the optimal 3.5 TLU per adult equivalent threshold:

Figure 5 Ratio TLU/AE according to tranches (386 families)



For other households below this threshold, only 9% (36 families, among which several ones with small herds) can be singled out as being "at risk", after taking into account different mitigation factors (agricultural production, other productive activities, remittances received from migrants). In addition, a large proportion of these are families from northern Mali, where extreme insecurity has been accompanied by a withdrawal of basic services, including animal health services.

Undertaking a transhumance on a recurring basis would seem to require two essential pre-requisites. On the one hand, it is necessary to have a substantial number of livestock (with a herd large enough to be able to absorb climate shocks), as well as having the means to be able to finance the costs of the transhumance (which are high, as will be discussed below). Having the same TLU/AE ratio, a family with 150 cattle and 400 small ruminants is in a much better position to recover from animal losses than another family whose herds is made up of only about 40 animals. On the other hand, transhumance must be part of livelihood systems with a strong agricultural base combined with other income generating activities.

In terms of herd structure, the sex and age composition of the cattle herd is also remarkably consistent throughout all zones surveyed, with an overall ratio of 71% females to 29% males. This confirms the inherent rationale of livestock systems in the Sahel, which are oriented not only towards reproduction and milk production, but also towards sales. Herd ratios are deliberately unbalanced in favour of a greater numbers of females, while preferring to select males for sale on the market.

In addition, statements made by herders regarding the very limited number of additional animals entrusted to them by outsiders for the time of the transhumance and/or during the following rainy season, confirm the high levels of control which herders themselves have over the family herd.

2.5 ANIMAL HEALTH

2.5.1 Vaccination, deworming and purchase of livestock medicine prior to departure

In total, 41 families (11%) reported that they did not vaccinate their animals before leaving on transhumance, and 95 families (25%) did not deworm their animals. Among these were many families from northern Mali, where herders face both a lack of veterinary products as well as a scarcity of qualified veterinary technicians.

Otherwise, vaccination and deworming are commonly practised, with a focus on a total coverage of cattle and small ruminants. After returning from transhumance, 187 families vaccinated their herd (compared to 345 families prior to departure), and 197 families dewormed their livestock (compared to 291 families). Half of transhumant families reinvested in animal health after the transhumance.

A total of 115 families (30%) stated that they did not have any stocks of medicine before leaving, with, once again, a predominance in northern Mali of households not purchasing drugs. For the remaining 271 families, there are 4 major categories of medicines which are stocked: antibiotics, deworming agents, trypanocides (against sleeping sickness) and vaccines.

Transhumants from the west tend to take larger stocks of medicine with them, which could be explained as being a result of difficulties in accessing medicines and animal healthcare professionals in hosting areas, as well as the expectation of a high incidence of disease (risk anticipation). The purchase of trypanocides in the west, as in the east, shows that transhumant animals are going further and further south into areas infested by trypanosomiasis.

Veterinary products were obtained on markets (142 families), from itinerant vendors who criss-cross the bush (12), or other herders (2). However, the majority of purchases were made in veterinary pharmacies (172), with private veterinarians (12), from the Livestock Department (8) or from veterinary auxiliaries (3).

In total, 156 responses link to purchases from the informal sector (market, itinerant vendors), compared with 195 in the formal sector (pharmacies, the Livestock Department, veterinary auxiliaries, private veterinarians).

This distribution clearly shows the efforts made by herders to look for good quality medicines, by going to see professionals. This also shows that herders are very aware that having to purchase veterinary drugs from the informal sector is only a second-best option, to use when no other choices are available.

2.5.2 The impact of livestock diseases

Of the 386 families surveyed, only 37 (10%) reported not having encountered any animal health problems. For the remaining 349 families, the impact of animal diseases (resulting in mortality, slaughtering and emergency sales to butchers) on transhumant herd numbers is high, especially in northern Mali.

Figure 6 Loss rates due to diseases:
(349 families)

AREA SURVEYED	CATTLE		SHEEP		GOATS	
	Total	As % of the total transhumant herd	Total	As % of the total transhumant herd	Total	As % of the total transhumant herd
Northern Senegal	322	4%	1,155	7%	316	9%
Mauritania	447	4.5%	487	3.8%	125	5.3%
Western Mali	146	1.6%	538	4.3%	254	4.1%
Northern Mali	399	16.7%	284	15.4%	267	16%
Northern Burkina Faso	135	4.1%	41	4.8%	66	7.8%
Eastern Burkina Faso	167	6.4%	11	2.8%	0	0%
Western Niger	183	4.4%	199	7.5%	132	11.4%
Total	**1,799**	**4.6%**	**2,715**	**5.8%**	**1,160**	**7.4%**

The treatment of livestock diseases by the herder himself is very common in all areas, followed, in second position, by veterinary auxiliaries. This shows, again, the difficulty which transhumants face in accessing the services of professionals. In the end, if mortalities due to other risks are included, the final rates of losses in relation to the total numbers of animals which left on transhumance is high.

Figure 7 Final losses (diseases and other risks) as a % of the total transhumant herd

LOSSES	Cattle	Sheep	Goats
Losses due to diseases	4.6%	5.8%	7.4%
Losses due to other risks	3.9%	6.1%	16.2%
Total %	**8.5%**	**11.9%**	**23.6%**

Although the rate of loss is significant among sheep and goats, the impact is often short-term, given the rapid reproduction rate of small ruminants. The recorded rate of 8.5% for cattle is potentially more damaging, as rebuilding herd numbers in the case of large livestock (cattle, camels) is a much slower process.

Transhumant systems are only viable if the size of the family herd is sufficiently large to absorb these losses, especially when it comes to the cattle herd. This puts into perspective the relatively large sizes of the herds enumerated during the survey, as well as the large number of families which are above the viability threshold, and often well above. Transhumance is an operation which involves animal losses that would not be sustainable in the long term for herds whose initial numbers were too low.

However, transhumance also involves other costs, this time monetary: food must be purchased, animals must be cared for, access to water and pastures must be secured. The next section will examine these costs.

2.6 THE COST OF THE 2014-2015 TRANSHUMANCE

2.6.1 Main expenditure items (17)

1. Veterinary products.

2. Salt for the animals: salt licks, salt bought on the markets or in the bush.

3. Human health.

4. Watering costs.

5. Access to pastures: access to gazetted forests, "purchasing" access to fields for crop residues, entry permits to pastoral areas, grazing fees.

6. Border crossings: Transit passes and visas on transhumance certificates, taxes paid to the Livestock Service, to Customs, or to the Police.

7. Payments to local governments: "Authorization to stay", "visitors tax", administrative papers, local development tax, "authorization to enter the municipality", "transit taxes", "residence permit."

8. Other taxes: payment to allow herds to pass through cultivated lands, tax paid to set up camp, right to bear arms (machetes), bridge crossing rights, wood cutting permit.

9. Food.

10. Small equipment: torches, batteries, solar panels, plastic sheeting.

11. Water drawing and water storage equipment.

12. Cart purchase and repair.

13. Bicycle purchase and repair.
14. (Mobile) phones.

15. Forage: cowpeas or groundnuts, sorghum and millet stems, etc**.**

16. Livestock feed: cottonseed or groundnut oilcakes, wheat bran.

17. Other: wages, clothing and footwear for wage-earning shepherds, transport costs for fodder supplements and livestock feed.

2.6.2 Structure of transhumance budget

The total expenditures declared by the 386 surveyed families for the 2014-2015 transhumance is close to half a billion FCFA (474.4 million), with an average budget of 1,230,000 FCFA per family. The largest expenditures involve livestock feed (44%) and food for the household (22%), followed by 6.5% for veterinary products, 4.3% for mobile phones and 4.2% for livestock watering costs. Total amounts reported as paid on taxes (border crossing, payments to local governments and other taxes) are low (1.6%) but these do not include the taxes paid on livestock markets.

Figure 8 Transhumance Budget (2014-2015) per Expenditure Item

Expenditure Item (In order of importance in the budget)	**Number of families**	**Amount expended during transhumance** (in FCFA, rounded up)			**As % of the total budget spend by the 386 families**
		Total	**Average per family having made this expense**	**Average over the 386 families**	
Livestock feed	318	209,655,000	659,000	**543,000**	**44%**
Food	381	103,520,000	272,000	**268,000**	**22%**
Veterinary products	348	30,900,000	89,000	**80,000**	**6.5%**
Telephone	376	20,250,000	54,000	**52,500**	**4.3%**
Watering costs	166	20,040,000	121,000	**52,000**	**4.2%**
Other expenses	106	15,470,000	146,000	**40,000**	**3.3%**
Access to pastures	152	13,550,000	89,000	**35,000**	**2.9%**
Salt for the animals	345	10,640,000	31,000	**27,500**	**2.2%**
Human health	265	9,518,000	36,000	**25,000**	**2%**
Small equipment	317	9,676,000	31,000	**25,000**	**2%**
Fodder	68	7,628,000	112,000	**20,000**	**1.6%**
Cart purchase and repair	151	7,071,000	47,000	**18,500**	**1.5%**
Border crossing	116	5,920,000	51,000	**15,500**	**1.2%**
Water drawing and water storage materials	266	5,178,000	20,000	**13,500**	**1.1%**
Bicycle purchase and repair	110	3,310,000	30,000	**8,500**	**0.7%**
Other taxes	28	1,065,000	38,000	**2,800**	**0.2%**
Payment to local governments	38	1,009,000	27,000	**2,600**	**0.2%**
Total	**386**	**474,400,000**		**1,230,000**	**100%**

Expenditures are spread out over long periods and across vast areas. During the 2014-2015 transhumance, thousands of transactions took place on a daily basis on markets (60%), directly with villagers (15%) and, for the rest: health clinics, veterinary pharmacies, the Livestock Department, blacksmiths, welder-mechanics, well-diggers, water management committees, veterinary auxiliaries, cell phone chargers, Water and Forests Department, bicycle and cart mechanics, etc. Transhumance creates employment and generates income, thus contributing to local livelihood improvements.

A market study conducted in northern Benin (2012) has come to similar conclusions, showing that the influx of transhumants facilitates access to quality animals at a competitive price for local communities, while increased demand for local products (cereal, basic necessities) results in lower prices for these commodities. In the end, not only are market activities at their highest during the presence of transhumant herders, but the well-being of the local population also improves[1].

Did the climatic situation influence the levels of expenditure? This was probably the case for livestock feed purchases which were most likely higher than normal for transhumants coming from drought-stricken areas (northern Senegal, southern Mauritania). However, the influence of the climate factor was much less pronounced in all of the other areas surveyed, in which the grazing conditions were more or less normal. Although it was conducted with a more restricted sample of families, the follow-up survey covering the 2015-2016 transhumance (see Section 3), which followed an excellent rainy season, indicated a decrease in livestock feed expenditure because the animals left the home area in good condition. However, the level of other expenditures remains high.

Such data is fundamental at a time when many decision-makers argue that livestock mobility is mainly a source of problems and does not provide any real benefits for the local economy in hosting areas frequented by transhumants.

2.7 SALE OF LIVESTOCK AND DAIRY PRODUCTS

2.7.1 Livestock sales during transhumance

The number of livestock sold was 2,039 cattle, 48 camels, 5,120 sheep and 1,902 goats. The total revenue generated by these sales is significant: more than 495 million FCFA. Among these sales, the number of animals entrusted to transhumant herders by others (farmers, migrants, traders, civil servants) is negligible (only 24 cattle). Camel sales are limited, reflecting the low numbers recorded of camels owned by the sample of households surveyed: only 15 families (from northern Mali) sold 51 animals. Only 42 households (11%) stated that they had not sold any livestock during the transhumance (sales prices on markets too low, financial reserve build up prior to departure through Tabaski linked sales of livestock, animals in poor condition).

For small ruminants, families were able to provide an overall estimate of sales and revenue. A more detailed analysis would have been too arduous, given the frequency of sale of sheep and goats, and the difficulty for the herders to remember the sex and age of each animal, the place of sale, the amount obtained and the buyer. However, such analysis was done for cattle.

Cattle contribute approximately 60% of all income generated, compared with 40% for small ruminants. This share of sheep and goats in the makeup of incomes highlights both the significant number brought on transhumance, as well as relatively intensive exploitation during the journey.

[1] **AGBOBLY-ATAYI Ayikoué Honoré**, 2012, Report on the Study of the Phenomenon of Transhumance in the Commune of Djougou in Benin, IRD.

The overall rate of sale is high, especially for cattle: 5.2%. This rate does not take into account family slaughter during transhumance, sales of animals remaining in the home area, or sales made between the return from one transhumance and the departure on another. Based on a maximum off-take rate of around 10 to 12% per year (beyond which herd growth may be compromised), this means that, about half of the potential sales are made during the transhumance period.

Figure 9 Off-take Rate During Transhumance
(344 families having sold animals)

AREA SURVEYED	CATTLE	SHEEP	GOATS
Northern Senegal	5.8%	14.8%	16.8%
Mauritania	4.9%	5.1%	9.1%
Western Mali	4.9%	12.3%	12.9%
Northern Mali	4.2%	5.5%	5.2%
Northern Burkina	5.6%	15.3%	16.7%
Eastern Burkina	6.2%	13.4%	0%
Western Niger	4.6%	8.2%	6.1%
Overall average	**5.2%**	**10.8%**	**12.1%**

Contrary to popular belief which holds that herders sell mostly males among their cattle, transhumant families have actually sold a large number of females in 2014-2015: 40%. Cattle sold were usually young, both males and females. Nearly half of the males were between 1 and 3 years old. For females, 30% were heifers less than 3 years old and only 17% of females were aged 10 and older. These figures show that we are far from the image of herders being reluctant to sell, under-exploiting their herds and only selling their culling cows.

Cattle sales were spread over a period of 10 months (November 2014-August 2015), thus feeding the value chain with high quality animals over a long period of time. Almost half (49%) of cattle sales were made on markets, 32% to small traders (*dioula*) in the camps, 16% directly to villagers (for draught power, fattening or celebrating funerals), and 3% to butchers (emergency sales resulting from accidents or diseases).

Transhumant herders are therefore a key contributor to the livestock value chain, far from the common perception of transhumants holding onto their animals.

2.7.2 Sales of dairy products

The sale of dairy products only contributed to household income in a negligible manner. Only 59 families reported having sold dairy products during transhumance, and this only very occasionally. For the remaining 327 families, the reasons given are mainly the fact that milk production is low, and thus entirely reserved for family consumption. Access to milk can reduce the need for food purchases. Milk is also a social good, highly valued by women. It is given as a gift to hosts (*logeurs*) with whom long relationships exist, and villagers. It is also sometimes exchanged for *gari* (dried cassava powder) or bran for the animals.

Revenues generated by the sale of dairy products are not commensurate with those generated by livestock sales by a long way. Declared sales totalled barely 2.5 million FCFA (420,000 FCFA for fresh milk, 1.3 million FCFA for curdled milk (yoghurt), and 850,000 FCFA for butter).

2.7.3 Differential between revenues and expenditures

For a total income of approximately 495 million FCFA generated from the sale of livestock during transhumance, the total amount of declared expenditures is approximately 474 million FCFA, for a positive differential of 21 million FCFA. This surplus allows for certain types of purchases, for example, when transhumants from eastern Burkina Faso acquire new motorcycles on the return journey. This also provides an explanation for the low livestock numbers sold in the weeks following the return from transhumance, when some herders explain that they made good sales in the hosting areas and have some money left in their pockets. This would also mean that transhumant sales strategies are based on two objectives: on the one hand, to bear the costs of transhumance and, on the other, to make a monetary profit that can be brought home and be used as a financial reserve for the next transhumance.

These findings once again confirm the considerable economic impact of transhumance, not only from the point of view of what is spent in the areas en route, but also in terms of the volume of livestock injected into the value chain.

2.8 THE SITUATION OF WOMEN

The survey was carried out among 131 women, spread across the zones covered by the survey, and drawn from the household sample. Discussions often included other women: daughters-in-law, sisters, cousins, nieces and neighbours. In the end, 329 women were part of the discussions.

2.8.1 General situation

Tasks related to livestock. All of the women surveyed are directly involved with livestock, whether or not they participated in transhumance. A compilation of the tasks carried out for each animal species according to the seasons show that they bear a wide range of responsibilities: watering, looking after young animals, milking, producing and selling dairy products, collecting dry fodder and firewood, preparing rations of salt and fodder supplements, building pens for small ruminants. However, they less often bring the animals out to pasture (which normally remains a task given to the men and boys; and, for small ruminants, to girls as well). Girls (below 12 years of age) are not spared the workload. In almost all cases, they actively participate in tasks related to small ruminants: milking them, looking after the young, giving them water, collecting fodder and, unlike their mothers, bringing them out to pasture. The same goes for cattle.

Women's rights to livestock. Nearly 90% of women (122) report full ownership of some animals. A significant number of women own cattle, with a reported total of 972 heads. However, of those interviewed, half of them own only a small number of cattle: between 1 and 5 head. 21 women reported owning between 10 and 50 cattle. The largest numbers owned (30 to 53 head) can be found in large-sized herds, such as the case with a woman from Burkina Faso who owns 27 cows and 10 oxen from within a family herd of 550 animals. In general, females (heifers, breeding cows) clearly dominate.

Ownership of small ruminants is also widespread: 87 women report owning a total of 1,204 sheep and 1,118 goats. When it comes to camels, the number of animals declared owned by women is 17, all of which were owned by women from northern Mali. Only 39 women reported owning small numbers of additional animals received as part of their dowry and left behind in the care of their parents: 137 cattle, 51 sheep and 81 goats. In addition, 71 women consider that they have some (partial) rights (milk, pre-inheritance for their children) over a total of 625 cattle, 13 camels, 1,216 sheep and 759 goats.

In most cases, animals to which women have full rights are integrated into the family herd and are therefore not subject to separate management, even in cases in which a woman might own a significant number of livestock. When this is not the case (only 7 incidences of separate management for cattle, 10 for sheep and 16 for goats), it is mainly (the woman's) children who are used to take the animals out to pasture and to water them, with only two recorded cases of recruiting wage-earning herdsmen.

The investment of women in animal health. Only a small number of women (38) who have complete or partial rights to animals provide them with preventive or curative treatments. For other women, the main reason given is that it is the men of the family who are responsible for animal healthcare. Vaccination is common (34 women). Treatments by the woman herself, and by veterinary auxiliaries are the typical methods used. The principal difficulties reported have to do with access to animal-health professionals and to good quality medicines.

Animal purchases. Only 22 women stated that they occasionally purchase animals to increase the size of their herds. For the others, the lack of time (*buying animals is the men's job*), limited financial resources to do it, and the uncertainty of being able to feed them properly (droughts, increasing cost of livestock feed) are all reasons brought forward for not making purchases. In addition, they often point to other expenses, which they consider more important: cereals, family health, etc. As a result, the numbers of animals purchased by women are small (about 10 cattle and about 50 small ruminants). The cattle bought are mostly breeding females, and the small ruminants often include males for fattening.

Milk products and sales. The vast majority of women surveyed are involved in milking activities for all species. However, the separation of tasks between men and women is not always formal. Milk is mainly processed into yoghurt (121 cases) and butter (110 cases). More rarely, women make soap (11 cases) or cheese (8 cases), both of which are produced for sale. Most women (91 out of 131) sell some of their dairy products. For the others, low milk production, the need to keep most of the milk for the family's consumption or the lack of market outlets are the reasons given for not making sales. Sales generally take place during the rainy season and the cold dry season, when milk production is most abundant. The most-sold products are yoghurt (84 cases), butter (72 cases), and fresh milk (44 cases).

Animal sales. The sale of animals over the previous 12 months by women themselves is relatively frequent (70 women out of 131), with a total of 46 cattle, 129 sheep and 149 goats sold during the 2014-2015 season. Those who did not sell gave, as the most common reasons, the lack of specific needs (for cash), the income gained from milk or the desire not to reduce herd size. However, the overriding reason for most of the women interviewed is that it is the men who sell the animals and who take responsibility for everything.

Out of the 70 women who reported sales, the income obtained was used first and foremost to purchase clothing (60), cereals (44), tea and sugar (37), livestock feed (34), and medicines for the family (29). In addition to this were other - fewer - purchases of gold and silver, cooking utensils, hides and mats, cell phone sim-cards, jewellery and gifts for parents.

Animal food supplements. Crop residues are used by about half of the women to feed their own animals. These mainly come from bran (60), millet (54) and sorghum (46) stalks, cowpea (43) and groundnuts (34) toppings. In addition, 51 women (out of 131) purchased livestock feed. Those who did not purchase any feed systematically referred to the fact that it is the men who purchase the livestock feed for the whole herd, including for the women's animals.

Regarding the purchases made during the last 12 months, priority went to cotton cakes (32 women), wheat bran (26), and cotton seed (23). Of those 51 women purchasing livestock feed 47 did so at the markets and 30 at special outlets selling livestock feed. Procurements through the Livestock Department were rare (only 3 women). Volumes bought are by no means negligible totalling almost 20,400 kg, for an average of 400 kg (the equivalent of 8 bags of 50 kg) per woman. However, most of these purchases (15,000 kg) were made by 18 women having ownership of a significant number of cattle and small ruminants.

2.8.2 Women Remaining in the Home Area (77)

Of the 131 women surveyed, 54 of them went on transhumance, while the others remained in the home area. Among transhumant families surveyed in eastern Burkina and western Niger, most women interviewed were reluctant to leave because of security problems in coastal countries and stayed behind.

Perception of the climate situation. Women have a very clear view of rainfall trends and of changes in their environment. The majority of women accurately assessed the 2014 rainfall deficit year, not only in terms of precipitation gaps, but also in terms of the early end of the rains and the resulting overall rainfall deficit. The impacts perceived by women for the following dry season are clearly related to the lack of pastures and the reduction of surface water. In addition, some mentioned early drying-up of wells, reduced volumes of crop residues, cutting down of trees affecting rest areas (lack of shade for animals, reduction in browsing material such as leaves and twigs), and an influx of animals from the north. According to them, the main changes observed over the past 10 years are the reduction in the length of the rainy season, the increased frequency of deficit years, a reduction in the quality of the grasses and the expansion of areas under cultivation, which has resulted in a reduction of pastoral resources.

Departure of animals on transhumance. More than half of the women who remained in the home area sent some of their animals on transhumance with the rest of the herd. The total numbers of their livestock having left for the 2014-2015 dry season is large: 451 cattle, 857 sheep and 484 goats. Compared to the number of animals stated as fully belonging to them, this represents 50% of the cattle held by women, 70% of the sheep and 40% of the goats. Even though they are not physically part of the transhumance, women thus rely on livestock mobility as a management strategy.

Excessive workloads. As discussed above, a significant number of family members (especially men) leave on transhumance. As a result, it becomes necessary for women to take on tasks in the home area that they would not normally have to perform. This includes: watering the animals, closely monitoring young animals, tending livestock, and, sometimes, even herding.

Communication with the group on transhumance. All of the women who remained in the home area were in regular contact with the group which had left on transhumance. Cell phone use is widespread. Messages are also given to those who go back and forth to the hosting areas. In crisis situations that involve a massive departure of both families and herds, cell phones provide those women who remain behind with a link which connects them daily with absent family members. In northern Senegal, after a year of drought in 2014-2015 which had seen entire families move south, one woman who had remained in the home area with elderly relatives explained how she had managed to remain alone, in the midst of deserted encampments, simply by showing her cell phone and adding, *"every day we talked, every day I called them, every day they called me."*

2.8.3 Women who left on transhumance (54)

A longstanding practice. For 44 of the 54 women who joined the 2014-2015 transhumance, the fact of leaving is not at all exceptional. The majority leave every year, and for many women, this is a longstanding practice. It is not uncommon to find women whose age indicates that they were already part of the transhumance journey as young girls, and that they simply continued into adulthood. Many women reported having left on an annual basis for more than 20 years, and some even between 25 and 35 years. Almost all women left with young children (under 12 years old), for a total of 91 boys and 81 girls.

Animals belonging to women and leaving on transhumance. The vast majority of women who have left on transhumance reported having brought with them most of their animals , both cattle and small ruminants. Ultimately, whether a woman is staying in the home territory or leaving, almost all of her animals are integrated into the transhumant herd. Mobility is thus a basic strategy for women to expand their livestock capital and preserve it in case of a crisis.

Tasks assumed during transhumance. Procurement of food supplies and preparation of meals are important tasks. During transhumance, camps move regularly, with livestock herding keeping the men away for long hours during the day (and sometimes at night). It is necessary to organize logistics, to supply the camp with water and to ensure that food is provided for the entire transhumant group. A significant proportion of women also report having to be involved in a number of herd-related tasks, which are all the more important since the risks of theft are high: watching over the young animals, watering and, to a lesser extent, bringing animals out to pasture and caring for their health. To all these are added numerous other tasks: general supervision of the camps, construction of temporary pens for small ruminants, firewood collection, harvesting of wild fruits, and construction of temporary huts with each new move. Some women later reported that such tasks require them to have cutting tools (such as small axes) with them, which often means that they face fines from the agents of the Water and Forests Department (for carrying “weapons”).

Difficulties associated with mobility. A majority of women (44 out of 54) felt that being mobile was difficult. The main difficulties put forward are (in order of frequency):

- The lack of livestock corridors (31 women),
- The lack of water points (26),
- Conflicts over fields (24),
- Bottlenecks on livestock corridors (22),
- Road accidents from trekking animals close to traffic (18),
- Conflicts over water points (15),
- The crossing of national parks (3),
- Border crossings (2).

Safety is also a constant preoccupation for women: cattle theft, ransoms, getting lost in the bush, attacks around water points, highway robbery.

Communication and information. During transhumance - as is also the case for the men - women spend a substantial amount of time gathering information. While some women (8) insist that information is an activity for men and that they follow their husband's instructions above all, other regularly look for information on (by order of frequency):

- The location of pastures and water points,
- The market situation, (price of cereals, milk powder, condiments),
- The start of the rainy season, both in the hosting areas and in the home area,
- The political and security situation,
- The presence of diseased animals,
- Bush fires,
- The presence of salt licks,
- The state of boreholes, and the risks of borehole breakdown,
- The carrying capacity in the hosting areas,
- The price of butter, of fresh milk and of curdled milk (yoghurt).

Mobiles phones are a basic tool to access information. Almost half of the transhumant women have one and most of them limit their spending (on airtime) by also using their husband or son's telephone. For the others, they use the mobile phones belonging to their husbands, but also of a sister, a brother or a son.

Other sources of information are also used. The wives of the hosts (their longstanding contacts in hosting areas) come to the camp and bring news about the area and the prices of goods in the markets. Women meet around water points, and even make visits to the villages. Transhumant women also participate in local life and go to events in villages (baptisms, funerals, marriages).

As a general rule (41 women out of 54), women also listen to the radio. These include mostly the national radio (31), local and community radios (20) and, in rare cases (3) RFI and the Voice of America broadcast in national languages. Most women listen to the radio in two languages, some even in three languages.

Social capital of transhumant women in hosting areas. Almost all women who went on transhumance (51 out of 54) stated that they had regular contacts with the local population, for various reasons:

Figure 10 Relations Between Transhumant Women and Local Populations (51 women stating that they had contacts in the hosting areas)

Main reason	Frequency of Answers
Purchase of crop residues	**47**
Purchase of food products	**47**
Sale of dairy products	**31**
Participation in local village festivals	**28**
Exchange of information on water and pastures	**27**
Animal sales	**11**
Livestock feed purchase	**9**

In contrast, only 8 women reported contacts with state officials. Apart from a visit to the clinic in case of illness or to the Livestock Department to treat animals, all other cases had to do with problems linked with the Water and Forests Department, in particular because the women were found in possession of an axe. In the same way, contacts with the elected representatives of decentralized local governments are rare: only 4 women reported having met them, mostly to receive transhumance certificates and to pay taxes.

Sales of livestock and dairy products by women during transhumance. Only 10 women sold animals during transhumance, for a total number of 17 cattle, 80 sheep and 40 goats. The total income generated is 5,660,000 FCFA, which is not negligible, given the small number of women concerned. Some of these sales are made directly to local women living in the villages, without going through the livestock market.

For the others, the most common reasons stated are that they do not have experience in livestock marketing and that, if necessary, it is their husband who is responsible for animal sales.

Cases of dairy products sales are more frequent (32), but remain occasional rather than regular: yoghurt (24), butter (18), fresh milk (15), and cheese (3).

Expenditures during transhumance. In total, 31 women (out of 54 who have left on transhumance) declared making personal expenditures, for an average of approximately 157,000 FCFA.

Figure 11 Expenditures of women during transhumance
(by order of importance, for 31 women reporting having made personal expenditures)

EXPENDITURE ITEM	Total Amount of Expenditure	Number of Women Having Made This Expenditure
Food (for the household)	**1,888,300**	29
Livestock feed	**1,380,000**	2
Other (clothes, shoes, telephone credit, soap, tea, cooking utensils)	**729,500**	15
Health expenses (clinic, medicines)	**467,000**	9
Water supply	**190,000**	8
Veterinary products	**103,500**	3
Post-harvest crop residues	**78,000**	3
Salt for the animals	**36,500**	7
Total	**4,872,800** (157,000 FCFA per woman)	

It should be noted that a woman from northern Senegal bought 1,280,000 FCFA of cattle feed using her own funds. At 48 years of age, this woman owns 35 cattle, 73 sheep and 30 goats, which she stated were under her full management. She brought all of her animals with her on transhumance, and integrated them into the family herd. With regard to the issue of buying additional livestock to increase the size of her herd, she explained that she was unable to do it this year because all of her savings were spent on livestock feed during transhumance.

3. THE 2015-2016 TRANSHUMANCE (YEAR 2)

3.1 METHODOLOGICAL APPROACH AND SAMPLING STRUCTURE FOR YEAR 2

It was agreed to focus the Year 2 survey on those 36 households earmarked during Year 1 as being the most vulnerable. This group was subsequently expanded to include other families identified as being on the margins of the viability thresholds. A few additional families positioned well above those thresholds were also included in order to verify other hypotheses (related to, for example: households owning a large number of cattle, but no small ruminants, in order to track the comparative advantages of large versus small livestock).

As a result, the 2015-2015 survey covered a total of 61 families. The significant representation of northern Mali (21 families) reflects the deterioration of the situation observed the previous year. For Senegal (19 families) the sample shows an ongoing social differentiation in this region, with a significant presence of poorer herders. On the other hand, the number of families struggling to make ends meet is much lower in Burkina Faso, Niger and Mauritania.

In order to ensure continuity, several themes were retained for the Year 2 questionnaire, with only minor simplifications. Family interviews were conducted by the same team of research assistants as the year before. However, in order not to influence discussions, interviewers (as well as herders) had no access to the quantitative data collected the previous year, especially regarding herd size and structure.

At an early stage, it was established that 6 families did not leave on transhumance for the 2015-2016 dry season. In addition, two families could not be reached: one from northern Mali, which had left for the Timbuktu region and which was still there at the time of the survey, and another from northern Senegal, which had already left for its 2016-2017 transhumance. In the end, 53 families were surveyed.

The survey enumerated a total of 1,042 people (compared with 1,023 last year for the same households). The population thus remained relatively stable. However, a case-by-case analysis revealed significant decreases in 5 cases (7 people and above) and, in 3 cases, significant increases (9 people and above). These situations testify to the complexity of livelihood systems in the areas surveyed. For one family, a brother joined the household, bringing with him most of his herd. For another household, several family members left on (labour) migration. Lastly – and this was often the case in northern Mali – the deterioration of security conditions resulted in people and livestock movement, either arrivals or new departures, depending on the situation.

3.2 THE PLACE OF AGRICULTURE AND OTHER PRODUCTIVE ACTIVITIES

Agriculture and other productive activities (livestock trade, small-scale trade, transport, handicrafts) continue to occupy the same positions of importance as last year within the household economy, and with a relatively similar breakdown between activities. The viability ratios used[1] in Year 1 remain valid.

However, it should be noted that some families grew more crops in Year 2 compared with the 2014 rainy season, which had been catastrophic in several areas. In some cases, additional crops were cultivated– e.g. sorghum or maize – as a result of the improved rainfall conditions in 2015.

[1] The ratios used are: 3.5 TLU/EA for households not practicing agriculture; 3 TLU/EA for households with a limited agricultural production (1 or 2 subsistence crops); and 1.7 TLU/EA for households with a solid agricultural base.

3.3 NUMBER OF LIVESTOCK DEPARTING FROM AND REMAINING BEHIND IN THE HOME BASE

Compared with the previous year, the numbers of livestock which left on transhumance for the 2015-2016 dry season are as follows:

1 621 cattle (versus 2,187 the previous year),
123 camels (versus 136),
3 734 sheep (versus 4,188),
2 214 goats (versus 2,049).

The decline in the number of cattle which left on transhumance can be explained by the fact that, as a result of the excellent 2015 rainy season, most of the families in northern Senegal have returned to their normal practice: i.e. mostly sheep go on transhumance, while a significant proportion of the cattle remain in the home area.

Additional animals were entrusted to transhumant herders by others (mostly farmers, traders, and migrants). There has been a significant increase in the numbers of cattle entrusted - increasing from 11% to 23% - and which can mainly be explained by the excellent 2015 rainy season. In this context, it becomes less risky to entrust animals to transhumant herders. In total, 20 families took additional animals on transhumance. Last year, half of these families had not taken any. However, this is not a long-term situation. It is likely neither to create strong dependency links with the owners, nor to reduce the level of control that families have over their herds. Apart for a few special cases, most of these animals return to their owners after transhumance.

In total, the number of livestock leaving on the 2015-2016 transhumance (family herds and additional animals entrusted) was 2 171 cattle, 165 camels, 3 902 sheep and 2 661 goats

3.4 HOUSEHOLD STRUCTURE OF TRANSHUMANT FAMILIES

The number of men, women, children and wage-earning herdsmen leaving on transhumance remained relatively stable between the two years, although with a downward trend.

Figure 12 Household structure of Transhumant Families (53 families)

	2014-2015 (Year 1)	2015-2016 (Year 2)	Differential (2-1)
Heads of families	39	39	**0**
Other adult men (brothers, uncles, nephews, sons)	141	105	**- 36**
Adult women	94	78	**- 16**
Children – 12 years	156	142	**- 14**
Wage-earning herdsmen	20	18	**- 2**
Total (people)	450	382	**- 68**

The size of family groups leaving on transhumance decreased overall (especially with regard to adult men other than family heads), while the numbers of livestock remained relatively stable (except for cattle in northern Senegal). Such a decrease can, once again, be attributed to the excellent conditions of the 2015 rainy season, especially in the hosting areas. The large number of seasonal ponds and the fact that they dried up very late in the season, as well as the good quality of the pastures, reduced the need for labour and motivated some family members to remain in the home area. The temptation to remain at home was all the greater since the previous transhumance had been exhausting. This is also reflected in an increase in the number of livestock under the care of one single herdsman: 17 TLU, compared with 14.8 TLU last year.

3.5 TRANSHUMANCE DESTINATIONS AND SCHEDULES

Overall, a comparison between Years 1 and 2 shows a relative consistency in the directions taken, but not necessarily in the final destinations reached, nor in the routes followed. In fact, of the 53 families surveyed, half (26) followed exactly the same itinerary, while the other half changed course, for various reasons, of which the main ones were the grazing conditions, bush fires, and safety issues.

The 2015-2016 transhumance was mainly internal (48 families out of 53), which should not lead to the conclusion that the cross-border aspect has decreased in importance since 2014-2015. As it was, families from northern Mali and northern Senegal being dominant in the Year 2 sample, the majority actually remained within their national territories, as they had done the previous year. As regards the other families located in the east (eastern Burkina Faso, western Niger) their transhumance to the coastal countries (Benin, Togo) continued.

Transhumance departure was later overall than the previous year, once again, a sign of the good rainfall conditions in the home areas. The bulk of departures took place in November-December 2015, with much later departures for some twenty families (38%), mainly from Northern Mali, leaving between March and May 2016.

The average length of the transhumance was 205 days (compared with 247 days the previous year). The main stages of the transhumance schedule were 45 days to reach the farthest point, 28 days to return to the home area, with 126 days spent at the most distant point. These lengths are remarkably consistent with those of the previous year. This tends to show that, even if the conditions impose changes in the route taken from one year to the next, the transhumance process is based on the same configuration of time: a homeward journey which is consistently faster than the outbound one, and a long absence, far from the home area.

In 2015-2016, transhumance movements were the shortest for the families from northern Mali (between 84 and 160 days). As discussed, this was as a result of the many late departures. The longest periods on transhumance were from the families coming from northern Senegal, with 9 families away on transhumance for a period of between 300 and 350 days.

3.6 ACCESS CONDITIONS TO HOSTING AREAS

The number of hosting areas frequented by transhumants decreased between the two surveys: 262 hosting areas on the outbound journey (versus 306 in 2014-2015) and 220 areas on the homebound journey (against 258). This was most likely the result of the excellent 2015 rainy season, which brought with it an abundance of good pasture, allowing transhumants to stay longer in each area and, consequently, in fewer hosting areas.

As with the previous year, the sample contained a number of cases (9) where a high number of hosting areas (between 6 and 25) were used, on both outbound and homebound journeys, confirming that transhumance movements may be combined with numerous stops. This emphasizes, once again, that the reality is far from the simplistic view of transhumance systems seen as essentially just a rapid and mechanical movement from point A to point B.

Access to hosting areas, as was the case during the previous year, is mostly secured through local hosts (*logeurs*), alternatively with villagers in exchange for manure or, as a last resort, through formal agreements with village authorities. The survey also showed, once again, the importance of access to surface water (ponds, watercourses, dams, reservoirs) for transhumants in the hosting areas.

3.7 LIVESTOCK CORRIDORS AND DIFFICULTIES ENCOUNTERED

There has been a clear improvement with regard to the use of livestock corridors. The number of transhumant families who followed livestock corridors increased (29 versus 19 last year), simply because, at that time, they were not yet demarcated. The number of occasions that herders had to change their itinerary due to blocked corridors decreased, mainly on homebound journeys, falling from 75 to 24 this year. The number of forced stops on the corridors greatly decreased, dropping from 25 stops in 2014-2015 to just 6 stops in 2015-2016.

Finally, 20 families (compared with 11 last year) considered that they did not encounter serious difficulties during their transhumance. The reasons given are not only linked to the abundance of pastures or water points, but also to the security provided by a demarcated livestock corridor. For the rest of the sample, although the actual number of reported difficulties had increased (72 versus 53 in Year 1), the frequency of cases in which the families concerned were obliged to pay in cash or in kind (animals) fell sharply, particularly in those situations normally considered to be the most complex to resolve: conflicts over fields, conflicts over water points, border crossings. The total amount disbursed actually decreased by two thirds. In addition, no animals were recorded as being forfeited, compared with a total of 22 sheep and 2 bulls which were lost in this way the last year.

Unfortunately, few changes can be seen in terms of security issues (19 cases versus 18 for the previous year), most of which are linked to problems unrelated to transhumance. This is especially the case for herders from northern Mali, where the security situation is a wider cause for concern, and where the highest number of cases of highway robbery and attacks on camps were reported.

3.8 ANALYSIS OF RISKS AND LOSS RATES

The frequency of risks encountered has decreased significantly, compared to Year 1. While predators, injuries and livestock theft continue to be critical, for other risks, the number of families affected is in decline. This trend is confirmed by looking at the number of animals lost per risk incurred and animal species affected by that risk. As was the case previously, injuries, predators (especially when it comes to small ruminants or calves) and livestock thefts have the highest impact on numbers of animals lost.

As a result of access to abundant surface water during the 2015-2016 dry season, no deaths as a result of boreholes breaking down were reported (compared to 89 animals lost in Year 1). All in all, the loss ratio fell by 82% for cattle, 68% for sheep and 66% for goats, which also affects losses incurred as a % of total transhumant herd numbers lost (see figure below).

Figure 13 Total losses Per Species
(53 families, all risks, excluding diseases)

Number and rate of losses	2014-2015 (Year 1)				2015-2016 (Year 2)				Differential (2-1)			
	Cattle	Camels	Sheep	Goats	Cattle	Camels	Sheep	Goats	Cattle	Camels	Sheep	Goats
Total	**250**	**42**	**635**	**607**	**44**	**40**	**203**	**207**	**- 206** - 82%	**- 2** - 5%	**- 432** - 68%	**- 400** - 66%
As a % of the transhumant population	**10%**	**27%**	**15%**	**29%**	**2%**	**25%**	**5%**	**9%**	**- 8%**	**- 1%**	**- 10%**	**- 20%**

3.9 ANIMAL HEALTH

3.9.1 Practices before and after transhumance

There is a great deal of consistency in approaches to animal health when comparing the two years of the survey. In total, 38 of the 53 families reported vaccinating their animals before transhumance (compared with 36 the previous year).

The reasons put forward by the other 15 families (mostly from northern Mali) have to do with the lack of availability of veterinary medicines, the absence of any vaccination campaign in their home area, or a vaccination campaign which simply started too late. In terms of practices, almost all the cattle, sheep and goats in the herd were vaccinated. As regards deworming, the same consistency in practice can be seen, with a total of 38 families having dewormed at least one animal species (as compared to 36 last year). The reasons put forward by the other 15 families (as was also the case with vaccinations) mainly have to do with the lack of access to deworming medication, especially for families in northern Mali.

Similarly, 32 families out of 53 stockpiled medicines before departure on transhumance (compared with 29 last year). The main reasons put forward by the others was the lack of veterinary products (especially for herders in northern Mali). As regards treatment against trypanosomiasis, this was only done by 15 families.

3.9.2 The impact of livestock diseases

The impact of livestock diseases on the herd was much less pronounced in Year 2. This is, once again, most likely due to a significant improvement in grazing and watering conditions, which contribute to keeping animals in a good condition. In total, 36 families reported having experienced livestock diseases, compared to 46 the previous year. In addition, the number of affected animals decreased considerably compared to the previous year. At the same time, the survival rate of animals has increased.

As a result, the loss rate decreased significantly. The total number of animals which died, were slaughtered or sold as an emergency measure declined from 1,082 (all species combined) to only 330, which represents a 70% decrease.

Figure 14 Impact of diseases by species
(36 families reporting animal health issues)

Animal Species	Total deaths, slaughter and emergency sales		Deaths, slaughter and emergency sales as % of transhumant herd	
	2014-2015 (Year 1)	2015-2016 (Year 2)	2014-2015 (Year 1)	2015-2016 (Year 2)
Cattle	321	141	13%	7%
Sheep	467	134	11%	3%
Goats	294	55	14%	2%
Total	1082	330	12%	4%

The methods used to treat the animals remain consistent with the practices observed the previous year. The lack of access to quality medicines or to veterinary health professionals means that treatment by the herder himself is common (15 cases), especially for transhumants from northern Mali, who have few services available to them. The second-most common method of treatment is by auxiliary veterinarians (11 cases), especially the case for herders in both northern Mali and northern Senegal.

All in all, in addition to the losses due to other risks, the final losses in relation to the total herd population on transhumance also show a significant improvement.

Figure 15 Final losses (diseases and other risks) as % of transhumant herd
(36 families reporting issues with diseases for the three main species)

ANIMAL LOSSES	Cattle		Sheep		Goats	
	2014-2015 (Year 1)	2015-2016 (Year 2)	2014-2015 (Year 1)	2015-2016 (Year 2)	2014-2015 (Year 1)	2015-2016 (Year 2)
Losses due to diseases	13%	7%	11%	3%	14%	2%
Losses due to other risks	10%	2%	15%	5%	29%	9%
% total	**23%**	**9%**	**26%**	**8%**	**43%**	**11%**

As was the case for Year 1, families from northern Mali recorded the highest cattle losses (116 deaths recorded out of a total of 141 for the entire sample). The same applies to livestock theft, with security conditions representing an additional factor contributing to losses.

3.10 FAMILY HERDS AFTER THE 2015-2016 TRANSHUMANCE

3.10.1 Post transhumance herds

In total, the numbers of livestock returning from transhumance show, for all species, an increase, compared to Year 1. This growth is low (but positive) for cattle (1.5% increase) and higher for small ruminants (25% for sheep and 21% for goats). This is undoubtedly due to the excellent rainy season of 2015, and to the reduction of losses incurred during the transhumance that followed it.

Figure 16 Post Transhumance Livestock Numbers Per Species
(53 families, post-transhumance herd situation, in September-October 2016)

SPECIES	2014-2015 (Year 1)	2015-2016 (Year 2)	Differential (2-1)	
			Number	%
Cattle	1,687	1,713	**+ 26**	**+ 1,5%**
Camels	75	133	**+ 58**	**+ 77%**
Sheep	3,554	4,442	**+ 888**	**+ 25%**
Goats	1,888	2,288	**+ 400**	**+ 21%**
Horses	50	42	**- 8**	**- 16%**
Donkeys	390	374	**- 16**	**- 4%**

3.10.2 Size of Herd in Relation to Family Size

A. Group 1 (16 families): no agricultural base, viability threshold of 3.5 TLU/AE

The overall average ratio for this first group increased from 2.9 to 3.2 TLU/AE between the two years. This is a very positive development, taking into account the fact that the ratio used in pastoral settings is normally 3 TLU/AE, but was increased for the purposes of the present study to 3.5 TLU/AE (in line with the standard recommended by the World Bank).

B. Group 2 (19 families): limited agricultural base, viability threshold of 3 TLU/AE

The overall average ratio for this second group increased from 1.5 to 2.2 TLU/AE between the two years. This is a positive evolution overall if we take into account the fact that the ratio used of 3 TLU/AE concerns families whose agricultural base, even if it is smaller than Group 3, is far from being negligible. Of the 19 families, 10 families produced sorghum, 5 families both sorghum and cowpeas, and 4 families produced sorghum, cowpeas and millet, with self-sufficiency durations from agricultural production ranging from 2 to 5 months.

C. Group 3 (18 families): solid agricultural base, viability threshold of 1.7 TLU/AE

The overall average ratio for this third group decreased slightly between the two years, from 2 to 1.7 TLU/AE. Given the viability threshold of 1.7 TLU, this is nonetheless still a very good average. In addition, it should be remembered that the strength of these families' agricultural production base places them among the least vulnerable families of those surveyed.

The final average ratio across the entire sample shifted from 2,1 to 2,4 TLU/AE, which was accompanied by a general increase in the livestock numbers.

Figure 17 Overall Change Average TLU/AE Ratio and Increase in livestock numbers (53 families)

Herd Size and Composition by Species in 2014-2015 (Year 1)				TLU/AE Year 1	Herd Size and Composition by Species in 2015-2016 (Year 2)				TLU/AE Year 1	Differential (2-1)
Cattle	Camels	Sheep	Goats		Cattle	Camels	Sheep	Goats		
1 687	75	3 554	1 888	2,1	1 713	133	4 422	2 288	2,4	+ 0,3

3.10.3 Cattle herd structure by sex and age

The average structure of cattle herds was remarkably stable between the two survey periods. In terms of pastoral viability, it also remains very coherent, with an overall imbalance ratio in favour of females (74%), compared to males (26%).

These figures show once again the fundamental robustness of pastoral and agropastoral animal husbandry systems oriented not only towards breeding and milk production, (where the sex-ratio favours females) but also towards sales (which is primarily focused on males). Breeding females are predominant, especially adult reproductive ones (of these nearly 50% are aged 4 years and older). At the same time, a sufficient number of males is retained for both sale and reproduction purposes, although a decrease in the ratio of young males in the herd (from 2 to 4 years old) is to be noted, as a result of sales during transhumance. On the other hand, the ratio of adult animals between 4 and 9 years of age (both males and females) has increased.

3.10.4 Level of control over the herd

The extent of control that the families surveyed have on the management of the herd under their care remains very good, and no significant change was recorded between the two surveys. In addition, there was no evidence of increased dependency by the families on animals belonging to others (farmers, migrants, traders).

3.11 Revenues from Sales of Livestock and Dairy Products

3.11.1 Livestock sales

Of the 53 families surveyed who left on transhumance, only one family (from northern Mali) did not sell any livestock during this period. This family indicated that the remittances sent by family members on (labour) migration had been sufficient to cover transhumance costs.

The total number of livestock sold was 212 cattle, 16 camels, 686 sheep and 339 goats. The overall income generated by these sales was substantial: close to 63.6 million FCFA, a turnover which was close to last year's figure of 66.5 million. Transhumant herders have, also during Year 2, sold animals of all ages, and females. This demonstrates once again the direct involvement of transhumant herders in the livestock value chain, both in good years and bad.

While the total income generated between the two years remained relatively similar, the overall structure of sales changed, as follows:

- Very little change in the numbers of the cattle sold between the two years (212 versus 211), but with an increased income generated (by nearly 2.4 million FCFA), which would tend to show that prices for livestock were higher than in 2014-2015.
- A reduction of approximately 40% in the number of sheep sold (686 versus 1,197).
- A slight increase in the number of goats sold (339 versus 316).

The final income generated should therefore have been lower. However, the main change comes from the number of camels sold, which showed an increase (16 versus 6 last year). Although this is not a big difference in numbers, most of these animals were sold at high prices in the markets of northern Burkina Faso and western Niger by herders from the Gao region who took advantage of very favourable prices. One third of the camels were sold between 425,000 FCFA and 475,000 FCFA per head. In the end, the income generated amounted to 5.6 million FCFA, 4 million FCFA more than the previous year. This increase partially offsets the decline in income generated by sheep.

For cattle, the rate of sales was higher (11.7% versus 9%), representing an increase of 2.7%. For a smaller number of cattle on transhumance (1,621 heads compared with 2,187 the previous year), the number sold was essentially the same. There was also an increase in the rate of sales for camels (+8%), representing a significant rise. On the other hand, the rate of sales of small ruminants decreased, especially with regard to sheep (- 11.4%).

The overall amount generated by livestock sales during transhumance and the resulting rate of sales show both an overall decline in the number of animals sold, and slightly decreased earnings from sales. This decrease should be seen in a positive light. An increase in the number of animals sold is not always a sign of a healthy pastoral household economy, especially if it leads to a reduction of the livestock capital. Too many sales can lead to a decrease in herd numbers, and a disequilibrium in the herd structure (reduction in the number of males intended for sales) which may force the family to start selling females.

3.11.2 Sales of dairy products

Compared to livestock sales, the sale of dairy products is once again negligible as a source of household income during transhumance. Only 9 families reported having sold dairy products (compared to 15 the previous year), and this only very occasionally, or even rarely. Milk is mainly used for consumption by the transhumants themselves. It is difficult to build up a surplus for sale, the more so as availability decreases throughout the dry season. In the end, the total reported income totalled barely 525,000 FCFA (against 493,000 FCFA last year).

3.12 THE COST OF THE 2015-2016 TRANSHUMANCE

Figure 18 Comparison of Transhumance Costs per Expenditure Item

Expenditure Item (in order of importance in the 2015-2016 budget)	2014-2015 (Year 1)	2015-2016 (Year 2)	Differential (2-1)
Food	14,934,000	11,442,000	**- 3,492,000**
Livestock feed	21,544,000	8,151,000	**- 13,393,000**
Veterinary products	2,254,000	2,123,000	**- 131,000**
Other expenses	428,000	1,569,000	**+ 1,141,000**
Telephone	2,270,000	1,523,000	**- 747,000**
Watering costs	1,702,000	1,467,000	**- 235,000**
Salt for the animals	920,000	1,205,000	**+ 285,000**
Human health	1,182,000	1,096,000	**- 86,000**
Natural fodder	687,000	749,000	**+ 62,000**
Small equipment	1,240,000	730,000	**- 510,000**
Water drawing and storage equipment	680,000	676,000	**- 4,000**
Cart purchase and repair	1,186,000	643,000	**- 543,000**
Access to pastures	453,000	298,000	**- 155,000**
Bicycle purchase and repair	37,000	259,000	**+ 222,000**
Border crossing	164,000	86,000	**- 78,000**
Taxes and payments to local governments	14,000	20,000	**+ 6,000**
Other taxes	50,000	2,000	**- 48,000**
TOTAL	**49,745,000**	**32,039,000**	**-17,706,000**

The budget is 32 million FCFA, compared with 49.7 million FCFA last year (- 35%). Everything was less expensive in 2015-2016: access to grazing, border crossing, small equipment, and equipment maintenance. Due to the quality of the rainy season, costs associated with mobile phones have also declined. A transhumance that goes smoothly, with good pastures in the home territories for the animals left behind, mean fewer worries, less problems to be fixed and, thus, fewer calls to be made. The same applies to watering, with costs reduced as a result of the long period during which the ponds provided water to the herds.

The largest savings are found in the main expenditure items identified during Year 1: food and livestock feed. The reduction of costs in relation to food purchases (close to 3.5 million FCFA) is mainly due to the shorter duration of transhumance and to the fact that, as discussed, fewer family members left with the herd. As for livestock feed, the savings compared to the previous year are considerable (reduced by more than 13 million FCFA).

This was one of the many positive impacts of a good year, especially for herders from northern Senegal who purchased large stocks of livestock feed the previous year, following the 2014 drought. Taken at the level of one TLU, the average expenditure on livestock feed thus went from 8,500 FCFA down to 3,300 FCFA.

That said, some expenditure items only show minor variations, as they represent costs that cannot be easily reduced: salt, human health, animal health.

3.13 Differential Between revenues and Expenditures

This year, the difference between revenue and expenditures is more marked, because the transhumance budget was reduced, due the excellent grazing and watering conditions prevailing during 2015-2016. The resulting positive balance amounts to approximately 31 million FCFA, which is almost double the previous year's 15.6 million FCFA.

Figure 19 Differential Between Revenue and Expenditures

	2014-2015 (Year 1)	**2015-2016 (Year 2)**
Revenue from livestock sales during transhumance	66 537 000	63 599 000
Expenditures incurred during transhumance	49 745 000	32 039 000
Differential between revenues and expenditures	**+ 16 792 600**	**+ 31 560 000**

The main aggregates once again confirm the considerable economic impact of transhumance, not only in terms of what is spent in the areas frequented by transhumant families, but also in terms of the numbers of livestock sold and injected into the value chain. The year-on-year differential also confirms the fact that the resilience of mobile herders is based on their ability to make reserves during good years in anticipation of future crises.

3.14 Conclusion

The surveys carried out in Year 1, after the 2014-2015 transhumance, provided invaluable information on the performance of mobile livestock systems. Although the size of the sample surveyed in Year 2 was more limited, the analyses thereof provide important lessons.

In terms of quantitative data - and taking into consideration the doubts frequently raised regarding the veracity of the statements made by herders - an important observation can be made. From one year to the next, the figures (for instance, the size of the family herd) reveal a remarkable consistency, whether this is at the household or at the aggregate level.

When it comes to livestock numbers or household size, almost all of the inconsistencies found during the verification of the questionnaires were clarified after re-contacting the herders concerned. Only one case of underestimation of herd numbers for Year 1 was identified. In addition, it is important to note that families were often interviewed by different research assistants than the previous year. In addition, neither the interviewers, (nor the herders whom they interviewed) were provided with benchmarks of their Year 1 answers.

The level of detail provided by families on multiple topics was sometimes surprising. Remembering the sale of a one-year-old calf, a breeder specified that it had been injured by a predator and that he sold it for only 10,000 FCFA because the butcher categorically refused to pay more. Establishing the list of his expenses, another insisted on the inclusion of two jerry-cans which he had purchased for 475 FCFA each, and added that he was forced to pay an extra 350 FCFA in order to access a tap and fill his jerry-cans.

Despite the fact that some statements may not be 100% accurate, or that some questions remain unresolved when cross-analysing with other data, major trends emerge, and working hypotheses were confirmed.

The livelihood systems at household level did improve. The Year 2 survey was undertaken in a very different context from that which prevailed in Year 1 (2014-2015). After a year with serious rainfall shortages, the following year, with its abundance of surface water and grazing in all the areas surveyed provided herders with a long-awaited respite.

The analysis of the data tends to show that herders have managed to draw maximum benefits from the favourable 2015 rainy season, confirming one key factor of resilience, namely the ability to quickly optimize all of the positive effects of a good year in anticipation of a (future) bad year. At the end of Year 2, the herders have kept control and ownership of their herds, while maintaining a functional herd structure, even after significant destocking which generated substantial revenues.

At the same time, since a good year implies fewer and lower expenditures, this will result in a positive financial balance from transhumance for the vast majority of herders. These savings will be used to limit destocking and to build up a supply of livestock feed, in case the rainy season in their home areas has been poor, forcing an early departure on (the next) transhumance.

The excellent 2015 rainy season and the marked improvement in grazing and watering conditions (both in the home and the hosting areas) inevitably raise the issue of whether it is possible to establish with any degree of certainty a causal link between the project's interventions and the improved livelihood conditions at household level. Whatever the case, what is abundantly clear is that securing mobility will have a positive impact on resilience indicators, regardless of the climatic conditions.

In a deficit year, the project interventions will contribute to facilitating the massive outbound journeys of herders towards refuge areas, while improving the general conditions under which transhumance takes place: better access to water points, to pastures in the hosting areas, to livestock feed, as well as to animal health services. In a good year, these same investments allow herders to optimize their earnings (in terms of time, money and livestock) and, in so doing, to build up strategic reserves to prepare for the possibility of a bad year.

A cross-analysis of the information gathered during the surveys with the quantitative data generated by the enumerating operations along livestock corridors (see Section 4 below) also point to positive impacts directly linked to the project's interventions in the field. Thus, the increase in flow of livestock along certain corridors can be partially explained by the demarcation of the corridors and improved access to surface water points. Certain herders also attributed the noticeable decrease in problems encountered en route to the fact that corridors have been secured and marked, in areas where "*last year, there was nothing*."

That said, the positive changes noted between the two years of observation must be approached with a certain amount of caution. Firstly, the time horizon is very short (only one year between the two field surveys). As such, the gains and losses are sometimes minimal, while far-reaching and lasting change can only take place over a longer period of time.

Secondly, measuring indicators of pastoral resilience is not easy, especially when the relationship between the human and animal groups must be quantified. Although it is always possible to estimate the ratio of herd size to family size at any given time, a household may decrease in numbers from one year to the next, but also increase, joined by single individuals or even whole families. These movements (decrease and increase in household size) are often accompanied by a similar movement in livestock (in or out of the herd) which, as a consequence, modifies both the composition and the size of a herd.

As a result, a change in a given parameter may be called into question the following year. Families and herds split and regroup under the influence of multiple factors, including the migration of a family member, a family disagreement or the security situation. Sometimes imperceptible, these shifts also testify to a constant reorganization of human population and animal stocking rates, a well-known management strategy in Sahelian livestock systems. The temporary or permanent reduction in family size also reduces the burden on a herd and thus encourages herd growth. Similarly, transfers of livestock to other herders help to diversify risks.

Despite all of the difficulties, and once certain precautions have been taken in interpreting the data, the results of the two surveys have once again proven the rationale and efficiency of mobile livestock systems, as well as the importance of their social and economic impact.

4. ENUMERATING PEOPLE AND LIVESTOCK ALONG THE CORRIDORS

4.1. CONTEXT

One of the resilience indicators included in the monitoring and evaluation system was the number of people (men, women, children) who moved along the livestock corridors where the AFL-BRACED project was involved. This indicator was considered “predictive” in the sense that the project is based on the fact that mobility is a basic strategy which enables herders to manage climate variability and, therefore, improves their resilience.

In the Sahel, tracking the use of livestock corridors is rare, probably because of the logistics and the high costs involved. The initiative undertaken by AFL, in collaboration with CIRAD-Dakar, is an exception, especially since it was decided to include in the enumeration not only people but also large livestock (cattle, camels).

The enumeration took place two years in succession, during the period of transhumance in 2015-2016 and 2016-2017. This work was implemented under the supervision of Jéremy Bourgoin, Christian Corniaux and Tangara Pape Ousmane from CIRAD (Dakar) who, in close collaboration with project partners in the field, implemented the protocol and analysed the data. Two important parameters need to be taken into account when analysing the data generated.

a) The first parameter relates to the challenge of linking the timeframes of the household surveys with the enumeration of movement along the corridors (human and livestock). From a methodological point of view, it was considered preferable to carry out the counting operations during the most intense period of transhumance departures (between October and January), and not during the homebound journeys, several months later. This allowed for a more accurate estimate of the total number of transhumant animals, whose numbers might be reduced during the return journey due to animal sales and losses during transhumance.

Overall, the period covering the departure on transhumance lasts from October to April of each year. As the work could only begin after the project's official start in January 2015, the first enumeration exercise took place in 2015-2016, and the second in 2016-2017.

However, the timeframe followed by the household surveys was different, as interviews were conducted once transhumant families had returned to their home base. As such, while the first counting operation provides an image of movements along the corridors at the beginning of the 2015-2016 transhumance, the household surveys covered a retrospective of the 2014-2015 transhumance, which had taken place several months earlier. A perfect match between the two survey protocols was therefore impossible. In order to have matched the two operations, the first enumeration exercise should have been carried out in October 2014. This was not possible since, at that time, the AFL-BRACED Project had not yet been approved.

From a scientific point of view, such a time lag does not constitute a major handicap. Indeed, the first enumeration (2015-2016) was able to account for movements along corridors on which the AFL-BRACED project had already begun to intervene, notably in terms of demarcating corridors, which would not have been the case the previous year. In addition, this first enumeration provided a useful background to the interpretation of the family surveys of Year 2 (2015-2016). For instance, the counting points located between Senegal and Mauritania noted the low cross-border mobility of livestock between the two countries following the excellent 2015 rainy season, a situation confirmed during the household interviews.

b) The second parameter has to do with the interpretation of the data. Although the temptation is great, it is important to avoid simply adding up the numbers counted across all of the counting stations. For example, for the first counting operation (2015-2016), a total of 7,441 men, 2,638 women and 5,058 children, with a total of 36,193 cattle and 8,938 camels were counted at 31 counting stations.

Such numbers should be approached with the utmost caution. Indeed, in order to assess the total number of people and animals that have used a corridor, it is absolutely necessary to avoid basing conclusions on a simple addition of all of the counts made. The counts provide a snapshot of the extent of movement along the transhumance routes selected over a three-month period. As such, the risk would be to count the same individuals (or animals) several times during this same period.

In addition, the household surveys have clearly shown that the transhumance often involves several stops in hosting areas, translating into exits from, and re-entries into the livestock corridors.

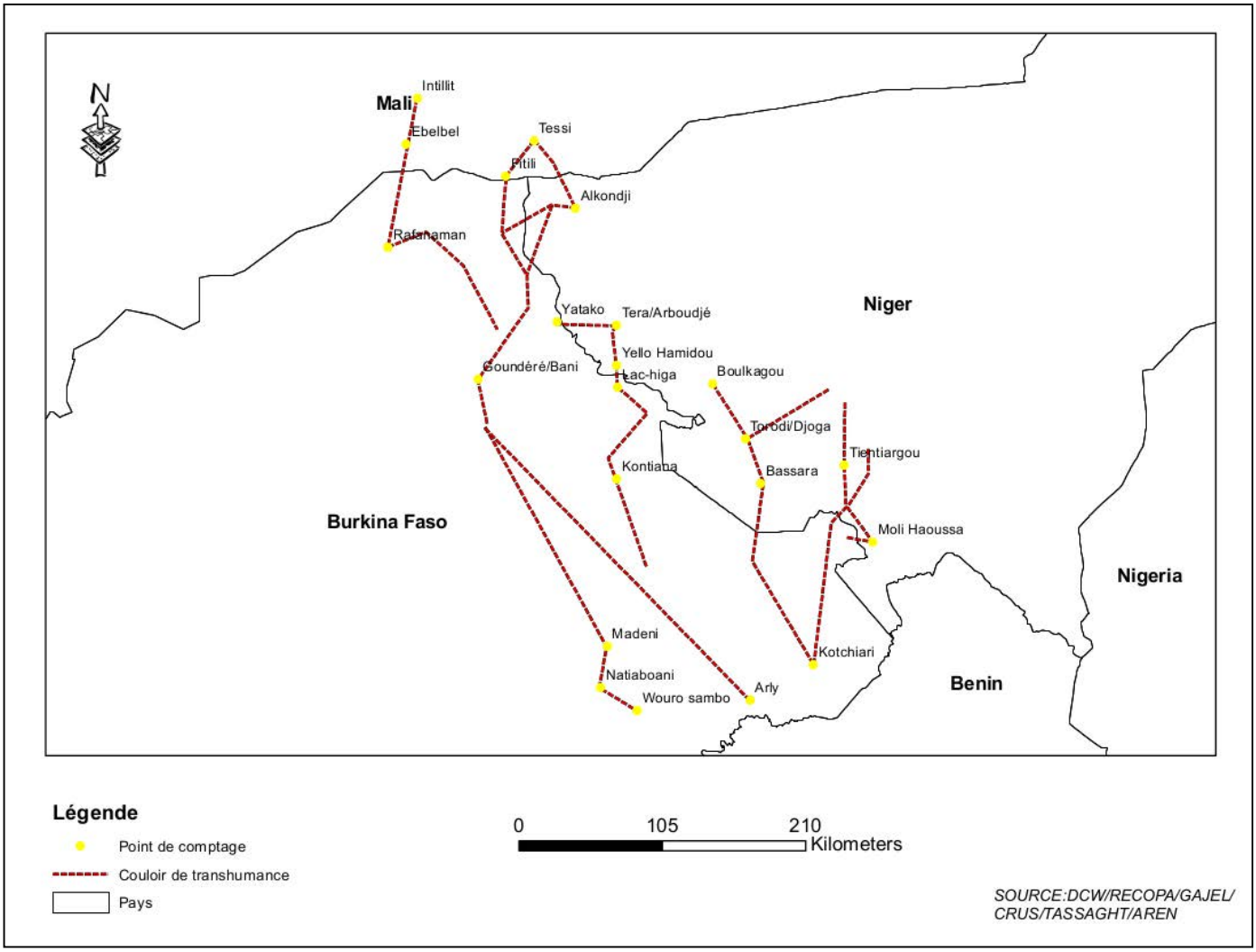
Finally, the corridors are not watertight, and may be used by other transhumants at any time. In other words, results must be analysed for each counting station, the protocol only fully expressing its potential if counts are repeated from one year to the next, allowing comparisons to be made at the level of individual counting stations.

4.2. METHODOLOGICAL APPROACH

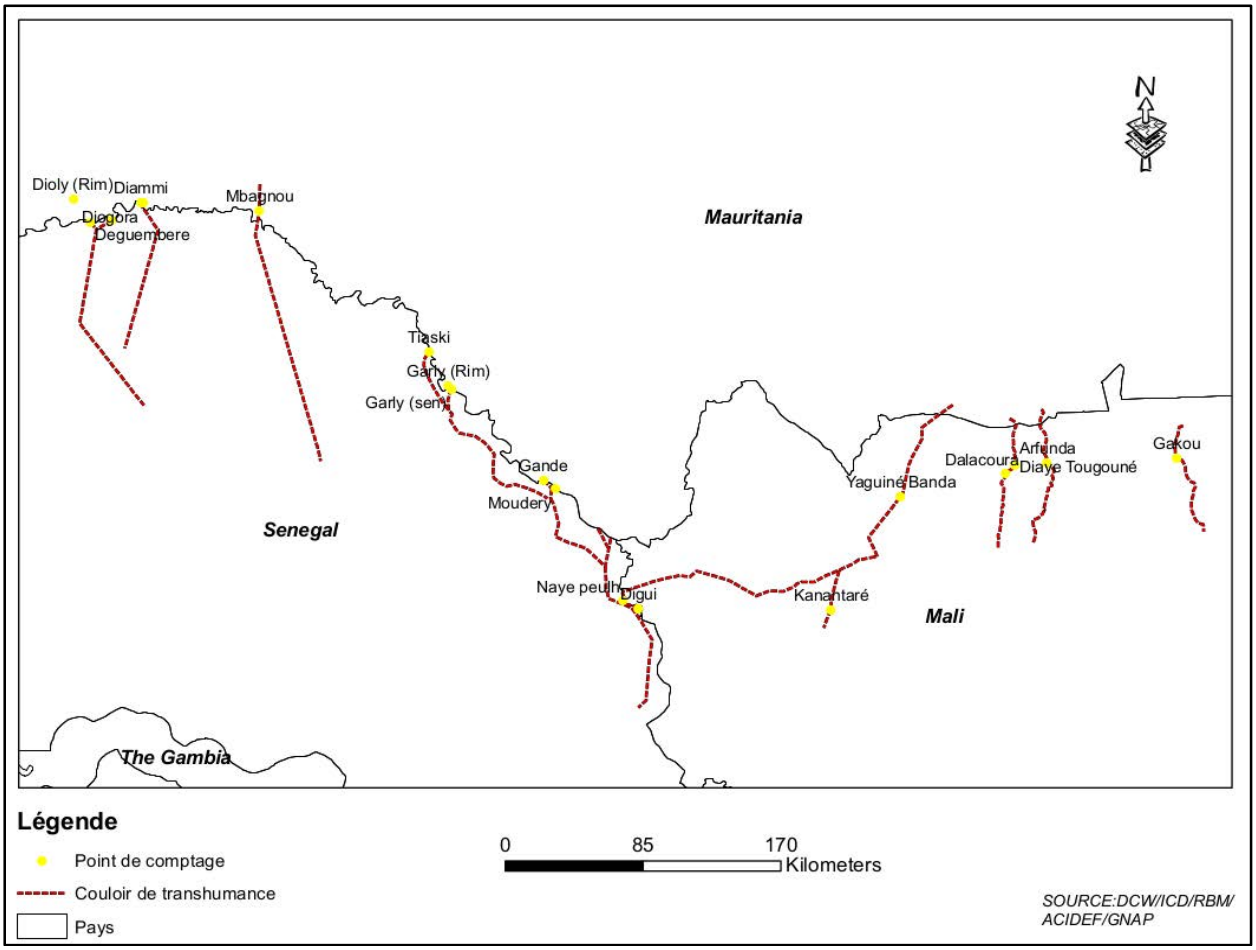
Given the high costs of aerial surveys and the many limitations to using drones (especially in tense security contexts), there was no alternative to manual and visual counting. The practical challenges to be overcome, the large areas to be covered and, consequently, the costs involved meant that such counting operations have rarely been conducted simultaneously on the scale of the entire Sahel. Counting had to be conducted both day and night, since many transhumants prefer to move at night, for a variety of reasons.

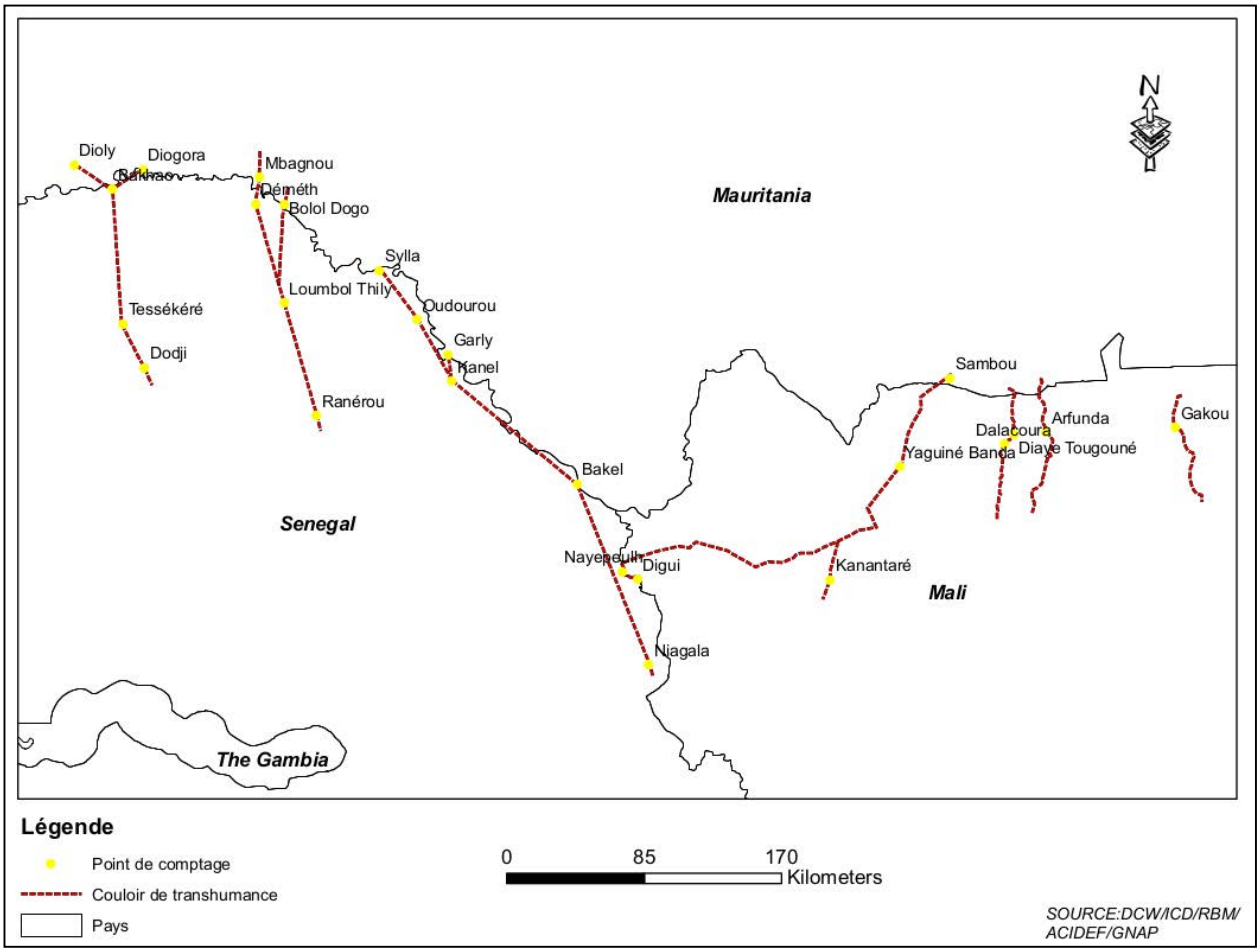
The counting protocol was thus based on an implementation period between October and January corresponding to the bulk of departures on transhumance, taking place 10 days per month, according to the peak periods of transhumance on the corridors. Counting was done day and night.

In total, 22 counting stations were monitored in the eastern zone (northern Mali, northern and eastern Burkina Faso, western Niger). For the western zone (northern and eastern Senegal, Mauritania, western Mali), 25 counting stations were monitored in Year 1 (2015-2016) and 19 stations in Year 2 (2016-2017).



Map 3 Location of Counting Stations in the Eastern Zone (Years 1 et 2)
(northern Mali, northern and eastern Burkina Faso, western Niger)





Map 4 Location of Counting Stations in the Western Zone
(northern and eastern Senegal, Mauritania, western Mali, Year 1 above, Year 2 below)

4.3. FIRST ENUMERATION 2015-2016

The compilation of tally sheets made it possible to count the passage of:

7,441	Men
2,638	Women
5,058	Children
361,913	Cattle
8,938	Camels

In terms of large livestock (cattle and camels), there was a high prevalence of cattle passing through the counting stations. Camels were only enumerated in northern areas. Cattle mobility was reduced in the western transborder zone, specifically in the areas covered by RBM and GNAP, due to the good rainfall in 2015. This would confirm the observations made during the household interviews with the families returning from their 2015-2016 transhumance. While the transhumance of small ruminants (especially sheep) remains a constant feature of transhumant movements (both in good and bad years), southbound cattle movements are particularly noticeable during drought years, with 2014 as an example. This is especially the case for transhumant families from northern Senegal.

In terms of counting people, the number of men on transhumance is greater than the number of women or children. The difference is more striking in the eastern transborder zone where, on average, there were 14.1 men per woman, while the average was 6.6 in the western zone. This is in line with observations from the household survey: in eastern Burkina Faso and western Niger, women are becoming increasingly reluctant to go on transhumance because of the security problems in coastal countries.

On the other hand, the ratio between women and children was relatively similar between the two zones: 2.7 children per woman. Two hypotheses can be put forward: (i) the majority of women and children remained in the home area and did not go on transhumance; or (ii) women and children go on transhumance, but later or elsewhere, notably to accompany the herds of small ruminants. There was also a great variability between the counting stations.

The number of cattle accompanied by (a single) herdsmen numbered 52 in the eastern zone and 63 in the western zone. This variability between zones is relatively low and probably fairly constant from one year to the next. It should be noted, however, that herds are often grouped together and that several herdsmen can manage up to 100, 150 or even 200 animals.

4.4. SECOND ENUMERATION 2016-2017

By comparing the two zones, a relative stability in transhumant cattle numbers in the eastern zone is noted. Although the differentials are real, they are not commensurate with those observed in the west.

This trend appears consistent with the results from the household surveys, particularly for pastoralists from eastern Burkina Faso and western Niger. The surveys clearly showed that while climate factors may lead to an increase or decrease in transhumant numbers, a reduction in pastoral resources in these areas is a major motivation for departure, regardless of the quality of the rainy season.

However, there are important differentials in the western zone, especially for Mauritania and northern Senegal, which are also consistent with the household surveys. After a catastrophic rainy season in 2014, abundant rainfall in 2015 provided much-anticipated relief to herders, dramatically reducing the movement of cattle and camels to the south. However, the resumption of movement southwards in 2016-2017 for all of the counting stations in the GNAP and RMB areas between Senegal, Mauritania and Mali is consistent with a more mixed rainfall season in 2016.

Figure 20 Comparison of Enumeration Data Between the Two Years

	Number of Cattle		Number of Camels		Number of Men		Number of Women		Number of Children	
	2015-2016	2016-2017	2015-2016	2016-2017	2015-2016	2016-2017	2015-2016	2016-2017	2015-2016	2016-2017
Total for the Eastern Zone	**279,219**	**266,917**	**8,938**	**6,113**	**6,178**	**5,877**	**2,292**	**1,733**	**4,185**	**3,654**
Total for the Western Zone	**82,694**	**252,584**	**0**	**1,879**	**1,263**	**3,294**	**346**	**305**	**873**	**1,087**
Total for the Two Zones	**361,913**	**519,501**	**8,938**	**7,992**	**7,441**	**9,171**	**2,638**	**2,038**	**5,058**	**4,741**

For large livestock, a predominance of cattle over camels is noted, with a large variability in numbers from one counting station to the next, and from one zone to another. It should also be noted that camel mobility is far more important in the eastern zone of the project, more precisely in northern Mali (TASSAGHT) as well as in western Niger (GAJEL and AREN). In the western zone, camel mobility is very limited and only observed in southern Mauritania, in the GNAP area. This situation is quite similar to that observed in 2015-2016.

A comparative analysis between the two years nonetheless shows that, in the eastern zone covered by the project, cattle mobility was lower in Year 2, with a relatively small variability in numbers from one counting station to the next, with the exception of those of Arly and Wouro Sambo.

For the western zone, the analysis shows an increase in cattle numbers, with often large variations, as was the case in western Mali, covered by ICD. There were important increases in cattle movements for the stations of Gakou, with 12,673 in Year 1 versus 116,361 cattle in Year 2, and Dalacoura, with 12,646 cattle in Year 1 versus 60,341 in Year 2. In addition to the fairly favourable climate conditions, the exceptional annual variation of cattle numbers counted at these stations by ICD could be explained as being the result of the AFL-BRACED Project interventions. In Dalacoura, the project financed the excavation of an existing pond. This increased the period that it held water, which usually lasted 2 months after the end of the rainy season, increasing to over 5 months after project intervention. At the Gakou pond, the project also supported the planting of 2 ha of *Echinochloa stagnina*, a highly nutritious perennial grass favoured by livestock.

Regarding the counting of men, women and children, the number of men leaving on the 2016-2017 transhumance was higher than the number of women and children. However, this difference was more striking in the western zone, where an average of 10.8 men were counted for every woman, compared with a ratio of 3.3 in the eastern zone. In addition, the ratio between women and children was relatively higher in the western zone, where 3.5 children were counted for every woman, compared with 2 .1 in the eastern zone.

The comparative analysis of data between the two years shows that, in the project's western zone, the ratio between men and women and between women and children was higher in Year 2 than in Year 1, where it was 3.6 men per women and 2 .5 children per women.

The eastern zone also demonstrated an increase in the ratio between men and women and between children and women, which rose, respectively, from 2.6 and 1.8 in 2015-2016 to 3.3 and 2.1 in 2016-2017, with high variability from one counting station to another. These indicators, combined with the data from the household survey, allow for a better understanding of the distribution of the workload and the various tasks to be performed during transhumance.

The number of cattle accompanied by herdsmen in 2016-2017, was fairly close to the previous year for the eastern zone, being in the order of 45.4 versus 45.1 in Year 1, with a relatively low annual variability from one counting station to another. The exceptions to this were the stations of Moly Haoussa (173.1 cattle for one herdsman in Year 1 versus 17.9 in Year 2), Rafnamane (26.1 cattle for one herdsman in Year 1 versus 148 in Year 2), and Torodi (133.3 cattle for one herdsman in Year 1 versus 23.1 in Year 2).

In the western zone, on the other hand, this ratio has increased. It was in the order of 76.6 cattle for each herdsman in 2015-2016, with a low annual variability from one station to another, with the exception of the stations of Gakou (80 cattle last year versus 142 this year) and Dalacoura (90,3 cattle in Year 1 versus 141,6 in Year 2).