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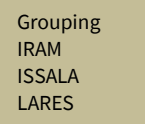
Analysis of the social, economic and environmental impacts, the main drivers of change and the long-term prospects of mobile livestock systems in West Africa

FINAL REPORT



This study was carried out within the framework of the implementation of the ECOWAS agricultural policy, ECOWAP, and more specifically of the 'Integrated and Secure Livestock and Pastoralism in West Africa Projet' (PEPISAO), implemented by the ECOWAS Commission through its Directorate of Agriculture and Rural Development (DARD), and whose components 1 and 2 have been delegated to the CILSS Executive Secretariat.

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LIST OF ACRONYMS AND ABBREVIATIONS

ACAD	Association of communes of Atacora and Donga (Benin)
ADECOB	Association de Développement des Communes du Borgou
AFD	French Development Agency
ALG	Liptako Gourma Authority
ANOPACI	National Association of Professional Agricultural Organisations (RCI)
ANOPERA	National Association of Professional Ruminant Organisations (Benin)
APD	Animal Production Directorate (Ghana)
APESS	Association for the Promotion of Livestock in the Sahel and Savannah
APIDA	Association for the Promotion of Intercommunality in the Department of Alibori (Benin)
APMC	Association of Central Sheep Producers (RCI)
APROCASUDE	Association of Sheep and Goat Producers of the South East (RCI)
BRIC	Brazil, Russia, India, China
BRICS	Brazil, Russia, India, China and South Africa
CAR	Central African Republic
CEBEVIRHA	Commission Économique du Bétail, de la Viande et des Ressources Halieutiques
CEMAC	Economic and Monetary Community of Central Africa
CEN	Northern Breeders' Collective (RCI)
CILSS	Permanent Inter-State Committee for Drought Control in the Sahel
CIRAD	International Centre for Agricultural Research for Development
CNT	National Transhumance Committee
COFENABVI/AO	Confédération des Fédérations Nationales du Bétail/Viande en Afrique de l'Ouest
CONAFIL	National Commission on Local Taxation
CORAF	West and Central African Council for Agricultural Research and Development
ECCAS	Economic Community of Central African States
ECOWAS	Economic Community of West African States
DAES	Directorate of Agriculture Extension (Ghana)
DNAGEP	National Directorate for Pastoral Land Management (RCI)
ECTAD	Emergency Centre for Transboundary Animal Diseases Operations
FADEL	Local Development Support Fund
FAO	Food and Agriculture Organization
FCFA	CFA Franc
FENACOFBVI-CI	Fédération Nationale des Coopératives de la Filière Bétail Viande (RCI)
FENAPPRU-CI	Fédération Nationale des Producteurs des Petits Ruminants de Côte d'Ivoire
GIC	Groupement Intercommunal des Collines (Benin)
GLIBITA	Ghana Livestock Breeders and Traders Association
GLIDEN	Ghana Livestock Development Network
IRD	Institute of Research for Development
MARAH	Ministry of Animal Resources and Fisheries
MOFA	Ministry Of Food and Agriculture (Ghana)
NAIP	National Agricultural Investment Plan
OECD	Organisation for Economic Co-operation and Development

ORSTOM	Office de la recherche scientifique et technique outre-mer
PADECI	Programme d'Appui au Développement de l'Élevage en Côte d'Ivoire
PCU	Project Coordination Unit (Ghana)
PCG	Police Customs Gendarmerie
PNIASAN	Plan National d'Investissement Agricole, de Sécurité Alimentaire et Nutritionnelle
PR	Small Ruminants
PRAPS	Regional Support Project for Pastoralism in the Sahel
PRIA	Regional Agricultural Investment Plan
PRIASAN	Regional Plan for Agricultural Investment, Food Security and Nutrition
RBM	Billital Maroabe Network
RESAKSS	Regional Strategic Analysis and Knowledge Support System
ROPPA	Network of Farmers' Organisations and Producers of West Africa
SIM	Market Information System
SODEPRA	Société de Développement des Productions Animales (RCI)
SPS	Sanitary and phytosanitary measures
SRID	Statistic Research and Information Directorate (Ghana)
SV	Veterinary Services
SWAC	Sahel and West Africa Club
TCE (TEC)	Tonnes of Carcase Equivalent
TME (TEL)	Tonnes of Milk Equivalent
TMP	Transhumance Management Plan in Togo
UEMOA	West African Economic and Monetary Union (WAEMU)
VSD	Veterinary Service Directorate (Ghana)
WAAPP	West Africa Agricultural Productivity Program
WTO	World Trade Organization

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1 Introduction

This document constitutes the main report of the study on the social, economic and environmental impacts, the main drivers of change and the long-term prospects of mobile livestock systems in West Africa. The study was carried out between June 2020 and January 2021 as part of the implementation of the Integrated and Secure Livestock and Pastoralism Project in West Africa (PEPISAO). This regional initiative is funded by the French Development Agency and implemented by the Economic Community of West African States.



Photo 1 Photo Côte d'Ivoire (F.T. Amalaman N'Dadou)

The problem of mobile livestock systems in West Africa

Mobile livestock systems (also called pastoralism, or transhumance¹) in West Africa have a long history. These systems allow an optimised use of the natural resources available in the region. They allow pastoralists to provide their herds during the rainy season with high quality pasture in the Sahelian and northern Sahelian zones (arid and hyperarid), with low sanitary pressure, while water for watering the animals is available in these areas. During the dry season, these herds can withdraw and benefit from pastures and crop residues in the Sudanian and Guinean zones (sub-humid and humid), where water is then easier to access. The passage of transhumant herds through the agricultural zone allows for the fertilisation of fields, and the supply of animals to markets for the supply of urban centres in the coastal countries. These negotiated exchanges also historically constitute social and cultural interactions between multiple sedentary and transhumant communities.

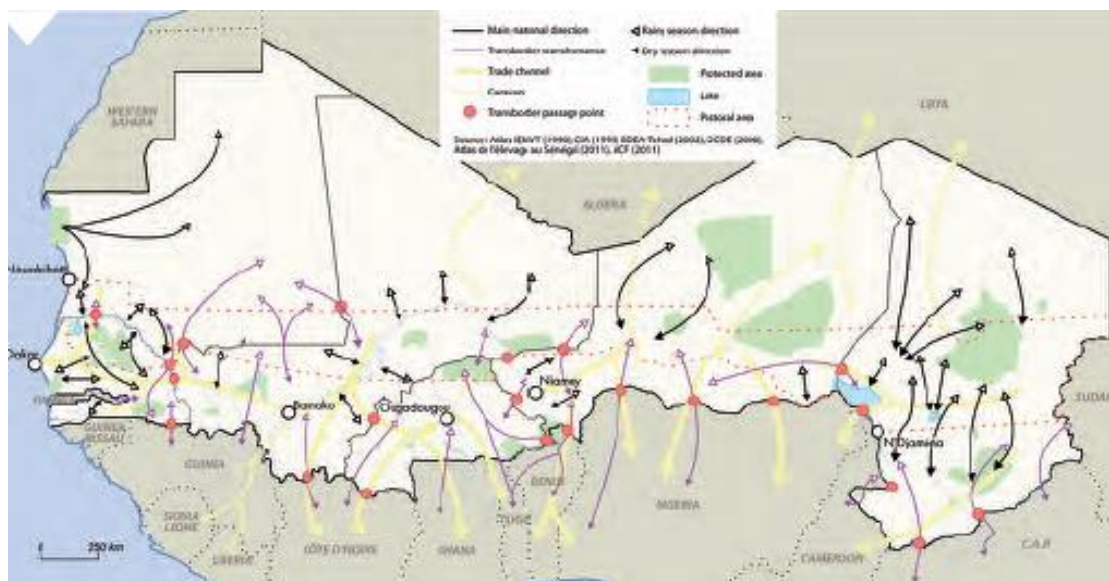
However, population growth, accompanied by a continuous expansion of agricultural fronts, has resulted in strong land pressure in coastal countries and Sahelian zones. This has led to increasing tensions, resulting in numerous conflicts between farmers and pastoralists. It is this development

¹ Nomadism does not refer to the system of herd mobility, but to the living arrangements of herder families. It is often considered to be an erratic mode of mobility, without any attachment. In reality, the movements of families and their herds are part of a certain regularity linked to the seasonality of pastoral resources and their accessibility. These movements are well and truly organised within the mobility group and negotiated with the other pastoral or sedentary communities in the territories crossed. During major droughts, pastoralists have to organise an exceptional transhumance. This requires them to negotiate alliances with the communities that have control over pastures and water points on alternative routes that are considered more suitable for limiting losses among the family herd.

that has led several coastal countries to ban cross-border transhumance and limit internal mobility to certain areas, with the aim of reducing tensions between users of natural resources. However, the number of households and the number of ruminant livestock engaged in pastoralism have increased significantly over the past decades (see livestock censuses conducted in countries such as Chad; Richard et al., 2019). Although more and more pastoralists are trying to develop an agricultural activity to secure their access to land, for the time being a large part of the populations of West Africa, and especially of the Sahelian countries, derive most of their income and resilience from mobile livestock systems (pastoral and agro-pastoral). Other important factors destabilising established balances are evident, such as climate change, especially the deterioration of the security situation in many West African countries in recent years, and more recently the Sars-Cov-19 corona virus pandemic.

A wide variety of mobile livestock systems overlap and combine in the seasonal use of regional resources. They adapt their itineraries continuously according to the variable availability of pasture and watering points, but security and the attractiveness of markets are also among these multiple factors. One of the essential elements in these conditions for managing mobility is the existence and consolidation of alliances with local sedentary communities. It is these alliances that can help to ensure the security of pastoralists in the territories they cross. Pastoralists in the Sahelian and Sudanian zones are mainly made up of Fulani groups who regularly practise cross-border transhumance. In the more arid zones, pastoralism is developed, depending on the country, by other Tuareg, Arab, Moorish and Tubu groups whose mobility is anchored around well-defined homelands within more restricted pastoral territories. These groups generally claim control over pastoral water points, which gives them control over access to grazing. However, these Saharo-Sahelian pastoral groups are led to practice exceptional transhumance across borders in the event of drought. The transhumance movements are largely mapped by North-South transhumance axes. However, there are also South-North movements, from Nigeria to Niger (Djerma et al., 2009; Bonnet et al., 2014), or from Nigeria to Chad, which are also frequent in the search for quality Saharo-Sahelian pastures during the rainy season. In addition, in the coastal countries, there are also some East-West movements of herds from Nigeria to Togo and Ghana, via Benin.

Map 1 Main mobility routes of Sahelian herds (after Touré, 2012)

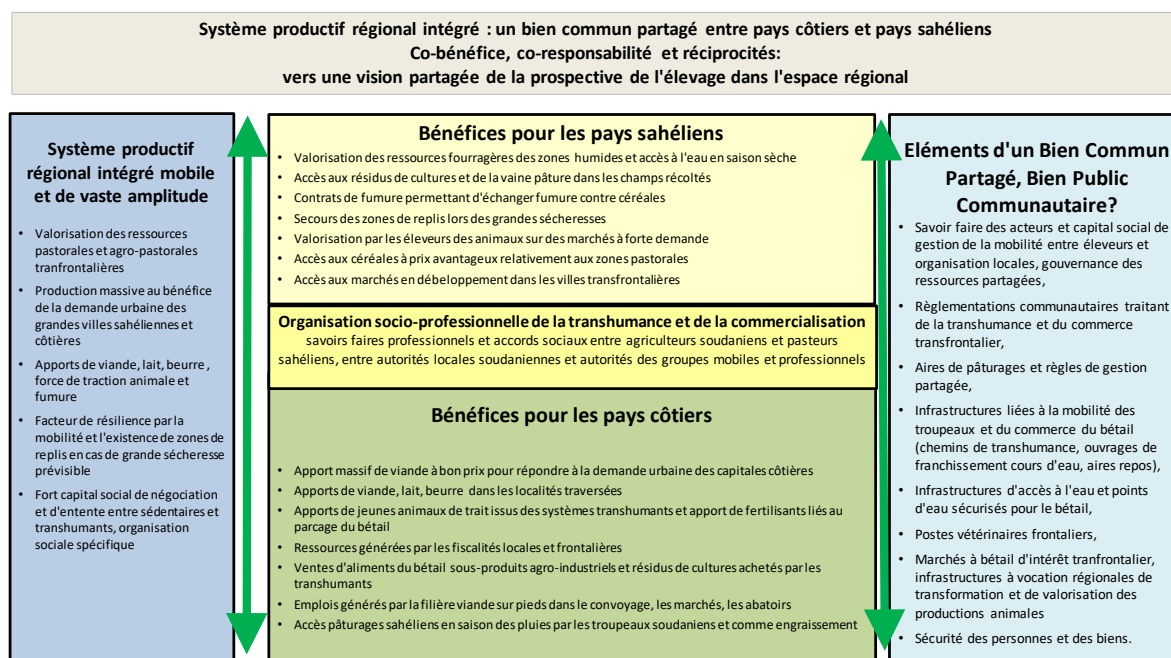


Transhumance from Sahelian countries to coastal countries also interacts strongly with livestock marketing by feeding flows from Sahelian collection markets to the terminal consumption markets of the major coastal cities.

ECOWAS countries have adopted some regulations to regulate cross-border transhumance. The implementation of these regulations was analysed in the report 'Evaluation of the regulatory framework for pastoralism and cross-border transhumance in West Africa and the Sahel' which was also produced by PEPISAO. One of the main conclusions is that the introduction of the International Transhumance Certificate (ITC), a central element of the regulatory framework, has not had the envisaged effects in terms of facilitating cross-border crossings, in particular because of the duality of national and regional regulations and the weakness of monitoring the movements in question. Furthermore, some countries are increasingly introducing restrictive regulations for the mobility of transhumant herds (notably Nigeria, Côte d'Ivoire, Benin, Guinea).

At national and regional level, there is a growing contradiction between the interests of the Sahelian countries and those of the coastal countries. In general, the governments of the coastal countries often express the view that cross-border transhumance from Sahelian countries is not in their interest. They point to the negative impacts of conflicts with farmers and competition over forage resources with coastal herds. They also tend to see transhumance as a vector of insecurity: cattle theft, robbery, kidnapping and ransom demands. On the other hand, the significant economic benefits for coastal countries generated by transhumance are rarely presented. As the work on formulating PRIDEC (2017) emphasised, we are indeed dealing with an integrated regional production system, constituting a common good shared between Sahelian and coastal countries, and therefore a factor of regional integration.

Figure 1 Integrated regional production system: livestock farming, one of the region's primary integration products



Source: PRIDEC, 2017, Main document: national and regional components

The paradox of mobile pastoralism. This paradox of the perception of pastoralism is also strongly reflected in the opinions of the actors in the field.

The various stakeholders in the territories are unanimous on the economic, social and, to a lesser extent, environmental benefits of transhumance: the development of local economies through the creation of jobs, the collection of taxes, the animation of local markets, the availability of animal products at a lower cost, easy access to draft animals and animals for fattening and social events, social integration, the maintenance of ecological balance, etc.

There is also unanimity on the fact that pastoralism, despite the many challenges, is the most suitable livestock system in the agro-ecological context of Sahelian countries, even if perceptions are highly controversial as regards future trends in the short, medium and long term. On this last point, despite the optimism displayed by some actors, no real certainty emerges to predict any future for transhumance.

On the other hand, the perception of some actors does not hide their hostility to transhumant livestock rearing, which they believe is a source of all the dangers for social cohesion (insecurity, community conflicts, destruction of the environment, etc.). *'For this category of actors, pastoralism is a backward, 'obsolete' and outdated system that needs to be completely reformed. Among these actors are numerous farmers' organisations, structures in charge of the protection and management of protected areas and the environment, as well as wildlife resource users (hunters' organisations), and certain actors in state services in charge of agriculture and the environment. This perception is also maintained by certain customary chiefs, who are generally close to the farmers.'* (CILSS/ZOOFOR, 2020).

Synthesis of stakeholders' perceptions of pastoralism and transhumance in PEPISAO's target areas.

Most of the actors interviewed (53.3%) agree that transhumance has threefold economic, environmental and social benefits. Nevertheless, almost half of the institutional actors have a negative (20.0%) or mixed (26.7%) perception, based mainly on farmer-herder conflicts, which are sometimes communal and violent, insecurity linked to cross-border transhumance and environmental degradation. (CILSS/ZOOFOR, 2020)

Reminder of the objectives of the study

The overall objective of the study was to build an analytical framework to better measure the effects and impacts (positive and negative) of mobile livestock systems (pastoral and agropastoral) on the environment, the space and the terroirs, the economy and the society (social and inter-community links, integration of peoples), food and nutritional security.

In doing so, the study should also:

- **Provide an initial overall assessment of these impacts,**
- **Analyse the changes/transformations taking place in pastoral and agro-pastoral systems**
- **To examine the way in which these changes contribute to the densification of the economy of the territories** through the emergence of new value chains, the introduction of technological innovations, etc.

Finally, based on the identification of current impacts and key drivers of change, the study aimed to highlight the **long-term prospects of mobile livestock systems and to make recommendations.** These analyses will be placed in the general context of the livestock sector in West Africa.

Given the lack of available information on the one hand, and the limited resources available for this study on the other, **the aim was not to carry out an exhaustive assessment, but to construct an analytical framework and to inform or illustrate it through an ambitious review of the**

literature and the carrying out of two case studies on representative cross-border areas, in hosting and transit zones.

Expected results

In view of these objectives, four results were expected from the study:

R1. A relevant analytical framework is available to understand the multiple impacts of mobile livestock production, the main evolutions that will influence these impacts, and the prospects for the development of mobile livestock systems and their impacts by 2040;

R2: This conceptual framework is put into the perspective of the West African regional space as a whole, in order to provide a first draft of a global assessment and to identify the information gaps that need to be filled in order to refine the assessment and knowledge of impacts;

R3: This conceptual framework is applied in two cross-border territories, It allows the diversity of impacts on specific territories to be assessed and the adaptation strategies of mobile livestock systems to be documented, which provides information on the mutations and transformations underway and nourishes the reflection on the trajectories and the future of these systems ;

R4. A synthesis of results 2 and 3 is prepared and recommendations are formulated in order to limit the negative impacts and maximise the positive impacts. This synthesis will be used to introduce the following work, in particular the regional workshop on the future of mobile livestock systems in West Africa and the Sahel, thus making it possible to (i) feed the dialogue to build a shared vision between public and socio-professional stakeholders, and (ii) think about the national and regional anticipation and support policies to be promoted.

Methodology and study process

The study combined 9 steps using complementary investigation methods of varying length and importance.

Method and timeline

Table 1 Provisional timetable for the transhumance impact study

Steps	Dates	Activities / objectives	Locations
1	February - April	Kick-off meeting and preliminary methodology report	Desk
2	February - May	Literature review	Desk
3	March	Drawing up interview schedules	Desk
4	March - May	Missions by regional experts to the capitals of coastal countries (institutional interviews and data collection)	Cotonou Abidjan
5	May	Surveys in border areas and host areas (two border areas and two host areas in coastal countries to be identified with stakeholders following step 4) Work by regional experts	Benin-Niger Côte d'Ivoire*- Mali/Burkina Faso

6	May - June	Processing of interviews, summary report and note to decision makers	Desk
7	June - July	Delivery of final reports	Desk
8	July	English translations	Desk
9	Sept- Nov.	Workshop to discuss the results of the study	

* Initially, it was planned to work on Guinea and the cross-border area with Mali, but in view of the electoral calendar in Guinea, the choice was then made to work on Côte d'Ivoire.

** This programming was defined in February and March 2020 before the consequences of the COVID 19 epidemic were known. Stage 4 then had to be adapted following the border closure measures. In Benin, this phase was organised through a series of remote exchanges with the national expert, who was able to conduct the bulk of the institutional interviews and data collection. The mission was introduced in advance by the Technical Assistant who travelled from Abuja.

Process, constraints and adaptations

The work took place between May and June for Benin and between August and September 2020 for Côte d'Ivoire.

The health constraints linked to the COVID 19 pandemic obliged the two international experts to work remotely in tandem with the two national experts, in particular during the methodological framing work, then the analysis of the data collected, then the rereading and comments on the provisional and final reports. The analysis of the economic impacts required numerous complementary exchanges to consolidate the necessary quantitative data as well as the estimates linked to the hypotheses of simulations to be progressively refined.

The field surveys in the transit zones and hosting zones selected at the end of the interviews during stage 4 of the dialogue with national actors focused respectively on the following areas and localities

Table 2 Field study areas in Benin and Côte d'Ivoire

Republic of Benin	Republic of Côte d'Ivoire
<p>The surveys were conducted specifically in:</p> <ul style="list-style-type: none"> ✓ Savè (host area in the Collines Department) ✓ Kandi & Malanville (cross-border transit area in the Alibori Department). <p>For institutional issues, the interviews also concerned Dassa-Zoumè (Collines), Parakou (Borgou), Gogounou, Kandi (Alibori).</p> <p>In this context, several actors were consulted: the umbrella organisations of livestock breeders' associations, local authorities (elected representatives), NGOs and inter-communal structures, projects/programmes, departmental technical services (DDEAP, ATDA), departmental officials (CDT) involved in transhumance management.</p>	<p>The consultant visited the selected localities (Bouaké, Niakara, Korhogo and Ouangolodougou) in order to have interviews and consultations with the actors on the ground.</p> <p>In this context, the following meetings and interviews were conducted:</p> <ul style="list-style-type: none"> -Meetings and discussions with the administrative authorities (Secretaries General of Prefectures, Sub-Prefects, municipal and regional authorities); -Meetings and discussions with the regional and departmental directorates of the main ministries concerned with the management of the agro-pastoral area; -Consultations with representatives of relevant population categories (village chiefs, land chiefs, farmers, livestock breeders, herders, relevant NGOs, youth and women's leaders or organisations).

Acknowledgements

The mission would like to thank in particular the institutional actors of the Ministries of Livestock and the POs who collaborated during phase 4, in Cotonou and Abidjan, as well as the actors of the

territories of the cross-border transit and hosting zones in Benin and Côte d'Ivoire who kindly agreed to be interviewed during phase 5.

Organization of the report

Following this introductory section, this report is organised into four main parts corresponding to the results set out in the terms of reference:

- ✓ Proposal for an analytical framework integrating the multiple impacts of mobile livestock farming;
- ✓ Analysis of the impacts of mobile livestock farming and transhumance in Benin and Côte d'Ivoire;
- ✓ Putting this analytical framework into a West African regional perspective;
- ✓ Synthesis of the study results and recommendations.

The annex contains a reminder of the terms of reference, the list of people met and contacted in the framework of the study, the interview frames used for the interview phases at national level, as well as the one for the interviews in the territories impacted by cross-border transhumance.

Photo 2 Young herders grazing in Benin (Onibon, 2020)



Photo 3 Loading of Sahelian livestock at a market in Benin

2 Proposal for an analytical framework integrating the multiple impacts of mobile farms

This section aims to address Result 1 of the study. The aim is to **develop a relevant analytical framework that will enable to grasp the multiple impacts of mobile livestock production, the main changes that will influence these impacts, and the prospects for the development of mobile livestock production systems and their impacts by 2040.**

Impact fields and indicators, combining quantitative and qualitative

In general, livestock farming contributes very directly to the achievement of eight of the seventeen Sustainable Development Goals: 1, 2, 3, 5, 8, 12, 13 and 15 below,

Figure 2 The different areas of impact of livestock in relation to the SDGs



Different methods for assessing the impacts of livestock systems at different levels have been developed over the last decades (LSIPT/FAO/CIRAD, 2020; Giraud et al., 2004). The impacts of livestock systems are often classified into three main categories: social impacts, environmental impacts and economic impacts. These three groups of impacts are often analysed to characterise the sustainability of a livestock system. This is also referred to as the social, environmental and economic sustainability of a livestock system (in reference to the concept of sustainable development).

Within these three fields, different indicators are generally chosen, which are considered as good (proxy) indicators for the different impacts, positive and negative, that have been identified. Based on the general knowledge of the experts, verified and complemented by a review of relevant literature on the impacts of mobile livestock systems in West Africa, an identification of the different impacts and their potential indicators was the starting point of this work. The result of the exhaustive identification of the impacts of mobile livestock systems is presented in the figure below. These different impacts are discussed in relation to the results of the case studies conducted in Benin and Côte d'Ivoire and the relevant literature in the following chapters.

In the first reflections of this study, we were able to attempt a regional mapping of the diversity of positive and negative impacts that can be identified in coastal countries, as well as in Sahelian countries.

Figure 3 Diversity of economic, social and environmental impacts of transhumance in coastal and Sahelian countries

Economic impacts			Social impacts			Environmental impacts		
	CC	SC		CC	SC		CC	SC
Access to water and Sudanian pastures	-	+	Conflicts between farmers and herders Conflicts between pastoralists and other users of natural resources (fishermen,	-		Forage resource harvesting in the Sudanian zone by Sahelian herds	-	+
Purchase of crop residues	+	+	Political and religious conflicts	-	-	Pasture fires to enhance perennial grasses	-	
Manure and cereal contracts	+	+	Perceived insecurity, livestock theft	-	-	Transhumance of Sudanian herds to Sahelian areas	+	
Sale of animals on markets in the South (induced jobs and market taxes)	+	+	Old social agreements with landlords, alliances and solidarity	+	+	Fertility and maintenance of agro-pastoral areas essential for agro-ecology	+	+
Supply of draught oxen for animal traction and efficient breeding stock for breeding	+	+	Source of resilience of pastoral livestock in case of droughts cf. 1984	+	+	Adjustment and regulation of resource exploitation through North-South and South-North mobility	+	+
Economic activity of food markets and consumption	+		Food and nutritional security of urban consumers	+	+	Pruning of woody fodder (<i>Pterocarpus erinaceus</i> , <i>Azelia africana</i> ,	-	-
Sales of milk and derived products (butter, cheese, etc.)	+	+	Job creation			Competition between livestock and wildlife in protected areas	-	-
Taxes related to transhumance	+		Strengthening the position of women			Greenhouse gas emissions		
Supply of meat to consumer markets	+					Biodiversity management		
Development of the input and feed market	+							

CC=Coastal countries, SC=Sahelian countries

However, for the remainder of this study a new analytical framework has been used to identify the main impacts. Thus, impacts are not simply classified as positive, neutral or negative, for coastal and Sahelian countries, because impacts are very complex and diverse in nature for different groups and actors in the countries.

The main types of economic impact of mobile livestock systems

The economic impacts of mobile livestock systems are fairly unanimous, judging by the figures for the contribution of pastoral livestock to state, community and individual resources.

- **Direct or indirect contributions to GDP, wealth of states.** In the Sahelian regional area, which includes Burkina Faso, Mali, Mauritania, Niger, Senegal, Chad and the eight northern Nigerian states, livestock production accounts for 40% of agricultural GDP and 15% of total GDP. Livestock products are, depending on the country, the second or third largest export item (Hiernaux et al. 2018).

- **Fiscal contributions to local authorities and the state.** Livestock markets in transhumance host areas in coastal countries become significantly animated during the presence of transhumant herders. For communities that have a livestock market, this is a major source of tax revenue, which can exceed 10 million CFA francs per month (11 to 15 million in Nigeria, for example) (CILSS-Zoofor, 2020).
- **Essential contribution to the income and poverty reduction of agro-pastoral households** and populations in transit and host territories for transhumance. It is estimated that livestock farming is the main economic activity for at least 50 million people (out of a total of 137 million Sahelians), and is practised by almost 80% of rural families.
- **Contribution to income equality.** This indicator of the simulation model is based on the Gini coefficient, or Gini index, a statistical measure that makes it possible to account for the distribution of a variable within a population. Recent work carried out within the framework of PRAPS shows that the overall income of pastoralists and agropastoralists shows very strong disparities (PRAPS-CILSS, 2019). The standard deviations are everywhere higher than the averages of monetary and global incomes, thus suggesting their unequal distribution in the PRAPS intervention zone. The Gini index is around 0.64 for total income, whereas it is 0.68 for monetary income. This Gini index appears to be particularly high (>0.5) and indicates strong income inequalities between different pastoral sites and groups of herders.

The main types of social impacts of mobile livestock systems

In the field of social impacts of livestock systems, several types of impacts are generally highlighted:

- In general, **the high social tensions generated by conflicts** often make the headlines, and **the rise in insecurity in several cross-border areas** frequented by transhumance.
- Other types of social impacts are less publicised but are also to be taken into account because they are societal in nature. These include **the contribution to the social well-being of communities organised to manage mobility and the reproduction of cultural values in pastoral societies.**
- In this field, the **contribution to the food security of pastoral households** and the **contribution to direct employment for families, particularly young pastoralists, and to indirect employment generated along the livestock/meat chain** are fundamental social and economic impacts.
- Finally, **the issue of animal welfare** cannot be dismissed, even if it is not given much emphasis in West Africa, as it is a growing societal concern at the international level that must be taken into account when analysing the impacts of livestock farming. The regulations of several countries have evolved profoundly with the growing awareness of the need to avoid all 'unnecessary' suffering and to seek optimal living conditions for animals. The sources of animal protection law are to be found at international level in the OIE's Terrestrial and Aquatic Animal Health Codes.

The main types of environmental impacts of mobile livestock systems

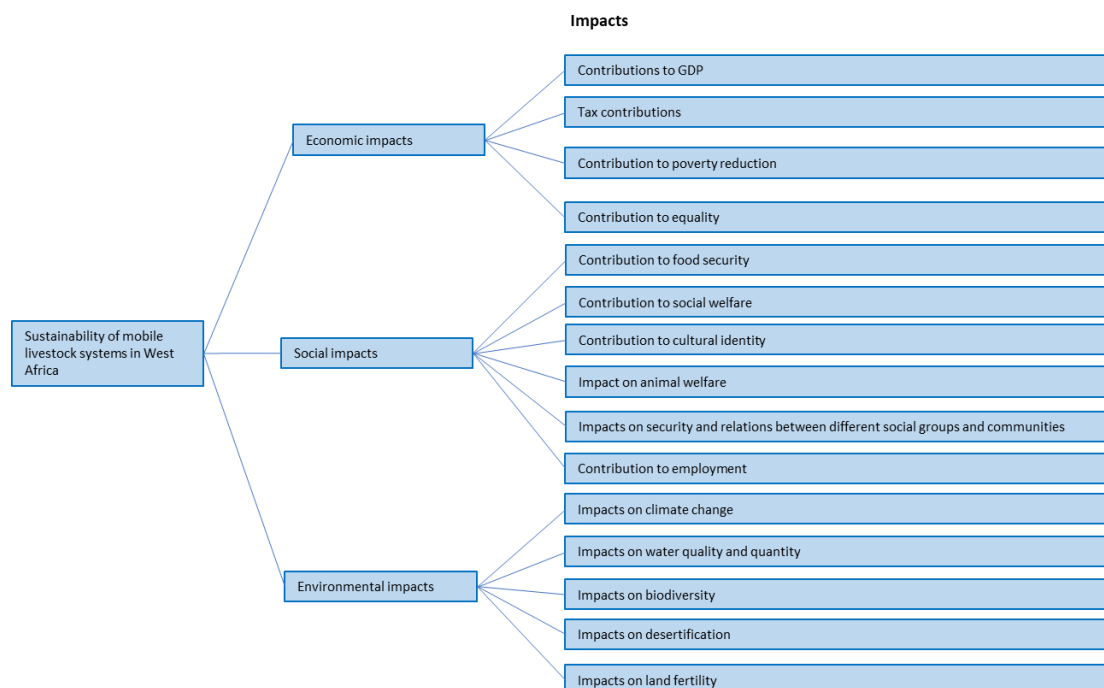
In the field of environmental impacts of livestock systems, five main types of impacts are often mentioned and deserve to be analysed by crossing the perception of stakeholders and the mostly recent knowledge of research.

- **The first type of impact is that of mobile livestock farming on climate change,** in connection with greenhouse gas emissions. This type of impact was strongly emphasised by the FAO's work highlighting the significant greenhouse gas emissions of roughage-fed herbivores, i.e. those

living on rangelands (Steinfeld et al., 2006). More recently, research has shown that this mode of resource exploitation is neutral or even slightly negative in relation to the territory developed (Assouma et al., 2017, 2018; Hiernaux et al.; 2020).

- **The impact of livestock on biodiversity** is a controversial issue in different contexts. In West Africa, due to agricultural pressure on land, in many countries pastoralists illegally use forage resources in protected areas, and these practices are detrimental to biodiversity. In contrast, the FAO and IUCN (Davies et al. 2020) consider that in many countries pastoral systems protect both habitats and the connectivity between habitats that allows habitat biodiversity to flourish.
- Impacts are also mentioned with regard to **desertification in Sahelian areas and degradation of natural resources** in Sudanian areas. Here too the dominant discourse generally highlights the risk of overgrazing by extensive livestock. Measurements made by researchers over a long period show that the impact of grazing is limited, since only 30% of the herbaceous biomass is exported by grazing, 70% being reintegrated into the soil through trampling, urine and faeces (Hiernaux et al.; 2019). Mobility allows a strong instantaneous pressure on the resource, much less degrading than continuous grazing by sedentary herds (Niamir-Fuller, 1999).
- **The impact on water quality and quantity is also one of the impacts to be analysed**, mainly in terms of water quality when it concerns surface water points that are soiled by the trampling of animals during watering. The quantity of water taken allows for the regulation of access to pastures through water points in the dry season.
- **The impact of mobile livestock systems on soil fertility is** an important area of impact. Not only is the amount of vegetation removed by livestock grazing for food modest, but livestock also contribute to soil fertility. Animal dung recycles almost half of the mass of fodder ingested into a form that can be broken down or assimilated by plants very quickly. By accelerating organic recycling in this way, livestock farming activates a whole biological chain in soils, playing a decisive role in the fertility of tropical soils, which are poor in organic matter, deficient in nitrogen and phosphorus, and often acid (Hiernaux et al., 2018).

Figure 4 Identification of the different impacts of mobile livestock systems



Some impacts could be categorised into different categories, especially the contribution to organic matter, food security, and animal welfare.

Quantified analyses of livestock sectors

Selection and adaptation of tools to analyse mobile livestock systems

The objective of many livestock system impact analyses is to quantify these impacts, in order to produce objective information for decision-makers. For the quantification of impacts, the authors have identified the Livestock Sector Investment and Policy Toolkit (LSIPT) which was originally developed by CIRAD with initial funding from AFD, and which from 2014 has benefited from a partnership between CIRAD, FAO and ILRI. The different tools in the toolkit are developed for analysis at different levels (including the herd, value chains, and national level). At the national level, the tools allow analyses for the livestock sector as a whole. Even though this study will focus more closely on mobile livestock systems, the following LSIPT tools at the national level were considered relevant:

- Contribution of the livestock sector to the national economy (M4-SM1: A1/A2 & M4-SM2: A2)
- Indirect contribution of the livestock sector to the national economy (M4-SM1-A2)
- Contribution of the livestock sector to reducing poverty and household inequality (M4-SM1-A4)
- Tool to characterise the sectors and analyse their financial performance (M3-SM2-A1-A2)

This allows the impacts of mobile livestock systems to be analysed within the broader framework of the livestock sector. This increases the feasibility and usefulness of these tools at the national level in West Africa. However, this also required a broader set-up and data collection than initially planned. Finally, the tools had to be adapted to capture and isolate the contributions of mobile livestock systems, particularly those that rely on cross-border movements.

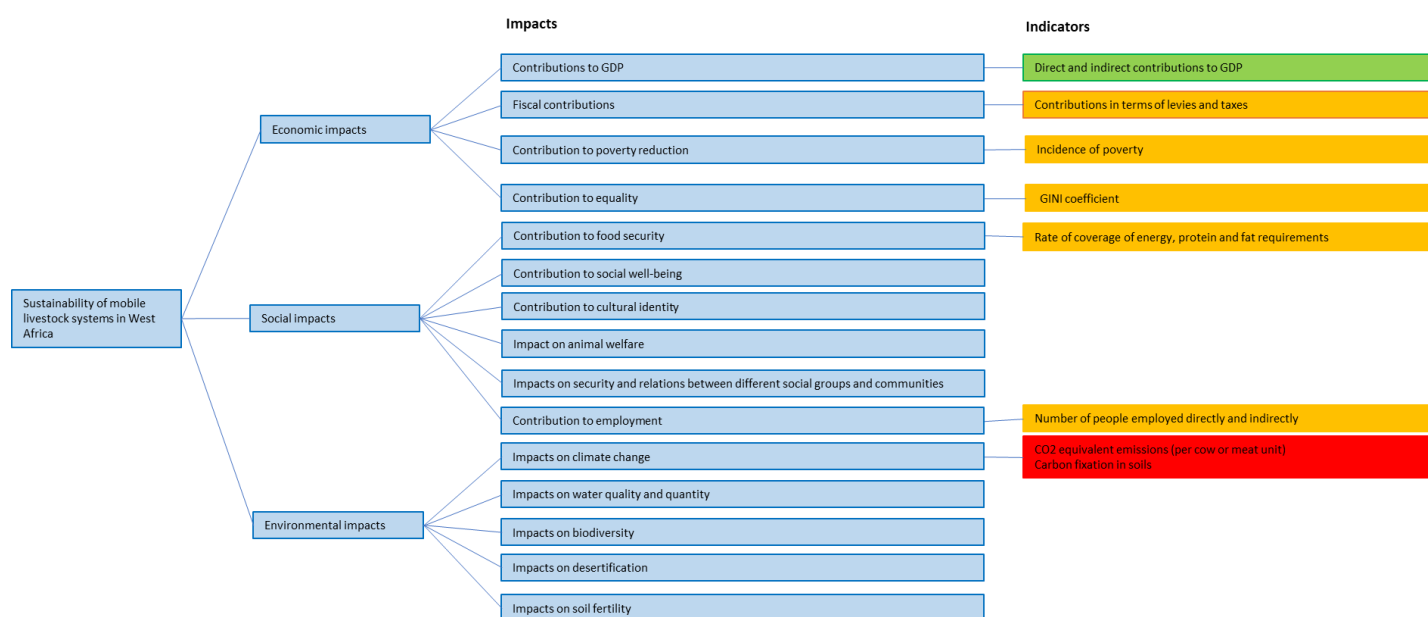
The LSIPT tools available at the beginning of the study were in the form of separate Excel files. These separate files allow the automated import of data from other files. However, given the adaptations made, doubts arose about the functionality of this import. It was also more efficient to combine the relevant tools in one file. Changes in the parameters produce modified results directly, without the need to repeat import procedures. Throughout all these adaptations, the tools have been adjusted while trying to maintain maximum consistency with the original tools.

Recently this toolkit has been used in the formulation of the second phase of PRAPS as an analytical tool at national and regional level, managed by CILSS with support from FAO and potentially other consortium members. The consortium had previously planned to convert the Excel files to a web interface to facilitate the use of the tools.

As mentioned above, the LSIPT tools allow analyses on different levels, and on different aspects, quantitative and qualitative. The tools that have been selected for this study, and which are proposed for analysis at national (and regional) level, are summarised above. These tools cover mainly economic and social impacts, but with the basis of the numbers of different animals in the different systems, it is then possible to quantify also environmental impacts. LSIPT tools for qualitative analysis are relatively underdeveloped and are not used in this study.

Considering the quantifiable indicators of the LSIPT tools adapted to the study, indicators were identified for the main economic, social and environmental impacts (following figure).

Figure 5 Identification of indicators of the impacts of mobile livestock systems



It may be noted that it might be appropriate to split the fifth social impact above into two by distinguishing more clearly between the impact on security (causes and occurrence of violent conflict) and the impact on the intensity of sociability (number and level of implementation of conventions between herder and farmer communities).

Although the indicators are included in the LSIPT tools integrated in an Excel file for this study, the possibility of obtaining results for these indicators depends on the availability of data and/or estimates for the parameterisation. For this first application of the tools adapted to Benin and the West African regional level (including Mauritania and Chad), it was only possible to estimate one indicator: the contribution to GDP, which was marked in green. The other indicators that are part of the LSIPT tools were suitable for this study. However, they could not be filled in due to lack of data and/or estimates. They are marked in orange. Indicators that are not currently included in the LSIPT tools are marked in red.

For some impacts it was not possible to identify usable quantitative indicators. For the corresponding impacts, but also for the quantifiable impacts, qualitative analysis is essential, in order to put the figures in the right perspective and also to take into account the limitations of some indicators and the reliability of the data used.

Identification and quantification of livestock systems in West Africa

The basis of the LSIPT tools for quantified analysis at the national level is a subdivision of the numbers of different types of animals into different livestock systems. These LSIPT tools refer to the international typology used by the FAO, a typology of livestock systems that is mapped globally² (Robinson et al, 2011). The tool allows the international typology to be replaced by a more specific typology in the LSIPT tools, but the authors had considered that ideally there would be consistency of the proposed analytical framework with the international typology. However, given the particular context of the present study, which focuses on mobile livestock systems straddling the Sahelian and Sudanian zones, it was preferable to integrate the typologies used by the governments of West African countries. Based on the experiences of the expert team, a first typology of livestock systems in West Africa was defined, as presented in the table below.

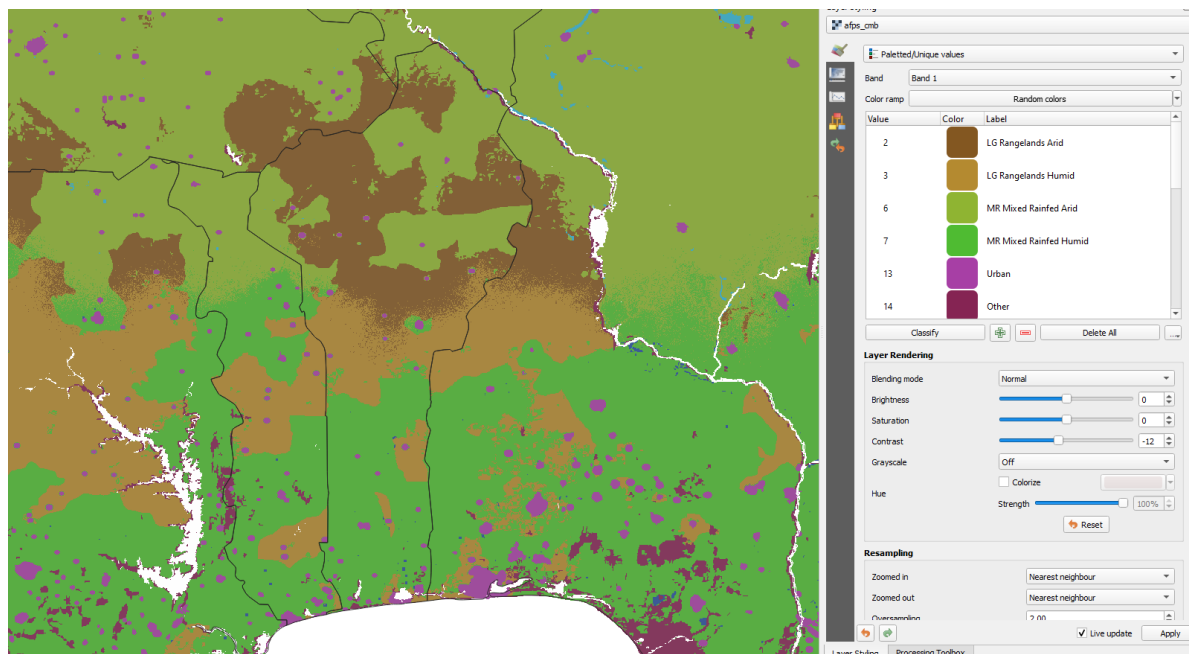
² <http://www.fao.org/geonetwork/srv/en/metadata.show?id=38193&currTab=simple>

Table 3 Typology of livestock systems (ruminants) in West Africa

Main types of livestock systems in West Africa
Sahelian pastoral system practicing a big amplitude transhumance in coastal countries
Cereal agro-pastoral system and transhumant herd in the Sahel zone
Farming system combining agriculture, animal traction and cattle herd practising a low amplitude transhumance
Farming system associating livestock farming with animal-drawn cultivation (purchase of draught oxen from transhumants)
Sedentary ranch or local farm system (state ranch and private ranch), fattening

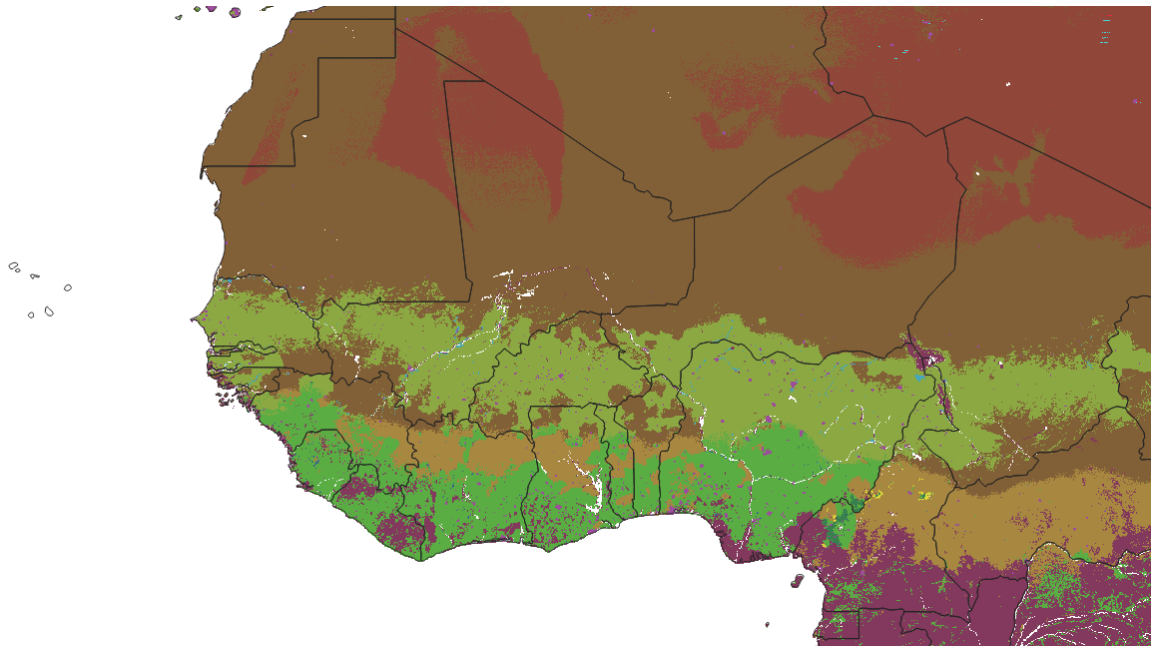
This typology was made consistent with the international typology. In addition, the typology mainly used in Benin was taken into account for the Benin case. By doing this exercise, the authors of this report were also able to bring the mapping of livestock systems in Benin and West Africa closer to the FAO's global mapping of livestock systems.

Map 2 Map of livestock systems in Benin



Source: Adapted in QGIS from FAO's Global Livestock Production Systems v.5 2011 GIS data for Africa (<http://www.fao.org/geonetwork/srv/en/metadata.show?id=38040&currTab=distribution>) and Thematic Mapping's World Boundary GIS file version 0.3 (https://thematicmapping.org/downloads/world_borders.php)

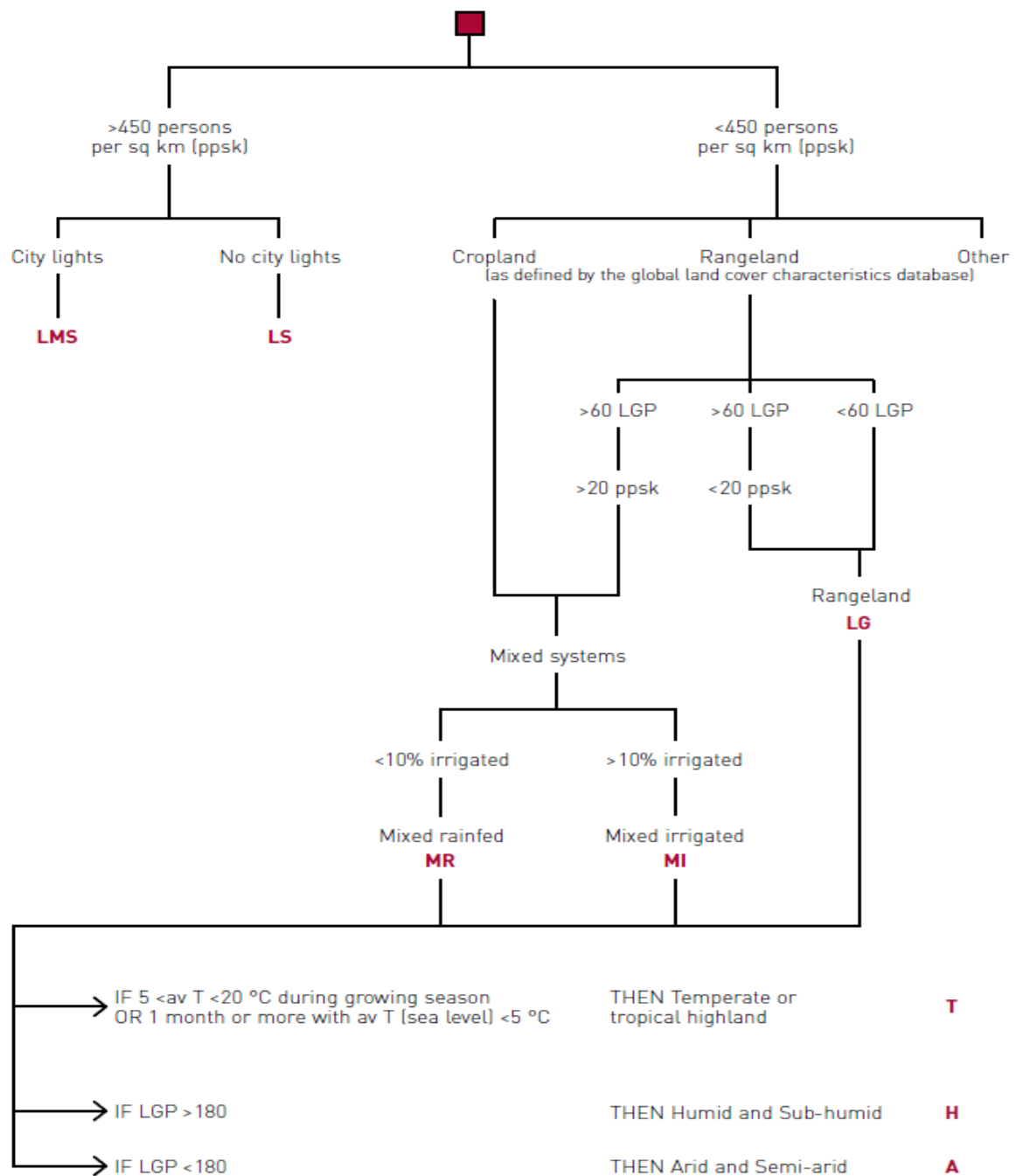
Map 3 *Map of livestock systems in West Africa*



Source: Adapted in QGIS based on a GIS map of Africa from FAO's 'Global Livestock Production Systems v.5 2011', (<http://www.fao.org/geonetwork/srv/en/metadata.show?id=38040&currTab=distribution>) and version 0.3 of the 'Thematic Mapping' World Frontiers GIS file (https://thematicmapping.org/downloads/world_borders.php)

There is in fact an inherent contradiction in this mapping of livestock systems, which also contains mobile livestock systems, if each point on the map can only correspond to one system. By their very nature, mobile livestock systems are partly also found in areas where sedentary livestock systems classified on the map are found. The classification of a given area as a sedentary system (Mixed Rainfed/MR and Mixed Irrigated/MI) or as a grassland system (LG) depends mainly on the land use in the remote sensing maps. GIS maps then qualify the length of the growing season to distinguish between arid/very arid (A) or humid/sub-humid (H) areas, while other GIS maps show temperatures to identify temperate areas (T). The following figure shows how an area is classified for global mapping of livestock systems by Robinson et al.

Figure 6 Decision tree for mapping of livestock production systems used for Version 5 (2011) of the mapped global livestock production systems



Source: Robinson et al, 2011 (Adapted from Thornton et al, 2002)

In this framework we consider the areas indicated as grassland systems in West Africa (LGA and LGH) rather as grazing areas that are used by these systems, while these systems also use other areas classified as rainfed mixed systems (MR). The difficulty for modelling with the LSIPT tools is that the wet and dry grazing areas (LGA and LGH) south of the area classified as MRA (coinciding for many with the Sahelian strip), are difficult to distinguish in the field. For this reason, these two systems, south of the Sahelian band with their centres of gravity in these areas, are considered as one system which we call LGA/H. However, these areas are also frequently used by herds of the LGA system with

their centre of gravity north of the Sahelian strip. The following table attempts to clarify the consistency between the systems of the different typologies.

Table 4 Typologies of livestock systems in West Africa and correspondence with the situation in Benin

International livestock systems typology (Seré and Steinfeld classification³) used in LSIPT tools and in GIS maps of livestock systems above	Typology chosen for the study	Typology used in Benin
<i>LGA – Grassland based-arid system (centre of gravity north of the zone)</i> <i>MRA - Mixed rainfed-arid system)</i>	Sahelian pastoral system practicing a big amplitude transhumance in coastal countries	Transboundary transhumant livestock farming system based on a big amplitude transhumance: (+ 300km) practised by foreign, mobile pastoralists and livestock breeders (herds from Niger and Burkina Faso, Nigeria during the drought)
<i>LGA/H - Wet and dry grassland based systems (centre of gravity south of the zone)</i> <i>MRA - Mixed rainfed-arid system)</i>	Cereal agro-pastoral system and transhumant herd in the Sahel zone	Transhumant livestock system (mobile national pastoralists) with a big amplitude: 100-300km (Pastoralists from Nigeria, Niger but based in Benin)
	Farming system combining agriculture, animal traction, and cattle herd practicing a small amplitude transhumance	Agropastoral (transhumant) or semi-sedentary system (the most important system in Benin)
<i>MRA - Mixed rainfed - arid system</i>	Farming system associating livestock farming with animal-drawn cultivation (purchase of draught oxen from transhumants)	Agro-livestock system with animal traction (sedentary)
<i>MRH - Mixed rainfed humid system</i>		Agro-livestock system without animal traction (sedentary)
<i>OF - Fattening system</i>	Sedentary ranch or local farm system (state ranch and private ranch), fattening	Agricultural livestock enterprises
<i>OM - Peri-urban dairy system</i>		

Source: PEPISAO. Benin Report. Regional expert, P. Onibon, 2020.

Another peculiarity that this table also shows is that we divide the combined category of southern pastoral systems of the Sahelian band again into two. At least in Benin and Côte d'Ivoire this subdivision does not coincide with the delineation between the LGA and LGH zones on the map. As described in the table above, these two sub-systems are very different, due to the very different modalities of access to land for pastoralist farmers and agro-pastoralists for whom land tenure security is far from guaranteed. These two sub-systems are distinguished by adding either Big

³ FAO, 1996 according to Robinson et al. 2011

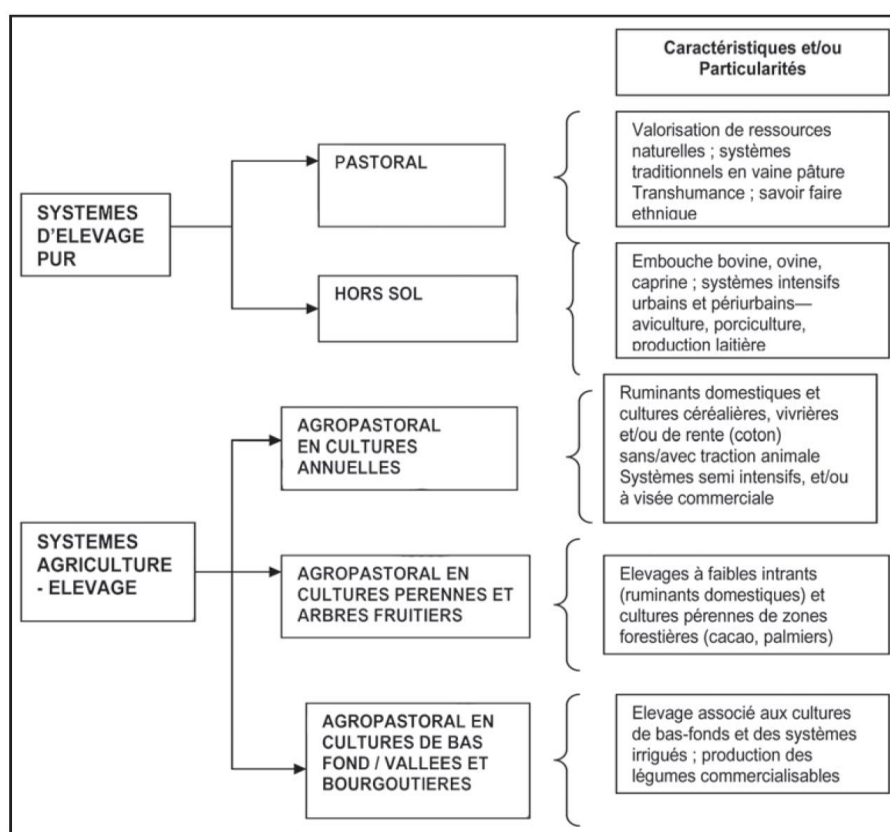
Amplitude (BA) for the sub-system that practices large amplitude transhumance, or Small Amplitude (SA) for the sub-system that practices small amplitude transhumance.

Concerning the correspondence between the MRA system and the mixed system integrating hitch-cropping, and the correspondence between the MRH system and the mixed system without animal-drawn cultivation, it is important to specify that this correspondence is not perfect. This means that the boundary between the MRA and MRH systems is mainly a boundary related to rainfall conditions, while the boundary between the systems with or without animal traction is more complex, also related to social factors.

In order to be able to isolate the contributions of transboundary pastoral systems, these systems and sub-systems (except the small amplitude transhumant system LGA/H-PA) were divided for modelling purposes by adding either Trans-Frontier (TF) or Non-Trans-Frontier (NTF).

The 2008 OECD report 'Livestock and Regional Markets in the Sahel and West Africa - Opportunities and Challenges' uses another typology shown below. Although there is some consistency with the international system of Seré and Steinfeld, this typology was not considered for this study.

Figure 7 Typology used in the 2008 OECD report 'Livestock and regional market in the Sahel and West Africa - Potentials and challenges



Source: OECD (2008) (Adapted from Fernandez-Rivera et al. 2004)

A modelling exercise with GIS software was attempted first to break down the numbers of animals in the different systems, helped by the fact that the FAO also produced GIS maps with densities of the different species. However, due to the mobile nature of pastoral livestock systems, this option had to be abandoned for lack of such precision.

First application and parameterisation of the tools in Benin, Côte d'Ivoire and West Africa

After and during the combination of different LSIPT tools in an Excel file, these tools were first applied to the situation in Benin. After this first application, the analysis was applied at the West African level (including Mauritania and Chad). For this regional application, the tools were adapted to this scale. Finally, in parallel, the exercise was launched for Côte d'Ivoire, but it was abandoned at a certain point due to lack of data and time.

A first difficulty in all three cases was the division of livestock numbers between the different livestock systems. Even if some consistency was found between the typology used in Benin and the international classification, statistics on livestock numbers are generally not collected or estimated by distinguishing these different systems. However, by exchanging with stakeholders based on estimates from a 2014 government report (ANOPER, 2014), the regional consultant who carried out the case study in Benin was able to make updated estimates for the division of livestock numbers between these different systems. At the regional level these divisions were extrapolated for ruminant numbers in the coastal countries. Cattle numbers in the Sahelian countries were broadly divided by an estimate that between 70% and 90% (i.e. 80% on average) of cattle numbers in these countries were in pastoral systems (OECD, 2008). For sheep and goats in the Sahelian countries an estimate of between 30% and 40% (i.e. 35% on average) of the animals were in pastoral systems was used.

After this initial parameterisation of the livestock numbers, the parameters of productivity, prices, and intermediate costs, distinguished for the different systems, which are required to be able to estimate the contribution to GDP, were also difficult to estimate. For some parameters relevant sources exist, for others estimates were made by the regional and international experts, as far as possible in consultation with relevant stakeholders.

In order to cover the impacts of transhumance across borders, the tools had to be adapted to try to better distinguish these flows. In coastal countries, transhumant animals from other countries are not included in the national numbers. These data had to be estimated. Existing official statistics collected by border posts are unreliable. A large proportion of border crossings are not recorded. A correction factor has been included because foreign transhumant herds only stay part of the year in the country. The tools also had to be adapted to better cover imports and exports of live animals. For the parameterisation of these imports and exports at regional level, the FAO data had to be corrected to deduce the trade flows between the countries targeted by this study.

It is important to underline that in view of the estimates made, the results of this first application of the LSIPT tools are still indicative. The reliability of the various data and estimates that are used as parameters remains too relative. However, these results give an indication of the magnitude of the economic contribution to GDP of the overall livestock sector, and more specifically of mobile (cross-border) livestock systems. This first experimental application shows how LSIPT tools can be adapted for mobile livestock systems analyses.

Within the relatively limited scope of this study, it was not possible to produce more quantified results for the different impacts. The contribution to GDP is important, but its significance should not be overestimated. The contribution of the livestock sector to poverty reduction and equality are socio-economic indicators that are also very important. However, in order to calculate the contribution to GDP, it is necessary to have several production and market parameters at the production and value chain level, which are very strategic for national administrations.

An important observation of the LSIPT tools used in this study is that they only consider exploitation rates as production parameters, and not other production parameters such as mortality rates and calving rates. These parameters are used in another tool in the LSIPT toolbox, the Dynmod model. This latter tool was not used here, as it does not produce a result that can be directly used as an

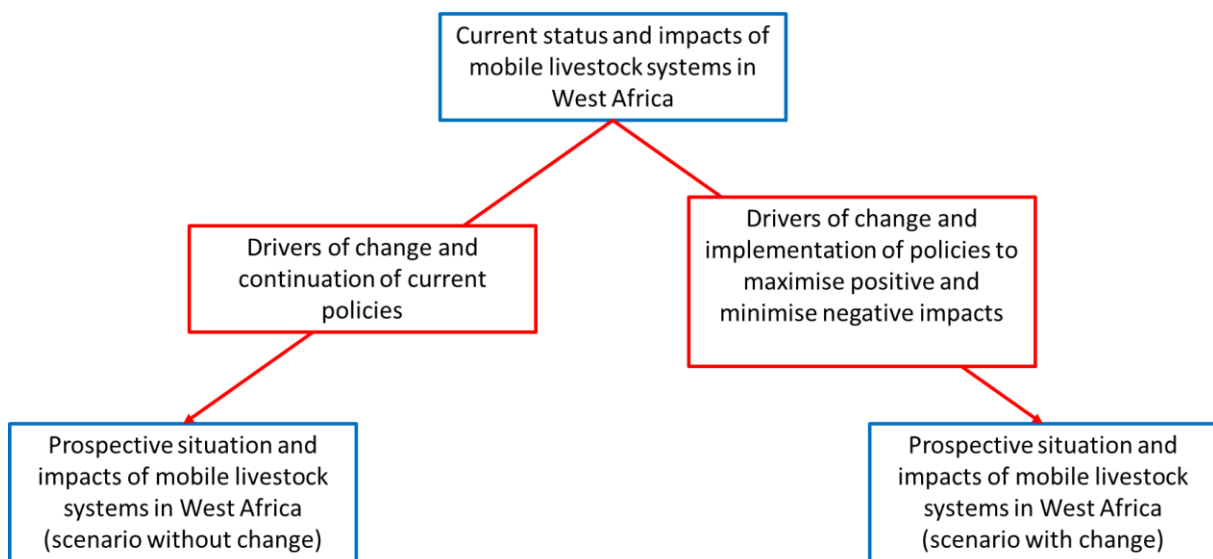
impact indicator and also due to the lack of reliable and consistent parameters to produce usable results. Finally, the correspondence with the other LSIPT tools is considered difficult to achieve.

Another important observation in calculating the contributions of different livestock systems to GDP is a risk of partial double counting of the value added that corresponds to organic matter and energy for animal traction. In ordinary GDP estimates, these contributions are not estimated separately, but partially accounted for in the value added of agricultural crop products. This is because farmers generally do not pay with money for these inputs. This is therefore not deducted as an intermediate cost. The tool that estimates the contribution to GDP reduces the overall GDP of a country with the part that corresponds with the livestock sector as estimated by the same source as the overall GDP (e.g. a country's statistical service). And then the estimated value added by the livestock sector calculated by the LSIPT tools is added instead. This estimate includes the value added by organic matter and energy in terms of draft. In this way part of this value added is counted twice: first in the value added by agricultural crops and then in the value added provided by the livestock sector. The other part of the value added provided by the organic matter, the part which is not applied on the fields, but directly on the pastures, is also counted twice and is not counted as an intermediate cost for livestock products.

Drivers of change and long-term perspective.

In addition to analysing the impacts of mobile livestock systems in West Africa, and of the livestock sector in general, this report also proposes a framework for analysing the main drivers of change and long-term prospects, in relation to current impacts. The figure below shows how the proposed overall framework can be organised.

Figure 8 Framework for analysing drivers of change and prospective impacts of mobile livestock systems



At this stage of the study, the main drivers of change identified are

- The worsening security situation in various West African countries, which restricts the movement of pastoral herds and negatively influences mobile livestock systems;
- According to current forecasts, climate change will result in higher temperatures in the warmer months at the end of the dry season. This will have little impact on plant and crop growth. It will also result in a trend observed over the last twenty years towards higher average rainfall, but spatially unevenly distributed and marked by large interannual variations.

- Continued strong population growth, accompanied by accelerated urbanisation and consequently a further increase in demand for animal protein from the sector's production.
- Continued expansion of cultivated land and therefore less grazing land available for mobile herds and, as a result, continued tensions between pastoralists and farmers over land issues.
- The occurrence of cross-border diseases, notably the Covid-19 pandemic, is another driver of change. It is accompanied by an increase in the complexity of cross-border trade and the use of livestock markets.
- Governance of the livestock sub-sector, marked by poor allocation of domestic public resources and little attention to social and youth concerns.

This limited study, in its review, has attempted to better understand these factors and identify other factors of change. These results also feed into the prospective reflection that will take place under the PEPISAO project. Under this reflection is engaged through three angles of thematic analysis in progress:

1. What are the prospects for the contributions of mobile livestock systems to the regional economy and livestock value chains in West Africa?
2. What prospects for mobile livestock systems in the face of the densification of rural areas and climate change in West Africa?
3. What are the prospects for the evolution of mobile livestock systems in relation to the political and social changes underway in West Africa and the Sahel?



Photo 4 Livestock market day in Benin during transhumance

3 Analysis of the impacts of transhumance in Benin and Côte d'Ivoire

This chapter applies the analytical framework developed earlier to the border and host area levels, and to the national level. The analysis focuses on Result 3 of the study:

R3: This conceptual framework is applied in two cross-border territories, It allows the diversity of impacts on specific territories to be assessed and the adaptation strategies of mobile livestock systems to be documented, which provides information on the changes and transformations underway and provides food for thought on the trajectories and the future of these systems.

Case study of a border area and a host area in Benin

Context of the two study areas

The border area studied in Benin is mainly the Department of Alibori in northern Benin, which shares borders with Niger and Nigeria. The host area in Benin is mainly the Department of Collines in central Benin. They were the subject of a field survey report and a national report from which the bulk of this synthesis is drawn (Onibon, 2020).

Livestock systems, and in particular transhumance

In the department of Alibori, a cross-border transit zone, four main livestock systems have been identified:

- Transnational pastoralists from Niger, Nigeria and Burkina Faso
- Agro-pastoralists, generally of Fulani (Peulh) and Gando ethnicity, who have settled in camps near farming villages. The size of their herds varies between 80 and 100 head of cattle. During the rainy season, they graze the animals in the land around their camps that is still grazeable.
- Agro-pastoralists, mainly from the Bariba, Boo, and Dendi ethnic groups, who mainly produce cotton and who own one or more pairs of oxen for ploughing their fields. They sometimes own cattle that they leave in the care of herders, often from the Fulani socio-cultural group.
- Micro-agricultural livestock enterprises are livestock units (cattle, sheep, goats) set up in the middle of the city or in the suburbs. They are created by retired civil servants, former butchers converted into fatteners, and housewives.

During the cultivation period (June-November/December), the herds take refuge in the buffer zone of Park W and/or in transhumance areas within the municipality. In January-March, the herders graze their herds in the harvested fields and on the banks of the Niger, Sota, etc. They leave for the great transhumance. They leave for the great transhumance towards the southern areas (Borgou, Collines, Zou, etc.) and towards Togo from March and return in May-June.

Transnational pastoralists from Niger, on the other hand, normally first exploit the crop residues in the fields at the beginning of the dry season (January-March) and transit through Malanville in March for the great transhumance to southern Benin or Togo. They return from these areas in May-June.

The official transhumance calendar in force in Benin runs from 15 January to 31 May. The current legal framework for managing transhumance in Benin with its strong acts of limiting transhumance to the hills in the centre of the country (Dassa-Zoumè) and the ban on cross-border transhumance

Alibori is to **seek to conquer new pastoral areas in which they settle half of their herds**, keeping the other half with them in their locality. Exchanges with agro-pastoralists and agro-pastoralists revealed **the departure of a large proportion of transhumant herds from the Alibori zone to Togo during the dry season**. They are increasingly confronted with the constraints of the progressive reduction of grazing land (due to its occupation by farmers' fields) and the W Park (located between Benin, Niger and Burkina Faso), which is no longer accessible to herders because of its strict surveillance. Some people also claim that the Sota Valley is infested with tsetse flies and is not conducive to good animal health. **This reduction in grazing opportunities is exacerbated by the use of herbicides** by farmers to control grasses that are undesirable for their crops (but which are grazed by animals). These herbicide-treated grasses become toxic to the cattle and make them sick.

Since the droughts of the 1970s and 1980s, the Collines and Zou departments (in the south) have become strategic territories for livestock mobility. Their Sudanian-Guinean climate with two rainy seasons allows for large amounts of good quality pasture. This gives these two contiguous regions the role of transit and hosting areas for herds coming from the north of Benin, Burkina Faso, Togo and especially Nigeria.

In the Collines department, the host area for transhumance, four main livestock systems have been identified:

- The foreign transhumant pastoralists from Nigeria who no longer return to their countries. They have chosen the hills (Savè, Ouessè, Glazoué, Savalou, etc.) as their base. They are in the process of becoming agropastoralists once they have favourable settlement conditions (agreements from landowners, etc.).
- Recently settled agropastoralists practising transhumance during the dry season (5-6 months). They are mainly Fulanis from Nigeria and the Sahelian countries. They become members of herders' associations (UDOPER, UCOPER) to legitimise their presence in Benin.
- Agro-pastoralists, who sedentarised a long time ago, but who are obliged by necessity to practice small transhumance (15-25 km) during the dry season over short periods (2-3 months). They are generally former Gando Fulani who have sedentarised in the area for more than a century and who are generally herders who have animals in their herds that have been entrusted to them by farmers and traders in the towns.
- Agricultural livestock enterprises (mainly oriented to fattening small ruminants). This fattening activity is currently limited by taboos, theft of livestock, etc.).

Dry season transhumance develops along two main axes: an east-west axis (flows from Nigeria) and a north-south axis (flows from northern Benin) (see map below).

Map 5 Main transhumance routes through the Collines department



Source: ICG/UDOPER Z/C (with support from Acting for Life)

In general, the cross-border transhumant herds that frequent the municipality of Savè come entirely from Nigeria. The main gateway to the East-West axis is the municipality of Savè (more precisely in the border villages of Oké-Owo, Monka, Djabata and Kaboua). Most of the transiting herds leave the country through the village of Tchèti (municipality of Savalou) to enter Togo through the village of Anié. The villages of Toui and Kilibo in the municipality of Ouessè are the entry points for transhumant herds (coming from North Benin on the North-South axis) into the Collines. The exit points are Doumè and Pira in the municipalities of Savalou and Bantè respectively.

In Savè, local livestock breeders (agro-livestock breeders) carry out their transhumance from January to March in order to facilitate access to pasture and water for their herds. This is also the cashew nut harvesting period. Transhumance allows them to prevent cattle damage to cashew fields. In contrast, transnational herders arrive in the area in November-December and leave in April-May.

The areas of attraction for transhumant herds in the hills are:

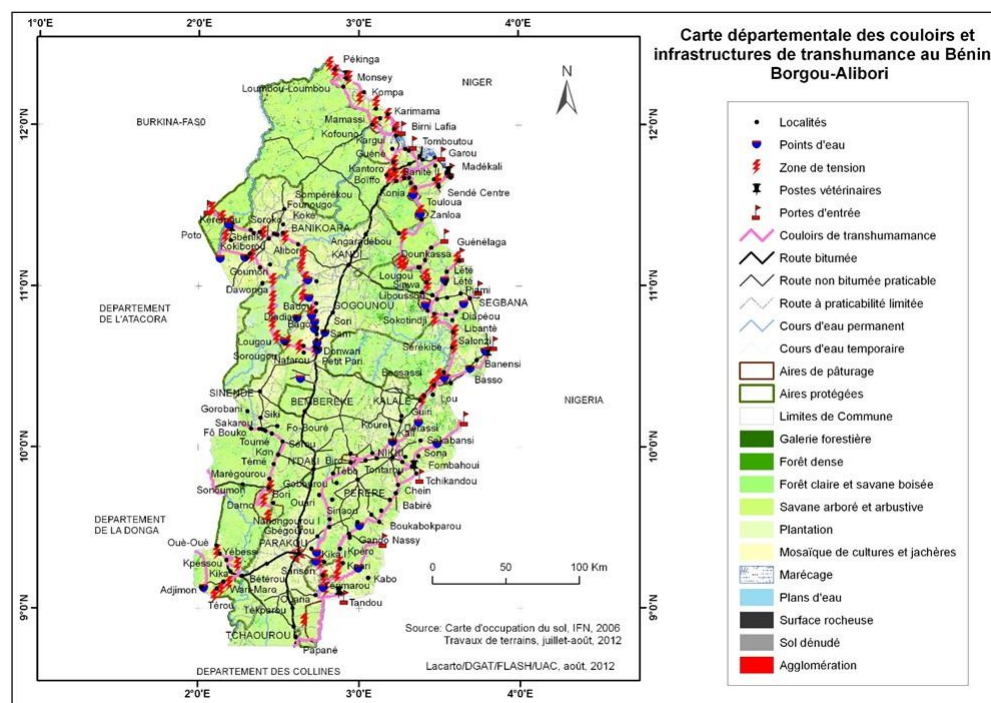
- The Okpara river banks, which include the border villages in the east of the country (Igbodja, Oké-Owo, Monka, Djabata, Sandéou, Monka);
- The Toui-Kilibo classified forest (Ouessè municipality);
- The banks of the large rivers in the Ouessè municipality (Beffa and Toumi);
- The banks of the Nonomè River (Savè, Ouessè, Glazoué);
- The confluence of the Ouémé and Okpara rivers at Okpa (municipality of Savè);
- The Boukou classified forest;
- The banks of the Ouémé River in the municipality of Dassa (at Bètécoucou).

The problem is that all these areas are now largely occupied by the fields of migrant farmers from southern and/or northern Benin.)

According to the report on the state of the agropastoral sector in the hills, the GIC and UDOPER Zou-Collines estimate that at least 50,000 cattle from Nigeria remain in Benin or continue on to Togo and even Ghana. But the data collected during the surveys go beyond that. According to UCOPER Savè officials, about 300,000 head of Nigerian cattle return to the municipality each year, either to spend the dry season there or to go to southern Benin (Agonli) or Togo (or even Ghana). More than half of these animals transit through the municipality of Savè on their way to Togo or Ghana. These figures have been falling for the last two years with the reforms in the agricultural sector (decree banning cross-border transhumance in Benin). The strong presence of transhumant herds in the hills (particularly in Savè) is due to its potential for agropastoral resources. According to livestock actors (DDAEP, private veterinarian, UDOPER/UCOPER officials) the 2019-2020 transhumance campaign has hardly recorded any transhumant herds because of the ongoing reforms in the management of transhumance in Benin due to the ban on cross-border transhumance in Benin. The number of herds coming from Nigeria has also decreased due to the continuous decline of pasture in the area. Another worrying phenomenon that hinders the arrival of transhumant herders is the insecurity, especially in the Fulani community, caused by hostage-takers. Some of the herds that arrive in the region on transhumance no longer return to Nigeria. They remain in unoccupied grazing areas, only to resume transhumance in the next dry season. The owners of these herds are foreign pastoralists who have chosen the hills (Savè) as a more secure anchorage area than their former anchorage area in Nigeria.

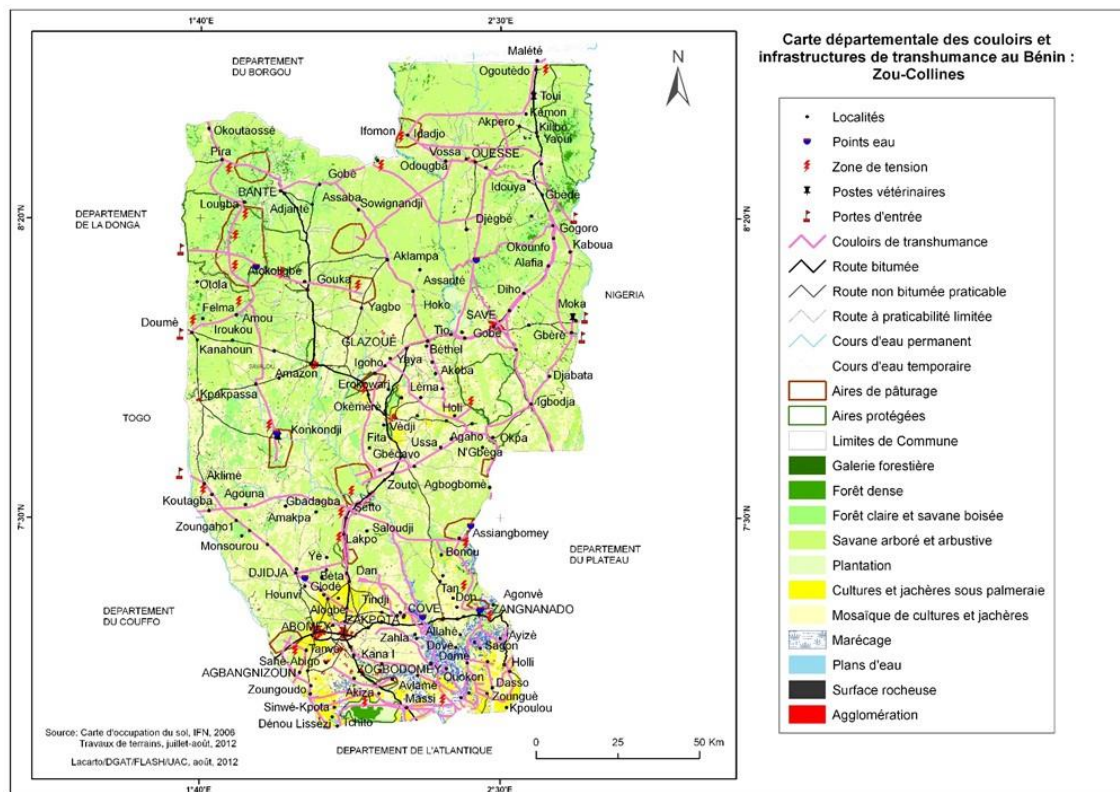
Several maps of transhumance movements were produced in the country. The following maps show the face of transhumance in the two areas of investigation of mobile livestock farming studied during this mission (North-East Benin and Central Benin).

Map 6 Transhumance corridors and infrastructures in Benin: Borgou-Alibori department



Source B. TENTE & Y. BONI (2012)

Map 7 Transhumance corridors and infrastructures (North-East Benin Department)



Source B. TENTE & Y. BONI (2012)

The social organisation of transhumance and the evolution of farmer-herder relations

Agreements, collaborations, loss of trust and increasing disputes between farmers and breeders

In the Alibori department, Fulani and Gando agropastoralists have been settling in villages for several years with the help of farmers' leaders (e.g. notables, land chiefs and village chiefs). These 'landlords' initiated heifer confiding contracts with the herders settled under their aegis, with an equitable sharing of the products. This kind of social contract was reinforced by the permanent dialogue between the village notables and the Fulani chiefs (*Ruga*, *Garso*, etc.), who used to contribute cattle to village ceremonies. Unfortunately, this collaboration tends to disappear after the death of a generation, victim of a crisis of confidence between the Fulani herders and the farmers (landowners). The farmers accuse the herders of stealing the cattle entrusted to them. Some farmers have taken their cattle out of the hands of the livestock breeders and have set up their own herds, led either by their sons or by hired herders. This crisis is currently weakening the social links between the two groups. There is also the development of agricultural activities promoted by herders and farmers, which restricts the land of many Fulani camps and consequently the availability of grazing space for the animals kept on site during the major transhumance.

This type of contract gave standing to the *Ruga* (Fulani chiefs) who are not only the spokespersons of the Fulani agropastoralists but also of the cross-border transhumant herders.

With the weakening of the *Ruga*'s standing and the guarantee of the village authorities to the livestock breeders, relays (or trackers) appeared between the transhumants and the local authorities. These relays facilitated the arrival of transnational transhumants in the municipalities (Karimama, Ségbana, Malanville, etc.) in exchange for payment for their service. The weak point of this system is that once the transhumants are on the terrain, the relay does not take care of them and is not concerned by the damage caused. With the advent of the pastoral code and the regulation

of transhumance campaigns, this role of intermediate relay should disappear. The pastoral code does not take this actor into account. It is the NTC, the National Transhumance Committee, and its branches in the field (DTC, CTC, ATC, LTC) that are instructed by interministerial orders to manage information, communication, awareness-raising, reception, training and education sessions for transhumant livestock breeders and the various actors involved in transhumance in the departure, transit and host areas for transhumant herds.

One of the associations that is widely recognised today by state institutions, local authorities, livestock breeders and farmers is ANOPER and its various branches. Agropastoralists and transhumant livestock breeders join to benefit from its protection. ANOPER is involved in all decision-making on livestock and transhumance in Benin. It is involved in various awareness-raising and management sessions on transhumance movements in the country. It has branches down to the local level. The strengthening of this association, especially at the local level (village) in transhumance areas, could facilitate links between farmers and livestock breeders.

Livestock breeders, who are mainly Fulani and Gando, are poorly represented in the local administration, which means that their voices carry little weight in the management of local authorities. In municipalities where the mayors are Fulani or Gando (e.g. Gogounou, Kalalé), conflicts are less and better taken into account according to the actors we met.

Farmers in Alibori have systematically combined animal traction and the use of animal dung to fertilise their fields (on a small scale) **in their agricultural practices.** Agropastoralists park their herds directly in their fields in order to benefit from the organic matter that emerges. The recurrent conflicts between farmers and livestock breeders do not favour the complementarity between livestock breeders and farmers to be sought through manure contracts. Despite the material assets (pairs of oxen, carts, etc.) that could be better used in the production of manure or compost by agro-livestock breeders and agro-pastoralists, there is a serious lack of organic matter to fertilise the fields.

Box 1 *The Agroecological Transition in Cotton Zones (TAZCO 2) project*

The Agroecological Transition in Cotton Zones (TAZCO 2) project, based in Kandi and financed by AFD, is currently underway and plans to improve the value of the agriculture-livestock association. It provides for :

- Facilitating inclusive village consultations (in 300 villages) for better management of the agro-pastoral area, in particular to enable the implementation of collective AE measures (living hedges, rotating parking, collective fodder plots) adapted to village territories
- The establishment of collective fodder plots (1500 ha) as a priority in the municipalities of Alibori, Borgou, West Atacora and Collines
- Materialization of livestock corridors/tracks: 3 km in 100 villages are planned to complement what is being done by livestock projects/programmes. The focus will be on the livestock corridors within the villages to facilitate the movement of animals towards water points and grazing areas and the legal transhumance routes. The latter have for the most part been demarcated and materialised as part of the interventions of livestock projects/programmes
- The delimitation of grazing areas and resting places for livestock resulting from village consultations in a hundred villages at a rate of 10 km per village

The actions of this project should be closely monitored to analyse changes in the relationship between agriculture and livestock. Similarly, the implementation of the SDACs of the Alibori

municipalities, particularly in the area of land allocation to livestock and agriculture, should be an opportunity to enhance the complementarity between agriculture and livestock.

In the Collines region, in the municipality of Savè, there is also an ancient link between agro-pastoralists and farmers, based on the purchase and confiding of cattle by farmers to agro-pastoralists (former pastoralists who have settled for over a century). This tradition of 'savings on hoofs' and at the same time of 'social agreement' survives in the municipality and is passed on from father to son. It allows agro-pastoralists to acquire a form of right of use with a certain land tenure legitimacy from the landowners. The links between farmers and agropastoralists are not yet strongly established despite the strong presence of both systems in the municipality of Savè. The majority of farmers in the municipality of Savè do not practise animal traction. There are also a few farmers who buy cattle (first generation Zebu bulls) or Sahelian sheep for fattening. They buy these animals at the Savè livestock market.

During the last 20-30 years, as in the northern part of the country, it was the sedentary Fulani chiefs who welcomed transhumant herders and facilitated their social integration in the transhumance areas. Most of the former chiefs have passed away and some are now tacitly replaced by their sons. The latter have frequently been involved in conflict resolution between farmers and livestock breeders. As a result of these developments, the Fulani chiefdom no longer really manages to control transhumance. Many transhumant herders come to the locality without contacting the chieftaincy representatives.

Today, it is the ANOPER-UDOPER-UCOPER network that has taken over this role of reception and integration played by the Fulani chiefs. Several transhumant herders seeking a stay in the transhumance areas go through this organisation and become members. However, the organisation is not structured at the grassroots level in some regions such as Savè, where it has representatives at the municipality level, but not at the village level in the transhumance areas. It is involved in conflict management and awareness-raising activities for transhumance actors. But it lacks the means (human, material and financial) to better organise the reception of transhumants.

In Savè there are also isolated individuals who play the role of 'transhumance brokers' who act as intermediaries between transhumants and village chiefs in the transhumance areas to facilitate their reception during the transhumance period. These intermediaries are not recognised by the formal authorities (NTC) and are strongly criticised by them. They are not really recognised and work underground.

In the camps visited in the municipality of Savè (Akpéo and Gbéré), the settled agro-pastoralists (former cross-border transhumants who have settled down) negotiate with the agro-pastoralists to settle near them. In general, the agro-livestock breeders thus support these demands from the landowners, who validate the insertion of the trans-border transhumants, who are ready to acknowledge their faults in case of damage caused by their herds to the fields. Here, although the level of tension between farmers and livestock breeders is considered to be high, several disputes are always managed amicably with the intervention of local Fulani camp leaders and UCOPER representatives.

The threat of pressure from agricultural land on grazing areas

Herders (transnational transhumants, agro-pastoralists, and agro-livestock breeders) are increasingly confronted with the constraints of gradually diminishing grazing lands due to their occupation by farmers' fields, and diminished access to classified forests. As explained before, pastoralists are trying to gradually establish themselves as farmers, and so they sometimes find

themselves in both groups. In fact, it is often the herdsmen who manage the daily movements and grazing of the transhumant herds. They are thus the vanguard in contact with the farmers in the bush. The herdsmen are mostly not the owners, but boys and young men dependent on the family or paid by the owners. However, the owners and their families travel regularly in close proximity to the herd, favouring more favourable places of residence according to the relations that allow them to stay in nearby localities.

Box 2 Paradox of the planning of host and transit municipalities

Livestock breeders' organisations also denounce the contradictions in the development policies of municipalities. While some municipalities accept transhumance and levy taxes on the herds, at the same time they sell off large areas of their land to farmers, thus reducing grazing space and making it difficult for the herds to move. For example, herdsmen in the Fulani settlement of Gossoé in Zagnanado estimate that in the space of a generation (25-30 years), agriculture has expanded to 80% of the pasture used, forcing them to move faster in transhumance further south. In the area of concentration of transhumant herds in Sagbovi, the municipal office has reportedly sold about 260 ha of land for an agricultural enterprise project.

Source: Analysis of social dynamics related to the peaceful management of transhumance in the Lower and Middle Ouémé valleys and its area of influence in the Republic of Benin. Study report, SNV-RBM 2015.

The herdsmen/livestock breeders find it difficult to graze their herds without the threat of trampling or grazing of crops in the fields. Indeed, fields are being laid out in a haphazard manner. The former passage tracks and grazing areas are not there anymore. The grazing areas around the camps are increasingly in competition with farmers' fields. Damage to crops and fields is increasing and tends to create permanent disputes (tensions) between farmers and livestock breeders. Thus, despite its social and economic role, transhumance is still perceived as predatory and generates disputes and conflicts. The damage caused by the herds of transnational and national transhumants has indeed rapidly become quite considerable. It should be noted that these conflicts are becoming increasingly violent, with the loss of human life. The social links and historical relations of coexistence between livestock breeders and farmers are deteriorating, and the use of fallow land and crop residues by livestock breeders is becoming more and more complicated.

Increasing reference to farmer-breeder conflicts

Two main factors that may aggravate tensions between farmers and livestock breeders:

- **The lack of dialogue** (or consultation) at various levels between the two parties (farmers and livestock breeders). Herdsmen and farmers from different ethnic groups often do not speak the same language. In the department of Alibori the transhumant herdsmen often do not speak the local language, which is *Monkolé*, and the farmers do not speak *Fulfulde* (the Fulani language) either.
- **Frustrations have built up in the face of governance and perceived injustices in the settlement of agro-pastoral disputes.** Livestock breeders accuse the authorities of turning a blind eye to the injustices they suffer at the hands of farmers, who are also landowners and almost no longer recognise their rights to use the agro-pastoral resources of their locality. The farmers, for their part, accuse the livestock breeders of corrupting the administration in conflict resolution.

Box 3 The importance of corrupt practices linked to the movement of transhumant herds

In the chain of corrupt practices, in the case of transhumance, herders are harassed by intermediaries. *Abusively called 'démarcheurs', they play the role of touts. Sometimes, the transhumant livestock breeder is accused of not having an up-to-date identity document, and sometimes a small detail in the vaccination booklet of his animals is used as a pretext for ransoming him. "This is why livestock breeders negotiate directly with these intermediaries who put them in contact with the municipal office and the police. This way, they are protected from problems," explains the herder we met in Zou....*

In any case, 'no tax has been instituted by the state', swears Olawolé Wolou, the transhumance focal point at the Ministry of Agriculture, Livestock and Fisheries (MAEP).

Source: Flore Nobimé (Survey conducted with the support of OSIWA) -.)- Passage des éleveurs nomades dans les champs : la corruption, terreau de la transhumance . . L'évènement Précis, 25 February 2020.

Management of transhumance by the public authorities

Faced with the rise in conflicts, Benin has long relied on transhumance committees structured at various levels: local/village, communal, departmental, and national. They were established by inter-ministerial decree (1992 & 2016) with the aim of regulating transhumance and facilitating dialogue and collaboration between the different actors (farmers and transhumant livestock breeders). Amicable settlements should be favoured to promote cohabitation between farmers and livestock breeders and thus avoid the breakdown of social ties. These committees organise consultations and sensitisation of transhumance actors before the start of transhumance, especially in areas of tension. But, generally speaking, at village level, these committees are much more in demand during conflicts between farmers and livestock breeders. In reality, these committees do not really have the technical and financial means to fully carry out their missions.

At the legal-institutional level, the country sets and communicates (by ministerial decree) each year the herd entry gates, the stock routes, and the start and end dates of transhumance as mentioned in sections 2 and 3 of its Pastoral Code. To remedy the poor functioning of the transhumance committees (i.e.: ad hoc management of transhumance) the Pastoral Code (Articles 83 & 84) provides for a more permanent institution that will have to coordinate transhumance management actions on a full-time basis throughout the nation: the AGNT. It also provides for conciliation procedures for the two parties in dispute (Articles 85-88) and procedures for settling disputes (Articles 89 to 92).

The Pastoral Code gives the AGNT the regulatory authority to prevent and manage disputes and conflicts between farmers and livestock breeders. In the absence of the installation of this structure, it is the branches of the National Transhumance Committee (NTC) that are active in this sense. The umbrella organisations of professional livestock breeders' associations (ANOPER, APESS) and the *Ruga*⁵ are involved in raising awareness among the actors and in pacifying situations in the event of serious conflicts in which human deaths are deplored. The government also often dispatches the police to the scene of conflicts and organises appeasement sessions with local authorities (municipal office, village) and customary authorities, and representatives of livestock breeders' associations (ANOPER, APESS). According to APESS Benin officials, conflicts have a negative impact on the emergence and proper functioning of livestock markets.

⁵ Customary chiefs act as authorities and negotiate with the administrative authorities. Some Fulani leaders are usually located at livestock market sites, providing a link with moving groups.

In Savè in particular, the main areas of dispute between farmers and livestock breeders are concentrated in the border villages (Igbodja, Bessé, Kaboua). In the Igbodja conflicts, both parties often claimed the right to use the land granted to them by the landowners. In Savè, at least 4 men are killed each year during the transhumance. The municipality of Savè also records large numbers of animals killed during the transhumance.

In order to reduce the recurrent conflicts between farmers and transhumant livestock breeders, the Beninese government is now advocating a political discourse in favour of the sedentarisation of herds. Thus, it is going to take two strong decisions: (i) limiting the movements of cross-border herds to the latitude of Dassa-Zoumè (by decision of the Council of Ministers of 13/12/17), and (ii) the inter-ministerial decree of 26/12/2019 prohibiting cross-border transhumance throughout Benin. Thus, according to DDEAP Collines agents, the pressure of cross-border transhumants has greatly decreased in the department since 2018 until now (which cancels the levies of transhumance taxes initially provided for in the Pastoral Code). However, they noted some cases of infiltration of transborder herds in transit. Those who tried to stay on the territory were allegedly turned back by the Republican police. Between November and December 2019, 13 cattle were slaughtered by the Republican Police (among the herds that pass during the night); the herdsmen did not respect the period of passage of the herds during the day (as stipulated in the Pastoral Code (Article 52).

According to the agents of the DDEAP of Savè, in order to return to the pre-established order of transhumance management, it is necessary to create infrastructures to receive transhumants (water reservoirs, animal passage corridors, grazing areas, herd rest areas, etc.). According to them, livestock breeders should also change their behaviour. Actions to demarcate transhumance corridors (stock routes), water reservoirs, resting and grazing areas have been financed by projects/programmes.

The national transhumance committee organises every year (for the last 3-4 years) awareness-raising activities for stakeholders (farmers, livestock breeders, local elected officials, etc.) on the various aspects of the laws governing pastoralism in Benin. The public administration through the Prefect, the DDAEP and the police is called upon to ensure that the laws on pastoralism are respected.

Box 4 The importance of securing pastoral land tenure, a major impact on the local economy

In November 2004, the weekly market of the village of agricultural settlers from the Atacora and sedentary agro-pastoralists (YEBESSI in the arrondissement of Bétérou: municipality of Tchaourou) was the scene of a violent confrontation between members of the two communities. The conflict, which left 8 Fulani livestock breeders dead, resulted from tensions arising from competition for resources. The need for land for both communities and for pasture for the livestock breeders has been aggravated by the increase in population and livestock and the limitations on access to natural resources imposed by the presence of the classified forests of the Upper Ouémé in the North and Warri Maro in the South. This conflict has led to the Fulani community moving back to the indigenous Bariba village, where they have begun to run an increasingly well-stocked livestock market. What is certain is that one of the biggest problems for the livestock breeders is access to pastoral land. This example also shows that solutions exist and need to be judiciously implemented.

i. Land disputes and recognition of rights

In the municipality of Savè, it is the village of Igbodja (hamlets: Kadjogbé, Gambiala, etc.) that has recorded the most violent disputes/conflicts over the last 10 years. According to the DDEAP agents, the landowners (Tchabè and Mahi populations who are the first to settle in these areas) would have 'sold' land to the transhumant livestock breeders (Fulani) and at the same time installed migrant farmers from the Abomey plateau. Disputes therefore arise between transhumant livestock breeders and migrant farmers over this land ownership. Here too, the weakness of the land code at the time and the lack of responsible governance fuelled conflicts between two categories of 'buyers'

ii. Changing the route of the corridors and challenging the right of use

According to the actors interviewed, changes in the corridors and entry gates by the government were also the cause of conflicts in Savè. For example, the ban on the entry of transhumant herds by Kaboua was not followed by some cross-border transhumants. The refusal of the latter by the police led to the killing of cattle and the death of a Fulani herdsman by unknown persons.

Source: Onibon P. PEPISAO, 2020

Market dynamics

The emergence and development of livestock markets has been one of the major changes in the rural economy of the regions above the 6th parallel in Benin over the last thirty years. All the municipalities of Alibori, Borgou, Atacora, Donga and Collines have at least one livestock market belonging to one of the classic categories: collection, assembly, cross-border or consumption markets. All categories taken together, these markets are active as a real weekly fair. The number of animals traded each market day depends on the time of year. These markets are fed by flows either from within the country or from neighbouring countries, mainly Burkina Faso, Niger and Mali, via Burkina Faso. Much of the livestock is then redirected to the consumption centres in the south of the country (Bohicon, Cotonou, Porto Novo and Ouidah), and especially to Nigeria.

In the markets visited in the north (Tourou/Parakou, Gogounou, Petit Paris, and Guéné/Malanville) and in the centre of the country (Savè), the number of animals sold during this period of transhumance (December-April) was low, according to the informants. Most of the animals go on transhumance to Togo. During this same period, notably between March and May 2020, restrictions on the movement of people in order to limit the spread of Covid, caused the price of animals on the markets to fall⁶ according to the actors we met.

⁶ In the Guéné/Malanville market, large oxen that used to sell for 500,000-600,000 FCFA were sold for 400,000-500,000 FCFA.

Photo 5 Béral de Tourou market



Source: photo Sounon Bouko, 2021

In general, there is a large flow of animals for slaughter in southern Benin and southwestern Nigeria. Buyers in Nigeria are mainly looking for large cattle from the Sahelian countries that have become overweight due to favourable feed and sanitary conditions. The Goudali and White Foulani breeds of zebu are often the most common. In Savè, a landing dock allows access to trucks transporting animals from Mali and Burkina Faso. These animals stop here to regain their strength for a few days in the pasture, before being transported on foot to Nigeria (especially to the Olodo market). They do not continue by truck, because the fees levied at checkpoints when travelling by truck to Nigeria are considered too high. This confirms the observations made in Togo on the systematic combination of transporting livestock by truck and on foot for reasons of feeding and comfort of the animals, as well as in relation to the costs and risks associated with trucking (Corniaux, 2020, ETP4).

The management methods of the markets visited vary, with in particular different levels of autonomy of market operators and management of financial revenues.

- The markets of Tourou/Parakou, Gogounou, and Petit Paris are managed by market management committees that have a leasing contract with the authorities of the municipalities where they are located. In these cases, the municipalities generally receive a certain percentage or amount of the various taxes and service charges levied by the market operators. The market management board takes care of the maintenance of the market, usually without any allocation from the municipality.

- The market in Guéné (Malanville) is managed in the traditional way by intermediaries (Dilani in Fulfulde). These are intermediaries who do not report to the local authorities. The latter do, however, collect taxes through the collecting agents sent by their financial services.
- The management of the Savè market is rather semi-automated. Indeed, the management system in place integrates both traditional institutions (Dilani or traditional brokers) and modern institutions (the management committee). The Savè market had recently stopped functioning for a month because of a dispute over financial revenues. The municipal office had not paid the management committee its counterpart of the fees for almost a year, which amounted to 2 million FCFA.) The committee therefore protested, inviting the main actors to cease activities for a while in order to get the municipal authority to reimburse the sums due. The market operators preferred a form of contractual management of the market with the town hall. They want the town hall to delegate the management of the livestock market to them ('affermage'). They believe that leasing will also benefit the municipal office and allow it to have stable and interesting fees⁷.

The data collected at the markets do not allow clear distinctions to be made between local cattle, (cross-border) transhumant cattle, and trade cattle. However, the managers of the Gogounou livestock market estimate that in recent years, 85% of the cattle sold on the market come from national agro-livestock breeders and agro-pastoralists, while the remaining 15% come from transhumant cattle from across the border, especially from Niger. At the Tourou/Parakou market, around 50-60% of the animals presented on the day of the fair are sold. At the Savè market this percentage is about 42%.

Economic impacts of transhumance in the regions studied

Contributions to GDP

The contributions to GDP of the livestock sector at the departmental level of the border area and the host area have not been calculated. From a theoretical point of view this should be possible, provided that several data are available such as the numbers of different animals in the different systems, the overall departmental GDP and technical parameters, prices, and margins and a decentralised basis of the national accounting matrix prepared by the National Institute of Statistics and Economic Analysis.

However, it can be estimated that the sharp decrease in transhumant animals from Niger and Nigeria following the recent restrictions imposed by the Beninese authorities has had a strong impact on the contribution of transhumance flows to the department's economy. In terms of production, the mobile livestock provided added value in terms of meat, organic matter, draught animals and milk. The animals sold by the cross-border transhumants also created added value in the meat sector, while generating some direct and indirect employment. These cross-border transhumants spent significant amounts on herd care (veterinary services and products, animal feed) and on their own needs (food, housing, transport, communication). The suspension of the transhumance of a significant proportion of Beninese animals to Togo also leads to a significant loss of financial resources, in other words wealth creation, for Benin. Transhumants from Sahelian countries also contributed to the supply of breeding cattle (*White Fulani*), enabling herders to obtain mixed animals and draught bulls for ploughing. These latter contributions are difficult to estimate in calculations of the contribution to GDP.

⁷ According to the collectors, it is possible to collect between 12-15 million communal taxes per year in the case of leasing compared to 10 million currently with the semi-managed form

However, while the assessment of the contribution of mobile livestock systems to the GDP of the terroirs poses methodological problems, linked to the incompleteness of the data, it is easier to assess their contribution to the incomes of the actors and to the budget of local communities.

Table 5 Estimated income of economic actors on the livestock market (Gogounou)

N°	Activities	Average number of actors	Average turnover/market day	Total amount of turnover average/market day	Amount of turnover monthly average	Amount of turnover annual average
1	Sale of small ruminants	456	45 000	20 520 000	82 080 000	984 960 000
2	Sale of large ruminants	467	200 000	93 400 000	373 600 000	4 483 200 000
3	Restoration	17	17 600	299 200	1 196 800	14 361 600
4	Sale of miscellaneous	8	50 000	400 000	1 600 000	19 200 000
5	Sale of motorbikes	5	1 050 000	5 250 000	21 000 000	252 000 000
6	Loading	6	4 875	29 250	117 000	1 404 000
7	Conveyance	28	7 500	210 000	840 000	10 080 000
8	Transport	20	35 000	700 000	2 800 000	33 600 000
9	Veterinary sales	1	120 000	120 000	480 000	5 760 000
	Total		1 529 975	120 928 450	483 713 800	5 804 565 600

Source: Field data collection, PIC Sarl, April 2016

Fiscal contributions

As mentioned above, financial revenues from the markets are managed differently in each market. Taxes on cattle sold on the markets visited varied between 2,000 and 2,500 FCFA per head. These amounts are generally shared between the sellers and buyers. And the revenues are shared between the municipality (and the village in the case of the Petit Paris market), the brokers/dilani, and the livestock market management committees (where applicable). For small ruminants, these taxes generally amount to 200 FCFA. In addition to these sales taxes per animal, there are also other taxes and fees that are levied. The boxes below refer to the market in Savè.

Box 5 Taxes and fees levied on the Gogounou livestock market

The number of cattle sold annually at the Gogounou market is 12,500 head, and the number of small ruminants is 18,500 head. According to the market's accountant, revenue is around 40,000,000 FCFA per year. They come from levies on the sale of livestock and other taxes:

- Taxes on sales of large ruminants: 2,000FCFA/head of cattle (1,000 FCFA seller and 1,000 FCFA buyer).
- Taxes on small ruminants: 200 FCFA/head (100 FCFA by the seller and 100 FCFA by the buyer)
- Loading taxes (loading dock taxes): 200 F/head of cattle
- Handling taxes 10% of the amount collected by the carrier
- Positioning fees: 1,000 FCFA/truck and 500 FCFA/van, 250 FCFA/tricycle
- Taxes on shops and hangars (external shops: 7,000 F/month and internal shops: 5,000 FCFA/month)
- Taxes on internal hangars: 2,000 FCFA/month
- Taxes on the restaurant: 10,000 FCFA/month
- Accommodation (Type 1: 2,000/night/room, Type 2 and 3: 5,500/night/room)

The market is self-managed by a management committee. It is governed by an agreement between the municipal office and the market committee. Thus, the municipal office levies fees on each of the market's taxes (50% on cattle and small ruminants sold, 30% on the taxes for loading cattle, 25% on the taxes for using the loading dock, 30% on

the taxes for animal passes issued by SRC/DDAEP agents, 25% for accommodation costs, 50% on shop rents, 50% on the costs of renting modern food stalls, 50% on the costs of renting traditional food stalls, etc.). The market committee employs at least 60 staff members who are paid from the share of the fees paid to it. It is obliged to ensure the proper functioning of the facilities made available to it. The municipal office makes practically no contribution to market expenses.

Box 6 Taxes and fees levied on the Savè livestock market

The taxes levied on cattle in the Savè market amount to 2,500 F/head sold. The seller pays 1,000 F/head and the buyer pays 1,500 F/head. This tax is distributed as follows: Municipal office (1,000 F/cattle), Broker or Dilani (1,000 F/cattle) and the market management committee (Comité de Gestion du Marché à Bétail or CGMB) collects 500 F/cattle. At the level of the landing dock, the municipal office receives 125 F/head of cattle landed. The management committee receives 2000 F/truck.

Apart from these main taxes on cattle, there are other taxes levied by :

- Law enforcement agencies: 1,000 F/vehicle to security forces
- DDAEP veterinary officer: 200 F/head of cattle sold for delivery of certificates
- Drivers' unions: 200 F/vehicle
- The municipal office: 200 F/place for vendors on the market

The table below summarises the various annual revenues that can be collected at the Savè livestock market and other municipalities in the Collines department between 2014 and 2017. These revenues do not take into account the taxes levied on small ruminants, which are not very present on this market.

Table 6 Annual revenues from the livestock market of Savè and other municipalities in the Collines department (per year between 2014 and 2017)

MUNICIPALITIES	Types of market	Average number of cattle sold on the market or on which taxes were taken/year	Tax revenue collectable by the municipal office/year on livestock markets in CFA francs	Average mobilisation of the municipalities' local development tax/year (2014 to 2017) in F CFA	Percentage share of potential tax revenue from livestock markets in the average local development tax of municipalities
Savè	Livestock market	10.920	10.920.000	30.574.994	120%
	Landing dock	205.313	25.664.125		
Bantè	Livestock market	780	780.000	21.235.194	4%
Ouessè	Livestock market	6.500	6.500.000	25.742.100	25,25 %
Savalou	Livestock markets	5.044	5.044.000	16.657.042	30,28 %
Total		228.557	48 908 125	94.209.330	52 %

Source: GIC & UDOPER 2018

For Savè, the figures in this table mean an amount per head of cattle of 1,000 FCFA for the market and 125 FCFA per head of cattle for the landing dock, in line with the information provided by the municipal office.

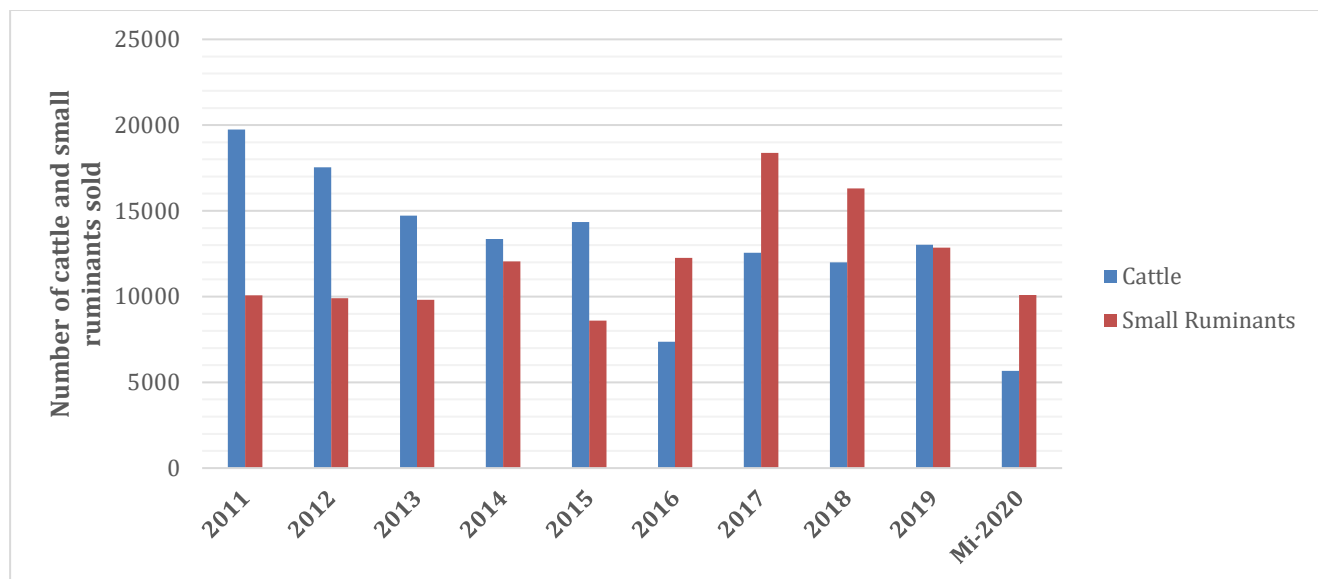
Table 7 Livestock registration in Gogounou market (2011 to mid-2020)

Year	No. of Large Ruminants	Nb Small Ruminants	Recovered taxes	
			Cattle	Small ruminants
2011	19733	10077	39466000	2015400
2012	17548	9897	35096000	1979400
2013	14721	9805	29442000	1961000
2014	13365	12053	26730000	2410600

2015	14351	8597	28702000	1719400
2016	7368	12261	14736000	2452200
2017	12547	18383	25094000	3676600
2018	11987	16299	23974000	3259800
2019	13019	12847	26038000	2569400
2020 (July)	5668	10095	11336000	2019000
Total	130307	120314	260614000	24062800

Source: ALGMB Gogounou (2020)

Figure 9 Evolution of livestock sales in the Gogounou market (2011-2015)



Estimated fiscal potential and turnover (income) of market players per year

- The municipality levies four types of taxes on the market. The first is the tax on livestock transactions, particularly on the sale of large ruminants. The second concerns the right to occupy the market place for the sale of small ruminants, poultry and trade in various products. The third tax is a 'patente foraine' levied on traders of various products. The fourth tax concerns the right to load and transport goods from the market.
- In the case of cattle, the distribution key for the tax is 50% for the municipal office and 50% for the ALGMB.
- For small ruminants, the distribution key is 50% for the municipal office and 50% for the ALGMB.

Table :8 Evolution and distribution of taxes collected (on animal sales) between the municipal office and the ALGMB

Year	Collected taxes			Distribution of funds received	
	Cattle	Small ruminants	TOTAL	Municipal office	ALGMB
2011	39466000	2015400	41481400	20740700	20740700
2012	35096000	1979400	37075400	18537700	18537700
2013	29442000	1961000	31403000	15701500	15701500
2014	26730000	2410600	29140600	14570300	14570300

2015	28702000	1719400	30421400	15210700	15210700
2016	14736000	2452200	17188200	8594100	8594100
2017	25094000	3676600	28770600	14385300	14385300
2018	23974000	3259800	27233800	13616900	13616900
2019	26038000	2569400	28607400	14303700	14303700
2020 (July)	11336000	2019000	13355000	6677500	6677500
Total	260 614 000	24 062 800	284 676 800	142 338 400	142 338 400

Source ALGMB Gogounou (2020)

With this income, the market management committee pays the agents who work there and can make small repairs. The municipal office does not invest in the livestock market, but facilitates the financing of the market infrastructure by turning to other sources of financing, notably the TFPs.

The Gogounou livestock market is of limited size in terms of the volume of transactions carried out compared to several other markets in the Alibori-Borgou region (Petit Paris, Guéné, Parakou, Tchaourou). It has the merit of being better organised than the latter, which are less transparent in their management.

Table 9 Estimated fiscal potential of the Gogounou livestock market

Different taxes	Units	Average Business volume	Minimum staffing levels of actors	Tax rate	Estimated amount weekly	Estimated amount monthly	Estimated amount annual
Large ruminant tax	Number	5	100	2 000	934 000	3 736 000	33 624 000
Small ruminant tax	Number	4	120	200	91 200	364 800	3 283 200
Certificates	Truck	1	12	1 500	18 000	72 000	648 000
Positioning tax	Truck	1	20	750	15 000	60 000	540 000
Loading tax	Number	5	35	150	26 250	105 000	945 000
Grass loading tax	Truck	1	3	1 500	4 500	18 000	162 000
Water sales charge	Number	1	25	15	375	1 500	13 500
Inspection ticket	Number	1	30	250	7 500	30 000	270 000
Accommodation costs at the hostel	Number	1	1	5 500	5 500	22 000	198 000
Accommodation costs for stalls	Number	2	1	2 000	4 000	16 000	144 000
Motorbike sales tax	Number	2	5	2 000	20 000	80 000	720 000
Ticket for bicycle parking	Number	1	350	100	35 000	140 000	1 260 000
Right of access	Number	1	25	100	2 500	10 000	90 000
Shop rent	Number	1	16	5 000	80 000	320 000	2 880 000
Modern catering box	Places	1	6	5 000	30 000	120 000	1 080 000

Traditional catering box	Places	1	16	2 000	32 000	128 000	1 152 000
Inspection fee	Number	1	30	250	7 500	30 000	270 000
				TOTAL	1 313 325	5 253 300	47 279 700

Source: Field data collection, PIC Sarl, April 2016

The number of cattle sold on the Savè market per week is estimated at 210 heads during the study, compared to an average of 500 heads of cattle presented (i.e. 42%). In addition, nearly 4,000 head of cattle are received each week at the landing dock for transport on foot to Nigeria.

In addition to the livestock that are brought to weekly markets, transhumance generates many other activities that contribute to the economy of the terroirs. Among these activities, which thrive in many areas, we can mention

- The market for veterinary products and animal feed. This sector makes it possible to absorb the unemployment of young veterinarians who have graduated from agricultural technical colleges and who open sales and care outlets in most villages where animals are concentrated
- Fodder crop production in the municipalities is growing and tends to occupy many young people in many village territories in the municipalities of the Collines and Borgou departments.
- Milk processing and marketing, which is traditionally in the hands of women. This link is also undergoing significant change with the appearance of community mini-dairies, integrating multi-service collection centres and small dairy production units. These products reinforce the domestic supply of traditional cheese (Waraghasi or Gassarou). Studies conducted in Borgou show that the income earned by women who process milk into cheese is sometimes higher than the guaranteed minimum wage in Benin (41,000 FCFA/per month).

Contribution to poverty reduction

The mission to northern and central Benin was unable to collect quantitative data on the contribution of (trans)border transhumance to poverty reduction. However, it is clear that transhumance is a strategy for transnational transhumants, agro-pastoralists, and agro-livestock breeders to increase their incomes by sending their livestock to other localities where food is available and sanitary conditions are more favourable. For transnational transhumants and agro-pastoralists this is even more important, as they are not otherwise involved in agricultural activities.

Transhumance is also a resilience strategy that allows herders to save and replenish livestock for future times of crisis and for unforeseen expenses. This includes family members and socially connected relatives who entrust one or more animals to a herdsman.

Contribution to equality

The mission to northern and central Benin was unable to collect quantitative data on the contribution to equality.

Social impacts

Contribution to food security

In line with the contribution to poverty reduction, transhumance contributes to several aspects that contribute to the improvement of household food and nutritional security for both pastoralists and the populations of the regions crossed or stayed. In many cases, cow dung has contributed to

making compost that has helped to fertilise the plots of agricultural producers and improve productivity. Agropastoralist farms are generally more productive than those of other farmers. The areas that receive transhumant cattle are often at the top of the cereal production list, limiting the severity of the hunger gap, which is so dreaded by the population.

In the same vein, the presence of transhumants offers host regions better access (at relatively low prices) to draught animals and slaughter animals. It improves the income of all actors and strengthens the food security of transhumant households, agro-pastoralists, agro-livestock breeders and other people who entrust them with one or more animals. In terms of availability, transhumance contributes to an increase in the availability of livestock products (milk, meat and offal) in the areas concerned, all of which helps to improve the nutritional situation of the population.

Contribution to social welfare

The contribution to social welfare may refer to the opportunity for young people to become herdsmen, and then livestock breeder or achieve other functions in the livestock sector. This is an important occupational opportunity for boys and young men from transnational transhumant and agro-pastoralist families. However, the task has become dangerous and probably stressful with the many disputes with farmers. Herders often move to localities where they are unable to communicate in the local language. The use of drugs by herdsmen is also considered to be common, but is also widely observed among young farmers during periods of heavy agricultural work. Young herdsmen cannot go to school when they are on transhumance with the herd, but it is also not sure that they would be able to access quality schooling in the transhumance departure localities.

Transhumance offers transnational transhumants the opportunity to identify sites that might be favourable for acquiring agricultural land. Many transnational transhumant households from Niger and Nigeria have settled in the areas visited. The perception is that they are fleeing mainly because of insecurity in their countries of origin. In view of the increasing constraints of transhumance, families are seeking to identify new possible anchorage points that would offer greater land security through the development of agricultural activities. Agro-pastoralists in turn also seek to further secure their land tenure by further developing their agricultural activities. These livestock systems are therefore not fixed, but constantly evolving. Livestock breeders try to adapt to local and regional dynamics. The existence of a fixed point of habitat to ensure agricultural production does not, however, exclude the mobility of herds following the pastoral calendar of transhumance.

Contribution to cultural identity

This point is not apparent in the Benin study, but as reported in several works, notably ECLIS, the organisation of transhumance has a very important dimension in maintaining the cultural heritage of pastoral societies. In the foreground is the fact that the movement of families and their herds must be anticipated and requires a very particular social organisation, in which the heads of families, the scouts and the *rugga* play a fundamental role. Most of the time, transhumance movements also provide the opportunity for major social events, such as the gatherings of the *guerewol* on the way down, in which pastoral traditions are perpetuated and alliances are forged, particularly through marriages. From this point of view, the fixation of families following major losses of livestock or its dissociation from the mobility of the herds are factors that hinder the inclusion of this social capital of mobility. Sedentarisation is then synonymous with exclusion from the social network of mobility, while being accompanied by great social isolation at the site of residence (Bénard, Bodé, ECLIS 2010).

Impact on animal welfare

Given the considerable increase in cropland in the north and centre of the country as described above, and the threat of robbery and even kidnapping for ransom, the transport of animals on certain stretches is increasingly done by truck instead of on foot. In particular, animals from Burkina Faso that are traded to urban centres in southern Nigeria are transported by truck to Savè and then transported on foot to the market in Olodo (Nigeria). The last part of their journey, from Olodo to Lagos, is again by truck. In the absence of suitable livestock trucks, this trend towards more truck transport does not improve the travelling conditions of the animals, which are adapted to walking long distances punctuated by grazing and watering.

Impacts on security and relations between different social groups and communities

As detailed in section 3.1.1, the symbiotic relationship that existed between livestock breeders and farmers is becoming increasingly tenuous as a result of the densification of the areas that were previously used by transhumants. Where cross-border transhumance used to build relationships between transhumants (mainly Fulani and Gando) and farming communities, there is now much more tension linked to competition over resources. Finally, in order to deal with insecurity and theft of livestock, many herdsmen of transhumant herds or commercial conveyance, are armed, without authorisation from either the country of departure or the host country. The phenomenon is accused of being the source of violent conflicts in transhumance areas. The local committees and other mechanisms set up to manage disputes are often overwhelmed, resulting in procedures being referred to police stations or gendarmerie stations, or even to the courts.

Contribution to employment

Foreign and national transhumants contribute to direct employment by hiring herdsmen, most of whom are from the Fulani community. Foreign transhumants naturally tend to use herdsmen close to their anchorage points in Sahelian countries. National transhumants, with both large and small-scale transhumance, tend to use Fulani herdsmen who have been in Benin for some time. But farmers who have become agro-livestock breeders also send part of their livestock on small-scale transhumance and use Fulani herdsmen. For these boys and young men, becoming a herdsman offers a rare opportunity to advance economically, with the prospect of gradually building up their own herds.

Indirectly, foreign and national transhumance contributes to job creation, including among farmers, livestock market brokers commonly called *dilani*, tax collectors mandated by the Savè municipal office, members of the market management committee, livestock traders, butchers, restaurateurs, snack bars, hoteliers, veterinary product sellers, and telephone credit sellers.

Numerous economic activities are carried out on the Gogounou livestock market, mainly involving livestock and poultry trade. The actors who earn income from the market are presented in the following table.

Table 10 Assessment of employees working in the Gogounou livestock market

	Number (per market day)
ALGMB employees: secretary, accountant, night watchman, data entry operator, maintenance worker	1-1-1-2-2 (i.e. 7)
The members of the Bureau of the Management Committee	7
The witnesses	15
Witness secretaries	15
The canvassers (Dilani)	0

Controllers	4
Bicycle guards	2
Sellers (on average)	250
Buyers (on average)	130
The conservators	24
Sellers of various goods and equipment	7
Motorbike sellers	7
Chargers	10
Conveyors	00
The manager of the pharmaceutical warehouse,	1
Transporters and drivers (on average)	8
Motorbike taxi drivers (on average)	5
Casuals (on average)	50

Source: ALGMB Gogounou (2020)

These different actors are either directly involved in the livestock and poultry trade or provide services to livestock market users.

Environmental impacts

Impacts on climate change

Livestock are generally considered to be a source of overgrazing and land degradation in the almost conventional discourse. However, in the municipality of Savè, deforestation is primarily linked to the installation of settler farmers who systematically clear the forests for yam cultivation. The resulting wood is probably partly sold. According to data from the PDC III⁸ of Savè, 'the municipality of Savè is one of Benin's suppliers of forest products, notably timber, firewood and charcoal. Farmers also settle in the Ouémé-Boukou classified forest (20,500 ha) where there are cases of clearing for agriculture without authorisation from the forestry administration (see photo below)

Photo 6 Cleared area with burnt trees for agriculture on a farm in Bessé (PDC III)



⁸ Cf. PDC III of Savè p34

Secondly, trees that are eaten by animals are severely pruned by transhumant herdsmen. Bushfires in the municipality of Savè are mainly practiced by young villagers in search of game (squirrels, agoutis, etc.).

In the department of Alibori, slash-and-burn agriculture continues to be practised; cotton stalks are uprooted and burned before the next crop is planted. This does not favour the return of organic matter, and therefore further impoverishes it. For decades, farms in Alibori have been facing a downward trend in crop yields due to poor farming practices and the adverse effects of climate change (intensity of extreme rainfall and flooding), which leads to soil degradation (soil erosion and a downward trend in soil organic matter). Techniques for making and using manure in the fields are struggling to emerge in the area, due to a lack of technical supervision, advisory support and training for producers. Severe pruning of fodder trees is still required by livestock farmers during transhumance to improve the ration based on perennial grasses of low fodder value. For a long time, the classified forests of the area and Park W were illegally used for animal grazing and lost their vegetation cover. However, the current control of these forest areas (Park W, Djona Forest) by the African Park company is expected to help the greening of these protected areas.

Impacts on water quality and quantity

The impact of mobile livestock on water quality or quantity is not highlighted by the stakeholders interviewed in Benin. The main problem is undoubtedly that of access to surface water for the herds due to the pressure of the fields near the watering points. Once the fields are close to the watering banks, the risk of damage to these new crops by herds accustomed to these sites increases. The potential damage that would follow would be attributed to the animals regardless of the prior pastoral use. However, Onibon reports that in Savè the sites where transhumant livestock breeders have stayed (and abandoned for a while) are fertile areas sought after for agriculture. They are being cultivated by migrant farmers without the knowledge of their year-round occupants who have moved to Togo. This leads to conflicts between these two protagonists (livestock breeders and farmers). This is the case of the deadly conflicts in Igbodja (Savè).

Onibon also notes that river waters are sometimes polluted (with toxic products) by farmers in search of fish during the dry season. This is a source of dispute between farmers and herders concerned about the risk of poisoning their animals.

Impacts on biodiversity

The presence of transhumant animals in parks and protected areas as described above in the section on climate change is likely to have a negative impact on biodiversity in these parks. But as mentioned, in some parks, controls to prevent entry into these protected areas have become stricter. On the other hand, in other parks farmers are moving in to clear new land, which contributes much more heavily to biodiversity loss through clear-cutting of habitats.

The main threat of pastoralism on biodiversity is probably the protection practices of shepherds against large protected carnivores which are also very threatening predators for cattle and small ruminants.

In general, and especially outside of parks, a strong decrease of herbaceous and woody species is often highlighted by the so-called overgrazing practices. These species are not in danger of extinction, so this prospect does not constitute a danger for biodiversity, but it could constitute a risk of long-term reduction in the nutritional value of these pastures, and consequently of the economic value derived from them. It should be recalled that ruminant grazing does not exceed one third of the herbaceous biomass of Sahelian pastures (70% being returned directly by trampling, urine and faeces) and varies between 4 and 11% of the biomass of woody plants depending on the season (Assouma et al., 2017, 2018).

Impacts on desertification

This concept is not widely perceived and is not reflected in fieldwork in Benin. As pointed out above, mobile livestock rearing, because of its seasonal nature, is one of the methods of exploiting natural resources that leaves the least footprint on the natural environment, in comparison with agricultural clearing and continuous cultivation of the soil.

Recent work in Senegal has shown that pastoral livestock farming, far from contributing to greenhouse gas emissions, has a neutral or even slightly negative carbon balance if the entire pastoral area is taken into consideration. On the other hand, sedentary livestock farming, which concentrates on grazing areas in dense agricultural zones, leads to a strong degradation of these ecosystems, with continuous grazing without guarding, leading to the disappearance of good forage areas (Hiernaux et al., 2006).

Impacts on land fertility

As explained in the section on the impact on climate change, a strong degradation of the soil was observed in the areas covered. A contradiction lies in the fact that the increased presence of crops would have required more fertilisation by animals, but the resulting tension between farmers and livestock breeders would, on the contrary, have led to a decrease in the use of animal manure by the farmers, due to the lack of accessibility. The manure contracts that used to exist between the two parties (exchange of crop residues for animal waste by keeping transhumant animals in crop fields) is considered to be less common.

Overall, soil fertility management is increasingly problematic for soils of poor agronomic quality in general: fallow land is disappearing in favour of continuous cultivation systems, while transhumant and sedentary herds have less and less secure space to reinforce the fertility transfer achieved up to now through the nocturnal stabling of herds in the fields. Onibon (2020) reports forms of competition over animal manure between farmers and livestock breeders.

Key drivers of change and long-term prospects

Five major drivers of change were identified that are likely to influence the trajectory of mobile livestock in the coming decades:

1. The worsening security situation
2. Evolutions related to climate change
3. Population growth and further urbanisation
4. Continued expansion of cultivated land and thus a decrease in the pasture available for mobile herds and, as a result, continued tensions between pastoralists and farmers
5. The Covid-19 pandemic, and restrictions put in place to limit its spread

a - The worsening security situation in various West African countries, which restricts the movement of pastoral herds

i. In the reception areas

How has this factor affected livestock systems in the last 10 years?

The current generation of young herders is less peaceful than the older generation (young herders are increasingly taking drugs). Some have even killed their own leaders (according to the livestock breeders interviewed)

Farmers are equipped with firearms	
There is also talk by some livestock breeders of threats of hostage-taking	
How is this factor estimated to affect livestock systems and their economic, social and environmental impacts in the next 20 years? (Without policy changes)	What public policies can be implemented to mitigate negative impacts and maximise positive impacts?
The major risks are linked to the increasing aggressiveness of young herdsmen in a context of poor security and increasing conflicts with farmers	Great need for awareness raising and education of young herdsmen and farmers Enforce the law for jurisdictional corrections of drug-smoking elements and those with firearms in their possession

ii. In transit areas

How has this factor affected livestock systems in the last 10 years?	
Transhumant livestock breeders are often accused of being armed during transhumance	
Increases of road banditry	
Violence against women by transhumant livestock breeders	
Theft of foodstuffs (yams) from villagers' fields by transhumants	
More and more drug addicts and uncivil behaviour among young herdsmen	
Open conflicts between farmers and livestock breeders with human deaths (case of May 2020 in Gougounou with 9 deaths: 6 livestock breeders and 3 farmers) / a battle that pitches livestock breeders against farmers.	
Development of a psychosis of fear and reluctance among the population towards transhumant livestock breeders.	
Forced displacement of transhumant livestock breeders by local populations	
How is this factor estimated to affect livestock systems and their economic, social and environmental impacts in the next 20 years? (Without policy changes)	What public policies can be implemented to mitigate negative impacts and maximise positive impacts?
A new form of banditry is developing within the Fulani community: the kidnapping of transhumant livestock breeders by the sons of livestock breeders. They mostly kidnap old, wealthy livestock breeders (with many herds) who owe their release to the payment of a ransom of 3-10 million for their release. Some Fulani herders have already been kidnapped 2 or 3 times (according to ANOPER, the police arrested a young Fulani in Gougounou for kidnapping on 25 June). There is a risk of an increase in the number of cases of kidnapping of wealthy people, not only within the Fulani community but also among the local population	Sustaining current road safety practices that have helped reduce road banditry over the past four years Develop and implement an education and schooling policy for young Fulani children Support local authorities to develop and implement a real land use policy that takes into account pastoral land (grazing areas, transhumance corridors, stock routes for conveyance of livestock on foot, water reservoirs, etc.). Facilitation of regular consultations between livestock breeders and farmers Develop an information platform on transhumance to avoid false news that aggravates tensions between farmers and livestock breeders
Risks of arms trafficking among transhumant Fulani communities and populations, and of an increase in deadly (armed) clashes between livestock breeders and farmers (supported by local hunters)	
Despite the ban on cross-border transhumance, the population continues to record the arrival of foreign transhumant herds and fears that they will be over-armed to defend themselves in the event of attacks	
Risk of further stigmatisation of transhumant livestock breeders in connection with insecurity in the rural areas	
Risks of livestock breeders being removed from their terroirs (occupied for several years)	

b- Climate change. It is considered to be characterised by greater variability of rainfall, alternating between dry phases and heavy rainfall causing flooding.

i. In the reception areas

How has this factor affected livestock systems in the last 10 years?	
<p>For the last 10-30 years, bad weather conditions have mainly caused agricultural migrants to move from northern Benin (Atacora) to the Collines (Savè) where fertile land is still available?</p> <p>The latter occupy the areas initially dedicated to the transhumance of livestock, which creates perpetual tensions between livestock breeders and farmers</p>	
How is this factor estimated to affect livestock systems and their economic, social and environmental impacts in the next 20 years? (Without policy changes)	What public policies can be implemented to mitigate negative impacts and maximise positive impacts?
<p>Drastic reduction of grazing areas (grass) and fodder trees</p> <p>Risks of relocation of transhumance to other suitable regions</p>	<p>The central state and local authorities should take seriously the problems of all kinds of occupation of grazing areas through the concerted development and implementation of SDACs in the municipalities</p>

ii. In transit areas

How has this factor affected livestock systems in the last 10 years?	
<p>Decrease in the quantity and quality of fodder (herbaceous and trees)</p> <p>Gradual disappearance of the best grasses palatable to animals (<i>Andropogon gayanus</i>, <i>Andropogon tectorum</i>, wild panicum, etc.)</p> <p>Appearance of weeds undesirable for breeding (very invasive): <i>Chromolaena odorata</i>, <i>hyptis suaveolens</i>, etc.)</p> <p>Rapid drying up of natural rivers</p> <p>Gradual decrease in the number of herds in the area (some herders have lost their primary occupation and have become farmers or traders)</p> <p>Development of the Niger and Sota valleys in favour of the policy of water control for rice cultivation, without taking into account the existing livestock systems in these localities</p> <p>Progressive relocation of the centre of gravity of livestock production, which is moving from North Benin to the southern areas of Benin, but especially to the northwest and Togo (and even Ghana)</p> <p>Livestock breeders in northern Benin are obliged to travel ever greater distances during transhumance in search of grass and water</p>	
How is this factor estimated to affect livestock systems and their economic, social and environmental impacts in the next 20 years? (Without policy changes)	What public policies can be implemented to mitigate negative impacts and maximise positive impacts?
<p>Risk of loss of quality grasses</p> <p>Overgrowth or total invasion of pasture areas by undesired weeds</p> <p>Total relocation of herds to Togo and Ghana, also due to the increasing occupation of grazing areas by cotton and maize fields, etc.), and occupation of riverbanks by market gardening (blocking the access of animals to natural and/or artificial water points)</p>	<p>The Rural Land Tenure Plans (RLTPs); tools promoted in the land tenure security policy have not solved the problems in favour of livestock</p> <p>Develop a strategy for securing pastoral land (as provided for in the pastoral code)</p> <p>Develop fodder crops (<i>Panicum C1</i>, <i>Andropogon gayanus</i>, <i>Gliricidia sepium</i>, <i>Leucaena leucocephala</i>, etc.)</p> <p>Orientation of hydro-agricultural developments for more integration of the mobile breeding dimension</p>

c-Population growth and continued urbanisation

ii. in transit zones

How has this factor affected livestock systems in the last 10 years?
<p>Herders complain about the subdivision of their camps by local authorities (particularly in the municipalities of Kandi, Malanville, Banikoara, etc.)</p>

General increase in demand for meat in line with population growth	
How is this factor estimated to affect livestock systems and their economic, social and environmental impacts in the next 20 years? (Without policy changes)	What public policies can be implemented to mitigate negative impacts and maximise positive impacts?
<p>Risk of disappearance of Fulani camps if nothing is done and disappearance of mobile livestock farming in northern Benin.</p> <p>However, according to the farmers we met, the implementation of the policy of sedentarisation of mobile livestock is complex. It is thought to be less profitable than mobile livestock farming.</p> <p>According to them, with the stabilisation of the herds, the prices of meat and milk will increase and will not be affordable for consumers. Yet mobility creates jobs for young herdsmen who, after a few years of work, manage to set up their own herds.</p> <p>The sedentarisation of herds will put an end to manure contracts between transhumant livestock breeders and farmers in the host areas, which will break up the direct parking of cattle in farmers' fields and put an end to this agroecological measure of GIAE, which is much sought after during this period of drastically declining soil fertility due to the loss of organic matter in the soil</p> <p>A barrier to mobility will also hinder the exchange of breeding stock between sedentary and transhumant livestock breeders during transhumance</p>	<p>Emphasis should be placed on the development and implementation of a real land-use policy that takes into account pastoral land (grazing areas, transhumance corridors, stock routes for conveyance of livestock on foot, water reservoirs, etc.).</p>

d-Continued expansion of cultivated land and therefore less grazing land available for mobile herds and, as a result, continued tensions between pastoralists and farmers over land issues.

ii. in the reception areas

How has this factor affected livestock systems in the last 10 years?	
<p>The large savannahs initially intended for grazing and water access for animals are now being colonised by farmers looking for land (from the South and North of Benin). They are involved in the almost systematic destruction of trees for the massive production of charcoal</p> <p>As a result, grazing areas are sufficiently reduced, forcing sedentary herders to go on transhumance, and the number of conflicts between farmers and livestock breeders is increasing in the area (with hectares of fields devastated by cattle and deaths of men and cattle)</p> <p>Progressive reduction in the flow of transhumant livestock breeders in the localities of Akpéo (Savè-Diho-Gbéré)</p> <p>According to the livestock breeders we met, landowners almost demand that transhumant herders pay one ox/year and offer an ox in case of a ceremony before settling on their land.</p> <p>Prohibition on herders grazing cattle in harvested fields in Savè as opposed to Glazoué (for example)</p>	
How is this factor estimated to affect livestock systems and their economic, social and environmental impacts in the next 20 years? (Without policy changes)	What public policies can be implemented to mitigate negative impacts and maximise positive impacts?
<p>If this situation continues, in the coming years we will see the confinement of sedentary livestock breeders' camps and the pure and simple suppression of the grazing terroirs of sedentary animals</p> <p>An exacerbation of disputes between migrant farmers and sedentary livestock breeders on the one hand, and conflicts between migrant farmers and cross-border transhumant livestock breeders who are both transhumant and sedentary (especially since young Fulani are becoming less behaving than their parents; according to the Fulani leaders we met)</p>	<p>There is an urgent need for coordinated spatial management (land use planning/SDAT) that judiciously integrates land allocations for agriculture and livestock farming</p> <p>Trace, clear and mark out stock routes and create and secure grazing areas and facilitate access to water for animals</p> <p>Developing fodder crops with sedentary livestock breeders</p>

<p>High risk of sales of livestock land to plot buyers</p> <p>Risks of disappearance of transhumance in the hills if the Government does not act in favour of the livestock breeders to apply the Pastoral Code</p> <p>Drastic reduction in the flow of transhumance (transhumant livestock breeders will prefer to go to Togo or Ghana where they feel more at peace)</p> <p>Risk of paralysis of livestock markets</p> <p>Reduction of municipal offices' tax receipts around livestock taxes in livestock markets</p>	
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ii. in transit zones

How has this factor affected livestock systems in the last 10 years?	
<p>The livestock breeders we met complained about the exponential increase in cultivated land in favour of cotton and food crops (maize). Even the buffer space on the edge of Park W is reportedly entirely occupied by crops, as is the space reserved for traditional practitioners</p> <p>Similarly, the hydro-agricultural developments in the Niger and Sota valleys were carried out without taking into account the fact that these are traditional grazing areas for animals</p> <p>In conclusion, livestock breeders live in frustration, confusion and feel that they have been left behind by agricultural policies that do not sufficiently integrate mobile livestock farming. Thus, for the livestock breeders we met, livestock mobility is no longer secure. Indeed, it is now difficult for them to move their animals between fields without causing damage</p>	
How is this factor estimated to affect livestock systems and their economic, social and environmental impacts in the next 20 years? (Without policy changes)	What public policies can be implemented to mitigate negative impacts and maximise positive impacts?
<p>There is currently a progressive relocation of livestock farming to other areas. This relocation will intensify in the coming years if nothing is done (a way of moving a problem from one area to another)</p>	<p>Develop and implement a real land use policy that takes into account pastoral land tenure (grazing areas, transhumance corridors, stock routes for conveyance of livestock on foot, water reservoirs, etc.).</p>

e-Covid-19 pandemic, restrictions put in place to limit its spread, and other indirect consequences

ii. in the reception areas

How has this factor affected livestock systems in the last two years?	
<p>During the period of the COVID 19 lockdown, there were no animals at the Glazoué livestock market (things have restarted recently)</p> <p>Livestock prices are being reduced in livestock markets due to the scarcity of customers from Nigeria</p>	
How is this factor estimated to affect livestock systems and their economic, social and environmental impacts in the next 20 years? (Without policy changes)	What public policies can be implemented to mitigate negative impacts and maximise positive impacts?
	<p>Promote strict compliance with preventive measures against COVID 19 in livestock markets</p>

ii. in transit zones

How has this factor affected livestock systems in the last two years?	
<p>The effects are felt in the marketing of livestock in the livestock markets visited. Traders and butchers from Nigeria (the main animators of the markets) have stopped coming because of the closure of the borders, the closure of the livestock markets in Burkina Faso.</p> <p>Beef prices are high in Cotonou. Some markets have almost ceased to function for a while (e.g. Petit Paris market). Cattle prices have fallen</p> <p>The number of animals sold has decreased. This has a negative impact on the taxes paid to the municipal offices</p>	
How is this factor estimated to affect livestock systems and their economic, social and environmental impacts in the next 20 years? (Without policy changes)	What public policies can be implemented to mitigate negative impacts and maximise positive impacts?
<p>Risk of exacerbating disruptions to the normal functioning of markets, with loss of revenue for municipal offices and unemployment for many livestock market agents</p>	<p>Permanent awareness raising of livestock market actors to strictly respect the measures advocated by the Government in the prevention of COVID 19</p>

Source: Survey results and consultant analysis (June 2020)

Case study of a border situation and a reception area in Côte d'Ivoire

Context of the transit and reception areas studied

The border area that was studied in Côte d'Ivoire is the area around the towns of Korhogo and Ouangolodougou in the north of Côte d'Ivoire. This area shares its border with Mali and Burkina Faso.

The host area analysed is the area around the towns of Bouaké and Niakara in central Côte d'Ivoire.

Livestock systems, and in particular transhumance

The northern border area is characterised by a strong expansion of crops, including perennial crops, in particular cotton and cashew nuts. Faced with this densification, which leaves less and less space for transhumant and sedentary herds, grazing space is pushed back into the classified forests for an increasingly long period of the year. Herdsmen and/or landowners generally pay more or less formal fees to the authorities managing these nature parks.

Livestock systems in the border area and host areas visited for this study correspond to the general typology presented in section 3.4.1. It is noted that in the traditional, sedentary system, cattle are herded in different ways: (i) small family herds are under the supervision of family members; it is generally the children who herd the animals(ii) collective herds (belonging to several people from the same village or from several villages) or individual herds (the owner is either a farmer with a large herd or a civil servant) are herded by paid herdsmen (generally from the Fulani community), part of whose remuneration is the milk production.

With the introduction of cotton cultivation in the northern part of the country, animal traction has developed considerably. It has increased the work capacity of farms, and thus increased yields.

Photo 7 Animal husbandry in the Korhogo department



Collaboration and disputes between farmers and livestock breeders

The scale and nature of the disputes vary from one locality to another. **In Bouaké, conflicts are recurrent from December to April**, which is the cashew and yam harvest period. These tensions are largely attributed to the transhumance of herds whose owners live in town, or to the movement of commercial herds in transit to the large urban markets.

The majority of sedentary herds belong to social groups described in the RCI as 'allochthonous and alien'. There are cases where the owners of the animals live in the city (Bouaké) and call on Fulani herders whose skills are indispensable for herding and maintaining the animals. This situation puts the Fulani herder in a comfortable position in case of crop damage. For the farmers, the presence of cattle is a source of conflict. It is not really perceived as an asset for the development of the region because of the lack of synergy between livestock and agriculture.

The farmers accuse the herdsmen of neglecting the strict guarding of the herds at night, and some go so far as to accuse them of intentionally bringing the animals into the unharvested plots. The herdsmen themselves report the fragmentation of grazing areas due to unreasonable cultivation of village land (annual crops, but also cashew plantations). They even accuse the farmers of seeking confrontation in order to obtain compensation that is more remunerative than production, for example by delaying the harvest, leaving stocks in the field unprotected, or by knowingly placing the plots in the path of the livestock.

Moreover, it is costly for farmers to call on the administration to help settle disputes with herdsmen: transport costs, compensation for state agents, loss of time. This explains the scale of the conflicts in this region and the frequency of acts of self-defence (slaughter of cows by farmers). It could be hypothesised that the low rate of agro-livestock breeders in this region increases the incomprehension and hostility of indigenous people (farmers) towards mobile livestock farming.

The locality of Niakaramadougou, located on the edge of the large livestock breeding areas of the north (Korhogo), has become since 2012 a favoured destination for livestock breeders in order to adapt to the increasingly intense competition in the traditional pastoral livestock farming basins and the scarcity of grazing areas. The fact that this locality belongs to the great Senufo people, spread over 5 regions in the north, most of which is the country's traditional livestock

farming area, and the vast areas still available for livestock feeding, have facilitated better integration of livestock breeders here. This growing and uncontrolled influx of animals now makes cohabitation more conflictual.

According to the authorities, since November 2017, the department of Niakara has been experiencing high tensions due to conflicts between farmers and livestock breeders, resulting in the destruction of property: cattle have been killed and injured, crops have been damaged, and livestock breeders have moved to other areas. If today a precarious calm reigns, it is because the authorities have set up a framework for dialogue to extinguish the sources of tension in certain villages and camps in the department.

In view of the predominant role played by the Department of Niakara in supplying animal products to national markets, the National Federation of Livestock and Meat Cooperatives of Côte d'Ivoire organised two awareness-raising missions on 13 February and 22 March 2019 in Niakara. This area is not considered an important livestock farming area, but land pressure in areas further north has forced trans-border transhumant livestock breeders, as well as national livestock owners, to set up this territory as a host area due to its vegetation that is still suitable for livestock breeding. Farmers perceived this massive and unorganised arrival of livestock breeders as a form of invasion.

This crisis led to the departure of most of the local Fulani herders to other areas. To allay the fears of the population and strengthen social cohesion in the area, the administrative authorities and the community initiated several actions:

- The establishment of a Local Transhumance Committee supervised by the Prefect of Niakara;
- Awareness campaigns to promote living together;
- The organisation of livestock breeders into cooperative societies ;
- Compensation for victims of crop damage and killing of livestock

All these measures have helped to reassure the parties concerned. Since 2019, confidence seems to have been restored, with stakeholders observing the gradual return of livestock breeders.

In the localities of Ouangolodougou and Korhogo, conflicts between livestock breeders and farmers are recurrent, but disputes with sedentary people are settled quickly and in most cases before the customary authorities. The lack of grazing land pushes the owners of large herds to move their animals to the classified forests open to grazing or to other localities further south (Niakara, Bouaké, Dabakala, Mankono). In Nambingué (Ouangolodougou), agro-livestock breeders pointed out that their herds are on transhumance in the classified forests during in rainy season during the growing season. They return in the dry season to make use of the harvest residues, which consist of cotton stalks, maize stalks, groundnut stalks and rice straws.

Market dynamics in relation to transhumance

The domestic marketing circuit drains cattle from the main production basins in the north to the consumption centres in the south. The best animals are selected for the southern markets where selling prices are attractive.

The Bouaké livestock market is owned by the municipal office. But its management is entrusted to a management committee. More and more traders have limited their movements for livestock purchases because several of them have been victims of attacks and robberies. They are asking more of the livestock breeders themselves to take the animals to the market for transactions.

Photo 8 Bouaké livestock market



The small ruminant market in Bouaké is open all year round, and becomes particularly active during the *Tabaski* period. Traders obtain their supplies of small ruminants from local livestock breeders. However, during periods of high demand such as the *Tabaski* period, 80% of the animals sold on the market come from Sahelian countries.

The locality of Niakara is home to a loading dock built in 2016 by the Confederation of National Federations of Livestock and Meat Industries of Côte d'Ivoire (Cofenabvi-Ci). An agreement was signed between the municipal office and the sector on a B.O.T basis to manage the infrastructure. According to the terms of this contract, the profits generated would be shared according to a previously agreed formula (60% for the sector and 40% for the municipal office).

Photo 9 Niakara livestock market



Niakara is not a major livestock area, but it is supported by an active marketing strategy based on trucking and fattening animals mainly from Mali. Indeed, the crisis in North Mali, which is still occupied by armed groups, is a major obstacle to the feeding of livestock. To cope with this difficulty, Malian livestock breeders prefer to go to Côte d'Ivoire, particularly the town of Niakara, to fatten their animals in order to increase their income. The animals arrive en masse during the dry season from December to February. The integration of these animals is considerably facilitated by the support of the livestock-meat sector.

These fattening animals represent more than 70% of the animals shipped from Niakara to the southern markets, mostly to Abidjan. The fattening period generally lasts 3 to 5 months. The Niakara market also serves as a resting place for livestock trucks coming from Mali and heading for the southern terminal markets.

The year 2018 saw a decrease in animal imports due to the occurrence of a major conflict in 2017 between farmers and livestock breeders. Following the measures taken as explained in the previous section, the numbers of animals increased again.

The locality of Ouangolo has the particularity of being a border area. It has an entry post that serves as a checkpoint for the commercial flow of animals, mainly from Burkina Faso. There is also a very active cattle market. It thus constitutes a large livestock supply basin, particularly dynamic in the rainy season. The market is supplied by local animals and animals from Burkina Faso crossing the border on foot.

As part of the promotion of regional trade, food and nutrition security, and poverty reduction, WAEMU has initiated a programme for the construction and rehabilitation of cross-border livestock markets. Within this framework, Côte d'Ivoire has benefited from the construction of a livestock market in Ouangolodougou and the rehabilitation of the livestock market in Niellé. Unfortunately, the Ouangolo market is not yet functional because stakeholders believe that it has construction defects.

Photo 10 Ouangolodougou border market built in 2017 thanks to WAEMU



The marketing of live animals in the Savanes District, which includes three large border regions (Korhogo, Ferkéssédougou and Boundiali), takes place on 16 markets, of which six are the main ones: Korhogo, Ouangolo, Ferké, Niellé, Tengrela and Boundiali. Local and transnational herds from Burkina Faso and Mali supply these markets from where loads leave for Abidjan and other markets such as Bouaké, Yamoussoukro, Daloa and Gagnoa.

At the livestock market or "*garbal*" in Korhogo, one can observe groups of animals waiting to be transported to the terminal markets in the south. The market is most active in the dry season and during festivals. It has a loading dock and containment corridors. Organisationally, two structures are responsible for managing the livestock market: the Korhogo municipal office and an internal management committee.

In Korhogo, as in the northern towns visited, the best animals are destined for the southern markets. Animals for local consumption are of lower quality, usually old cows and injured animals. They are

bought by local butchers for their low price. A kilo of meat for consumption averages 1,500 FCFA, while the price in the southern markets varies from 2,200 FCFA/kg to 2,500 FCFA.

Economic impacts

Contributions to GDP

The contributions to GDP of the livestock sector at the regional or district level of the border area and the host area are not calculated. This assessment exercise is possible in theory, it depends on the availability of data on the numbers of different animals in the different systems, on the overall GDP at these levels and on technical parameters, prices, and margins.

It is recognised that transhumant animals from Burkina Faso and Mali, as well as Ivorian transhumant animals, contribute significantly to regional and district GDPs. However, this important economic contribution is likely to have diminished as a result of the increase in agricultural land use, reducing the amount of pastoral space used by transhumance. As described above, transhumant (and sedentary) animals now graze in classified forests where the organic matter concentrated in the night parks is less valuable. It is also likely that the flow of foreign and domestic animals is being reduced due to insecurity and the administrative closure of borders in connection with the pandemic.

Transhumant animals generate added value by producing meat, milk, draught animals and organic matter. The animals sold by (cross-border) transhumants also create added value along the value chain in the meat chains. These cross-border transhumants spent significant amounts on the care for their herds (veterinary services and products, and animal feed) and their own needs (food, housing, transport, communication...).

Fiscal contributions

Right of access to grazing land. Access to pastoral resources, which was free in the past, is becoming increasingly monetised. The price of permits varies according to the needs of the person giving them (village chiefs, landowners, including government services that manage classified forests, youth groups) and also according to negotiations. In all the localities visited by the mission, this type of contract for access to pastoral resources is commonplace. The landowners demand a sum of between 10,000 F and 15,000 FCFA/month/herd from the livestock breeders. In some cases, the livestock breeder is asked to provide a cow to enable him to have access to the resources of the terroir. Of course, these practices lead to local financing, but their recognition as local taxation is not always proven.

In Niakara, a sort of guardian of the livestock breeders is responsible for negotiating access to the pastures. The right of access is negotiated at between 10,000 and 15,000 FCFA per herd per month, which represents about 300 CFA francs per head per month. A right of access is also established for the exploitation of forage resources in the classified forests of the north of the country by the Société de Développement des Forêts (SODEFOR), the company responsible for the elaboration and implementation of the government's policy on the development of forest production. An officer in charge of forests in the Ferkessedougou area reports that in 2019, nearly 900 herds of at least 50 head were able to graze the 12 forests in his district. This would have brought in around 65 million CFA francs for SODEFOR, for a stay of the herds of an average of 4.8 months per year.

Water access fees. Transhumant livestock breeders also pay substantial fees for watering rights to the local committees that manage dams that were originally intended for pastoralism.

Photo 11 Receipt for grazing rights in the Badenou classified forest

Direction Commerciale et Marketing
01 BP 3770 Abidjan 01
Tel: (225) 22 44 30 00 - 22 44 46 16
Fax: (225) 22 44 02 40 - 22 44 55 96
R.C. 169778 ABIDJAN

CG: KORTHO GO
UGF: BADENOU
MONTANT (F CFA) 45000 F

REÇU N° 0009154 / 2018

OBJET DU REGLEMENT: Parcours et Pâturage
NOM DE L'ATTRIBUTAIRE: FATOGOMAN ALI
N° CONTRAT OU AUTRE:
La somme de (en toutes lettres) Quarante cinq mille francs
En règlement (partiel) de: Pâturage en Forêt Badenou
0.3 mois
Par chèque: N° du: Espèces 45.000 F
Reste à payer: Schéma 12/11/2018

Centre de Gestion UGF
Nom: KORTHO GO
Prénoms: Thierry
Signature: [Signature]

Volet 1 - Client

Taxation of trading herds. At the Bouaké market, traders pay FCFA 4,000 per day for the supervision of animals and FCFA 300/head to the municipal office. Livestock traders are also required to pay multiple fees when transporting animals:

- the sum of 10,000 CFA francs for a badge issued by the National Federation of Livestock and Meat Cooperatives (FENACOBVI);
- FCFA 10,000 for a certificate of the federation;
- 20,000 FCFA for the remuneration of a conveyance assistant assigned to each truck by the Federation;
- fees for animal health checks amounting to 150 CFA francs per head of sheep or goats and 250 CFA francs per head of cattle, and entitle the holder to a health certificate issued by the veterinary services.
- road costs (harassment) not determined.

Far from being all formalised and regulated, these modalities of levy on access to resources, the movements of the herds of the livestock breeders and traders contribute very largely to the important revenues of the actors and institutions concerned in the territories concerned.

Contribution to poverty reduction

The mission to the north and centre of Côte d'Ivoire was unable to collect quantitative data on the contribution of (cross-border) transhumance to poverty reduction. However, it is well known that transhumance is a strategy for increasing income for transhumant livestock breeders who move their animals to benefit from seasonal grazing and also to buy cereals at better prices (the ratio between livestock prices and cereal prices is more favourable to them than in the Sahelian pastoral zone).

Contribution to equality

The mission to the north and centre of Côte d'Ivoire was unable to collect quantitative data on the contribution to equality. However, an observation was made about the expansion of cashew nut plantations, which are financed by urban investors and not by family farmers. According to this analysis, the development of these industrial plantations would create inequality against local

farmers and livestock breeders for whom the planted areas are removed from seasonal grazing areas.

Social impacts

Contribution to food security

In line with the contribution to poverty reduction, transhumance contributes to income and therefore to food security through the access of transnational transhumant households, agro-pastoralists, agro-livestock breeders, and people who have confided one or more animals to them. In terms of availability, transhumance contributes to the increased availability of livestock products (meat, offal and dairy) during the transhumance period in the areas concerned.

Contribution to social welfare

One form of contribution to social welfare can be seen in the opportunity for young people to become herdsmen. This is an important professional opportunity for boys and young men from the families of national transhumants, who are generally from different Fulani groups. These young herdsmen cannot go to school when they are on transhumance with their herds, but it is not certain that they would have been able to go to school if they did not go on transhumance, especially in the current security situation.

Transhumance can also be part of a strategy developed by transnational transhumants to secure land tenure and a peaceful living environment. Without settling permanently, many transnational transhumant households from Mali and Niger have settled in the areas visited. Many of them flee, especially when confronted with violence in their home areas. They also realise that transhumance is becoming increasingly difficult and risky. They thus aim to secure a base with a minimum of land security while developing agricultural activities associated with their herds.

Contribution to cultural identity

This point could not be developed from the interviews at the level of the border area and the host area.

Impact on animal welfare

The considerable increase in agricultural cultivation in the north and centre of the country, as well as regulatory measures prohibiting the movement of herds for trading on foot, raises questions about this type of impact. The shift from transport on foot to transport by truck does not necessarily improve animal welfare. There is greater stress on the animals during loading and unloading, in trucks that are not designed to be used as livestock trucks. Exposure to hunger and feeding is also greater, especially given the density of roadblocks. In particular, animals from Mali that are traded to urban centres in southern Côte d'Ivoire are transported by truck. However, transporters make stopovers in resting and grazing areas to allow the animals to recover before being put on the market.

Impacts on security and relations between different social groups and communities

The survey of 32 farms in the three departments of the Poro region (Korhogo) showed that 78% of the farms are owned by indigenous Senufo. On the other hand, 97% of the managers are Fulanis from either Mali or Burkina Faso.

As detailed in section 3.2.1, the relationship between pastoralists and farmers has become strained, particularly as it faces the densification of areas that were previously used by transhumants. Cross-border transhumance, which had a positive impact on relations between transhumant pastoralists and resident sedentary groups, is changing. Social ties and economic complementarities are tending to give way to competition for access to land, which generates tensions between these different communities.

It should also be noted that when farmers mobilise Fulani herdsmen to guard their herds, this can give the false impression of a large presence of Sahelian pastoralists' herds. On the other hand, this type of guarding contract can provide some insurance for Fulani herdsmen in case of crop damage.

Contribution to employment

The mission to the north and centre of Côte d'Ivoire was unable to collect quantitative data on the contribution to employment of (cross-border) transhumance. However, foreign and national transhumants contribute significantly to direct employment through the hiring of herdsmen, most of whom come from pastoral communities. Farmers in Côte d'Ivoire take recourse to these herdsmen as soon as they have a nucleus of cattle that requires herding and grazing. For these boys and young men, becoming a herdsman is a rare opportunity to advance economically and to gradually acquire their own herd.

The indirect contributions of cross-border and national transhumance are also very important in terms of generating indirect employment opportunities for young pastoralists and farmers, livestock market brokers, tax collectors mandated by the municipal offices, market management committee members, livestock traders, livestock conveyors, transporters, fatteners, butchers, restaurateurs, hoteliers, veterinary product sellers, call credit sellers and all the small trades that make up the livestock markets.

Environmental impacts

Impacts on climate change

As mentioned earlier, transhumant animals now graze for a large part of the year in classified forests, which can potentially contribute to their degradation and can also enhance carbon storage through grazing. However, herd owners pay access fees to the authorities responsible for managing these parks, and these resources should be used for the sustainable management of these parks.

On the other hand, with a large proportion of the livestock in the north of the country spending part of the year in these classified forests, and with relations between farmers and livestock breeders becoming increasingly strained, this could result in a reduction in organic matter for crops. This would reduce carbon storage in agricultural soils. These crops would then be more vulnerable to droughts, as the reduction in organic matter implies a reduction in water retention capacity.

Impacts on water quality and quantity

The current situation of the pastoral dams built mostly in the north of the country under the large SODEPRA programmes is not well known. A total of 367 micro-dams were built between 1975 and 2001 in seven administrative regions and 16 departments. The former Savannah Region (Poro, Bagoué, and Tchologo) has 239 of them, or 65% of the total. They are in an advanced state of degradation, due to lack of maintenance and, above all, the loss of their pastoral vocation as a result of agricultural occupation of these areas.

A study conducted in 2015 on 19 small dams still in operation in the Ferkessédougou department revealed that they are managed exclusively by local farmers. Thus, the relatively large revenues from the management of these dams come almost exclusively from watering rights paid by livestock farmers. The income is allocated to several activities of various uses. It must be noted that the share devoted to the maintenance of the dams is very low, or even non-existent in some places.

There are therefore clearly no negative impacts of the watering practices on these spaces, much less than the problems of water pollution by herbicides and crop treatments. It is rather the question of the tenure status of this common resource at the time of development, since forms of privatisation of access to these areas can be observed.

Photo 12 Pastoral dam of Pokaha (Korhogo) which became a private dam of the Club des Pêcheurs Amateurs de Kgo



Impacts on biodiversity

The increase in annual and perennial crops (especially cotton and cashew nuts) no longer leaves much space for cross-border transhumant animals and local animals. The resulting pressure on grazing in classified forests for part or even all of the year raises the question of the impact of grazing in these forest areas or in certain protected areas. This pressure can contribute to the degradation of biodiversity in parks. But on the other hand, if the contributions of the herders who graze in these parks, collected by the authorities that manage these parks, are actually used to ensure protection measures, perhaps this effect would be mitigated.

The interviews conducted in the field also show that water and forestry agents accuse herdmen of being complicit in many crimes, notably forest fires in the dry season and the illegal entry of animals into restricted areas. This is part of the relatively classic clash of views between foresters and livestock breeders, and there is a lack of reliable data to confirm or refute it.

Impacts on desertification

The case study in Côte d'Ivoire did not gather any relevant observations related to this impact.

Impacts on land fertility

Investigations carried out among the managers of a cotton company (COIC-SA) that supervises producers in the regions of Niakara and Korhogo show that despite the popularisation of manure pit techniques, cotton producers are practising organic fertilisation less and less.

Several constraints limit the use of organic manure in the cotton savannah zone:

- The absence of carts on farms which limits the transport of manure to the field;

- The arduous nature of the work involved in making manure pits limits the development of manure production techniques: construction of a stable shelter, digging of the maturation pit, daily littering and regular evacuation of manure from the stable;
- The still fertile space available in some cotton growing areas ensuring an average yield;
- The absence of cattle for a large part of the year in classified forests for grazing, and therefore less availability of animal manure in agricultural areas; Distrust between farmers and livestock breeders reducing the exchange of organic matter for crop residues.

The national framework of the impacts of transhumance in Benin

Country context

Policies

Benin's legal arsenal in terms of livestock farming has recently been enriched by Law n°2018-20 'Portant Code pastoral en République du Bénin' (of 23 April 2019) which recognises the practices of national and cross-border transhumance (Article 50). It also recognises and distinguishes nomadism on the national territory (Article 65). The regulatory measures of the Pastoral Code are based on the following main points.

Box 7 Extracts from the regulatory framework for transhumance in the Benin Pastoral Code

<ul style="list-style-type: none"> • Article 43 of the Pastoral Code stipulates that transhumant herds must be moved along stock routes. The decentralised territorial authorities have a list of stock routes and itineraries.
<ul style="list-style-type: none"> • The State will define the development policy for pastoral areas and contribute to its operationalisation. On this basis, the municipal authority will have to integrate pastoral areas into the master plan for the development of its territory (Article 39). Local authorities have two years to comply with the provisions of the Act (Article 103).
<ul style="list-style-type: none"> • In its article 21, the Pastoral Code prohibits users from clearing any land, planting crops or any other non-pastoral activity within a distance of one hundred (100) metres around pastures, passage corridors, stock axes and routes, resting areas, livestock markets and livestock assembly points.
<ul style="list-style-type: none"> • Competent national authorities assess the carrying capacity of the host areas and, on this basis, allocate the number of transhumant cross-border livestock by country of origin before each transhumance season (Article 22).
<ul style="list-style-type: none"> • Fallow land and privately owned arable land are open to grazing by livestock with the consent of the owner.
<ul style="list-style-type: none"> • The use of water resources for pastoral purposes is done with respect for the rights of other users
<ul style="list-style-type: none"> • The Pastoral Code specifies that the roaming of domestic animals is prohibited throughout the national territory. Thus, the minimum age for keeping domestic animals outside the village is set at eighteen (18) years (Article 46). The number of herdsmen per herd must be at least one for every fifty head of livestock and any herd crossing a border must be accompanied by at least two herdsmen. The dates of arrival and return of cross-border transhumant herds are fixed each year by order of the Minister in charge of livestock, taking into account agropastoral zones, crop seasons and climatic changes (often between December and May).
<ul style="list-style-type: none"> • Article 52 of the Pastoral Code stipulates that in accordance with Decision A/DEC.5/10/98 on the regulation of transhumance between ECOWAS member states, candidates for cross-border transhumance in the Republic of Benin must: obtain an international transhumance certificate (CIT), respect the obligatory passage for transhumance corridors and routes, cross the border during the day, and have a sufficient number of shepherds, depending on the size of the herd.
<ul style="list-style-type: none"> • The Pastoral Code provides for the creation of a public institution called the National Transhumance Management Agency (ANGT) responsible for implementing state policy on transhumance. It provides for the creation of a public establishment called the Pastoralism Support Fund (Fonds d'appui au pastoralisme) responsible for financing pastoralism (Article 71) under the authority of the MAEP.

<ul style="list-style-type: none"> • It provides for several levels of taxes, including: the entry deposit is FCFA 1,000 per head of small ruminants and FCFA 5,000 per head of large livestock.
<ul style="list-style-type: none"> • At the beginning of each transhumance season, ANGT and its branches (deconcentrated) are expected to organise consultation and exchange sessions on the rules of transhumance management in the transit and host zones for transhumant animals.
<ul style="list-style-type: none"> • Disputes relating to pastoralism are settled amicably between the parties. If this method of settlement fails, the disputes are brought before the competent ANGT branch.
<ul style="list-style-type: none"> • In the event of failure to reconcile, disputes relating to pastoralism are brought before the ordinary courts of the Republic of Benin.
<ul style="list-style-type: none"> • The Pastoral Code guarantees trans-border transhumant livestock breeders, regularly admitted to the territory, their protection and fundamental rights. Consequently, the carrying of firearms is prohibited (Article 53 & 54).

Source: *Assessment of the regulatory framework for mobile livestock systems and cross-border transhumance in West Africa and the Sahel (2019)*

This regulatory text recognising the practice of pastoralism on Beninese territory, since its adoption by the National Assembly and promulgation by the President of the Republic of Benin, has not benefited from any implementation decree allowing its real application. Thus, the ANGT has not been constituted. It is the CNT⁹ and its branches in the departments (CDT), municipalities (CCT), arrondissements (CAT), and villages (CLT) that ensures the animation and management of transhumance campaigns in its place.

The public authorities and the CNT take the transhumance of foreign herds very seriously because of the conflicts it has generated since 2016. Thus, we note the limitation of the movements of foreign herds by decision of the Council of Ministers of 13/12/17, following the examination of the results of the campaigns of cross-border transhumance by the Council of Ministers of 13 December 2017. Herd movements are now prohibited south of the latitude of the municipality of Dassa-Zoumè. The entry of transhumant herds from Niger and Nigeria is increasingly and more restricted. The exit and entry of foreign and Beninese herds to and from Togo do not seem to be affected by these restrictions. An exceptional bilateral agreement has been signed between Niger and Benin, based on a maximum quota of 50,000 head of cattle during the 2019/2020 season. It would appear that only a very small number were finally registered under this agreement. This is due to the fact that the agreement was signed rather late between the states concerned. The transhumants probably organised their movement differently. Another reason may be the restrictions put in place to limit the spread of the Covid-19 pandemic. (See the assessment made in early 2021 by RBM and ECOWAS).

Following recurrent conflicts that have resulted in the death of men every year since 2016-2017, the transhumance campaign is no longer conducted as usual. Pastoralists are now bound by the requirements of the law, decrees and orders.

Box 8 Several major developments are recorded

- **The calendars for the transhumance campaigns are set by interministerial order each year.** The one for 2019-2020 dated October 2019, for example, sets the calendar between 15 December 2019 and 31 May 2020. It is difficult for cross-border transhumants to respect this calendar rigorously. They arrive earlier than 15 December (especially in October-November). And on the return journey (even on the right date), they come up against the installation of early fields (off-season crops, in the lowlands, near water points) by farmers; this leads to conflicts

⁹ Cf. Inter-ministerial Order N°2016-269/MISP/MAEP/MDGL/MCVDD, on the creation, organisation and functioning of transhumance committees (25 November 2016).

- **Limitation of cross-border herd movements by decision of the Council of Ministers of 13/12/17.** The examination of the results of the cross-border transhumance campaigns by the Council of Ministers on 13 December 2017 led the Beninese authorities to limit the movements of herds to the latitude of the municipality of Dassa-Zoumè, and therefore prohibit the arrival of transhumant herds to the southern region where human damage is more serious in view of the experiences of past years
- For the past two years, **the "political discourse in Benin has clearly been in favour of the sedentarisation of herds"**; this goes against the current Pastoral Code. The argument is based on the expected higher productivity of the herds (milk, meat) but also on a desire to eliminate the recurrent conflicts between farmers and transhumant herders (Cf. Corniaux C., 2019)

There is now a political will to better control mobile livestock. In addition to the creation of a public establishment called the National Transhumance Management Agency (ANGT) responsible for implementing state policy on transhumance, the Pastoral Code provides for the creation of a public establishment called the Pastoral Support Fund responsible for financing pastoralism (Article 71) placed under the authority of the MAEP. Transhumance taxes have been introduced to fund it.

The capacity to receive transhumant animals by host areas areas is estimated and fixed each year by the CNT in collaboration with the Livestock Directorate on the basis of the "non-agricultural areas available for livestock" and their carrying capacity (0.5-1 LU/year). This carrying capacity of pastures is evaluated by researchers and academics from the faculties of agronomy.

Livestock systems, and in particular transhumance

According to Corniaux (May 2019/TAZOC), several typologies of livestock production systems are available in Benin, mainly from work carried out or supervised by the Faculties of Agronomic Sciences of the University of Abomey-Calavi or Parakou. This work is partial or ad hoc, and there are no recent studies on the whole country. Above all, there are no studies on the observed dynamics of these farming systems. It is therefore difficult to characterise them in detail and to imagine how they will evolve over the next decade. However, there are five classic types of livestock farmers (according to Corniaux, 20110):

- Farmers with extensive ruminant livestock (mobile)
- Agro-livestock breeders with dominant agricultural activities (often with draught oxen)
- Agro-livestock breeders with a large herd
- Farmers with no ruminants
- Foreign transhumants

In its analysis of the current situation of livestock and livestock breeders in Benin (analysis and perspective), the National Association of Professional Ruminant Breeders' Organisations of Benin (ANOPER, 2014), in collaboration with the Directorate of Livestock (DE/MAEP) and TFPs, identified 4 types of livestock breeders at national level, namely:

- National pastoralists
- Agropastoralists
- Agro-livestock breeders
- Agricultural livestock enterprises
- In addition to these different groups, there are transnational transhumant pastoralists from neighbouring countries (Niger, Nigeria, Burkina Faso) who come to the country on transhumance during the dry season

¹⁰ Corniaux C., 2019: TAZCO project: Aide-mémoire of the CIRAD expertise mission "Agroecology and support to livestock systems" p 10 and p 17

This ANOPER classification is largely consistent with that of Corniaux and highlights the major livestock systems in Benin.

Table 11 Similarities between the typology proposed by Corniaux C. and ANOPER.

Typology C. Horns	ANOPER typology
Farmers with extensive ruminant livestock (mobile)	National pastoralists
Agro-livestock breeders with dominant agricultural activities (often with draught oxen)	Agro-livestock breeders
Farmers with a large herd	Agropastoralists
Foreign transhumant livestock breeders from the Sahel (Burkina, Niger), coastal countries (Togo, Nigeria)	Cross-border transhumant livestock breeders
NS	Agricultural livestock enterprises (state farms, private cattle/small ruminant farms, etc.)

Source: Consultant
NS = Not Said

The livestock systems practised in Benin, as already described above and in section 3.1, correspond more or less to the livestock systems of the international typology, as described in section 2.2.2 and shown in Table 4. The table below estimates the number of animals in 2018 in the different systems.

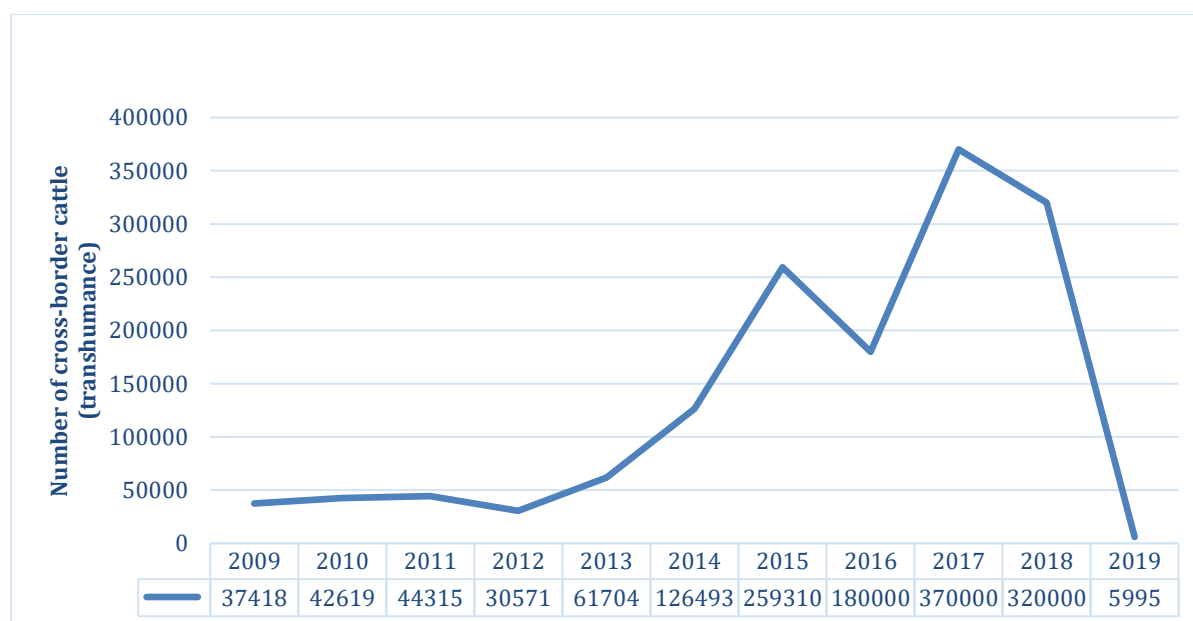
Table 12 Estimated numbers by major livestock systems

Typology of livestock systems (FAO standard)	Typology PEPISAO study	Correspondence in Benin	Estimated cattle numbers for 2018	Proportion of national livestock (%)	Comments
LGA – Grassland based arid/semi-arid system (cycle passes north of the MRA zone - Mixed rainfed/arid/semi-arid system)	Sahelian pastoral system practicing a big amplitude transhumance in coastal countries)	Cross-border transhumant livestock system based on a big amplitude transhumance: (+ 300km) practised by foreign, mobile pastoralists or livestock breeders	700 000	N/A	Herds from Niger and Burkina Faso, Nigeria during the drought
LGA/H - Wet/sub-humid and arid/semi-arid grassland based systems (cycle remaining south of the zone MRA - Mixed rainfed - arid/semi-arid system)	Cereal agro-pastoral system and transhumant herd in the Sahel zone	Transhumant livestock system (national mobile pastoralists) with a big amplitude: 100-300km)	61 550	2,5%	Livestock breeders from Nigeria, Niger but based in Benin
	Farming system combining animal traction agriculture and cattle herding with small amplitude transhumance	Agropastoral (transhumant) or semi-sedentary system	1 895 740	77%	The most important system in Benin

MRA - Mixed rainfed - arid/semiarid system	Farming system associating livestock farming with animal-drawn cultivation (purchase of draught oxen from transhumants)	Agro-livestock system with animal traction (sedentary)	393 920	16%	
MRH - Mixed wet/subhumid system		Agro-livestock system without animal traction (sedentary)	98 480	4%	
OF - Fattening system	Sedentary ranch or local farm system (state and private ranches), fattening	Agricultural livestock enterprise	12 310	0,5%	
10M - Peri-urban dairy system					
TOTAL			2 812 000	100	

Cross-border transhumant cattle would represent at least 350,000 cattle on average per year in 2017 and 2018 according to the statistics of the entry point observation posts (see figure below), but in reality it would probably be more like double the number of animals during those years.

Figure 10 Evolution of cross-border transhumant cattle (see Annex 2)



Source: DE, MAEC-Benin and CNT statistics (2018, 2019)

In 2019 the number of cross-border transhumant animals falls dramatically. But this coincides with the levying of entry taxes by the border posts. Obviously, a large proportion of the herds did not register at these posts in order to avoid these taxes. Nevertheless, the drop in transhumant entries is real in 2019 and the trend is likely to continue in 2020. According to livestock actors (DDAEP,

private veterinarians, UDOPER/UCOPER officials), the 2019-2020 transhumance campaign has hardly recorded any cross-border transhumants because of these ongoing reforms in transhumance management in Benin. The number of cattle coming from Niger (during the 2019 transhumance season) can be estimated at at least 35,000. For the 2019/2020 (2020) season Benin had concluded an agreement with Niger that limited the number of entries to 50,000 head, but in the end these animals mostly did not arrive, probably also partly in connection with the 2019/2020 Covid-19 pandemic. However, around 100,000 transhumant ruminants have been reported around the W park stretching between Burkina Faso, Niger and Benin.

The number of herds coming from Nigeria also seems to have decreased during the 2019/2020 season in connection with the current restriction measures taken by the Beninese state. During field surveys, transhumant cattle from Nigeria returning to Benin via the municipality of Savè, either to spend the dry season there or to go to southern Benin (Agonli) or Togo (or even Ghana), are estimated to number around 300,000 head. This number is evaluated on the basis of the number of transhumant herds declared by the UDOPER-Zou branches in the villages where the transhumants enter.

Transborder transhumant herds from Nigeria were initially considered as LGA, like other transborder transhumants. But considering that their transhumance cycle is rather east-west instead of north-south, and that they do not graze in the northern pastoral zones of the MRA, the classification LGA/H is finally considered more appropriate for these herds. In addition, the surveys found that a significant part of the Beninese herd is now conducting a transhumance towards Togo, due to the densification of the agro-pastoral areas in Benin.

More and more cross-border livestock breeders who go to southern Benin no longer go on transhumance with sheep and goats, mainly because of conflict problems. But in North Benin, there are transhumant herders from Niger.

There is a strong tendency for transnational transhumants to settle in Benin because of climatic and security problems¹¹ in their country of origin. This trend has increased over the last five years. It is estimated that around 30% of transborder herds currently settle in Benin and integrate in the national pastoral or agropastoral system. This figure could be estimated at 10% in the 2000s. As soon as cross-border transhumants manage to forge alliances with landowners, they settle and change their status by becoming agropastoralists. Another stakeholder interviewed estimated that up to 40% of these transhumant cross-border herds from Nigeria would attempt this form of anchorage in unoccupied areas, while continuing transhumance in the next dry season. The owners of these herds are among the foreign pastoralists who have chosen the hills (Savè) as their anchorage area.

Another worrying phenomenon is the development of kidnapping targeted at pastoralists. It is said to slow down the arrival of transhumant livestock breeders because of the insecurity. The most affluent pastoralists are particularly targeted, for whom huge ransoms of up to 10 million CFA francs are demanded. In three years, ten people have already been victims of such violence. The victims are said to have been released in exchange for a payment of up to 4 million CFA francs, or to have been killed if the ransom is not paid.

The usual entry points for transhumant livestock as presented in the table below have been updated with article 55 of the Benin Pastoral Code¹² which stipulates that before the start of the transhumance campaign, the Government shall communicate the respective entry points and dates, the hosting areas and the dates on which transhumants have to withdraw. From now on, each year (from the 2017-2018 campaign onwards), an interministerial decree will set the terms and conditions for the transhumance campaign. It sets the dates of entry and exit of transhumants and chooses the

¹¹ Akibou ALITCHAN BOBO (*President of UDOPER Zou-Collines*)

¹² Law n°2018-20 of 23 April 2019 on the Pastoral Code in the Republic of Benin

entry points and priority axes, itineraries, and hosting sites for transhumant herds in the country's departments.

Table 13 Former official entry points for transhumant livestock in Benin

Source:	Entrance points
Niger	Malanville (officially, in accordance with Law No. 87-013 of 21 September 1987), but there are a multitude of unauthorised entry points; the itinerary is as follows Malanville-Bodjécali-Guéné-Goungoun-Angaradébou
Burkina	Porga; the itineraries are: (i) Porga-Tanguiéta-Natitingou-Djougou-Bassila; (ii) Porga-Gouandé-Datori-Korontière-Boukoumbé-Perma-Majatom-Bassila
Togo	Atomey and Lanta; the itineraries are: (i) Atomey, along the Mono River and the west side; (ii) Lanta, along the Mono River and the west side
Nigeria	Waria, Kaboua, Toui, Ilikimou and Gbanago; the itineraries are as follows: (i) Waria-Boukovo-Malété; (ii) Kaboua-Savè-Glazoué-Savalou-Tchetti; (iii) Toui-Kilibo-Djègbè (for animals coming from Borgou); (iv) Ilikimou-Idigni-Iladji-Dogo; (v) Ibatè-Towé-Illolofin-Gbanago

Source: FAO (2012)

There are currently 13 transhumant livestock entry points in the 2017 season.

Table 14 Official entry points for transhumant livestock in Benin

Department	Municipalities	Entrance points	Capacity
Atacora	Material	Porga	20,000 head of livestock
		Nambouli	
Donga	Bassila	Adjiro	
	Copargo	Anadana	
Borgou	Kalalé	Neganzi	100,000 head of livestock
	Nikki	Oroumonsi	
	Tchaourou	Kassouala	
Alibori	Malanville	Medecali	50,000 head of livestock
	Segbana	Sanmia	
		Lougou	
Hills	Ouessè	Okpara-Toui	
	Banté	Okouta-Ossé	
	Savè	Igbodja	

Source: Comité National de Transhumance (CNT)/Bénin/Manuel de procédure des acteurs de la transhumance (Edition 2018--2019) and observations of the consultant

The axes and hosting areas for the 2017-2018 transhumance campaign are as follows

Table 15 Main axes, itineraries and (official) reception areas of transhumant herders

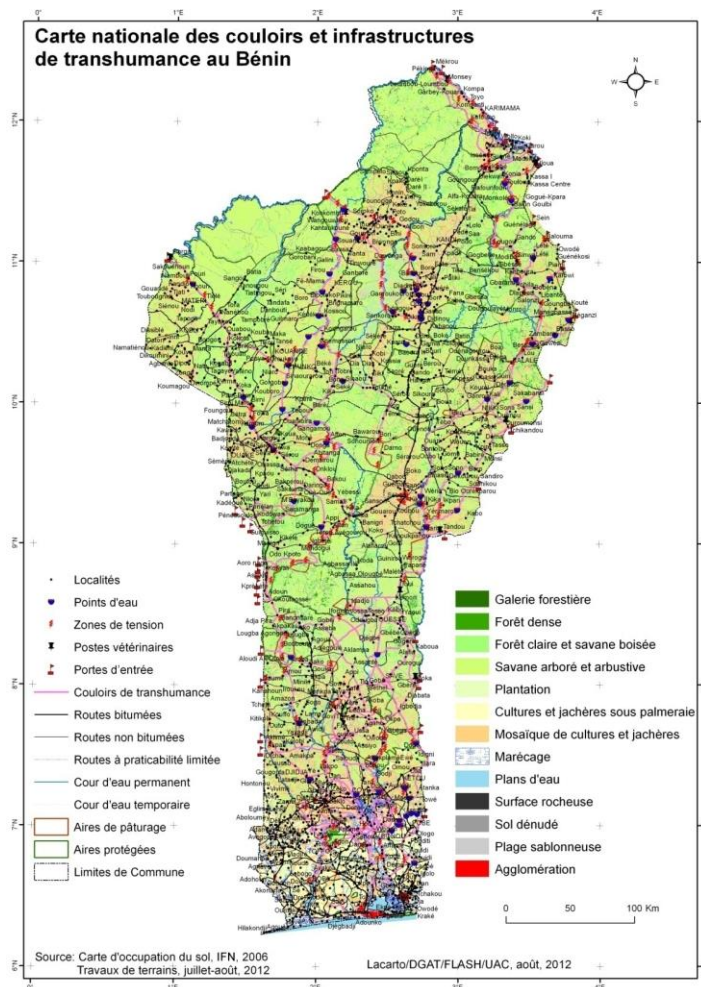
Axes	Routes	Hosting and grazing sites
Axis 1: Porga- Nigeria	Porga/Nambouli-Tanguiéta-Toucoutouna-Perma (Natitingou-Ouest) -Koaundé-Ouassa-Nassou-Ouassa (Djougou)-Yébessi-Bétérou-Kassouala-Nigeria	Tahonta, Tchoumi-Tchoumi, Sinahou, Nassou, Borokpèrè,

	Porga/Nambouli-Tanguiéta-Toucountouna-Perma (Natitingou-Ouest)-Kouandé-Ouassa-Nassou-Ouassa-Tobré-N'Dali Ouest-Parakou-Nigeria	Kolokondé, Barè, Wèwè-Bakou 1 and 2
Axis 2: Madeira-Nigeria	Madécali-Engaradébou-Kandi Fô-Kassakou-Est-Borodarou Est-Tila-Gogounou-Centre-Petit Paris-N'Dali Ouest-Parakou-Okpara-Kika-Nigeria	Sam, Sonsorou, Engaradébou, Bensékou, Sori, Gasso, Bessassi, Sokotindji, Biro, Danon
	Madécali-Engaradébou-Kandi Fô-Kassakou-Est-Borodarou Est-Tila-Gogounou-Centre-Petit Paris-N'Dali-Wora-Logou-Yara (Sinendé)-Péhunco-Kolokondé-Partago-Onklou-Yébessi-Bètèrou-Kabo-Nigeria	
Axis 3: Adjiro-Nigeria	Adjiro (Bassila)-Okouta/Ossé-Pira-Lougba-Gobada	Saramanga, Doguê, Lougba, Gouka, Alafiarou
	Adjiro-Igbéré (Bassila)-Térou-Wari-Marô-Bétérou-Parakou or Alifiarou-Kabo-Nigeria	
Axis 4: Toui-Otola-Toui-Monka	Toui-Kilibo-Djègbé-Vossa-Ouessè-Lougba-Bantè-Lougba-Koko Lougba-Agongni-Otola	Vossa, Idadjo, Odougba, Gbédé, Okounfo, Djabata, Okpara, Igbodja, Assanté
	Toui-Kilibo-Djègbé-Vossa-Ouessè-Health-Savè-Géré-Monka	

Source: National Transhumance Committee (CNT)/Benin. Manual of procedure for transhumance actors (Edition 2017-2018).

Axes 2 and 4 are the ones most used by livestock breeders who conduct a transhumance through Alibori and Collines (see report on field surveys).

Map 8 National map of stock routes and infrastructures in Benin



Source: CHN Benin Presentation 2018

In general, the transhumance calendar is as follows:

Table 16 Transhumance calendar (traditional)

Type of transhumance	Entry (departure) period	Exit period (return)
Cross-border transhumance	End of November	Mid-June and July
National transhumance - Big transhumance	October	Early June
National transhumance - Small transhumance (which aims to keep livestock away from agricultural areas)	Mid-June	Late September/early October

Source: various documents

This calendar, traditionally used by transhumants, is no longer officially in use. It has evolved according to the current requirements of the law on pastoralism and the interministerial decrees which often set it between December and May.

Collaboration and disputes between farmers and livestock breeders

From agro-pastoral disputes to deadly conflicts. The scale of conflicts between livestock breeders and farmers is often expressed in terms of the number of men killed (and wounded), the number of hectares devastated, and the number of animals slaughtered. Sometimes the number of granaries and tonnes of provisions looted are also recorded. According to the APRM, the damage is estimated at 2,149 ha devastated during the 2017-2018 agricultural season and concerns fields of maize, groundnuts, soya, cowpeas, rice, yams, cotton, and market garden crops (tomatoes, okra, leafy vegetables, etc.). A presentation of the participatory evaluation of the 2017/2018 transhumance campaign for the CHN of the 2018 peaceful transhumance speaks of 1,153 ha of crops devastated, some 20 food granaries looted/fired, 176 cattle slaughtered, 50 people seriously injured and 46 others killed. Benin's submission for the 2019 NHC indicates 519 hectares devastated, 29 animals slaughtered, and 3 deaths.

In general, disputes related to transhumance are attributed to crop damage by cattle, which herdsmen find difficult to manage because of the anarchic occupation of grazing areas and passageways by farmers. There is a real structural problem of coordinated land management. These conflicts could be limited if the municipalities had Master Development Plans (SDAC) implemented in a concerted manner (i.e.: with all actors: local farmers, migrant farmers, agro-livestock breeders, agro-pastoralists, transhumant pastoralists, etc.). The rise in these disputes sometimes leads farmers or livestock breeders to take the law into their own hands: sometimes fatal blows and injuries are inflicted on cattle, and on both sides, livestock breeders and farmers may come to blows and injuries that can be fatal.

One thing leading to another, simple agro-pastoral disputes can turn into deadly, very virulent conflicts between farmers and livestock breeders. Previous disputes or conflicts that have been poorly resolved can then be revived through settling of scores. Transhumant livestock breeders often feel aggrieved in the settlement of disputes that can lead to deaths in their ranks. They may then unexpectedly turn to innocent victims in the villages for revenge.

The different kinds of disputes related to transhumance are mainly

- Disputes between farmers and transhumant livestock breeders
- Disputes between resident (national) and foreign transhumant livestock breeders
- Disputes between resident (national) livestock breeders and farmers

- Disputes between national livestock breeders and forestry services
- Disputes between transhumant livestock breeders and fishermen
- Security disputes during transhumance (robbery, rape, etc.)

The Benin Pastoral Code provides that disputes related to pastoralism should be settled amicably between the parties. If this method of settlement fails, disputes must be brought before the competent branch of the Agence Nationale de Gestion de la Transhumance (ANGT13), Art.85. This institution should be established in the coming years. For the time being, it is the members of the transhumance management committees who mediate in the event of a breakdown in negotiations between livestock breeders and farmers in order to find common ground. In the case of assault and battery, it is the police and the court that are responsible for settling disputes.

Since 2017, the National Transhumance Committee (CNT) has remained quite dynamic and mobilised on this issue of cross-border transhumance in conjunction with the ministries concerned. Every year, it organises awareness campaigns for transhumance actors in the cross-border municipalities (Kandi, Malanville, Nikki, Parakou, Tanguiéta, Natitingou, Matéri, Bantè, Dassa-Zoumè, Pobè Kétou, Djidja, Abomey, Aplahou, Lokossa, Athiémé, Zogbodomey, Covè, Zangnanado, Ouinhi) and conflict zones during the weeks before the official start of the transhumance (September, October, November). Between 2017-2018 and 2018-2019, the loss of human life during the transhumance is thought to have decreased significantly. It is estimated to have fallen from 46 in 2018 to 3 in 2019.

In order to reduce disputes between livestock breeders and farmers, work on the demarcation of transhumance corridors, resting areas and grazing areas, and the construction of water reservoirs are also financed by livestock support projects/programmes. As mentioned above, the national transhumance committee organises every year (for the last 3-4 years) awareness raising activities for stakeholders (farmers, livestock breeders, local elected officials, etc.) on the different aspects of the laws governing pastoralism in Benin.

Farmers often denounce the corruption of political and administrative authorities, who are said to be influenced by transhumant livestock breeders in the management of disputes/conflicts. Livestock breeders who are solicited by local authorities for various licit and illicit taxes are often perceived as corrupters with a view to influencing the assessment of damages. (Nobime, 2020)

Valorisation of organic matter from herds. Most agropastoralists (transhumant) and agropastoralists (sedentary) use manure from cattle and small ruminant droppings to maintain soil fertility. The two main methods used are the rotating parking of animals on the areas to be fertilised and the collection/storage/spreading of animal dung in the fields. In Banikoara, women organic cotton producers collect animal dung crumbs free of charge from farmers to fertilise their cotton fields. In Cobly (West Atacora), farmers can also collect animal dung crumbs for fertilisation. However, some livestock breeders no longer allow farmers to collect animal dung. They prefer to keep it to fertilise their own fields. In the large cities of the South, cattle crumbs and chicken droppings are sold to market gardeners.

Traditionally, farmers did not use cattle manure. But farmers trained in composting techniques in northern Benin (Atacora-Donga) by (agro-ecological) development projects and programmes are in great need of cow dung (crumbs) and lack it to make compost, which is an opportunity to develop collaborations between farmers and transhumant livestock breeders. There are agro-ecological

¹³ The Board of Directors of NGWA is composed of nine members as follows: 2 representatives of the professional organisations of livestock breeders, 2 representatives of the professional organisations of farmers, 1 representative of the local authorities, 1 representative of the ministry in charge of livestock, 1 representative of the ministry in charge of security, 1 representative of the ministry in charge of decentralisation, 1 representative of the ministry in charge of the environment

initiatives underway in Benin that could facilitate the adoption of agro-ecological techniques of combining agriculture and livestock farming.

Animal traction is highly developed in the North and Centre of the country and involves about 80,000 head of cattle. The use of animal traction increases labour productivity by providing energy for ploughing and transport. The draught oxen are bought by farmers in the livestock markets of Alibori (Petit Paris, Gogounou, Guéné, Savè, etc.) where animal-drawn farming is widespread on all farms in addition to cotton growing. It is especially at the start of the agricultural season (April-May-June) that the 2nd age bullocks intended for draught are best sold.

Market dynamics

The quantity of livestock on the markets depends mainly on the demand for animals on local and sub-regional markets: Nigeria (Olodo, Ilesha, Lagos), Accra, Cotonou, Lomé. The peaks are mainly observed in September, October, November and December (period of massive arrival of cross-border transhumants). During the transhumance period, according to stakeholders, an estimated 40-50% of the livestock of transhumant pastoralists (cross-border) are sold in the Savè livestock market (Collines and Zou), and during the non-transhumance period, this number is estimated at 5-10% (from Nigeria) in the Savè market.

The live animals are cattle, sheep and goats, pigs, poultry; transported by truck or on foot from neighbouring countries to Benin or from Benin to neighbouring countries. In general, cattle transported to Benin in this way are re-exported to Nigeria. Cattle from Mali and Burkina-Faso are mostly either transported by truck to Savè and transported on foot to the Olodo livestock market (Nigeria), or transported by truck to Tourou (Parakou) and transported on foot to the Ilesha livestock market (Nigeria). From the Olodo market the animals are often transported by truck to Lagos.

These transactions are done mainly by livestock traders who hire herdsman to convey the animals on foot to these markets in Nigeria. It is difficult and currently impossible for livestock traders to transport cattle by truck to Nigeria because of police and customs harassments.

On the way, the conveyors on foot pay: the health tax (100 Naira/cattle), 300 Naira/cattle for the local government tax and customs duty of about 1,000 Naira per animal. In addition to all this, there are the incidental charges at the many police stations along the way, and the loss of time which often mortgages the lives of the animals being transported. It is preferable for traders to transport animals on foot, even if this involves risks (theft, disputes with farmers, etc.). They escape all these taxes, harassments and police corruption.

Table 17 Imports of live animals from neighbouring countries to Benin

Species	Burkina Faso	Togo	Mali	Niger	Nigeria	Total
Cattle	115.650	230	7.423	2.000	0	125.303
Sheep	59.702	4.283	11.732	46.321	0	122.038
Goat	82.603	858	8.644	30.481	32	122.618
Pig	3.697	5.120	0	0	102	8.919
Poultry	0	5.215	0	3.860	13.275	22.350

Source: DE, 2013

Table 18 Benin's live animal exports to neighbouring countries

Species	Burkina Faso	Togo	Libya	Niger	Nigeria	Total
Cattle	247	267	0	0	152.268	152.782
Ovine	0	163	0	0	35.029	35.192
Goat	0	207	51	164	50.864	51.286
Pig	0	67	0	0	4	71
Poultry	0	0	0	0	10	10

Source DE, 2013

Economic impacts

Contributions to GDP

An important aim of the exercise was to assess the contribution to GDP of the overall livestock sector and of mobile, cross-border livestock systems in order to estimate the contribution of transhumance to the economy of coastal countries. The table below summarises the results of these calculations.

Table 19 Summary of the contribution to GDP of the livestock sector and mobile livestock systems in Benin

6. Comparison with official statistics	Sources	Official data	Data calculated here*
Livestock VA (production) (in millions FCFA, current prices)	INSAE 2018	280 600	426 246,3
National VA/revised (in million FCFA, current prices)	INSAE 2018	7 922 000	8 067 646,3
Contribution of livestock (production) (%)		3,5%	5,3%
VA of livestock value chains (production and value chains) (in millions FCFA)			476899
National VA/revised (in millions FCFA)(option 2)	INSAE 2018	7 922 000	8 067 646,3
Contribution of the livestock sectors (production and value chains) (%)			5,9%
VA linked to cross-border transhumance (production & value chains) (in million FCFA)			3718
Contribution to national GDP (production & value chains) linked to cross-border transhumance (%)			0,05%
Fraction of livestock VA (production and value chains) linked to cross-border transhumance (%)			0,8%
Livestock VA (FAO, 2017, Gross value) (in millions FCFA, current prices)		10 954	
Livestock VA (% FAO 2017 multiplied by GDP agriculture WB 2018)(in millions)		197 495	
Livestock contribution (%)		2,5%	

It should be noted firstly that these calculations are based on the numbers of Beninese animals in 2018, but with estimates of the numbers of foreign animals passing through Benin on transhumance for the year 2020. It should also be noted that the contribution of transhumant cross-border animals has been taken into account only for the 3-month period during which the majority of these animals are estimated to have stayed in Benin in 2020¹⁴. The estimated contribution to GDP of the overall livestock sector is 5.3% (for production only). This is significantly higher than the official 2018 estimate. It should be noted that the 5.3% estimate includes estimates of the value of organic matter of FCFA 10 per kg for poultry and CFAF 5 per kg for all other types of animals. Without this contribution from organic matter, the contribution to GDP at the production level would be estimated at 3.7% (and 4.3% with the rest of the value chains after the production stage included). It is assumed that the official estimate of 3.5% does not include the contribution to GDP in the

¹⁴ The majority of the animals used to stay in the country for 5-6 months a year, but this has decreased significantly in recent years due to the large increase in cultivated fields in the north of the country.

chains¹⁵. An alternative calculation based on a combination of FAO¹⁶ and WB¹⁷ data shows a 2.5% contribution of the livestock sector to GDP. For this figure it is not clear whether it concerns only the contribution at the production level, or also the rest of the value chains.

The contribution of cross-border mobile livestock systems to the overall GDP of 0.05%, and to the GDP of the overall livestock sector of 0.8%, seems very low. It is at least partly related to the fact that the number of foreign transhumant animals (LGA system) is very much underestimated. It is much lower than in the past when herds stayed longer in the country. The table below shows the differences between 2018 and 2020.

Table 20 Estimates of major differences in cross-border transhumance.

	Cross-border transhumant cattle	Cross-border transhumant sheep	Cross-border transhumant goats	Period spent in Benin
2018	700 000	75 000	25 000	5,5
2020	175 000	37 500	12 500	3

While the corresponding parameters have changed in the LSIPT tools to reflect the situation in 2018, the value added corresponding to cross-border transhumance increases from 23,077 million CFA francs to 26,796 million CFA francs. This corresponds to a contribution of cross-border mobile livestock systems to overall GDP of 0.33%, and to the GDP of the overall livestock sector of 5.4%.

The data used for imports and exports of live animals (excluding transhumant animals) have strong implications for the results of the calculations of the value added in the value chains. In Annex 2 the difficulties encountered with these data are explained.

Data and estimates are used as production parameters while other parameters are included in the LSIPT tools. These data are probably not always representative for the current situation of the different livestock systems. In particular, the intermediate costs¹⁸, which are deducted from the overall income used to calculate value added, are based on a study with a limited focus and on estimates.

Not all indirect contributions to GDP by mobile livestock systems are included in these calculations, and it would be too perilous to estimate them for inclusion in this exercise. These include the production and sale of inputs, such as feed and veterinary products and services. There are also transport services for the animals, as well as the owners of the herds that are important.

Another important contribution is the supply of young heifers and bulls to other livestock systems. According to Sounon (2019), *'mobile livestock farming provides young animals (heifers and young bulls) to semi-sedentary livestock farms, and the dynamics of sedentarisation creates uncertainty as to the supply of cattle and meat to the region by semi-sedentary livestock farming, which would become the majority'*. For him, the sedentarisation policy currently advocated by the Beninese

¹⁵ The official statistics distinguish a category 'Food and beverage industries', and it is assumed that the livestock product sectors are included in this category, but the amount is not known.

¹⁶ The FAO estimates of value added appear to be very underestimated compared to other sources. These figures appear to be based on uniform values of products per unit, and in USD, so they probably cannot be used in the calculations of the ISL&P tools. *Agriculture includes ISIC Divisions 1-5 and includes forestry, hunting, fishing, and crop and animal production. Value added is the net output of a sector after adding up all products and subtracting all intermediate consumption. It is calculated without making deductions for depreciation of goods produced or loss of value or degradation of natural resources. The origin of value added is determined by revision 3 of the Standard International Trade Classification (ISIC).* Note: For value added bank countries, gross value added at factor cost is used as the denominator

¹⁷ The WB website mentions under Agriculture, value added (% of GDP) - Benin: '.' *'Source: World Bank National Accounts data and OECD National Accounts data files.'* and more detailed in English:

<https://databank.banquemondiale.org/reports.aspx?source=2&type=metadata&series=NV.AGR.TOTL.ZS>

¹⁸ Intermediate costs are estimated as a percentage of the producer price in the '2.production' tab to calculate value added at the production level. This same parameter is estimated as an amount in the tabs for calculating value added in the value chains, but not used in the calculations.

authorities will break this dynamic of local complementarity between livestock systems (transhumant, semi-sedentary and sedentary), leading to a loss of meat production for the country.

Fiscal contributions

Fiscal contributions from mobile livestock systems in Benin consist of market taxes and entry taxes for foreign transhumants. There are also fees paid by herd owners or herdsman for grazing in some localities. These fees are often paid to local authorities or local facilitators as mentioned in the section 'Collaboration and disputes between farmers and livestock breeders'. These fees are often perceived as corruption, which is probably true, if there is no traceability of these levies in local government budgets. However, the line between corruption and local taxes is not always easy to discern.

As described in the section on market taxes, financial revenues from markets are managed differently in different markets. The taxes per head of cattle sold in the markets visited were between 2,000 and 2,500 CFA francs, which is probably fairly representative of the rest of the country. These amounts are generally paid equally by the seller and the buyer. The revenues are shared between the municipal office (the village in some cases), the brokers/dilani, and the livestock market management committees (where applicable). For small ruminants, these taxes generally amount to 200 FCFA. In addition to these sales taxes per animal, various other taxes and fees may also be levied. Thus, a tax of 200 CFA francs per head of cattle is paid, including 125 CFA francs for the municipal office of Savè for the use of the animal landing dock.

As described in section 3.3.1, since 2019 entry taxes have been levied at the gates at the rate of FCFA 1,000 per head of small ruminants and FCFA 5,000 per head of large livestock. The funds raised by these taxes go to a public institution called the Pastoralism Support Fund, which is responsible for financing pastoralism under the authority of the MAEP and is fed by the entry taxes among other taxes. In 2019 there were only 5995 cattle entries that paid this tax, which would correspond to an amount of 29,975,000 FCFA. In 2020 there were probably even fewer.

During the field phase there is no specific data that has been collected on grazing access levies collected/paid to local authorities and forestry services.

Contribution to poverty reduction

The worksheets of the tools that calculate the contribution of the livestock sector to poverty reduction can probably not be completed without conducting a larger follow-up survey, taking into account the different livestock systems, or through the integration of the collection of these data during a livestock census¹⁹. However, even with these indispensable complementary results, it will probably remain difficult to isolate the specific contribution of cross-border mobile livestock systems. In the end, such tools are probably most important for the analysis of the overall livestock sector.

Contribution to equality

This point could not be developed from the interviews conducted at national level.

Social impacts

Food and nutritional security

For the impact on food and nutrition security, the LSIPT tools give the option of calculating the coverage rate of energy, protein and lipid needs by the overall livestock sector. It would probably not be very difficult to adapt these tools to allow the calculation of the coverage rate related to cross-

¹⁹ There is also a risk that households with more than one kind of animal will be counted more than once in the calculations.

border transhumance. But this has not yet been done, as the overall coverage rates have not yet been calculated. The nutrient contents for the different animal products are not known and therefore cannot be included in the tool. Obviously, imports and exports of live animals have an important effect on the coverage rates of nutritional requirements. The section on imports and exports of live animals explains this.

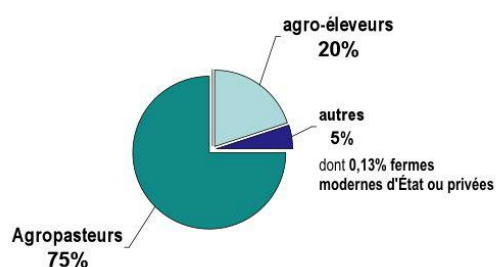
Calculations on consumption and contribution to protein, energy and lipid consumption are originally based on production figures, do not take into account transhumant animals and the balance of imports and exports (which is negative in Benin for cattle). The calculations on the chains take them into account, but they are in TCE, which is less precise, as the weights per animal are not the same in the different systems. For this reason, the tools have been adapted to use the commodity chain calculations, but with different weights per TCE for the different livestock systems. In terms of imports and exports of animal products, in the FAO data only imports of poultry meat and milk (equivalents) seem to be relevant for the calculations in tab '7. Demand'. Government data for these parameters could not be obtained.

Distribution of cattle production by type of breeder (Cf. ANOPER, 2013)

According to the document analysing the situation of livestock and ruminant breeders in Benin (ANOPER 2014, p11), peasant family livestock breeding accounts for 95% of national cattle production, and agropastoralists are the main breeders of ruminants, particularly large ruminants (75% of cattle production comes from cattle raised by agropastoralists, as opposed to 20% from cattle raised by agro-livestock breeders who have smaller herds; Of the remaining 5% 0.13% was produced in 2013 on large public and private livestock farms. See figure below.

Figure 11 Distribution of national cattle production by type of farmer (or by farming system)

Répartition de la production bovine nationale des agropasteurs, agro éleveurs et autres éleveurs au Bénin



Sources : MAEP – état des ressources zoogénétiques, rapport national, 2005
FAO – rapport de la revue de la filière bétail/ viande lait au Bénin, 2013

Contribution to social welfare

Land tenure situation of agropastoralist Family Farms

According to ANOPER, "studies have made it possible to gain a better understanding of the land characteristics of livestock farms (agropastoralists), especially in Borgou and Alibori. These farms have land available (on average 10.89 ha/holding compared to 9.43 ha in the other countries), which allows them to combine agriculture and livestock farming (respectively: agriculture (42%) and livestock farming (58%)). This is essentially cereal-based agriculture (millet, sorghum, maize). However, their land availability is not secure and is precarious, despite the ancestral alliances forged for this purpose with the Bariba who are the landowners. This situation does not encourage

most agropastoralists to invest in fodder crop production. They practice a predominantly transhumant livestock rearing system (small and large transhumance).

Contribution to cultural identity

This point could not be developed from the interviews at national level.

Impact on animal welfare

This point could not be developed from the interviews at national level.

Impacts on security and relations between different social groups and communities

We are witnessing a loss of trust and a deterioration of social ties between sedentary and transhumant people.

Social links between transhumant herders and local herders are deteriorating as a result of repeated conflicts between farmers and herders. In general, foreign transhumants no longer come on transhumance with their families. Young shepherds/herdsmen capable of defending themselves lead the transhumant herds. Their immediate sponsors are the national pastoralists who are their colleagues and who have already succeeded in forging a 'base' on the national territory (albeit precarious, as they do not own land). For them, these 'hosts' are relays on whom they can rely to come to Benin for transhumance. Some of them are in contact with 'intermediaries' who take money from them in exchange for helping them to come to the country. The powers of traditional leaders are currently limited. However, they are involved in the sensitisation sessions organised by the transhumance committees at different levels.

Strengthening social links between farmers and herders

The livestock breeders, who are mainly from the Fulani and Gando communities, are poorly represented in the local administration, so their voice is not very strong in the management of local authorities. In the municipalities of Gogounou, Kalalé and Ouassa-Péhunco, where the mayors come from the Fulani or Gando communities, conflicts are less frequent and better taken into account, according to the actors we met. If the governance bodies gave more space to the representation of Fulani or Gando livestock breeders in the administrative management of villages, arrondissements and even municipalities, the problems of the livestock breeders could be better taken into account.

One of the credible associations today, in the eyes of state institutions, local authorities, livestock breeders and farmers, is ANOPER and its branches. APESS is also gaining ground in the north of the country (in Malanville). Agropastoralists and transhumants join it to benefit from protection. ANOPER is involved in all decision-making on livestock and transhumance in Benin. It is involved in the various awareness-raising and channelling sessions for transhumants in the country. It is developing branches down to the local level. The strengthening of this association's branches, especially at the local level (village) in transhumance areas, could facilitate links between farmers and livestock breeders.

Contribution to employment

This point could not be developed from the interviews at national level.

Environmental impacts

Impacts on climate change

This point could not be developed from the interviews at national level.

Impacts on water quality and quantity

This point could not be developed from the interviews at national level.

Impacts on biodiversity

Several university research studies in Benin (Houinato, 2001; Brisso et al., 2007; Ahoudji, 2009) have shown that woody plants such as *Azelia africana*, *Khaya senegalensis* and *Pterocarpus erinaceus*, which play an important role in cattle feeding, are especially prone to pruning in the dry season. According to the farmers, *Azelia africana*, *Khaya senegalensis* and *Pterocarpus erinaceus* are becoming increasingly rare (Ahoudji, 2009). The same species are exploited every year, which prevents their development (Brisso et al., 2007). Houinato (2001) reported that species such as *Khaya Senegalensis*, *Pterocarpus erinaceus*, *Azelia africana* and *Daniellia oliverii* that undergo regular cutting of their foliage eventually fail to bear fruit, thus compromising any possibility of their natural regeneration.

Overgrazing in some areas would lead to the scarcity or even disappearance of species with high forage value in some areas (e.g. *Andropogon gayanus*) and the invasion of herbaceous species not eaten by animals, such as *Hyptis suaveolens* and *Chromolaena odorata*, etc.

In order to objectify these statements, it would also be necessary to evaluate the proportion of these woody forage species that are also subject to agricultural clearing practices that are far more harmful than the pruning of foliage for grazing.

More specifically in the case of Benin's protected areas, transhumance is generally perceived as one of the most recurrent threats to biodiversity. 52,646 domestic cattle were estimated in the Parc W Transboundary Reserve in 2012. The highest densities are found on the W Benin side and in the Djona Hunting Zone (Bouché²⁰, 2012), indicating a strong human presence.

Fire-related issues. According to the Ministry of the Environment, *'every year, forests, pastures, crop fields, plantations and even houses are ravaged by anthropogenic fires during the long dry season. This act inhibits the efforts of the brave people in the rural areas and in most cases, the use of forest fires is beyond the control of their users and leads to significant damage to homes, crops and stocks of agricultural products, fields, plantations, forests, etc.'* According to statements made in the fifth report on the implementation of the Convention on Biological Diversity in Benin (January 2014), uncontrolled bushfires represent a very high disturbance to plant biodiversity:

- Destruction of the vegetative power of perennial grasses ;
- Destruction of annual grass seed stock ;
- Reduction in rangeland diversity in the long term.

According to Sinsin B²¹, early fire has a positive influence on the regrowth of hemicryptophytes, while late fire inhibits this regrowth, but is the best factor for reducing pasture scrub. For the time being, apart from protected areas and state farms where bushfires are controlled, the policy of bushfire management does not yet seem to be taking hold in the peasant community. In general, livestock breeders (pastoralists, agro-pastoralists, agro-livestock breeders) are accused of causing uncontrolled bushfires. But they are indignant about this, as they find it difficult to imagine burning straw when the cattle need it. The use of adapted bushfires to encourage grassy regrowth and avoid 'wild' bushfires should be introduced into sustainable agropastoral development and management plans in order to limit soil and plant cover degradation.

²⁰ The fifth report on the implementation of the Convention on Biological Diversity in Benin (p35)

²¹ "Biomonitoring of habitats and threatened species. A research contribution to the interpretation of protected areas".

Impacts on desertification

This dimension did not gather any additional observations to the point developed above with the actors on the ground in the hosting and transit zones.

Impacts on land fertility

Transhumance offers a large availability of organic fertiliser for fertilisation of fields. This fertiliser is derived from animal faeces. But its use is handicapped by the low level of consultation and trust between farmers and transhumant livestock breeders

Estimates of annual nitrogen production per animal in Benin are reported by FAO in 2018²² extracted from the 'Tier 2-GLEAM' approach, assess nitrogen fractions in manure as well as manure production by individual animals. However, a calculation of the coverage rate by cross-border mobile livestock systems of overall nitrogen consumption (natural and chemical fertilisers) in agriculture has not yet been done. For this, the consumption of chemical fertilisers would be required.

For other indicators of environmental impacts (such as the impact on biodiversity and water availability), it is difficult to apply general assumptions, because these effects are unclear and probably very diverse in space.

For other environmental impact indicators (such as contribution to greenhouse gas emissions), the tools do not currently allow the option of calculating them, but this could be added easily now that the basis with numbers of different animals in the different systems is well established.

It is estimated that a pair of draught oxen produces 3 to 5 T of manure/year (with a high variability depending on the case). It would thus be possible to fertilise 1 ha / year / adult animal (Vall, 2007). It is estimated that a herd (150 head of cattle) of transhumant cattle would produce between 400 and 700 T of manure/year. Assuming that transhumant herds exploit the national territory for half the year, it is estimated that a transhumant herd would produce 225-375 T of manure per year, i.e. the capacity to fertilise 45-75 ha of fields per year. In order to exploit this potential, a collective agreement between agro-livestock breeders and livestock breeders-pastoralists and good village and municipal governance of transhumance are necessary.

Key drivers of change and long-term prospects

Five main areas of change were highlighted in discussions with stakeholders in Benin:

1. The worsening security situation in WA, limiting the movements of transhumant (mobile) livestock breeders
2. Climate change
3. Rapid urbanisation correlated with high population growth in WA (& Benin specifically)
4. Expansion of agricultural land at the expense of pastureland
5. The continuation of the recent health crisis

Worsening security situation in WA, limiting the movements of transhumant (mobile) herders

Impacts on mobile livestock systems in the last 10 years
Increasingly massive movements of transhumant herds towards the more secure coastal areas of the country (Benin, Togo, Ghana, etc.)
Progressive development of transhumant (semi-sedentary) agro-pastoral livestock farming to the detriment of pure pastoralism

²² Nitrogen inputs to agricultural soils from livestock manure New statistics, 2018

<p>Management of herds on transhumance by young herdsmen (without wives and children) who lack diplomacy and courtesy in their job as herdsmen (unlike their parents)</p> <p>Reduction in the amount of milk milked during transhumance (due to the absence of women = 'loss of income for households')</p> <p>Increase in the number of conflicts between farmers and livestock breeders (with significant damage: human deaths)</p> <p>Livestock breeders have equipped themselves with firearms</p> <p>Development of the phenomenon of kidnapping of wealthy Fulani herders to demand bail</p> <p>The appearance of new vices among young herdsmen: alcoholism, drugs, prostitution, rape of women, theft, machete killings, etc.</p> <p>Linking transhumance with the phenomenon of armed robbery</p>	
Impacts on mobile livestock systems in the next 20 years if nothing is done	Public mitigation strategies (or mitigation of negative impacts and enhancement of positive impacts)
<p>Increasing imbalance between the carrying capacity of pastoral areas and the number of herds they accommodate</p> <p>Increase in epizootics and parasitic diseases</p> <p>Exacerbation of conflicts between farmers and livestock breeders with several deaths, theft and clandestine slaughter of animals</p> <p>Strong tendency for transhumants to arm themselves with more powerful guns to ward off possible attacks</p> <p>Increase in armed robberies with loss of life and goods</p> <p>Prohibition of transhumance in coastal countries despite local regulations on pastoralism and regional agreements signed (ADEC/ECOWAS, etc.) in favour of the development of sedentarisation of herds</p> <p>Complete breakdown of the local complementarity between agropastoral (semi-sedentary) and mobile systems</p> <p>Difficulties in supplying livestock/meat markets with mobile livestock</p> <p>Disappearance of seasonal local markets linked to transhumance</p>	<p>Develop strategies to combat insecurity in strict collaboration with the population and livestock breeders' associations, customary and religious authorities</p> <p>Develop strategies for combining agriculture with livestock farming</p> <p>Maintain the awareness of the actors by the CNT/ANGT</p> <p>Strengthen the capacity of livestock POs and NGOs to fully play their roles</p> <p>Develop a spatial planning policy in collaboration with local authorities</p> <p>Promote inter-stakeholder consultations</p> <p>Valorise the presence of transhumant herds on the national territory for the benefit of young people and women in connection with poverty reduction (develop value chains around transhumance)</p> <p>Update the legal and regulatory framework for mobile transhumance at regional level</p> <p>Support countries in the renewal or creation and management of livestock infrastructure (water reservoirs/dams, stock routes, grazing areas and fodder crops, etc.)</p>

Climate change

Impacts on mobile livestock systems in the last 10 years	
<p>Annual/periodic mass arrivals of foreign transhumant herds (Niger, Nigeria, Burkina Faso and Mali) in Benin</p> <p>Increasing agricultural colonisation of wetlands</p> <p>Reduction of pastoral (grazing) areas</p> <p>Increased overgrazing and degradation of pastures</p> <p>Increased water deficit for livestock in the dry season</p> <p>Increasing conflicts between farmers and transhumant livestock breeders</p> <p>Degradation of pastoral land tenure systems (displacement and/or disappearance of Fulani settlements)</p>	
Impacts on mobile livestock systems in the next 20 years if nothing is done	Public mitigation strategies (or mitigation of negative impacts and enhancement of positive impacts)
<p>Exacerbation of conflicts between farmers and transhumant livestock breeders</p> <p>"Militarisation' of transhumance and strong degradation of the security environment in relation to transhumance</p> <p>Possible abolition of transhumance by public authorities</p> <p>Abolition of the livestock/meat sector (linked to transhumance) and of these value chains</p>	<p>Integrate climate change into awareness-raising messages for pastoralists by NTCs</p> <p>Strengthen the rights of pastoralists so that they can better manage climate variability</p> <p>Recognise the public utility of pastoral camps by securing them (Art. 67 Pastoral Code)</p> <p>Develop a land use policy based on customary pastoral land tenure systems</p> <p>Improving and securing the governance of pastoral land tenure</p> <p>Establish a policy of concerted development and management of agro-pastoral infrastructures (water points, stock routes, grazing areas, etc.)</p>

Reduction of regional integration and bilateral relations between Benin and the Sahelian countries (Niger, Burkina Faso, Mali) and Nigeria	
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Rapid urbanisation²³ correlated with high population growth in WA (& Benin specifically)

Impacts on mobile livestock systems in the last 10 years	
<p>Decline in rural land used for agricultural and livestock activities in favour of residential land, especially in southern Benin and around the country's major cities</p> <p>Increasing number of housing developments on rural land, thus reducing agricultural and livestock farming areas in southern Benin</p> <p>Eviction of sedentary/semi-sedentary/transhumant livestock breeders (near urban centres) from their camps and livestock terroirs by landowners</p> <p>Increasing conflicts between landowners and livestock breeders</p> <p>Most countries in the West African sub-region are experiencing rapid population growth. Nigeria, is estimated to consume 360,000 tonnes of beef per year (Cf. Jimmy Smith, Director General of the International Livestock Research Institute/ILRI, based in Nairobi, Kenya, 2019). And, despite its sizeable national herd, it is estimated that almost 30% of the animals slaughtered in the country come from abroad (Mali, Burkina Faso, Niger, Benin, Togo, Chad and CAR).</p> <p>This situation pushes livestock breeders in these countries to produce more cattle; this leads to competition for access to land with agriculture, which is also seeking to gain a foothold with the development of industrial sectors such as cotton</p> <p>Transhumant livestock farming, on which millions of small-scale livestock breeders and traders depend, is increasingly taking a beating. According to Bénédicte Kurzen (May 2017), some of the butchers working in the Maiduguri slaughterhouse have joined the Boko Haram jihadist sect</p>	
Impacts on mobile livestock systems in the next 20 years if nothing is done	Public mitigation strategies (or mitigation of negative impacts and enhancement of positive impacts)
<p>Reduction, or even almost total cancellation in some places of pastoral areas (interstices)</p> <p>Very poor access to forage resources for animals</p> <p>Strong trend towards the establishment of private cattle, sheep and goat fattening farms, with the exploitation of agro-industrial by-products (cotton seeds, cassava and/or yam peelings, soya beans and cakes, etc.) available in the suburbs of the cities</p> <p>According to Mr. Jimmy, this annual Nigerian demand for cattle is expected to almost quadruple by 2050 (from 350,000 tonnes to 1,440,000 tonnes). This could also quadruple the supply of cattle from neighbouring countries (Mali, Burkina Faso, Benin, Niger, Togo, Chad and CAR) to Nigeria. This will exacerbate competition between livestock breeders and farmers for access to land. This will accentuate the deadly conflicts between these two communities</p>	<p>To support Benin's pastoralist municipalities in the development of their land tenure and pastoralist management policies in conjunction with appropriate tools (SDAC, PFR, etc.)</p> <p>Establish village consultations for the management of agro-pastoral resources</p> <p>Promoting and developing fodder crops and developing fodder banks</p> <p>Promote small-scale fattening farms (cattle, sheep and goats) on the outskirts of cities in connection with the use of agro-industrial and agricultural by-products</p> <p>"Modernise pastoralism", for example by opting to develop the production of forage and cereals for cattle feed, as well as fodder crops</p>

Expansion of agricultural land to the detriment of pastureland

Impacts on mobile livestock systems in the last 10 years	
<p>The large savannahs initially intended for grazing and water access for animals are now being colonised by farmers in search of land (from the South and North of Benin). They are involved in the almost systematic destruction of trees for the massive production of charcoal</p> <p>As a result, grazing areas are sufficiently reduced, forcing sedentary livestock breeders to go on transhumance, and the number of conflicts between farmers and livestock breeders is increasing in the area (with hectares of fields devastated by cattle and deaths of men and cattle)</p> <p>Progressive reduction in the flow of transhumant livestock breeders in the localities of Akpéo (Savè-Diho-Gbéré)</p> <p>According to the herders we met, landowners almost demand that transhumant livestock breeders pay for one cow/year and offer a cow in case of a ceremony before settling on their land</p> <p>Prohibition on livestock breeders grazing cattle in harvested fields in Savè as opposed to Glazoué (for example)</p>	
Impacts on mobile livestock systems in the next 20 years if nothing is done	Public mitigation strategies (or mitigation of negative impacts and enhancement of positive impacts)

²³ "The urbanisation rate has almost tripled in 50 years and by 2020, more than half of Benin's population will be living in cities," says the DAT, based on INSAE data.

<p>Conflicts between farmers and livestock breeders are increasing Risk of explosion of the security situation; leading to wars between indigenous populations and Fulani herders Development of policies for the sedentarisation of transhumant herds by the public authorities If this situation continues, in the coming years we will see the confinement of sedentary livestock breeders' camps and the pure and simple suppression of the grazing grounds of sedentary animals An exacerbation of disputes between migrant farmers and sedentary livestock breeders on the one hand, and conflicts between migrant farmers and livestock breeders who are both cross-border transhumant and sedentary (especially since young Fulani are becoming less well-behaving than their parents; according to the Fulani leaders we met) High risk of sales of livestock land to plot buyers Risks of disappearance of transhumance in the hills if the Government does not act in favour of the herders to apply the Pastoral Code Drastic reduction in the flow of transhumance (transhumant livestock breeder will prefer to go to Togo or Ghana where they feel more at peace)</p>	<p>There is an urgent need for coordinated spatial management (land use planning/SDAT) that judiciously integrates land allocations for agriculture and livestock farming Fence and mark out animal passageways and create and secure grazing areas and facilitate access to water for watering of animals Developing fodder crops with sedentary livestock breeders Support the development/update and concerted management of SDACs in agro-pastoral municipalities Promoting agricultural and livestock intensification techniques Promote agro-ecological practices based on the combination of agriculture and livestock (rotational parking, manure stable, forage production, etc.) Strengthen POs to advocate for the implementation of the Pastoral Code</p>
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Continuation of the recent health crisis

Impacts on mobile livestock systems in the last 10 years	
<p>The effects are felt in the marketing of livestock in the livestock markets visited. Traders and butchers from Nigeria (the main animators of the markets) have stopped coming because of the closure of the borders, the closure of the livestock markets in Burkina Faso Beef prices are high in Cotonou. Some markets have almost ceased to function for a while (e.g. Petit Paris market). Cattle prices have fallen The number of animals sold has decreased. This has a negative impact on the fees collected by the local authorities.</p>	
Impacts on mobile livestock systems in the next 20 years if nothing is done	Public mitigation strategies (or mitigation of negative impacts and enhancement of positive impacts)
<p>Risk of exacerbating disruptions to the normal functioning of markets, with loss of revenue for municipal offices and unemployment for many livestock market agents</p>	<p>Permanent awareness of livestock market actors to strictly respect the measures advocated by the Government in the prevention of COVID 19</p>

Source: Survey data and consultant's analysis (April 2020)

The national framework of the impacts of transhumance in Côte d'Ivoire

Country context

Policies

From 1972 onwards, the State defined livestock breeding as a national priority. This political will mobilised significant human, financial and technical resources. It resulted in the creation of SODEPRA (Société de Développement des Productions Animales) for the promotion and development of livestock activities throughout the country. For ruminants, this orientation involved: the implementation of a project to supervise sedentary cattle; the execution of a programme called "Operation Zebu" according to several successive strategies (censuses and monitoring of movements, attempts to set up hosting areas for transhumants, pastoralist livestock breeder – autochthone farmer tandems, etc.); the implementation of a pastoral development programme with the creation of 367 dams (from 1975 to 2001), 239 of which in the Savannah District (the Poro, Bagoué and Tchologo regions); more than 900 km of stock routes, tick baths (33), 47 molasses tanks, more than 2,500 improved containment corridors, etc. (SODEPRA-Nord).

In addition to this infrastructure, this proactive policy has produced important results, such as the increase in the Ivorian cattle population from 460,000 head in 1975 to around 1,442,000 head in 2001. Over the same period, the number of small ruminants increased from 600,000 to 2,200,000.

The great success of this proactive policy was to contribute to the birth of a "livestock breeder" mentality among farmers in a country where pastoral livestock farming was not a tradition. The issue of transhumance management and conflict prevention was at the heart of the strategy for developing agro-pastoral areas and preventing farmer-livestock breeder conflicts with the development of *farmer-livestock breeder tandems*. However, this development did not prevent the dissolution of SODEPRA following successive structural adjustment programmes, which led the government to question certain intensification choices (Véronique Ancey, 1996).

With the dissolution of SODEPRA, the thorny farmer-breeder conflict intensified, prompting the Ministry of Agriculture and Animal Resources (MINAGRA) to organise a seminar on the farmer-livestock breeder conflict in **July 1994** to conduct a general reflection between administrative authorities, politicians, farmers' and livestock breeders' organisations in order to analyse the problem and make proposals to the Government to reduce and eliminate the causes of this conflict. Following this seminar, the regulatory framework was strengthened with the adoption of four (4) decrees and two (2) interministerial orders.

With this in mind, the state set up a programme called the National Programme for the Management of Rural Areas (PNAGER-NORD), whose main mission was to develop a local and participatory approach to terroir management that combined agriculture and livestock farming. However, it was interrupted with the advent of the successive socio-political crises of December 1999 and September 2002.

These crises, which lasted from 1999 to 2011, did not allow for the proper application of regulatory texts relating to livestock farming and pastoralism, let alone their improvement. The result, with the uncontrolled flow of transhumant livestock breeders from countries in the sub-region into the areas concerned, on the one hand, and the absence of the administration in the northern part of the country, on the other, has been a worsening of the conflictual cohabitation between livestock breeders and farmers, the colonisation of stock routes, the banks of pastoral dams and grazing areas by farmers, and the degradation of almost all pastoral infrastructure.

Following the long socio-political crisis experienced by the country, which ruined the many gains made after the implementation of a sustained livestock development policy (more than 170 billion CFA francs of direct investment in 30 years), the sector is gradually regaining its dynamism. This slight improvement is the consequence of the implementation of a policy to restructure the Ivorian livestock industry; thus, in the efforts to revive livestock production, the Ministry of Animal and Fishery Resources (MIRAH) proceeded to the formulation of a strategic plan for the development of livestock, fisheries and aquaculture (PSDEPA 2014-2020). It should be noted that the PSDEPA is in line with the PND (2012-2015) and PND (2016-2020) as well as the PNIA I (2010-2016) and PNIA II (2018-2025) in order to ensure the operationalisation of the government's policy in terms of animal and fisheries resources. This policy document sets out the strategic orientations and areas of intervention in the animal resources sector. The PSDEPA aims to make the animal and fisheries resources sector a source of sustainable growth and job creation in order to contribute to the reduction of extreme poverty and hunger in Côte d'Ivoire. It is implemented along four main lines of intervention: Line 1: Improving the productivity and competitiveness of the animal sectors; Line 2: Development of the value chains; Line 3: Strengthening the capacities of stakeholders in the development of the sector; Line 4: Strengthening governance and sub-regional integration of the sector. This plan attaches great importance to the development of the pastoral livestock sub-sector through Axis 4, the implementation of which is expected to lead to the following expected outputs:

- An institutional mechanism for transhumance and rangeland management and conflict prevention is in place and functional;
- An effective land registry system and participatory local governance established for the management of pastoral areas and rural land;
- Harmonisation of national regulatory texts on the development of animal resources with regional and international regulations (ECOWAS, WAEMU, EU);
- Active participation of Côte d'Ivoire in the management of shared resources for the development of animal resources strengthened.

Overall, the above-mentioned programme has produced encouraging results. In the pastoral livestock sub-sector, the PSDEPA has made it possible to strengthen the regulatory framework through the adoption of Law No. 2016-413 of 15 June 2016 on transhumance and livestock movements and the proposal of a series of draft decrees for the application of the said law, to build production infrastructure and to control epizootic diseases

However, in view of the many challenges facing the pastoral system, these results seem mixed. The thorny problem of agro-pastoral land tenure management, and in particular the conflictual cohabitation between farmers and livestock breeders, has so far not found a satisfactory solution.

In recent years, the country's recent socio-political crisis has led to rapid and profound mutations that have affected people's lifestyles. The Ivorian pastoral livestock sub-sector has not remained on the sidelines of these evolutions. These upheavals have rekindled the debate among stakeholders in the sector, and even among the Ivorian political class, on the need to consider the sedentarisation of mobile livestock systems based on the assumption that the way of life of transhumant peoples should change because it is no longer adapted to the new socio-economic environment of rural areas, which were once welcoming and conducive to this practice. It is also incompatible with the agricultural practices of coastal countries and is the cause of many problems of a security, health and environmental nature, etc.

In fact, these assertions are not without foundation. Indeed, over time, the main production resources of agricultural areas are under increasing pressure and are being depleted by multiple factors, including population growth, the unbridled emergence of new crops deemed more profitable, climate change, etc. For pastoralists, however, this situation translates into a drastic reduction in grazing land, threatening their livelihood.

Building an entirely sedentary model of mobile livestock systems by giving priority to supplying stabled livestock with fodder products is the seed of a new form of policy orientation that is gaining ground within MIRAH. This proposal was defended by MIRAH at the 9th meeting of the Ministers in charge of Agriculture, Livestock and Fisheries of the UEMOA space which was held on 19 May 2020, by videoconference and which saw the participation of the Director of Cabinet, Mr. ZOUMANA MEITE ANLYOU. In line with this dynamic, one of the recommendations of the 9th meeting of the UEMOA High Level Committee on Food and Nutritional Security (CHN-SAN) invites countries wishing to do so to initiate large-scale national fodder production projects to be submitted to financing organisations, notably BOAD.

Box 9 The phenomenon of sedentarisation of herds in Côte d'Ivoire

The phenomenon of sedentarisation of transhumant herds in Côte d'Ivoire

Based on a study conducted by the OIPR in the north-eastern part of the country, between 2010 and 2016, an average of 19% of the herds (5,147 head of cattle) that came from the neighbouring country on transhumance to the territory of Côte d'Ivoire (Doropo Department) did not return home. This explains the creation of 'semi-transhumant' camps in these localities: the phenomenon of sedentarisation of transnational transhumant herds.

Table 6: Transhumant cattle entry and exit points (2010-2016) in Doropo

Years	Entry (Cattle)	Exit (Cattle)	Remaining numbers (balance)	%
2010	20 827	20 150	677	3
2011	26 901	21 833	5 068	19
2012	22 980	16 870	6 110	27
2013	27 020	20 250	6 770	25
2014	31 610	22 883	8 727	28
2015	30 150	27 810	2 340	8
2016	32 042	25 705	6 337	20
Total	191 530	155 501	36 029	19
Means.	27 361	22 214	5 147	19

Source: OIPR, 2018

Introduction of the agropastoral calendar

The agropastoral calendar was proposed in 1992 by SODEPRA. It was the subject of awareness-raising days and meetings within the framework of SODEPRA's Agro-pastoral Units Programme and CIDT consultations (MINAGRA/DGRA, 1994). This practice was taken up in Decree No. 96-431 of 3 June 1996 regulating the movement of livestock throughout the national territory, which stipulates in Article 8 that *'a pastoral calendar is established in the North, North-East, North-West, North-Central and Central regions, and if necessary, in the other regions, specifying the dates of the beginning and end of the annual cropping cycles. These dates determine the cropping period and the pastoral period. During the pastoral period grazing of harvested crop land and transhumance are prohibited. Animals and herds must be kept on uncultivated land, fallow land and pastures in their original districts.* This measure is defined by a prefectural or sub-prefectural order. It authorises national and transhumant livestock breeders to have access to resources (pasture, crop residues, water points, etc.), especially in the dry season, while at the same time ordering farmers to clear their fields of agricultural produce.

Although it has been introduced in some localities, several factors limit its application on the ground:

- **Climate change:** with climate change every year (pockets of drought, delay, or on the contrary excess of rainfall), the geographical distribution of rainfall does not respect any meteorological logic. This makes it difficult for the farmer to rely on a single crop calendar. Some years it rains heavily, while in other years it does not. This situation sometimes delays the harvesting of certain crops and hinders the mobility of animals because of the presence of crops on the fields;
- **Cashew cultivation:** The dry season is the cashew harvest period. Some early fruits begin to fall in December and January, but the main harvest period is from February to the end of May. The cashew harvest period coincides with the transhumance season.

A detailed overview of the legal framework for pastoral spatial management and transhumance in Côte d'Ivoire is available in the Côte d'Ivoire case study report carried out as part of this research.

Livestock systems, and in particular transhumance

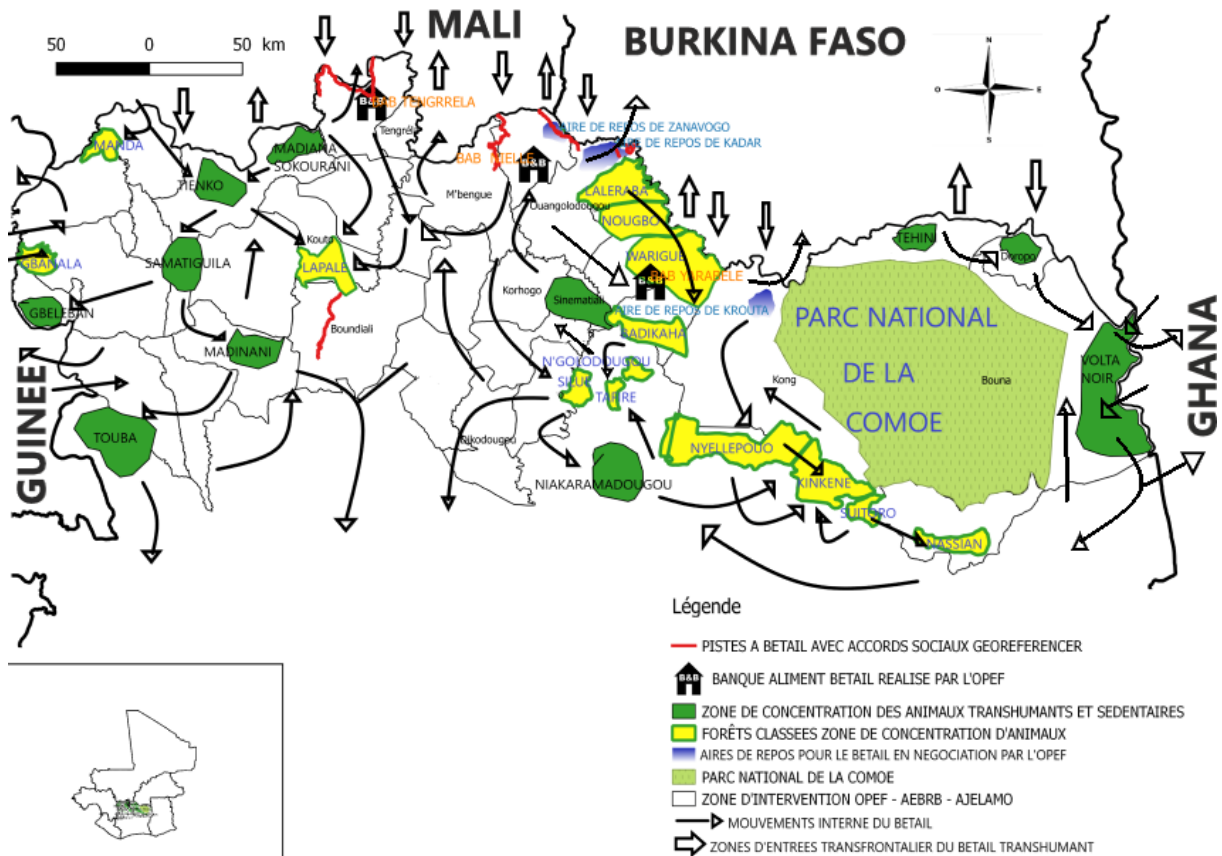
Pastoral livestock production in Côte d'Ivoire is mainly classified by the national authorities into three production systems: i) the traditional system, ii) the improved traditional system and iii) the modern system.

i) The traditional system, which is in the majority in Côte d'Ivoire, is based on the exploitation of natural pastures. Livestock farming conditions are marked by increasing land insecurity due to extensive and space-consuming agriculture, which limits the access of herds to pastoral resources, resulting in a permanent risk of conflict between farmers and livestock breeders. In this system, the animals do not necessarily receive supplementary feeding or care apart from organised vaccination programmes. The livestock rearing methods encountered in this system are :

- **Sedentary livestock farming:** This is the type of livestock farming practised mainly by nationals and also by a few foreign Peuhls. Both are farmers. This system is also practiced by officials and traders. In the sedentary type, livestock rearing has evolved in some areas towards integration between agriculture and livestock rearing, characterised on the one hand by the use of agricultural by-products and animal manure, and on the other hand by the adoption of animal traction by the farmers. The use of oxen for animal traction is widespread in the cotton-growing areas of the northern regions (Korhogo, Ferké, Boundiali, Tengrela, Odienné, Séguéla).
- **Transhumant livestock**, distinguishing between cross-border and internal transhumance:
 - **Cross-border transhumants** consist of animals that graze in Burkina, Mali and Niger and enter Côte d'Ivoire in the dry season (October to April) from the northern regions to central Côte d'Ivoire. These are movements of great amplitude. In recent years, the period of arrival and return of transhumants has been variable. It can be early or late depending on the climatic conditions in the Sahelian zones. In addition, it is increasingly observed that a large proportion of transhumant herds do not return to their country of origin. These herds are in the process of settling in favourable, more welcoming localities (semi-sedentary) and then practise transhumance of small amplitude in the dry season.
 - **Internal transhumance** is said to involve a smaller number of animals in the northern cattle-breeding regions. Most often, the animals belong to livestock breeders of Sahelian origin (Mali, Burkina Faso, Niger, etc.) who are residents and cultivate a few plots of land during the rainy season, taking advantage of the organic manure. A single livestock breeder may own two, three or even four herds. To a lesser extent, some herds are owned by local farmers or officers. In the dry season, they practice internal transhumance in search of forage and water for animal feeding. In some places, communal livestock farming is practised.

In general, the mobility of animals on the territory is based on the availability of pastoral resources in the different agro-ecological zones of the country. Under these conditions, it is difficult to keep a mobility map valid for a long period.

Map 9 Cross-border and internal transhumance movements



Source: PAMOBARMA, 2019.

ii)-The improved system is the result of a progressive intensification of traditional systems. They are represented by the bovine agro-pastoral farms. It is characterised by individual pens, permanent guarding, greater use of veterinary and food inputs (salt and agro-industrial by-products) and, increasingly, direct intervention by the owners or members of their families in the management of the herd.

iii)-The modern system is the one developed in state farms, research centres or private commercial farms. These farms are characterised by a herd size well above average (several hundred head), rational animal management, regular application of health protocols (vaccinations, tick removal, internal deworming, etc.), distribution of mineral salts and, finally, major genetic improvement efforts in the form of the purchase of N'dama heifers and bulls, mainly from the Marahoué ranch.

The last real census of the Ivorian livestock population dates back to 2001. The numbers are estimated each year by the MIRA's Direction de la Planification, des Statistiques et des Programmes (DPSP) according to a methodology that varies according to the species. More than 15 years after the 2001 RNA, the statistical data need to be updated, given the socio-political upheavals that the country has experienced. In this context, as long as a new and more exhaustive census of livestock is not carried out, the problem of controlling the animal population remains unresolved. The breeds used in Côte d'Ivoire are generally local and include three local breeds of bulls, one local breed of sheep and of goats.

Nevertheless, the data reported by the regional directorates of the MIRA in the border areas, far from being exhaustive, give an idea of the importance of the flow of transhumants at the national level.

Trends in three major border areas show a sharp decline in the 2018-2019 season; from 498,369 cattle in the 2017-2018 period, to 244,136 cattle in the 2018-2019 season, a decline of 51%.

Table 21 Evolution of the transhumant cattle population

	2016-2017	2017-2018	2018-2019
Northwest	43 250	44 232	20 172
North	454 137	454 137	219 402
North East	6 913	534	4 562
TOTAL	504 300	498 369	244 136

Source, DNAGEP, 2019

Collaboration and disputes between farmers and livestock breeders

The migration of transhumant herds already established in Côte d'Ivoire increased from 2003 onwards, under the influence of the socio-political crisis of 2002. Transhumant Fulani herders previously located in the former Savannah Region (Korhogo, Boundiali, Tengrela, Ferkessédougou) moved en masse to new areas they considered more favourable for the development of their animals.

Thus, areas that used to be relatively little frequented by transhumants have seen a concentration of livestock breeders since 2003. This is the case of the Gbêke (Bouaké), Bélier (Yamoussoukro) and Marahoué (Bouaflé) regions, as well as the N'Zi (Dimbokro) and Gontougo (Bondoukou) regions. As a result, disputes between farmers and livestock breeders have resurfaced, activating the old conflict of cohabitation between the two parties.

The number of cases of disputes reported is not exhaustive. In some regions, disputes are either settled out of court by the customary authorities, or the protagonists prefer to turn to the police or the S/Prefects who settle these disputes directly without referring them to the competent MIRA structure in their area.

The main sources of conflict are not systematically identified by the MIRA services. These are :

- Crop damage attributed in most cases to transhumants;
- Thefts of livestock from both sedentary and transhumant livestock breeders are generally attributed to young pastoralists who are said to have the necessary 'skills' in this area;
- The killing of animals, often in retaliation for crop damage or following land disputes, is widely recognised as a disproportionate response.

Table 22 Evolution of crop and animal damage

		2015	2016	2017	2018
Crop damage	North West Zone	206	193	215	195
	Northern zone	158	160	226	207
	Central zone	108	147	145	120
	North-East zone	118	144	153	45
	North Central Zone	47	37	69	68

	Forest area	37	52	70	93
	Total	674	733	878	728
Damage to animals	Killed animals	203	417	61	29
	Injured animals	0	26	29	69
	Missing animals	0	114	170	131
Calculated compensation (FCFA)		131.374.850	169.479.065	215.623.790	170.023.360

Source DNAGEP, 2019

Litigation has reportedly stabilised at a high level in recent years, and seems difficult to reduce for several reasons:

- Pastoralists always settle with the agreement of certain village chiefs, land chiefs or opinion leaders. The new settlers then ensure the protection of these village authorities by maintaining links through gifts of money and livestock;
- The movement of herds from village to village is often done at night and the number of animals in a herd is often too large for one or two herdsman. The latter do not have sufficient capacity to contain the entire herd, and several animals escape their vigilance. This is linked to the low and irregular remuneration of herdsman (10,000 FCFA/month).
- Farmers' management of arable land does not take into account the need for animals to move around in search of pasture and water. The wide spatial dispersion of small fields, with a lack of the habitude of fencing of these fields. The phenomenon of 'trap fields', which is the work of farmers driven by easy gain who intentionally leave part of their sometimes insignificant crops on the fields in order to see them grazed by transhumants.
- The territorial administration has been absent from the field for a long time. Insufficient awareness and dissemination of regulatory texts on the management of pastoral areas. Bias or laxity in the application of sanctions, all of which combine to fuel a lack of governance in the management of shared and complementary agro-pastoral areas and uses.

Conflict resolution is governed by Decree No. 96-433 of 3 July 1996 on the settlement of disputes between farmers and livestock breeders. With this decree, the State expects to give a legal basis to the method of settling conflicts between farmers and livestock breeders. The law n° 2016-413 of 15 June 2016 on transhumance and livestock movements in its article 13, reinforces the provisions already taken by the decree. In 2018, an interministerial decree established the compensation scales for the (partial) destruction of crops and other investments in rural areas and the killing of livestock.

According to this decree, the settlement of disputes is carried out according to a three-tier procedure:

- the village settlement committee, chaired by the village chief;
- the sub-prefectural settlement commission, chaired by the sub-prefect;
- the Prefectural Commission of Appeal and Arbitration, chaired by the Prefect.

According to this decree, recourse to the competent court is only allowed in case of failure of attempts to settle before the above-mentioned bodies.

The data collected show that litigation and referral to the prefectural commission for appeal and arbitration are rare. According to the actors interviewed, the vast majority of conflicts are settled out of court, either by the protagonists through direct arrangements or by the village chiefs, who are also the presidents of the village commissions, especially when the two parties belong to the same

community. This is also usually the case when the non-native livestock breeders have settled on the terroir for many years and are well integrated into the community. However, the intensification of conflicts in certain areas stimulates the use of sub-prefectural commissions, as the village commissions are sometimes overwhelmed.

Although amicable settlement is the preferred method under the law, it is nevertheless confronted with multiple difficulties that sometimes reduce its effectiveness. The most bitter criticisms are levelled at the administrative authorities:

- In the majority of cases, the population criticizes the decisions of the administrative authorities, which they consider to be biased;
- The non-existence in some localities of village commissions for the amicable settlement of disputes between farmers and livestock breeders, in accordance with Decree No. 96-433 of 3 June 1996 on the settlement of disputes between farmers and livestock breeders;
- The behaviour of certain village chiefs who chair commissions, who are both judge and jury, or who appropriate the compensation paid to victims of crop or harvest damage or damage to livestock;
- Non-compliance by some sub-prefects with the provisions of Decree No. 96-433 of 3 July 1996 on the settlement of disputes between farmers and livestock breeders; this is reflected in the following actions: (i) the carrying out of reports and the evaluation of damage by actors other than the technical services of the supervisory ministries; (ii) the non-involvement of MIRA agents in the carrying out of reports of crop or harvest damage, etc.
- High travel costs (60,000 CFA francs) for the technical agricultural agents responsible for carrying out crop or harvest damage surveys at the expense of the complainant, plus the operating costs of the sub-prefectural commissions; hence the reluctance of some victims to refer the matter to the administration.

Photo 13 The 2,500 ha pastoral area of Noronigué (Ouangolodougou) occupied by rice and maize fields



Box 10 Pastoral space decimated: consequence of the cashew nut boom

For a long time, cotton was the only cash crop in the north of the country. But the rise in cashew nut prices in the 1990s made cashew nuts an important source of income for farmers and encouraged the creation of cashew orchards in the north and centre. Cashew is currently the main perennial cash crop in the northern and central regions of Côte d'Ivoire. Indeed, cashew production went from being a secondary production in 1994 with 16,327 tons to a major production since 1999 with 74,552 tons of nuts. Since then, production has continued to increase, taking Côte d'Ivoire from 9th in 2003 to 1st in 2015, with a production of 702,510 tonnes, i.e. 24.22% of world production (CAC, 2016).

This feat is not without consequences on the space. Cashew nut production, which began in the Korhogo and Odienné areas, now covers more than eleven (11) areas in Côte d'Ivoire: Bondoukou, Dabakala, Katiola, Korhogo, Odienné, Ferkéssédougou, Boundiali, Tengrela, Séguéla, Mankono and Bouna. The savannahs and forests of the northern zones of

the country are being transformed into vast areas of perennial cashew farming. With a planted area estimated at 420,000 ha according to the census carried out by ANADER in 2005, it stood at around 1,350,000 ha in 2018 (FIRCA, 2018).

*The strong propensity of the population towards this speculation has led to a strong reduction in agricultural and rangeland areas in rural areas. This situation puts pressure on the few available forage resources in some of the regions visited, such as Korhogo and Ouangolo, where there are hardly any free rangelands for animals, leading to the disappearance of certain forage species due to overgrazing and the appearance of other invasive plant species such as *Hyptis suaveolens*.*

The integration of agriculture and livestock farming makes it possible to increase productivity and improve the sustainability of production systems through animal traction, the use of manure for fertilisation, and animal feed through the use of fallow land and crop residues. On this basis, SODEPRA had built trials to introduce the association model in the peasant environment. However, the agriculture-livestock association between farmers and transhumants has been limited in recent years, due to the occupation of former pastoral areas by crops, which forces transhumant transborder and national herds to graze for a large part of the year in the classified forests. The combination of agriculture and livestock is more noticeable among agro-livestock breeders using manure and animal traction. Animal traction is promoted by the supervisory structures in the context of the development of cotton cultivation.

According to the 2016 law on transhumance, **'agropastoral tandems' can be developed between farmers and livestock breeders**. According to Article 15 of the 2016 law, a 'tandem' can be defined as **'an agreement between a farmer and a livestock breeder for the purpose of grazing livestock on a crop plot'**. This practice began in 1984 in the Korhogo region. Originally, it maintained the Senoufo farmer and the Fulani livestock breeder in a form of relationship where the Senoufo farmer sets up plots with fences and hedges, which he maintains. These enclosures serve alternately as night parks and crop fields. The pastoralist must ensure that manure is distributed equitably between the farmer's plots and his own.

The data collected show that the tandem can take two related forms. The first allows a farmer to receive one or more pairs of bullocks from a livestock breeder to plough his plot in areas where ploughing is practised. In return, at the end of the harvest, the crop residues from the farmer's plot are made available to the livestock breeder. The second form of tandem, which is closer to the definition given by the law, consists of the farmer making crop residues or forage resources located on his plot available to the livestock breeder in exchange for animal manure from the livestock. In all cases, these tandems are practiced informally without the intervention of the administration. This makes it difficult to obtain data on this practice, which is also unregulated.

The data collected show that the tandem is not practised in the localities of Bouna (East) and Béoumi (Centre), (Prof. GAGO Chelom Niho, 2019). In the Korhogo region, the tandem between farmers and livestock breeders, which was quite common in the 1970s, is less and less practiced. The Korhogo livestock breeders' association believes the tandem tends to disappear in their area. This situation is the result of a combination of several factors in the three localities: the reduction in available space due to the expansion of perennial crops (cashew nuts), the increase in livestock, the growth in the agricultural population and the burning (Bouna) or sale (Korhogo) of crop and harvest residues by farmers.

However, it appears from the comparative data collected that in certain vast cotton-growing regions of the Far North (Mankono, for example), the tandem is still practised by certain actors. On analysis, it seems that the implementation of the tandem is conditioned by the availability of large areas. As a result, it can also be implemented in the context of large farms or modern fenced farms that allow for a rotation in the use of crop plots to be fertilised by animal manure. This analysis is in line with that of the central departments of MIRAH (Livestock Production Department, Animal Nutrition and Pastoral Area Management Department, etc.). It should be noted, however, that in these large or

modern farms, the owners also own animals and therefore do not use the tandem system. But it cannot be excluded that this practice could be used by these large farmers or by village communities to fertilise their land. In our reflection on the impacts of transhumance, it would be important to look further into the possibilities of developing forms of contractualisation between these large modern farms and mobile livestock breeders.

Market dynamics

Trucks and trains are the two main means of transport used to serve Ivorian markets. Truck transport is the most used (300 trucks/month for the Abidjan market alone, compared to 220 wagons). Indeed, the enthusiasm for truck transport comes from the most affluent traders, who are committed to rapid shipments and have significant capital at their disposal, allowing them to rotate constantly between the collection markets and the terminal markets.

However, at the same time, the transport of cattle destined for slaughter on foot, although prohibited in Côte d'Ivoire, is increasing. This trend escapes administrative control but constitutes a significant part of the market, according to the actors in the sector. Moreover, this movement of livestock on foot is assimilated to transhumance. In practice, traders who send their livestock on foot in the dry season combine transhumance with commercial transport. They graze their animals in the regions they cross, to fatten them up before marketing. Professionals in the livestock-meat sector have noted that these transhumant traders cross the country on foot at all times. It is this category of transhumants that is seen as the cause of most farmer-livestock breeder disputes and its intensification.

Côte d'Ivoire has a multitude of livestock markets that structure the marketing channels. The supply of these markets depends to a large extent on animals from the Sahelian countries. The markets can be grouped into three main categories:

Collection markets (main livestock basins in Mali, Burkina Faso and Niger for the Sahelian countries; and the northern and central zone of Côte d'Ivoire);

- Transit markets (areas more or less close to the border, i.e. Korhogo, Bouaké, Odienné and Doropo markets);
- Terminal consumption and distribution markets (large urban areas in Côte d'Ivoire such as Abidjan, Bouaké, Daloa, Soubré, Abengourou, Yamoussoukro, Man, San Pédro etc.).

Livestock markets exist in all urban areas of the country. In 2018, the situation of the marketing infrastructure for live animals at the level of the External Services is as follows: (i) 80 livestock markets that serve to market live animals; and (ii) 107 slaughterhouses: the slaughterhouses are maintained by the municipal services. Most slaughterhouses are in a very advanced state of disrepair. They are in fact slaughterhouses that do not comply with health standards.

Table 23 Status of slaughter and marketing infrastructure

Regional Directorates	Livestock markets	Slaughterhouses
ABENGOUROU	05	04
ABIDJAN	01	06
ABOISSO	00	09
AGBOVILLE	00	06
BONDOUKOU	06	06
BOUAFLE	02	05
DALOA	03	05
DIMBOKRO	05	07

DIVO	03	03
GAGNOA	06	04
BOUAKE	10	07
GUIGLO	05	05
KORHOGO	16	11
MAN	03	06
ODIENNE	04	05
SAN-PEDRO	03	06
SEGUELA	04	04
TOUBA	05	04
YAMO USSOUKRO	01	01
TOUMODI	01	03
TOTAL	80	107

Source: EBP 2018, DPSP

During the period 2012-2017, imports of live cattle increased steadily. In 2018, imports of cattle and small ruminants generally decreased compared to 2017.

Table 24 Cumulative annual official imports of live animals by species (number of heads)

Species/Years	2012	2013	2014	2015	2016	2017	2018
Cattle	97 589	104 418	105 478	120 828	125 440	155 865	109 113
Small ruminants	121 627	168 298	180 282	199 127	249 744	254 454	228 522

Source, PSD 2020

The country relies on external sources to cover most of the population's milk needs (over 80% of its consumption). In 2016, national milk production was estimated at TME 31,908, i.e. 12.6% of the national consumption estimated at TME 253,994.

Table 25 Trends in national milk production and consumption

Year	2011	2012	2013	2014	2015	2016
National Milk Production (TME)	31 337	31 358	31 395	31 649	31 908	32 458
Imports of milk and milk products (TME)	153 664	210 985	161 705	154 705	312 641	222 086
National contribution (%)	16,9	12,9	16,2	16,9	9,2	12,6

Source: MIRAH/DPSP, 2020

In the face of the scale of the COVID-19 pandemic, the economic principle of the free movement of people and goods in the West African region has been shattered. Indeed, to curb the spread of the disease, countries were forced to close their borders. This radical measure has affected several sectors of activity, including the livestock and meat industry. In Côte d'Ivoire, livestock markets were initially supplied partly by local production.

Subsequently, the opening of humanitarian corridors between states to facilitate the circulation of foodstuffs made it possible to supply livestock markets. Today, despite the lifting of certain restrictive measures, the supply of Ivorian markets has not been completely normalised. According to stakeholders, this handicap is due to the fact that no measures have been taken to ensure the return of traders after the livestock has been conveyed. This dysfunction makes restocking slow.

Economic impacts

Contributions to GDP

Since independence, the agricultural sector has always occupied a predominant place in the economy and development of Côte d'Ivoire, both in terms of the active agricultural population and in terms of its contribution to wealth creation in the country. It contributes 34% of the total GDP. However, livestock farming is still a developing economic activity, with a contribution of about 4.5% to agricultural GDP and 2% to total GDP (PSDEPA, 2014-2020).

Due to time and data constraints, the contributions to GDP of the overall livestock sector, mobile livestock systems, and cross-border mobile livestock systems in Côte d'Ivoire have not been estimated as indicators of their economic impacts, as was done for Benin.

Fiscal contributions

In Côte d'Ivoire, the incursions of transhumants into the classified forests of the north led SODEFOR in 1994 to integrate the pastoral dimension into its forest management policy. Controlled grazing trials were therefore initiated in the 28,917 ha Badénou forest, located 40 km north of Korhogo (northern Côte d'Ivoire). Approximately 15,000 cattle roam the Badénou Forest each year. As described earlier in the relevant section, at the level of a host area and a border area in Côte d'Ivoire, the prices that are paid for this access vary between 10,000 and 15,000 FCFA per herd per month or 300 FCFA per head per month. This financial windfall is managed locally for the development and maintenance of grazing sites. According to SODEFOR, there are 234 classified forests, 112 of which are in the savannah zone of the country. If the revenues from 12 classified forests in the Ferkessedougou area are extrapolated to the 112 classified forests in the savannah area, this would generate revenues of approximately FCFA 607 million per year.

As described above, traders and herders selling animals pay taxes and fees at livestock markets collected by the municipal office. Livestock traders are also required to pay multiple fees when transporting livestock. Transhumant livestock breeders also pay substantial fees for watering rights to local committees that manage dams that were originally intended for pastoralism. In Côte d'Ivoire, cross-border transhumants are not obliged to pay entry taxes when they enter the territory.

Contribution to poverty reduction

The Côte d'Ivoire case study was not able to collect quantitative data on the contribution to poverty reduction of (cross-border) transhumance at the national level either. However, it remains that transhumance is a strategy for transnational and national transhumants to increase their income by sending their livestock to other locations with more favourable feed availability. In addition, transhumant livestock production provides important income to many sections of the population through trade and other exchanges (manure, feed, traction).

Contribution to equality

The case study in Côte d'Ivoire was not able to collect quantitative data on the contribution of (cross-border) transhumance to equality at the national level either. However, it is clear that cross-border transhumance allows people who depend on this production system to make significant income in a situation where they have few alternatives. In addition, cross-border transhumance has allowed many people to settle in the north of the country, freeing them from the precarious security situation in their previous areas of anchorage. Also, the small amplitude transhumance practiced by national transhumants and farmers allows them to significantly increase their income. In this way, transhumance contributes significantly to the equality between rural and urban populations in Côte d'Ivoire.

Social impacts

Contribution to food security

In line with the contribution to poverty reduction, transhumance contributes to income and therefore to food security in terms of access for transnational transhumant households, agro-pastoralists, agro-livestock breeders, and people who have entrusted one or more animals to them. In terms of availability, transhumance contributes to the increased availability of livestock products (meat, offal, and dairy). In this way, transhumance contributes significantly to the food and nutritional security of the populations of Côte d'Ivoire.

Contribution to social welfare

As described in more detail in section 3.2.3, in terms of contribution to social welfare, it was noted that the opportunity to become a herdsman is an important occupational opportunity for boys and young men from national transhumant families. In addition, transhumance offers opportunities for transnational transhumants to sedentarise.

Impact on animal welfare

In view of the considerable increase in the area under cultivation in the north and centre of the country, it seems that animals are increasingly being transported by truck and train instead of conveyance on foot. It is mainly animals from Mali that are traded to urban centres in the south of Côte d'Ivoire that are transported by truck. Also the Ivorian animals that are traded to the south of the country make the last part of their journey rather by truck. The journeys by truck and train are often very long and during the journey the animals usually receive very little water and feed. In addition, the animals usually have very little space to move around in these modes of transport, which are not adapted for transporting animals.

Impacts on security and relations between different social groups and communities

As described in section 3.2.3, farmers in the north of Côte d'Ivoire belong mainly to the Senoufo group, while transnational and national transhumants are mainly of the Fulani group. The symbiotic relationship between livestock breeders and farmers has become strained as a result of the densification of areas that were previously used by transhumants. Whereas (transborder) transhumance had a positive impact on the relations between different ethnic groups, today there is a negative impact and tensions related to transhumance due to more intense agricultural use in these areas.

Contribution to employment

The agricultural sector is estimated to employ 2/3 of the active population (PSDEPA, 2014-2020). The livestock sector, the second largest activity in the primary sector, has 666,479 exploiters, or 38.2% of all exploiters. The number of women involved in this activity is estimated at 92,308, representing 13.9% of all livestock exploiters. (REEA 2015/2016). The Côte d'Ivoire case study was unable to collect more precise quantitative data on the contribution of (cross-border) transhumance to employment at national level. However, as described in section 3.2.3, both foreign and national transhumants contribute to direct employment through the hiring of herdsmen. In addition, several categories of actors are involved in the marketing circuit. The following table presents the different categories of actors and their role in the marketing chain.

Table 26 Actors at different stages of the marketing chain

Stages of the marketing circuit	Actors	Roles
Production	Local and Sahelian livestock breeders: Pastoralists, agro-pastoralists, fatteners	They fulfil the function of production and supply of animals.
Supply of livestock markets	Collectors and conveyors on foot as they handle an increasing share of the livestock trade	They travel to rural markets and villages to obtain livestock and build up a stock destined for sale.
	Loading and unloading aids	They load and unload animals on departure and arrival
	Guardian or host	He is the intermediary between the livestock trader and the customer. He is also the guarantor of the animals.
	Merchants	They buy mainly from collectors and sometimes from fatteners and producers.
Dead circuit	Wholesale butchers	They slaughter and sell wholesale to butchers and other buyers.
	Butchers	Butchers retail the meat in a butcher's shop.

Environmental impacts

Impacts on climate change

As described in section 3.2.4, transhumance can play a role in climate change mitigation, by contributing to carbon sequestration in agricultural soils. But this contribution is undermined by the densification of pastoral areas and tensions between farmers and livestock breeders. This also applies to the potential role in terms of contributing to climate change adaptation by increasing the capacity of soils to retain water, and thus their resilience to droughts.

Impacts on water quality and quantity

As described in section 3.2.4, transhumance pays the majority of the fees raised by the local committees that are responsible for managing the many dams in the north of the country that were originally built for pastoralism, but are now also used for irrigation and other purposes. However, the fees raised by these local committees are hardly used for the maintenance of these dams, which are consequently generally in a poor condition with a diminished capacity.

Impacts on biodiversity

As mentioned in 3.2.4, international and national transhumant animals (owned by sedentarised transhumants and autochthone farmers) potentially contribute to the degradation of the biodiversity of the nature parks where they graze for part or all of the year. On the other hand, if the levies on the farmers who graze in these parks are used by the management authorities to carry out protection measures, the negative effect is mitigated and perhaps even positive. Farmers are trying to move into these nature parks as well, and the fees paid by the livestock breeders potentially allow the park management to better manage these and other incursions. However, the opening up of forest areas to livestock breeders is increasingly criticised for a number of environmental consequences. These include

- Degradation of ecosystems through the overexploitation of forage plants;
- Overgrazing in grazing areas due to the non-respect of the carrying capacity of the spaces would progressively lead to soil compaction and exposure to light and wind;
- Disturbance of wildlife ;
- Competition in the use of feed resources ;
- Degradation of wildlife habitats ;
- Poaching by transhumants;
- The emergence of human-elephant conflicts in grazing areas.

Impacts on desertification

Work in Côte d'Ivoire does not provide specific information on this dimension of the environmental impacts of mobile livestock farming on a national scale. Major factors have led to the deforestation of the country, primarily commercial timber exploitation from forest areas, followed by agricultural clearing. Mobile livestock farming contributes very little to the deforestation of the country in relation to these two factors and, as we have shown, grazing by herbivores provides a useful input to the carbon cycle by recycling biomass in rangelands. This leads to a balanced or even negative GHG balance in Sahelian pastures. The same type of assessment remains to be carried out on Sudanese-Guinean pastures, where grazing removes less biomass due to the lower palatability of perennial grasses and the density of woody plants.

Impacts on land fertility

As described in 3.4.1, the association between the agricultural system and the mobile livestock system, through farmer-livestock breeder tandems, is reportedly less and less practiced in Côte d'Ivoire. The low level of use of manure is very marked in the central region (Bouaké, Tiébissou) where only 9% of farmers use cattle manure. In Bouaké, the organic manure used is often chicken droppings, most often with rice husks or sawdust added. The doses are very low: 0.12 to 0.24 kg/m² in Allokrokro (Koffi and Dugué, 2001).

On the other hand, the northern region of the country has a much higher level of use of animal manure. The use of organic matter in the form of manure seems to be widespread on all vegetable crops with low inputs: 0.3 to 1 kg/m² on onions, but sometimes at higher doses up to 3 kg/m² (FIRCA, 2019). But as described in the corresponding section under 3.2.4 animal manure is reportedly used less and less for cotton.

As a result, the contribution of transhumance to land fertility appears to decrease significantly due to the densification of pastoral areas in the north of the country, and probably also due to the increase in livestock numbers. These two factors combined would also result in tensions between farmers and livestock breeders, and thus less collaboration and use of organic matter for agricultural soils.

Key drivers of change and long-term prospects

a- The worsening security situation in various West African countries, which restricts the movement of pastoral herds:

- The socio-political crisis in Côte d'Ivoire from 2002 to 2011;
- Farmer-livestock breeder conflicts;
- Terrorism ;
- The circulation of firearms ;

- Growing insecurity in Sahelian areas.

How has this factor affected livestock systems in the last 10 years?	
<ul style="list-style-type: none"> - Absence of the administration and abandonment of technical supervision of livestock in the zones formerly occupied by the rebellion; - Uncontrolled flow of transhumant animals across the country with the risk of spreading diseases; - Illegal occupation of pastoral enclaves, stock routes and pastoral dams by farmers, new ex-forces; - Reversals of alliances during this conflict (Peuhl and new forces) increasing resentment towards pastoralists - Sedentarisation of transhumants in the country - Movement of transhumants in the southern part of the country ; - Farmer-livestock breeder conflicts ; - Trespassing in protected areas ; 	
How is this factor estimated to affect livestock systems and their economic, social and environmental impacts in the next 20 years? (Without policy changes)	What public policies can be implemented to mitigate negative impacts and maximise positive impacts?
<ul style="list-style-type: none"> - Increasing farmer-livestock breeder conflicts ; - Livestock theft ; - Massive displacement of pastoralists to Côte d'Ivoire; - Unsustainable pressure on resources ; - Intense competition between farmers and livestock breeders for natural resources 	<p>Carry out a diagnostic study of transhumance, pastoral areas and agropastoral infrastructures for a better identification of pastoral investments (stock routes, water reservoirs, pastoral enclaves, etc.)</p> <p>Strengthen inclusive dialogues and structures for conflict prevention and resolution where disputes are most intense</p> <p>Formulate and implement national and regional cross-border programmes for peaceful transhumance;</p> <p>Update and accelerate the implementation of the PRIDEC ;</p> <p>Create a formal framework for collaboration between the structures in charge of natural resources;</p> <p>Increase awareness of the legal texts and the merits of peaceful coexistence;</p>

b- Climate change. It was mainly characterised by the increase in the frequency of exceptional episodes: drought and flooding

How has this factor affected livestock systems in the last 10 years?	
<ul style="list-style-type: none"> - Difficulties in feeding livestock due to biomass scarcity; - Rapid degradation of the bromatological value of pastures ; - Decline in the quality of animal feed ; - Early movements of animals to coastal countries; - Decline in production of livestock farming 	
How is this factor estimated to affect livestock systems and their economic, social and environmental impacts in the next 20 years? (Without policy changes)	What public policies can be implemented to mitigate negative impacts and maximise positive impacts?
<ul style="list-style-type: none"> - Drastic reductions in pastoral resources - Desertification - Lack of water - Many conflicts between communities 	<p>Rehabilitate agro-pastoral dams to conserve and better control water circulation</p> <p>Communicate sufficiently on climate change, its causes and consequences to increase awareness of the phenomenon;</p> <p>Assessing the carrying capacity of forests open to grazing in order to adjust the number of animals to the forage potential;</p> <p>Promoting high-yield fodder crop production and hay making</p>

c- Continued demographic growth and urbanisation

How has this factor affected livestock systems in the last 10 years?	
<p>Limited availability of natural resources ;</p> <p>Reduction of space for animals and crops;</p> <p>Expropriation of farmers and livestock breeders, reducing production</p> <p>Growing demand for animal products in cities</p>	
How is this factor estimated to affect livestock systems and their economic, social and environmental impacts in the next 20 years? (Without policy changes)	What public policies can be implemented to mitigate negative impacts and maximise positive impacts?
<p>Increased pressure on the natural environment ;</p> <p>Impoverishment of populations ;</p> <p>Trespassing in protected areas</p> <p>Increased food production through intensification of production on the land</p> <p>Overexploitation of renewable resources (deforestation, ploughing and overgrazing that can lead to desertification, loss of biodiversity)</p> <p>Diversification of livestock systems other than ruminants.</p>	<p>Identify and promote sustainable and productive agricultural sectors in order to limit the expansion of cash crops</p> <p>Promote the integration of fodder crops in farming systems; Development of agro-ecological practices in the extension of the agriculture-livestock association</p> <p>Encourage the setting up of local multi-actor innovation platforms to increase the responsibility of local actors (local authorities, socio-professional organisations, administrations,);</p> <p>Supporting local actors in drawing up transhumance charters</p> <p>Establish co-management committees for agro-pastoral infrastructure and strengthen their capacity;</p>

d- Continued expansion of cultivated land and thus a decrease in available grazing land for mobile herds and, as a result, continued tensions between pastoralists and farmers over land issues.

How has this factor affected livestock systems in the last 10 years?	
<ul style="list-style-type: none"> - Colonisation of pastoral facilities (banks of dams, stock routes and pastoral enclaves) by farmers; - Soil degradation; - Destruction of crops and harvests by transhumant animals; - Frequent clashes between farmers and livestock breeders; - Killing of animals in retaliation for crop damage 	
How is this factor estimated to affect livestock systems and their economic, social and environmental impacts in the next 20 years? (Without policy changes)	What public policies can be implemented to mitigate negative impacts and maximise positive impacts?
<ul style="list-style-type: none"> - Drastic scarcity of forage and water resources; - Decline in livestock production ; - More or less pronounced degradation of biological and landscape resources; - Weakening of social cohesion 	<ul style="list-style-type: none"> - Raise awareness of the legal texts governing transhumance; - Work to ensure that the pastoral dimension is taken into account in the process of securing rural land tenure; - To study and propose different options for modernising the livestock sector and animal feeding that can benefit both farmers and livestock breeders;

	<ul style="list-style-type: none">- Developing strategies for more agriculture-livestock integration- Sedentarise mobile livestock and intensify fodder production;- Promote the use of agricultural and agro-industrial residues in animal feeding
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Photo 14 Sale of livestock restraint and control ropes for farmers at the Tourou/Parakou livestock market (P. Onibon, Benin)

4 Putting this analytical framework into perspective at the West African regional level

This chapter now turns to the regional perspective of the analytical framework developed earlier. The analysis thus focuses on result 2 of the study:

R2: This conceptual framework is put into the perspective of the West African regional space as a whole, in order to provide a first draft of a global assessment and to identify the information gaps that need to be filled in order to refine the assessment and knowledge of impacts.

Context of the region

The social organisation of transhumance and the evolution of farmer-livestock breeder relations

In recent years, regional news has been dominated by conflicts that are allegedly linked to pastoralism and transhumance. However, we must be careful not to equate pastoralism with violent conflicts between farmers and livestock breeders, as is often the case. Many studies show that pastoral mobility is the result of a social construction that is constantly maintained and adjusted (Djerma et al., 2009; Marty et al., 2009). Mobility is only possible and effective if it is based not only on the collective know-how of mobile groups (notably their information system on pastures with scouts and informers and guarantors on livestock markets), but also on alliances that are constantly maintained and renewed with sedentary local communities and their authorities.

The threat of pressure from agricultural land on grazing areas

The forage resources of rangelands, whose surface area is decreasing due to the advance of agricultural fronts and urban sprawl, are increasingly faced with overexploitation and the impact of climate change (which is also anthropogenic), which reduce their productivity and quality. Indeed, cultivated land, which covered 520,404 km², 13.6% of the land of ECOWAS countries in 1975, covered 1,057,624 km², 27.8% of the land, in 2013, i.e. an increase of 104% in 35 years (Tappan et al., 2017). At the same time, built-up land increased by 141%, bare land increased by 10% in connection with soil erosion and also the development of mining, while steppes and Sahelian savannahs decreased by 13%, Sudano-Guinean savannahs by 22% and forests by 20%. In addition, the reduction in the area of rangelands is accompanied by their fragmentation and the occupation of stock routes, both of which reduce access to the remaining rangelands and sometimes to water points. This reduces the room for manoeuvre for pastoral activities and limits the opportunities for future agricultural clearing. Nevertheless, as Hiernaux et al (2021) point out, the dynamics of resource exploitation play out differently in different countries and agro-ecological zones; for example, there is an increase in cultivation in the arid pastoral zones of Mauritania and Niger, a densification of agroforestry in certain semi-arid agricultural terroirs, and an expansion of cultivated land in the vicinity of and in humid zones. This situation has accentuated the competition for access to natural resources and land for the two extensive production systems: agricultural family farming and pastoral livestock farming.

Increasing reference to farmer-livestock breeder conflicts

‘While there are important national and regional hotspots where unresolved disputes fester, peaceful relations and a spirit of cooperation persist over much wider areas. Even within hotspots, violent conflict is usually ad hoc and intermittent, occurring alongside regular cooperation. Most conflicts in rural areas are managed peacefully by traditional leaders and local institutions. The current focus on the escalation of violence neglects this reality and therefore prevents lessons from being learned.’ (Krätli et al., 2020). However, the effectiveness of local conflict resolution

mechanisms has been severely undermined where communities are caught up in a 'war economy' or where local governance is dominated by corruption and predation that tend to exacerbate tensions that lead to violence instead of fair and transparent management of agro-pastoral disputes. Bias and corruption in the settlement of agro-pastoral disputes are often denounced in the field (Nobimé F. 2020; ZOOFOR Consult, 2021).

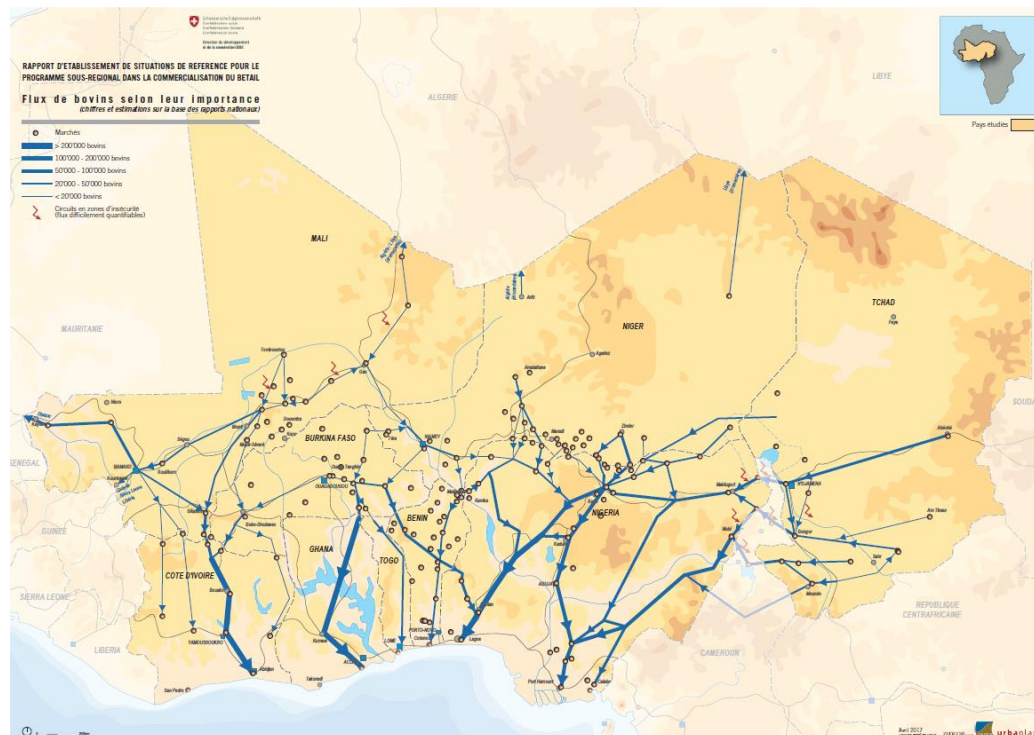
Management of transhumance by the public authorities

Coastal countries are increasingly regulating transhumance in their territories: entry and exit dates, annual animal quotas, level of taxation, corridors to be used, confinement of transhumant livestock in existing or to be developed host areas, transhumance monitoring procedures. Legal instruments have been developed at national and regional level (ECOWAS Decision A/DEC.5/10/98 regulates cross-border transhumance), but they have been little implemented since the early 2000s to preserve pastoral mobility (PEPISAO, 2020). Initiatives aimed at regulating pastoral mobility are also being developed in certain cross-border areas (Yaro Bottoni, 2021). These include the joint cooperation commissions on transhumance (Burkina Faso/Niger, Mauritania/Mali, Mauritania/Senegal, etc.). A successful experience of 'inter-collectivity' (cross-border local authorities) in the eastern region of Burkina Faso should be noted. Cross-border committees for the education and training of pastoral populations have also been set up as part of the implementation of the Regional Programme for the Education and Training of Pastoral Populations (PREPP). Lastly, there are the innovation platforms for conflict management developed in the north of Côte d'Ivoire in connection with mobility flows from Mali and Burkina Faso. However, in this diversity of cross-border consultation frameworks, a common feature is the persistent difficulties of functioning due to a lack of financial resources.

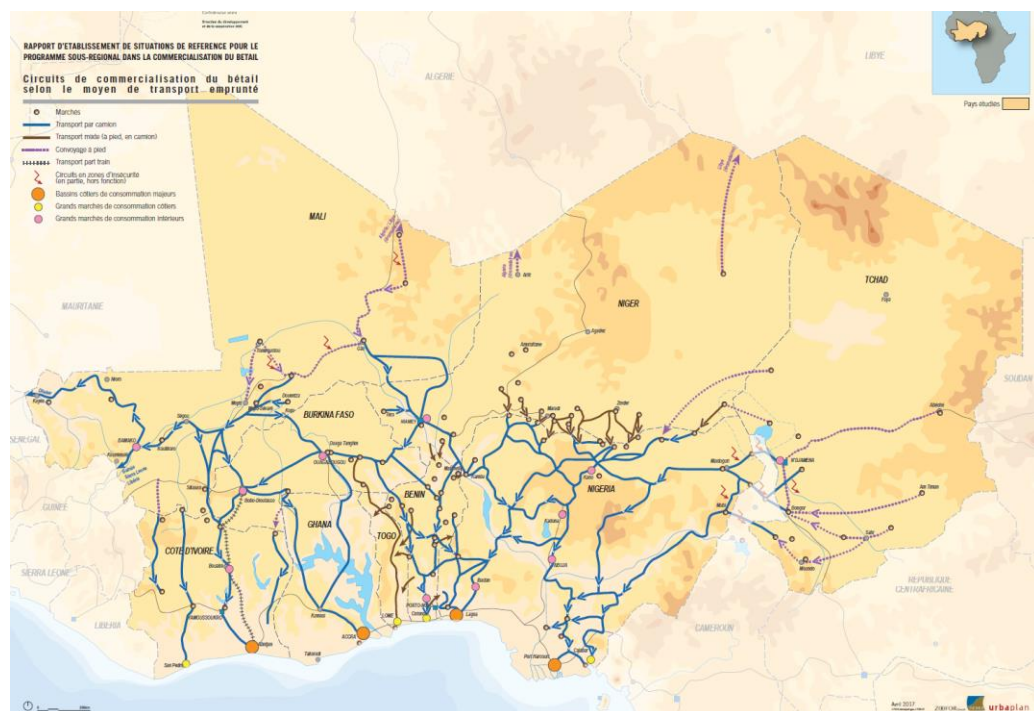
Market dynamics

As described in part in the Benin and Côte d'Ivoire case studies, a large flow of livestock trade from the Sahelian countries, with their vast seasonal pastoral areas facilitating the development of large breeding stock, fuels trade and transhumance movements to the coastal countries, and especially destined to respond to the demand of the urban centres in these countries. These flows are constantly adapting according to market conditions, regulatory frameworks, weather conditions, security conditions, and other factors. The main axes of these flows have been mapped by several studies. Below two maps have been developed to establish a baseline situation for the Programme to Support Livestock Marketing in West Africa (PACBAO), funded by the Swiss Agency for Development and Cooperation (SDC).

Map 10 Map of cattle flows by size and livestock markets



Map 11 Livestock marketing routes by mode of transport



Source: ZOOFOR Consult et al, Gedes, and Urbaplan, 2017, Establishing a baseline for the West Africa livestock marketing support programme, SDC

The map clearly shows three main ways of transporting animals: by truck, by train and on foot. According to this map, only travel between Burkina Faso and Côte d'Ivoire is by train. (But the map does not cover the whole study area). From this map, it also appears that travel between Benin and Nigeria is mainly by truck. This is in contradiction with what was observed by our case study in Benin. It mentions that many trucks from Burkina Faso and Mali unload their animals in Benin, only to

continue their journey on foot to the Olodo market in Nigeria. The drivers of such practices are security and regulatory issues specific to this area. The animals can then often continue the journey by truck to Lagos.

This map also shows that transport between the Sahelian countries is mainly by truck, whereas between Burkina Faso and Togo and between Niger and Nigeria, transport is mainly on foot. This schematisation remains very sketchy and it should be considered that transport on foot is widely practised between other Sahelian countries and coastal countries and that it remains largely complementary to and combined with other modes of conveyance (Corniaux et al., 2021).

Cross-border transhumance movements between the Sahelian countries and the coastal countries also play an important role in these livestock trade flows. Some of the animals of transhumant livestock breeders are sold directly by them on the markets of coastal countries. This practice is not called conveying on foot, but there are gradations between the two practices, and the distinction between the two is not always clear. The roads and tracks used by transhumants are also used by conveyors on foot.

Specifically, conveying on foot is an efficient practice that allows animals to lose less weight and even fatten up during their journey, thus increasing the value on terminal markets. (Corniaux et al., 2012 according to Corniaux et al. 2020) However, as explained before, some coastal countries have put in place limitations on herd movements, both for (cross-border) transhumance, and for conveying on foot. Benin and Togo impose limitations on foreign herds at their borders. Côte d'Ivoire prohibits the transport of animals destined for slaughter on foot.

At the beginning of the Covid-19 pandemic, several countries tightened restrictions on cross-border movements of people. This greatly affected conveyance on foot and cross-border transhumance. Traders were also restricted in their movements. These disruptions to livestock trade flows between Sahelian and coastal countries had various impacts, but generally resulted in price increases during some months in the urban centres of coastal countries, and price falls on livestock markets in Sahelian countries. Since then, some of the restrictions have been lifted, but some have also remained in place.

Livestock market information systems ('SIM-bétail') are implemented by several governments in the region, partly coordinated by CILSS and with financial support from the WB (PRAPS). Data from this system has enabled the BRACED project to analyse the connectivity of livestock markets in Mali, Burkina Faso and Niger and the impacts of climate and security factors. The report concluded that markets are well integrated at national and regional levels, with rainfall and terrorism having a significant and negative impact on livestock prices (Simonet et al., 2020).

The option of slaughtering animals in Sahelian countries and exporting the meat to coastal countries is often mentioned as a solution to avoid the problems associated with transhumance and conveyance on foot in coastal countries. However, this development has only rarely materialised so far (Corniaux et al. 2020). It would require an equally complex (including quality standards and cold chain) and stable organisation, for which the current conditions are still far from being met. Slaughterhouses in the northern parts of coastal countries and the southern parts of Sahelian countries are generally public slaughterhouses serving small private butcher shops in the locality. Butchers have the animals they have purchased slaughtered there. The meat is mainly intended for consumption by the local population, and the quality standards are relatively low. Very few private slaughterhouses have tried to establish themselves in the Sahelian countries in order to meet local demand and to export to coastal countries (Corniaux et al. 2020). The reference is the privately

managed slaughterhouse in Kayes, Mali, on the border of Senegal and Mauritania. The profitability of this slaughter chain is linked to the supply of a niche clientele consisting of several mining companies in the region. The stable supply of animals in line with this demand for quality, and the legal, institutional, social and economic environment are real challenges to the profitability of this initiative (Corniaux et al. 2020).

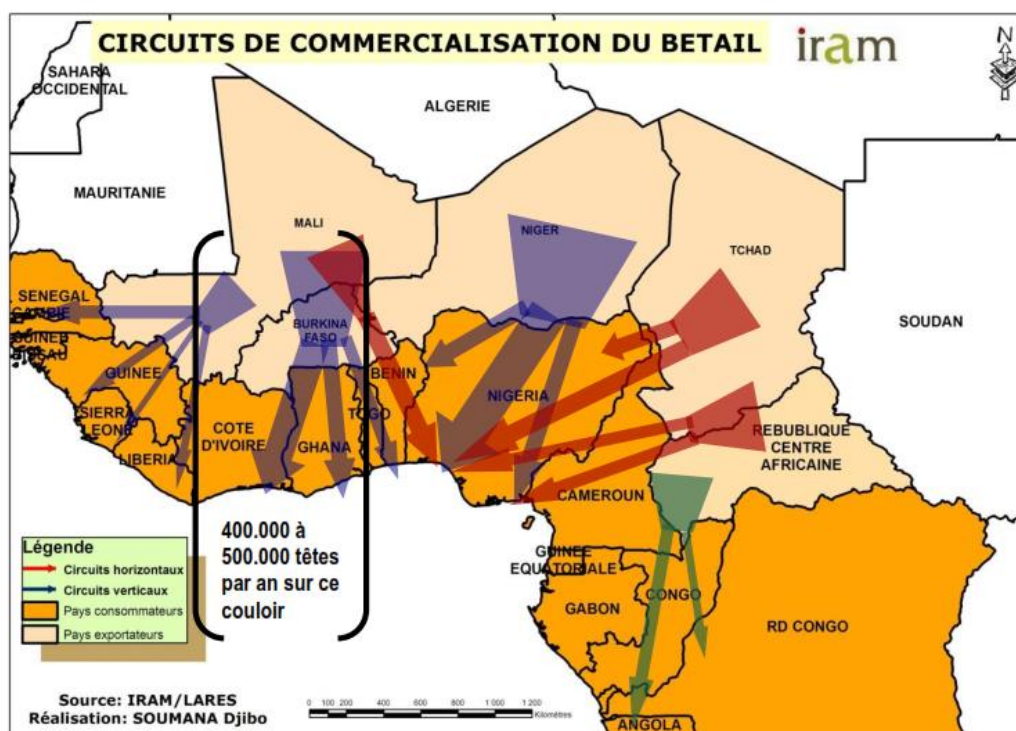
In view of the growing demand for meat in the region, these market dynamics must be placed in a general context of transition towards the consumption of other sources of protein from short-cycle livestock (especially chicken, pork and fish), instead of red meat (ruminants). Offal and chicken are also imported in large quantities now. Imports from outside West Africa of red meat, rather of high quality, are still low, but growing (Corniaux et al. 2020, Duteurtre and Corniaux, 2021).

The dairy sector has long been in competition with imports from the world's major exporters, especially the European Union and New Zealand. This concerns mainly milk powder, often reconstituted with other products such as palm oil. This milk is mainly consumed by urban consumers. With the exception of Mauritania, local milk is consumed by livestock breeders and rural consumers in the vicinity. The milk is also partly converted into cheese, which is also sold on urban markets. Apart from this traditional milk production, which is characterized by low productivity of the dairies, a small number of peri-urban farms are being developed that produce fresh milk for urban consumers. For mobile livestock systems, milk production plays an essential role in the food security of pastoralist families and part of it is also sold by women on the markets.

In the end, regional trade in livestock between Sahelian and coastal countries is considerable. In the central trade corridor of West Africa, Burkina, Mali and Niger are estimated to sell 400,000 to 500,000 head of live animals per year to southern countries such as Côte d'Ivoire, Ghana, Togo and Benin. Nigeria is one of the main destinations for livestock from Sahelian countries. According to Sounon 2021²⁴ *'Between 2001 and 2015, thanks to the strength of the Nigerian currency, the naira, the Guéma (Parakou) market, which specialises in transactions involving animals from Burkina Faso and Niger, received 25 to 30 lorries of 35 oxen each per week, i.e. a weekly flow of between 875 and 1,050 oxen and 36,500 to 54,600 heads per year. These animals are then transported to Nigerian markets. Direct flows from Niger to the Federation are estimated at over 250,000 head per year.*

²⁴ Sounon Bouko Boni, 2021. Effects of COVID-19 on cattle trafficking between Burkina-Faso and Nigeria, Journal Banouso n° 55, Cotonou -Benin.

Map 12 Trade routes and importance of the central axis



Source: Denis GOH & Bertrand GUIBERT (IRAM), 2015 Context of the study area

In short, as inter-réseaux développement (2015) points out, we are dealing with an integrated regional production system that strongly interrelates the problems of cross-border transhumance and marketing, which is reflected in a certain parallelism between transhumance corridors and transnational marketing circuits.

'When we talk about a regionally integrated production system, this implies that the movement of the herd is part of a livestock management that will allow the animals to be finished gradually, possibly with targeted food supplements for the animals that are to be marketed, from the time they leave on transhumance until they arrive, often more than 1,000 km away, on the markets of coastal countries. The animal sold in Abidjan, Lagos or Accra is therefore a product linked to a regional territory and resources, and not only to the Sahel. This notion of an integrated regional production system is not only valid for animals born in the Sahel and slaughtered on the outskirts of coastal cities. It also makes sense in the agriculture-livestock systems that are developing very rapidly in the south of Sahelian countries-north of coastal countries. In winter, the herds kept by these agro-livestock breeders are often entrusted to a shepherd who goes to the pastoral areas to free up the land for cultivation.'

Economic impacts

Contributions to GDP

Different sources provide different estimates of the contribution of the livestock sector to national GDP and agricultural GDP. Broadly speaking, three sources of data are available:

- The economic statistics of the statistical services of countries that use varying methods to estimate the contribution to GDP of the agricultural sector, including livestock. The comparison is therefore not always relevant. Some publish the respective contributions of

the sub-sectors, including livestock, while others do not. When this is the case, the breakdown is different (for example with or without 'hunting' and 'fishing').²⁵

- FAOSTAT: The data available on this FAO website give a Value of Agricultural Production, by product, aggregated by sector, including the livestock sector. However, intermediate costs have not been deducted, which does not correspond exactly to the contribution to GDP. These data are calculated on the basis of data provided by the governments of the countries, but which are subject to a certain processing, including to ensure a certain homogeneity of the data between countries.
- WB economic statistics show total GDP and GDP of the general agricultural sector, but without specification of the part that corresponds to the contribution of the livestock sub-sector. These data are calculated from a database provided by country governments, but are also subject to processing, including to ensure some measure of data homogeneity across countries.

The LSIPT tool offers the opportunity to estimate the livestock sector's contribution to GDP in absolute terms. But it incorporates other estimates of the livestock sector's contribution to GDP and total GDP, notably those of the country's government statistical service, to estimate the percentage contribution of the livestock sector to GDP.

Various reports quote percentages of the livestock sector's contribution to the GDP of WA countries, based on different sources.

'Agriculture in the broad sense has a particular economic weight in West Africa, since in the WAEMU area, for example (Benin, Burkina Faso, Côte d'Ivoire, Mali, Niger, Senegal, Togo, Guinea-Bissau), it contributes 30% to GDP and employs more than 50% of the active population (Renard et al., 2004). In landlocked Sahelian countries that are net exporters in the central corridor of the ODS space, the contribution of livestock to GDP varies from 10 to 15% (MRA/Niger, 2001; MRA/Burkina Faso, 2005; MEP/Mali, 2004). It is relatively lower in the coastal countries of Senegal (8%), Ghana (9%) and Togo (8%). In terms of agricultural GDP, livestock production plays a very important role, as the share of livestock production ranges from 5% in Côte d'Ivoire to 44% in Mali, with an average of nearly 40% for the Sahelian countries alone. In Mauritania, although livestock accounts for 15% of GDP, its contribution to agricultural GDP is 80%. In Nigeria, the position of livestock seems to have declined, over the last 4 years, the agricultural sector contributed 49% to GDP, of which 13% was livestock. In 2003, these proportions were only 35% and 3% for the agricultural sector and livestock respectively (Eboh et al., 2004; OECD, 2008).

In reality, the contribution of the livestock sector to GDP would be higher in West Africa if the value of animal traction and organic manure in mixed crop-livestock systems, which are widely represented in the region, were included (Winrock International, 1992). Smith et al (1996) indicate that including labour and organic manure as livestock products would increase the contribution of the sector to agricultural GDP from 25% to 35% for sub-Saharan Africa and to nearly 50% for West Africa.

Various case studies also show that in countries that are highly dependent on agriculture, i.e. where it accounts for more than 20% of the gross national product (GNP), overall economic growth is closely correlated with that of agriculture. For example, a \$1 increase in farm income would correspond to a \$2 increase in the total income of the local economy (Delgado et al., 1998; OECD, 2008).

²⁵ Another difficulty is the breakdown of the industries' contribution. A breakdown of this contribution for the agri-food industries is normally made, but then this contribution does not show the contribution of the livestock industries separately.

An indicative estimate of the contribution to GDP of the livestock sector in WA (including Mauritania and Chad) with the LSIPT tool, based largely on the estimates of production parameters used for Benin for all WA countries, is given below.

Table 27 Summary of the contribution to GDP in 2018 of the livestock sector and mobile livestock systems in West Africa (including Mauritania and Chad)

6. Comparison with official statistics	Sources	Official data	Data calculated here*
VA livestock (production) (in millions FCFA, current prices)		10 859 796	11 827 308
Regional VA/revised (in million FCFA, current prices)	WB 2018	363 212 853	364 180 365
Contribution of livestock (production) (%)		3,0%	3,2%
VA of livestock value chains (production and value chains) (in millions FCFA)			14004291
Regional VA/revised (in millions FCFA)(option 2)		363 212 853	364 180 365
Contribution of the livestock value chains (production and value chains) (%)			3,8%
VA linked to transhumance (production & value chains) (in million FCFA)			8 839 539
Contribution to regional GDP (production & value chains) linked to transhumance (%)			2,43%
Fraction of livestock VA (production and value chains) linked to transhumance (%)			63,1%
VA linked to cross-border transhumance (production & value chains) (in million FCFA)			1 634 549
Contribution to regional GDP (production & value chains) linked to cross-border transhumance (%)			0,45%
Fraction of livestock VA (production and value chains) linked to cross-border transhumance (%)			11,7%
Percentage of Livestock in Agricultural Production Value (14/17 countries, FAO, 2016)		13,6%	
VA livestock (% FAO 2016 multiplied by GDP agriculture WB 2018)(in million FCFA)		10 859 796	
Contribution of livestock to GDP(%)		3,0%	

The estimated contribution to GDP of the overall livestock sector is 3.2% (for production only). This is higher than the (incomplete) FAO/WB 2018 data-based estimate. Note that the 3.2% estimate includes estimates of the value of organic matter of 5 FCFA per kg for poultry and 0.5 FCFA per kg for all other types of animals. Without this contribution from organic matter, the contribution to GDP at the production level would be estimated at 2.9% (and 3.5% with the rest of the value chains included). It is not clear whether the FAO and WB data-based estimate of 3.0% relates only to the contribution at the production level, or also in the rest of the value chains.

For the estimation of GDP contributions at the regional level, also the contributions of all mobile livestock systems (production and value chains) have been isolated. This contribution of mobile livestock systems to overall GDP of 2.4% seems small, but the estimated contribution to GDP of the overall livestock sector of 63.1% is very large. The estimates of the contribution of cross-border mobile livestock systems to overall GDP of 0.45%, and to the GDP of the overall livestock sector of 11.7%, appear low.

This estimate remains indicative and should be treated with great caution. To be more precise an estimate of all the production and other parameters that are needed for these estimates, it would be better to make the estimates first rather at the national level, as we did for Benin, but in an even more precise way as envisaged with the design of the LSIPT tools. Once the estimates have been made for all countries, a consolidated estimate of the contribution of the livestock sector to GDP at the regional level could be approached. For this, important work needs to be done to harmonise the estimation approaches used by countries.

Finally, another point that remains to be clarified in the comparison of the estimated contribution of the livestock sector to GDP with official statistics is the inclusion of the contribution of organic matter²⁶.

²⁶ See also Annex 2 for detailed conclusions and recommendations

Fiscal contributions

As partially discussed in Chapter 3, the fiscal contributions of mobile livestock systems consist mainly of the following six types of taxes:

- Market taxes
- Entry fees for transboundary transhumant herds
- Taxes and harassments of passage and grazing
- Import taxes levied on animal imports
- Taxes and harassments paid by trucks transporting animals
- Different types of taxes levied downstream in the value chains of animal products (including VAT and taxes levied in slaughterhouses)

We will briefly discuss these different types of taxes here.

Market taxes

Market taxes are composed of different rubrics, with sometimes the difficulty to distinguish between what is a real tax and what is a service fee. The organisation and taxation of livestock markets is to a large extent decided by local authorities ('collectivités'). Diallo et al (2013) show the diversity in the level of contributions levied and the distribution of these revenues between the municipal office, the management committee, brokers, and others, by analysing seven livestock markets.

Entry fees for cross-border transhumant herds

Entry taxes for cross-border transhumant herds are officially not allowed under the regional regulatory framework, but the entry taxes levied in Benin are highlighted in the fiscal contribution sections. Several ECOWAS member countries do not comply with many clauses of this regional regulation.

Taxes and harassments of passage and grazing

As described in Benin and Côte d'Ivoire, harassments for passage and grazing are practiced. In Benin the amounts are paid to individuals and communities, while in this area it is often difficult to distinguish between genuine taxes, harassment and compensation for a meditation/negotiation service. In Côte d'Ivoire it is the National Park services that levy taxes on shepherds in return for the right to graze their herds in these parks. The general impression is that these taxes and harassments are more common in coastal countries where the (agro)pastoral areas are generally denser. However, the frequent prevalence of passage harassments is also known in southern Burkina Faso, especially for shepherds who want to transhume with their herds to Ghana (Le Cotty et al., 2021).

Import taxes levied on animal imports

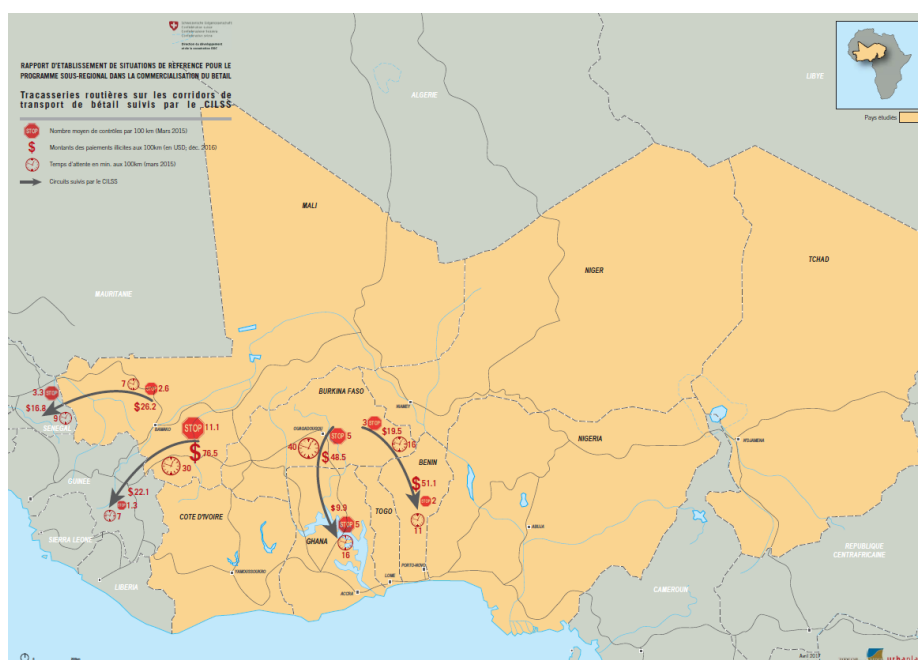
Even though imports are theoretically not subject to import taxes in the ECOWAS trade area, VAT and/or other taxes are nevertheless levied by customs services at the borders on trucks transporting animals between two countries. For the transport of animals from other countries, e.g. imports into Senegal of animals from Mauritania or into Nigeria of animals from Cameroon, import tariffs may be added.

Taxes and harassments paid by trucks transporting animals

The harassments imposed at multiple roadblocks are still widely known to be prevalent in West Africa. There are significant variations in the amounts charged to truckers transporting livestock.²⁷ The baseline situation established for PACBAO maps these charges for some livestock trade routes.

²⁷ As described in the section on animal transport from Benin to Nigeria, these harassments are sometimes so great that traders prefer to unload their animals and continue the journey by conveying the animals on foot to avoid these multiple roadblocks.

Map 13 Road harassment on major livestock trade routes monitored by CILSS



Source: ZOOFOR Consult et al, Gedes, and Urbaplan, 2017, Establishing a baseline for the West Africa livestock marketing support programme, SDC.

Multiple taxes levied downstream in animal product value chains

Downstream in the value chains, several taxes of varying amounts are established between different countries in West Africa. Generally, small businesses would be less exposed to these taxes. Taxes apply to businesses in all sectors, some are specific to livestock value chains, such as slaughter taxes levied in public slaughterhouses.

The LSIPT tools (Indirect contribution of the livestock sector to the national economy, M4-SM1-A2) also allow the estimation of fiscal contributions of the livestock sector. As with GDP contributions, an additional difficulty is to disaggregate these contributions between mobile and sedentary livestock systems. Disaggregating livestock systems into sedentary and mobile systems, and then into cross-border and non-border systems, as is done for the estimation of GDP contributions, should allow the fiscal contributions to be distinguished as well. However, here again, the main difficulty lies in estimating per animal, per unit produced, or on another scale.

Contribution to poverty reduction

One of the LSIPT tools (Livestock Sector Contribution to Poverty Reduction and Household Inequality, M4-SM1-A4), via two options, estimates the poverty percentages of different livestock systems, and the poverty percentages of these households according to their livestock income. In the framework of this study, it was not possible to complete these estimates at either national or regional level. Detailed data on total income and income from livestock activities of households in different livestock systems are not available to do this. These estimates should be made first at the national level, and then averaged out at the regional level. At the national level, ideally, these parameters of total income and household income from livestock activities should be provided either by a dedicated survey that disaggregates households into different livestock systems. Alternatively, estimates could be made from income databases set up for other purposes, such as vulnerability and food security monitoring systems. The tool also allows for a comparison between the baseline situation and with a specific intervention ('No change' and 'With change'). In this case,

estimates of the parameters establishing the situation with change and the baseline situation need to be put in place.

The OECD (2008) study on livestock and the regional market in the Sahel and West Africa cites Reardon (1997) who estimates that in West Africa, the incomes of rural people, the main victims of poverty, depend on agriculture for 40-78%. He also cites a 1992 publication by Winrock International which states that at least 50% of the cash income of agro-pastoralists in tropical Africa is derived from the sale of livestock products. ¹

For the establishment of the PACBAO baseline (2017), the results of some national studies have been compiled in the table below. These results show that livestock would contribute between 18% and 81% to rural and livestock breeder households' incomes. However, this wide range comes from a single study in Mali.

Table 28 Contribution of livestock to rural household income

Pays	Revenu ménage agricole	Revenu ménage d'éleveur	Part de l'élevage	Part non élevage
Bénin (2015)	ND	921 483 FCFA 100%	598 447 FCFA 65%	323 036 FCFA 35%
Burkina Faso (2011)	100%	ND	38,8%	61,2 %
Côte d'Ivoire	ND	ND	ND	ND
Mali	ND	100%	18 - 81%	19 - 82%
Niger	ND	ND	22 - 30%	ND
Nigéria	ND	ND	ND	ND
Tchad	ND	ND	ND	ND

Source : Etude, rapports pays.

Source: ZOOFOR Consult, Gedes, and Urbaplan, 2017, Establishing a baseline situation, livestock marketing support programme in West Africa. SDC, 95 p.

In reality, the contribution of livestock activities to rural household income can probably vary between 0% and close to 100%, when isolating the different production systems. For the livestock systems identified for this study, based on the typology used by FAO, the variation is probably almost as wide (but certainly not 0%). Poultry probably provides relatively low incomes for rural households with predominantly agricultural activities. However, if we consider only mobile livestock systems (grassland-based systems) we can be sure that livestock do contribute to the majority of household income, probably still with large variations.

A 2002 ILRI study (Thornton et al.) attempted to map poverty and livestock in developing countries. For this mapping the study uses the same FAO typology that is used by the LSIPT tools, as well as their constrained geolocation (see section 2.2.). The geolocation of poor households faces strong data constraints. The study uses national-level poverty rates applied to housing densities at the most decentralised administrative level. Corrections are made to locate more people in cities and along roads. The latter data are based on population censuses that locate pastoralists generally at their administrative place of anchorage. The study provides tables with estimates of the number of people per country in the different livestock systems and the numbers of poor people per country in the different livestock systems (using different definitions of poverty).

Potentially more detailed poverty maps developed by the WB or other international and national institutions can be used in the future to develop estimates in terms of numbers of poor people and poverty rates for different livestock systems. There are promising new methods that combine traditional household survey data with non-traditional data. (Rodriguez Castelan et al, 2019)

It is generally recognised that the livestock sector plays a key role in the income of the poor²⁸. Without this income, their situation would be even more extreme. With regard to mobile livestock systems, the pastoralists concerned are generally considered to be the poorest, compared to agricultural producers in rural areas of West African countries. These pastoralists have very few other income options given the latitudes they work in and the land tenure constraints they face. Mobile livestock farming is thus extremely important to avoid a worsening of the poverty situation in West African countries, especially for a part of the population that is already among the poorest.

Contribution to equality

One of the LSIPT tools that can be used to estimate the contribution to poverty reduction (Contribution of the livestock sector to the reduction of household poverty and inequality, M4-SM1-A4), also provides an inequality ratio. This should be estimated from the average income of the richest decile and the poorest decile. The fractions of income in the top and bottom 10% are available for some countries in the WB database, and also allow the calculation of the same inequality ratio. The WB database also contains estimates of the GINI coefficient, the most frequently used inequality indicator. However, these estimates are not from the same years and not all countries are covered in the recent period 2010-2019.

In line with previous observations on the contribution to poverty reduction, a significant proportion of the poorest depend on livestock systems for part of their income, it is clear that mobile livestock also play a key role here in contributing to equality in West African countries.

Social impacts

Contribution to food security

The contribution of mobile livestock systems to food security can be approached in at least two ways: the (direct) contribution in terms of food production and the (indirect) contribution in terms of the importance of mobile livestock farming for income, which enables households to purchase other foods to ensure their food and nutrition security. The importance of mobile livestock systems for income has already been discussed in terms of their contribution to poverty reduction; here we will focus on the direct contribution in terms of food production.

One of the LSIPT tools (M4-SM1-A2) allows the production of different livestock systems to be estimated in terms of energy, protein, and lipids. This requires first of all that the content levels of these nutrients are entered for all the different livestock products consumed. These levels are not pre-reported, and no reliable and harmonised source of these levels could be found in the framework of this study. Therefore, the contribution to food and nutritional security in terms of energy, protein and lipid production could not be estimated. Once the production of these nutrients can be estimated, the tool will also allow the estimation of the coverage rate, based on the daily requirement parameters that are pre-set in the tool²⁹. The tool rather divides production between the different main products (meat, milk and eggs), and then between the different types of animals that produce these products. These results are therefore not currently disaggregated between livestock systems, but it would probably be possible without too much difficulty to isolate the contribution of mobile livestock systems.

With the gradual growth in ruminant numbers over the past decades, and the assumption that a large proportion of these animals are in mobile systems, mobile livestock systems are also

²⁸ The FAO website indicates that there are 1.3 trillion people engaged in livestock production worldwide, of which 600 million are among the world's poorest (FAO, 2020).

²⁹ Energy: 2,900 kcal, protein: 61 g, and fat: 97 g

contributing more to the nutritional needs of West African populations. However, populations are growing faster than animal numbers, while at the same time urban populations are consuming more and more animal protein. In an attempt to meet this growing demand, monogastric livestock and aquaculture have developed rapidly over the past decades. Imports of chicken and milk powder have also increased considerably over the same period (Duteurtre and Corniaux, 2021). The relative contribution of mobile livestock systems in terms of food production may thus have decreased over the last decades. This would be in line with the global trend of decreasing relative production of ruminant meat, in favour of short-cycle production such as chicken and pork, as well as fish from aquaculture.

However, it should be considered that mobile livestock systems have a greater importance for food and nutrition security than the percentage coverage and daily³⁰ energy, protein, and lipid requirements that could be estimated with the LSIPT tools. The availability with a huge spatial coverage of animal products from mobile livestock systems (meat and milk/cheese) at low prices implies that these systems play a more important role in contributing to the food and nutrition security of populations in rural areas most vulnerable to food and nutrition insecurity.

Particularly in coastal countries, mobile livestock systems also allow the use of a larger share of production factors for crop production (which is obviously also important for food security) and/or of their foreign exchange earnings. This has to be weighed against the situation of households where these meat needs/consumptions should be covered by monogastric meat and fish from aquaculture.

Contribution to social welfare

Welfare is a concept that can be interpreted from many angles. Above we have mainly mentioned land security, schooling and opportunities for youth. The limiting of farmer-livestock breeder conflicts can also be seen as an important component of social welfare. This angle is described in the subsection on impacts on security and community relations below.

Land security

As mentioned in the case studies, transhumance allows some of the pastoralists who wish to do so to develop social links on favourable sites or hosting areas. This allows them to establish a gradual anchorage point without limiting the mobility of the herds, contrary to what is often described as a sedentarisation process. To conclude, this process of seeking out anchorage points is now reinforced by the flight from areas of extreme insecurity in certain Sahelian regions, such as Nigeria.

Schooling

The thematic prospective reflection note carried out by PEPISAO on social-political aspects³¹ (Camara, 2021) describes that the poorest families benefit greatly from schooling in pastoral settings. For them schooling is a means of social emancipation. For these families, schooling is an investment in the future of their children, in the realisation that they will not be lucky enough to inherit a large number of animals. The note also mentions that school is also an opportunity for integration into the national community for certain groups at risk of marginalisation, notably the most mobile pastoralists (*Wodaabe, Mohamid Arabs*, etc.). The note also highlights initiatives that have been developed in different West African countries to make schools more accessible to pastoralists' children.

³⁰ Firstly, the needs are considered to be greater than the actual consumption, which can manifest itself in over-consumption of livestock products.

³¹ What are the prospects for the evolution of mobile livestock systems in relation to ongoing the political, technological and social mutations in West Africa and the Sahel?

Opportunities for youth

Young people in pastoral societies face precarious and difficult situations, in which vulnerability and difficulties in intergenerational relations within these groups interfere (Camara, 2021; IR, 2015). While a significant proportion of young pastoralists do not necessarily wish to adopt the profession of their parents, the economic viability of pastoral activities is still very important. It is probably still the most important to ensure employment prospects for a significant proportion of young people who wish to do so. Employment prospects in urban areas remain limited for the children of pastoralists, and the risk of being attracted to illicit activities may constitute a worrying alternative in the major social transformations that are underway.

Contribution to cultural identity

For the social groups that practice transhumance, these mobile livestock systems play a central role in the construction of their cultural identity. Pastoral mobility can only function through a solid social construction of transferring specific socio-technical knowledge as well as strong alliances between families and between pastoral and sedentary communities. Herding practices and the complex and agile organisation of movements are the main reference to the way of life, the history, and thus the identity of these groups (IIED SOS-Sahel, 2010; Hesse et al., 2013; Swift, 2008).

Impact on animal welfare

Animal welfare can be analysed through a few main aspects in the context of transhumance and mobile livestock farming in the region. These are the health of the animals, the conditions under which they are transported, and the extent to which they can develop their natural behaviour as domesticated herbivores. These three aspects are described below. In the end, this type of impact is obviously difficult to quantify. Animal welfare is not currently a major concern of citizens and consumers in West Africa, but it is likely that this moral concern will become more important in the future. In fact, mobile systems are livestock systems in which farmers' attention to the welfare of their animals is by far the highest. It should not be forgotten that this concern for animal welfare emerges from the conditions of intensive and industrial farming systems. On the other hand, questions arise downstream of the chain when approaching motorised transport and slaughterhouses in the terminal consumption centres.

Animal health

Animal health is seen as a key component of animal welfare. At first sight, transhumance could be associated with both positive and negative practices in relation to animal health:

- Contribution to better livestock health: In essence, transhumance is a way of optimising the use of forage and water resources across large areas, in order to optimise animal health, which is expressed in terms of production (in terms of milk and meat) and animal reproduction. This results in significantly better performance in mobile than in sedentary pastoral systems (over a long period to take into account droughts that can strongly impact the system) (Colin de Verdière, 1995; Hiernaux et al., 2008).
- Negative contribution related to the extent of movement: Animals may have to walk for several days in strong heat with little water available. This can lead to significant health stress at times. However, transhumants who move over long distances practice night grazing and night-time movements for this reason.

Animal transport

Conditions for motorised livestock transport are generally poorly developed in West Africa. The trucks that are used are not designed for animal transport and the availability of water and feed is often not assured on board and along the long road legs. In addition to the long distances to be

travelled in the trucks, there are also the waiting times imposed by many of the road harassment practices on the livestock transport routes. But these practices are not closely linked to mobile livestock systems, quite the contrary. Transport by truck (and train) is a strategy to avoid conveyance on foot, which is becoming increasingly difficult with urbanisation and the closure of stock routes by fields. However, in order to be viable and to preserve the animals, or even to allow them to recover from fatigue and hunger and thirst by truck, a phase of moving on foot is always integrated (Corniaux et al., 2021). It is estimated that animal stress is significantly lower for animals conveyed on foot or in transhumance than for animals transported by truck or train. However, as evidenced by the Benin case study, in the face of these constraints, livestock trade actors are trying to set up services around the unloading docks to allow animals to graze for a few days to recover from the truck journey before continuing.

Expression of natural behaviour by domestic herbivores

Ruminants in mobile livestock systems, as well as those in mixed, extensive systems, have the opportunity to express their natural herbivore behaviour. Cattle and sheep in intensive systems (fattening and peri-urban dairy) often do not have this opportunity, and spend their time tethered and stabled where they are fed according to the feed available and distributed.

Impacts on security and relations between different social groups and communities

Transhumance is built on negotiation between communities (between livestock breeders, between livestock breeders and farmers), which contributes to the production of social and economic relations between different social groups, particularly through the development and renewal of multiple social links and agreements. The groups that go on transhumance negotiate with the groups in the areas they pass through, pastoral areas, transit and hosting areas, in order to establish economic and social links. Agreements for access to water points are a reality, as are manure contracts providing access to crop residues in exchange for manure. But other forms of exchange and agreements that create links between social groups and communities were developed in the past: marriages, commercial exchanges, confiding of animals by sedentary people to transhumant people, etc. These reciprocal economic and social exchanges still exist, but the densification of the hosting and transit zones has put them to the test. The prevailing echoes in recent years have brought to the forefront rather conflicting relationships. The significant increase in cultivated land in these areas, including on stock routes and along water infrastructures and rivers, and including the expansion of perennial crops such as cashew nuts in the savannah areas of several coastal countries such as Benin, Ghana and Côte d'Ivoire, is said to have led to a rise in conflicts. The media are increasingly reporting on the violence of these conflicts, which result in deaths and injuries on both sides, with consequences in terms of injured, stolen or dispersed animals. The assessments of transhumance campaigns on the agenda of the annual High-Level Concertations for Peaceful Transhumance often contain such statistics. The table below summarises, for example, such reports from countries during the 2019 High-Level Concertations on transhumance.

Table 29 Number of deaths, number of conflicts, number of animal injuries, and number of cases of crop damage during the 2018-2019 transhumance season

	Number of people who died	Number of conflicts	Number of animal injuries	Number of cases of crop damage	Crop damage in financial damage
Benin	3	n.r.	29	519	n.r.
Burkina Faso	n.r.	85	n.r.	n.r.	n.r.
Ivory Coast	n.r.	n.r.	n.r.	728	169,922,372 F CFA

Ghana	n.r.	n.r.	n.r.	n.r.	n.r.
Mali	2	61	53		n.r.
Niger	2	21	n.r.	n.r.	n.r.
Togo	0	0	87		n.r.

Source: Country presentations during the 6th High Level Regional Meeting for a Sahel-Coastal Countries Transhumance, Accra, 7-10 October 2019 (n.r. = not reported)

These figures are not collected in a homogeneous way by the different countries, so comparison between countries can be hazardous. These conflict indicators show a downward trend over three years (2016-2017, 2017-2018, and 2018-2019). This decrease could probably be due both to the multiple conflict management initiatives (including by the PEPISAO project) and to the decrease in the number of transhumant animals (due to limitations imposed by governments and/or personal choices of transhumants to avoid dense and tense areas). But the root cause is in fact not (only) the mobile livestock systems that have existed for a long time, but the densification of the reception and transit areas, especially because of the increase in cultivation, including perennial crops in these areas. Other analysts also question the evolution of the modes of governance of spaces and resources, which can reinforce frustrations and predations and themselves generate tensions.

Box 11 Farmer-livestock breeder conflict in Africa: rethinking the phenomenon?

The ACLED data does not support the recent political focus on violent conflict between farmers and livestock breeders. While the data shows high and rising levels of violence in a handful of countries, these are aggregate figures for the population as a whole. There is no evidence that farmer-livestock breeder conflict has increased more rapidly than other forms. Indeed, in ACLED data, the proportion of national incidents and casualties associated with farmer-livestock breeder conflict is often lower than the percentage of pastoralists in the national population. Nevertheless, when incidents do occur, they are often staggeringly brutal and widely reported in the media.

The ACLED data also tells us that while there are significant national and regional hotspots where unresolved disputes fester, peaceful relations and a spirit of cooperation persist over much wider areas. Even within hotspots, violent conflict is usually ad hoc and intermittent, occurring alongside regular cooperation. Most conflicts in rural areas are managed peacefully by traditional leaders and local institutions. The current focus on the escalation of violence neglects this reality and therefore prevents lessons being learned.

Source: Toulmin C., Krätli S., Briefing. 2020.

The perception of insecurity fostered by the news, social networks and some local governance actors is increasingly damaging to social well-being, but can only be partially attributed to mobile livestock systems.

Contribution to employment

Among the LSIPT tools, one tool (Indirect contribution of the livestock sector to the national economy, M4-SM1-A2) estimates the contribution to labour of different livestock systems, based on the following parameters

- Number of households (by livestock system) ;
- Family labour force in pers/months per year (per household) ;
- Paid labour in pers/months per year (per household).

This tool has not been tested in this study, neither at national nor at regional level, due to the lack of detailed and reliable data to estimate the parameters for the three parameters.

The 2008 OECD study on livestock and the regional market in the Sahel and West Africa mentions that agriculture in general and livestock in particular provide 52.5% of employment in West Africa. Citing Renard et al (2004), the report also mentions that the agricultural sector in the broad sense employs more than 50% of the active population in the UEMOA member countries (Benin, Burkina Faso, Côte d'Ivoire, Guinea-Bissau, Mali, Niger, Senegal, and Togo).

An alternative method of estimating the employment contribution of the combined livestock sector (not subdivided by livestock system) would be to multiply the rural population (which is known³²), with the percentage contribution of the livestock sector to agricultural GDP. But this method assumes that the entire rural population works only in the broad agricultural sector, and that the distribution of employment between the livestock sub-sector and the rest of the agricultural sector corresponds with the ratio of the contribution to GDP.

Clearly, the multiplication of livestock markets, essentially supplied by transhumant animals, the appearance and multiplication of traditional and modern collection and processing centres, and the installation of feed distribution centres and veterinary posts, vaccination parks, and the operation of slaughterhouses and meat distribution points, generate many jobs, the extent of which is not well understood.

Box 12 Impacts on (illegal) migration as well as on trafficking in illegal products

Livestock systems are regularly suspected of contributing significantly to (illegal) migration as well as trafficking in illegal products. Like people from other groups, some people from pastoralist groups who practice transhumance are involved in illegal activities such as trafficking in people, drugs, cigarettes, weapons, and other illegal products. By their presence in the sparsely populated arid areas between the Gulf of Guinea and North Africa, they are a link in the chain on the way north. The involvement of these people cannot be attributed to mobile livestock systems, but rather to the lack of economic opportunities for youth in these systems, or elsewhere. For these reasons, the impact on (illegal) migration as well as on the trafficking of illegal products was not included in the framework for analysing the impacts of mobile livestock systems.

Environmental impacts

Impacts on climate change

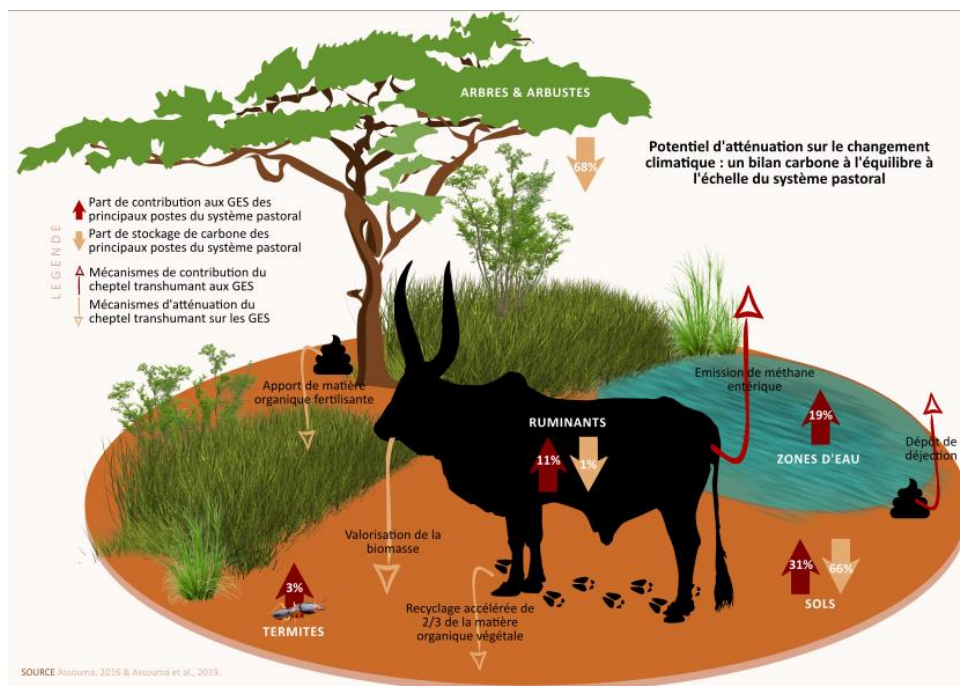
One of the tools in the LSIPT toolkit (Indirect contribution of the livestock sector to the national economy, M4-SM1-A2) mentions climate regulation services as an indirect, environmental contribution of the livestock sector, but not in a quantified way. The FAO has developed the 'GLEAM' Global Livestock Environmental Assessment Model tool to estimate the contribution of livestock activities to climate change and other environmental impacts. The tool could not be tested in this study to estimate the contribution of different livestock systems in West Africa, particularly mobile livestock systems. However, the regional component of the PRAPS II project is planned to support the application of the GLEAM tool by CILSS, by supporting relevant services at the national level in the countries covered by the project (Mauritania, Senegal, Mali, Burkina Faso, Niger, Chad).

Another tool developed by FAO to estimate climate change contributions in the agricultural sector, including the livestock sub-sector, is called 'Ex-Act'. The similarities and differences between these two tools could not be analysed by this study. However, each model is based on different

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assumptions about the emission and fixation of greenhouse gases by different types of animals and/or livestock systems. The first models of greenhouse gas emissions were rather calibrated on the basis of intensive livestock systems in developed countries. It is therefore likely that these early models overestimated the contribution to climate change of extensive livestock systems in developing countries, including West Africa. The first models also did not take into account the positive contributions of mobile livestock systems through carbon fixation in the land. Fertilisation of pastoral areas with nutrients from dung allows for increased soil carbon fixation. A recent paper by Assouma et al. (2016, 2019) highlights these positive contributions and results in a rather neutral or even slightly negative net contribution of mobile livestock systems. Other publications had estimated that methane emissions from ruminants were higher the more extensive the systems were and the more natural pastures were consumed, which required a lot of rumination work to be absorbed.

Figure 12 Diagram of GHG emissions mechanisms from livestock in pastoral areas



However, although methane emissions per animal are less favourable for pastoral red meat production than for concentrate-based livestock such as chicken and pork, the analysis in terms of life cycle and on the scale of the areas used, largely reverses the analysis. The indirect negative effects of these intensive systems are particularly important, as they are fed with soya from South America, the result of forest clearing and fertilised with chemical fertilisers.

Impacts on water quality and quantity

The LSIPT toolkit on indirect contributions also mentions water cycle regulation as a regulatory service of the livestock sector, but this is not quantified. The Global Livestock Environmental Assessment Model (GLEAM) tool also estimates nutrient and water use. The GLEAM tool was not tested at this level for this study to estimate the contribution of different livestock systems in West Africa, and in particular mobile livestock systems. However, under the regional component of the PRAPS II project, it is planned to support the application of the GLEAM tool by CILSS, by supporting relevant services at national level in the countries covered by the project.

All livestock systems, including mobile livestock systems, use water resources. However, transhumance shifts this need to areas with better water resources during the dry season of the year. As evidenced by the case study in Côte d'Ivoire, water infrastructure that was originally built to meet the water needs of herds has often been occupied by farmers for crop irrigation and other needs. Mobile livestock systems do not generally have significant negative impacts on water quality, but they often suffer from water quality degradation due to overuse of pesticides on crops and pollution from mining activities.

Impacts on biodiversity

The LSIPT toolkit on indirect contributions also mentions biodiversity as an indirect contribution of the livestock sector, but again in an unquantified way. The Global Livestock Environmental Assessment Model (GLEAM) tool also estimates interactions with biodiversity. The GLEAM tool was not tested in this study to estimate the contribution of different livestock systems in West Africa, and in particular that of mobile livestock systems. However, under the regional component of the PRAPS II project, it is planned to support the application of the GLEAM tool by CILSS, by supporting relevant services at national level in the countries covered by the project.

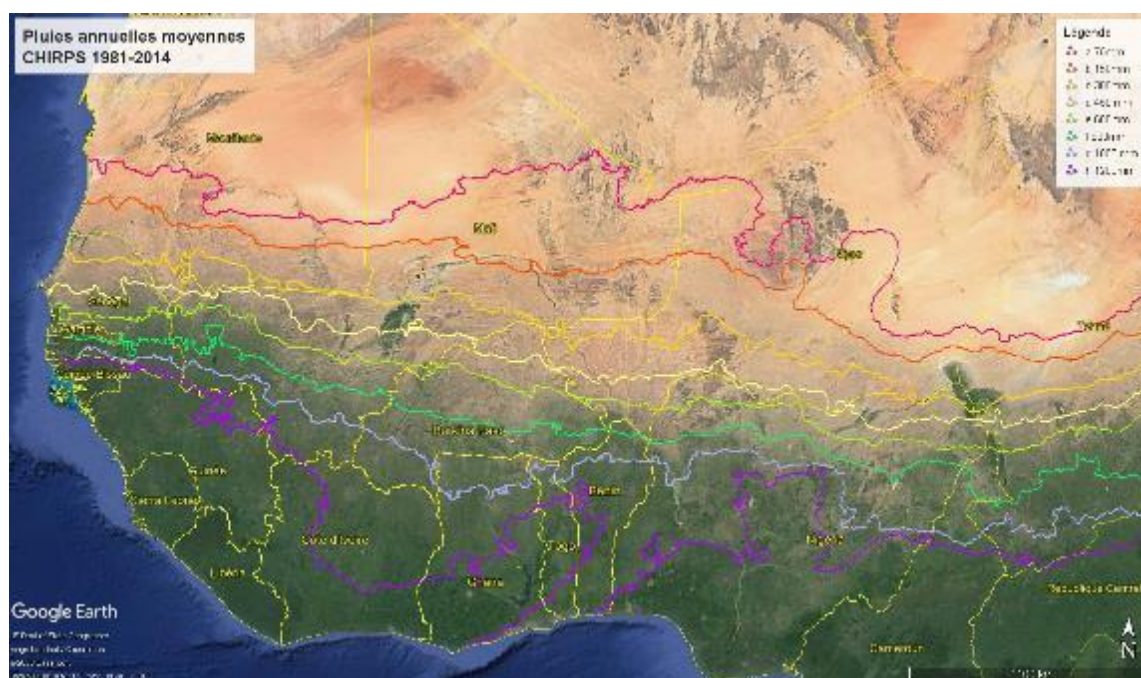
In the case studies, the impacts on plant biodiversity were interpreted more in terms of the prevalence of grazed species, grasses and woody plants useful in terms of animal nutrition, or conversely the invasion by plants without pastoral value. In people's minds, pastoral systems are very often equated with overgrazing. However, high instantaneous loads over short periods practised by pastoralists are favourable to the development of good forage species. Conversely, low and continuous animal loads throughout the year are characteristic of sedentary herds. They tend to degrade the rangelands, which become overgrown and dominated by unpalatable plants (Hiernaux et al., 2006, Hiernaux et al., 2018).

In terms of impacts on biodiversity in the conventional understanding, mobile livestock systems certainly have negative impacts, because of their too regular presence in protected areas in search of grazing and water. Pastoral occupation of protected areas has obvious negative impacts on the fauna and flora in these parks and reserves. However, agricultural clearing on the periphery is also common, with much greater consequences such as poaching. The case study in Côte d'Ivoire shows that government services allow herds to graze in (buffer zones) of some parks and reserves, on condition that entry fees are paid, as a form of regulation. In contrast, in Benin the contracting of African Parcs for the management of certain parks and reserves aims to drastically limit the access of transhumant and semi-sedentary herds to protected areas.

Impacts on desertification

Mobile livestock systems are also generally attributed with negative impacts on desertification. However, as explained in the sub-section on the impact on climate change, fertilisation with nutrients allows for more carbon fixation, contributing to the greening of vegetation towards the Saharan fringes. This greening is mainly attributed to increased rainfall in recent years, but the provision of nutrients in easily assimilated forms, and the transport of seeds by herds supports this dynamic (Hiernaux and Assouma 2021, Benjaminsen et al., 2019). Another positive contribution in this context is the positive effect of herd trampling on the soil structure and especially on crusted surfaces, which facilitates water infiltration and plant propagation on these closed soils.

Figure 13 Map of average annual rainfall in West Africa (CHIRPS data 1981-2020)



Map of average annual rainfall in West Africa. With the staggered bioclimatic zones: hyper-arid, Saharan, north of isohyet 75 mm; arid, North-Saharan, between isohyets 75 and 300 mm; semi-arid, South-Saharan, between 300 and 600 mm; sub-humid, Sudanian, between 600 and 800 mm; sub-humid, Sudanian, between 800 and 1000 mm; humid, Sudanian-Guinean, between 1000 and 1200 mm; and very humid, Guinean, above 1200 mm.

Sources Serving: <https://climateserv.servirglobal.net/>

Impacts on land fertility

The LSIPT toolkit on indirect contributions also mentions the ecological function in the cycle of nutritive elements (biogeochemical cycles, symbioses, etc.) as an indirect contribution of the livestock sector. The Global Livestock Environmental Assessment Model (GLEAM) tool is also used to estimate land use and land degradation. The GLEAM tool was not tested in this study to estimate the contribution of different livestock systems in West Africa, and in particular that of mobile livestock systems. However, under the regional component of the PRAPS II project, it is planned to support the application of the GLEAM tool by CILSS, by supporting relevant services at national level in the countries covered by the project.

The positive contribution of mobile livestock systems on grazing lands has already been explained in the previous subsection on climate change and biodiversity impacts. Many studies credit pastoralism with the ability to regenerate soil fertility (Manlay et al., 2004; Hiernaux and Diawara, 2014; Rasmussen et al., 2018), while land tenure policies have long favoured the expansion of cultivated land to the detriment of rangelands and thus pastoral livestock. The positive impact of mobile livestock systems on agricultural land is also very important, but as explained above, the deterioration of relations between farmers and livestock breeders could reduce this contribution of mobile herds by restricting their movements.

These positive impacts of the supply of organic matter by different livestock systems, including mobile livestock systems, have been estimated in monetary value by the LSIPT tools as part of the estimation of the livestock sector's contribution to GDP. Estimates of the contribution of the livestock sector made by the statistical services of the countries do not consider the value of the

organic matter produced by the livestock sector. However, for the part of the organic matter of the different livestock systems that is applied to agricultural land, this value is included in the value of agricultural products and thus in the GDP contribution of crops. For estimates of contributions to GDP, intermediate costs are deducted from the value of the products. But presumably for estimates by national statistical services, the value of organic matter is not deducted unless there is a monetary payment, which is rarely the case (apart from manure concentrated with nutrients, such as poultry manure). The methodological issue this poses for LSIPT estimates is discussed in more detail later.

Main drivers of change and long-term prospects

The main drivers of change described in section 2.3 have thus been adapted to better cover the dynamics that were observed by the case studies in Benin and Côte d'Ivoire and documented in the corresponding literature references:

- The worsening of the security situation in various West African countries, which is leading to a recomposition of vast pastoral areas and weakening the alliances and complementarities between communities;
- Climate change would, according to current forecasts, result in an increase in temperatures during the hottest months at the end of the dry season, with little impact on plant and crop growth. They would also manifest themselves in a trend observed over the last twenty years of higher average rainfall, but spatially uneven with large interannual variations;
- An increase in the demand for animal protein produced by the sector, but with changes in the types of animal protein consumed (relatively more fish and white meat, less red meat, higher quality demanded, especially by urban populations);
- Further expansion of cultivated land, including perennial (tree) crops, and thus less grazing and crop residues from annual crops in the fields available for mobile herds;
- The Covid-19 pandemic, which was accompanied by an increase in the complexity of cross-border trade and the use of livestock markets;
- The increase in ruminant numbers in general in West African countries, including in mobile livestock systems, due to the know-how of pastoralists and the availability of fodder, combined with the increase in pastoralist populations, the lack of alternative economic opportunities for the youth of these populations and a growing demand for animal products (ref. the third driver of change)

Finally, one might wonder whether other more global and societal factors are not at play, such as a kind of breakdown in responsible governance, mainly on land tenure issues, social protection and youth management by local societies.

For each of these change factors, a table attempts to summarise how they may influence the different impacts of mobile livestock systems. A synthetic and explanatory description is added for each factor. Finally, the six drivers are combined in a table, adding an identification of public policies that would aim to maximise positive impacts and minimise negative impacts. The colour codes in the tables indicate a positive (green), negative (red), mixed (orange), or neutral/unknown (no colour) influence on the impacts at the regional level which can be positive or negative as described in sections 4.1.2-4.1.4.

The worsening security situation

	Influence on the impacts described in sections 4.1.2-4.1.4, without accompanying policies (or remaining on the same level as today)
Contributions to GDP	In West Africa, the contribution of mobile livestock systems to GDP has probably declined, or increased less, as a result of the worsening security situation. In the most affected Sahelian countries (Burkina Faso, Mali and Niger), large areas of pastoral land have had their access compromised by security problems. On the other hand, in some coastal countries, the (semi-) sedentarisation of pastoralists of foreign origin, partly induced by the problematic security situation in Burkina Faso, Mali, Niger and Nigeria, has probably contributed to an increase in the GDP contributions of mobile livestock systems, but especially those practising small-scale, non-cross-border transhumance.
Fiscal contributions	Consistent with the influence on GDP contribution, the fiscal contributions of mobile livestock systems in West Africa have probably decreased, or increased less strongly, due to the deteriorating security situation in several areas. Fiscal contributions have probably increased more in some coastal countries, indirectly, as a result of the semi-sedentarisation of foreign transhumants in the northern areas of these countries. Some attacks have targeted livestock markets, which have subsequently been closed or are less frequented, so this has probably reduced fiscal contributions in the localities concerned.
Contribution to poverty reduction	Consistent with the influence on GDP contribution, the contribution of mobile livestock systems to poverty reduction has probably decreased, or increased less strongly, due to security problems in West Africa.
Contribution to equality	Consistent with the influence on the contribution to poverty reduction, the contribution of mobile livestock systems to equality has probably decreased, or increased less strongly, because of security problems in West Africa. In the countries most affected by security problems, the incomes of pastoralists, who often already had relatively low incomes compared to the rest of the population, have decreased even more, thus increasing inequality.
Contribution to food security	Consistent with the influence on GDP contribution, the direct and indirect contributions of mobile livestock systems to food security have probably decreased, or increased less strongly, due to security problems in West Africa.
Contribution to social welfare	The different elements of social welfare discussed in section 4.1.3 are affected differently by the security troubles. The semi-sedentarisation of foreign pastoralists in the northern parts of the coastal countries (to which the security troubles has indirectly contributed) could increase their land tenure security. Potentially their children's access to schooling could also increase, but this is not certain. It is not known how the semi-sedentarisation that sometimes occurs has influenced opportunities for pastoral youth. The non-accessibility of large parts of pastoral areas has probably contributed to a higher concentration of transhumant animals in areas close to crops, which may result in a higher increase in tensions between pastoralists and farmers and between pastoralists and (semi-) sedentary pastoralists. In the end, the trend here is a mixed influence, which is not very clear. ³³

³³ Of course, security problems and all the human suffering they cause have greatly reduced social welfare, but in this analysis the influence of security problems on the contribution to social welfare of mobile livestock systems is sought.

Contribution to cultural identity	The influence of security problems on the contribution of mobile livestock systems to cultural identity is probably negative. Transhumance routes and practices are disrupted by these security problems, which may also disrupt the contribution to cultural identity.
Impact on animal welfare	Although not a major concern for the public, animal welfare has certainly undergone an ambivalent evolution. While the improvement in animal health care, due to access to good quality pharmaceutical products and food supplements, has improved animal welfare, the gradual and in some cases almost systematic switch to transporting animals by lorry and train in harsh conditions has increased the stress on the animals and worsened their weight.
Impacts on security and relations between different social groups and communities	As described in section 4.1.3, the contribution of mobile livestock systems to relations between different social groups and communities is under pressure. Security problems increase the pressure even more. The fact that large parts of pastoral areas are becoming inaccessible means that the concentration of animals in areas where there are crops is greater. In the host areas transhumants are often also suspected of having alleged links with armed groups, putting further pressure on relations between social groups and communities.
Impacts on (illegal) migration as well as on trafficking in illegal products	Security problems could possibly lead to increased incentives for (illegal) migration and trafficking of illegal products. But, as described in section 4.1.3, the link with mobile livestock systems and its influence on security problems is not proven and known.
Contribution to employment	Consistent with the influence on the contribution to GDP, the contribution to employment of mobile livestock systems has probably decreased, or increased less strongly, because of security problems in West Africa.
Impacts on climate change	
Impacts on water quality and quantity	
Impacts on biodiversity	The fact that large parts of pastoral areas are no longer or less accessible means that the concentration of animals in protected areas could potentially be higher, with potentially greater negative impacts on biodiversity.
Impacts on desertification	
Impacts on land fertility	

Ultimately, security issues have a mostly negative influence on the positive and negative impacts of mobile livestock systems.

Climate change

	Influence on the impacts described in sections 4.1.2-4.1.4, without accompanying policies (or remaining on the same level as today)
Contributions to GDP	The exact influence of climate change on the contribution of mobile livestock systems at the regional level in West Africa is probably very difficult to estimate. But apart from the mixed influence on productivity and pasture composition as described in the PEPISAO thematic note on climate change (Hiernaux and Assouma, 2021) and consequently on the

	contribution of mobile livestock systems to GDP, there would be above all the reinforcement of the perceptible shift of pastoral areas towards the north under the pressure of the rise in cultivation, combined perhaps with a regreening of the Saharo-Sahelian areas.
Fiscal contributions	Consistent with the influence on GDP contribution, the influence on fiscal contributions of mobile livestock systems at the West African level is poorly known and probably mixed.
Contribution to poverty reduction	Consistent with the influence on the contribution to GDP, the influence on the contribution to poverty reduction of mobile livestock systems in West Africa is poorly known and probably mixed.
Contribution to equality	Consistent with the influence on the contribution to GDP, the influence on the contribution to equality of mobile livestock systems in West Africa is poorly known and probably mixed.
Contribution to food security	Consistent with the influence on the contribution to GDP, the influence on the contribution to food security of mobile livestock systems in West Africa is poorly known and probably mixed.
Contribution to social welfare	Consistent with the influence on the contribution to GDP, the influence on the contribution to social welfare of mobile livestock systems in West Africa is poorly known and probably mixed.
Contribution to cultural identity	The influence of climate change on the contribution of mobile livestock systems to cultural identity is likely to be negative. Transhumance routes and practices will change as a result of climate change, which may also disrupt the contribution to cultural identity.
Impact on animal welfare	The increase in heat waves probably means a partial deterioration of animal welfare, including in mobile livestock systems.
Impacts on security and relations between different social groups and communities	As described in section 4.1.3, the contribution of mobile livestock systems to relations between different social groups and communities is under pressure. Climate change is expected to put it under pressure also in southern pastoral areas that are being invaded by crops.
Impacts on (illegal) migration as well as on trafficking in illegal products	-
Contribution to employment	Consistent with the influence on the contribution to GDP, the influence on the contribution to employment of mobile livestock systems in West Africa is poorly known and probably mixed.
Impacts on climate change	Climate change is identified as both an impact and a driver of change. In section 4.1.4 the impact of mobile livestock systems on climate change is estimated to be limited with a balance close to neutral. The influence of climate change on this contribution is poorly known and probably mixed.
Impacts on water quality and quantity	-
Impacts on biodiversity	The influence on biodiversity impact of mobile livestock systems in West Africa is poorly known and probably mixed.
Impacts on desertification	As described in section 4.1.4, the impacts of mobile livestock systems are likely to be less negative with regard to desertification. Climate change, through increased rainfall in currently very arid areas, would expand the pastoral areas in

	which mobile livestock systems could participate in regeneration and sustainable use of the environment.
Impacts on land fertility	In the same way that climate change could have a positive influence on the impact of mobile livestock systems on desertification, climate change could also have a positive influence on land fertility depending on the nature of the soil.

In summary, climate change could have mixed influences on the impacts of mobile livestock systems, which are still often poorly understood. As transhumance is an adaptation strategy to climatological variations, it can be assumed that it is relatively capable of integrating the new variations induced by climate change.

Increasing and changing demand for animal protein

	Influence on the impacts described in sections 4.1.2-4.1.4, without accompanying policies (or major changes).
Contributions to GDP	Increasing demand for animal protein in terms of red meat and dairy products, including from mobile livestock systems, means that these systems can increase their contribution to regional GDP.
Fiscal contributions	Consistent with the positive influence on the contribution to GDP, the influence on the fiscal contributions of mobile livestock systems in West Africa is expected to be positive.
Contribution to poverty reduction	Consistent with the positive influence on the contribution to GDP, the influence on the contribution to poverty reduction of mobile livestock systems in West Africa is expected to be positive.
Contribution to equality	Consistent with the positive influence on the contribution to GDP, the influence on the contribution to equality of mobile livestock systems in West Africa is expected to be positive.
Contribution to food security	Consistent with the positive influence on the contribution to GDP, the influence on the contribution to food security of mobile livestock systems in West Africa is expected to be positive.
Contribution to social welfare	Consistent with the influence on the contribution to GDP, the influence on the contribution to social welfare of mobile livestock systems in West Africa is expected to be rather positive, with higher incomes allowing more schooling and more opportunities for youth.
Contribution to cultural identity	Consistent with the influence on the contribution to social welfare, the influence on the contribution to cultural identity of mobile livestock systems in West Africa is expected to be rather positive, with higher incomes allowing recognition and adaptation of traditional ways of life.
Impact on animal welfare	The increase in demand for animal protein in terms of red meat and dairy products will probably mean an increase in intensive livestock systems with their limitations in terms of animal welfare. But the influence on the impact of mobile farming systems is poorly known and probably mixed. However, the number of animals involved will increase, partly due to this increase in demand.
Impacts on security and relations between different ethnic groups	-
Impacts on (illegal) migration as well as	-

on trafficking in illegal products	
Contribution to employment	Consistent with the positive influence on the contribution to GDP, the influence on the contribution to employment of mobile livestock systems in West Africa is expected to be positive.
Impacts on climate change	In section 4.1.4 the impact of mobile livestock systems on climate change was estimated as mixed, with a neutral balance. The influence of increasing and changing animal protein demand on this contribution is poorly known and probably mixed.
Impacts on water quality and quantity	The number of animals in general, including in mobile livestock systems, will increase, partly as a result of this increased demand. Larger numbers in mobile livestock systems will also mean greater use of infrastructure to access water resources.
Impacts on biodiversity	The number of animals in general, including in mobile livestock systems, will increase, partly due to this increase in demand. Larger numbers in mobile livestock systems would also mean a greater impact on biodiversity.
Impacts on desertification	As described in section 4.1.4, mobile livestock systems are estimated to have a much less negative impact on desertification than usually mentioned. The number of animals in general, including in mobile livestock systems, will increase, partly due to this increased demand. Larger numbers in mobile livestock systems will also mean a greater positive impact against desertification if the rainfall pattern continues.
Impacts on land fertility	In the same way that the increase in demand for animal protein is estimated to positively influence the impact of mobile livestock systems on combating desertification, the increase in demand for animal protein is expected to also have a positive influence on land fertility.

In summary, the increase and change in demand for animal protein could have mixed influences on the impacts of mobile livestock systems, but especially positive economic and social impacts.

Further expansion of cultivated land

	Influence on the impacts described in sections 4.1.2-4.1.4, without accompanying policies (or remaining at the same level as today)
Contributions to GDP	The expansion of cultivated land limits the increase in ruminant numbers in mobile livestock systems. Increased competition for the remaining grazing resources will also mean that pastoralists will continue to pay more for access to these resources, and thus face higher intermediate costs, leading to a lower contribution to GDP ³⁴ .
Fiscal contributions	Consistent with the negative influence on the contribution to GDP, the influence on fiscal contributions of mobile livestock systems at the West African level could be negative in terms of market taxes. On the other hand, if the fees that are paid for access to grazing resources in dense areas would be seen (partly) as taxes, this would imply an increase in fiscal contributions.

³⁴ However, these costs for transhumants are revenues for others, and thus an indirect contribution to GDP.

Contribution to poverty reduction	Consistent with the negative influence on the contribution to GDP, the influence on the contribution to poverty reduction of mobile livestock systems in West Africa is expected to be negative.
Contribution to equality	Consistent with the negative influence on the contribution to GDP, the influence on the contribution to equality of mobile livestock systems in West Africa is expected to be negative.
Contribution to food security	Consistent with the negative influence on the contribution to GDP, the influence on the contribution to food security of mobile livestock systems in West Africa is expected to be negative.
Contribution to social welfare	Consistent with the negative influence on the contribution to GDP, the influence on the contribution to social welfare of mobile livestock systems in West Africa is expected to be rather negative, with lower incomes allowing less schooling and fewer opportunities for youth. In addition, the pressure on transhumant-farmer relations due to the expansion of cultivation will mean more conflicts, which is also seen as a negative aspect of social welfare.
Contribution to cultural identity	Consistent with the negative influence on the contribution to social welfare, the influence on the contribution to cultural identity of mobile livestock systems in West Africa is expected to be rather negative, with sharp breaks in their traditional ways of life.
Impact on animal welfare	-
Impacts on security and relations between different social groups	The pressure on transhumant-farmer relations due to crop expansion will mean more strained relations between different social groups and communities, and a negative influence on the positive impacts of transhumance on these relations.
Impacts on (illegal) migration as well as on trafficking in illegal products	-
Contribution to employment	Consistent with the negative influence on the contribution to GDP, the influence on the contribution to employment of mobile livestock systems in West Africa is expected to be negative.
Impacts on climate change	In section 4.1.4 the impact of mobile livestock systems on climate change was estimated to be mixed and neutral. The influence of cropland expansion on this contribution is poorly known and probably mixed.
Impacts on water quality and quantity	The number of animals in mobile livestock systems will be limited partly because of this expansion of cultivated land. Lower numbers in mobile livestock systems will also mean less use of water resources.
Impacts on biodiversity	The number of animals in mobile livestock systems will be limited partly because of this expansion of cultivated land, but the herds will move more to reserves and parks where they can have negative impacts on biodiversity. Therefore, the influence per balance is considered to be negative.

Impacts on desertification	As described in section 4.1.4, mobile livestock systems could have a positive impact on combating desertification. The number of animals in mobile livestock systems will be limited partly due to this expansion of cultivated land.
Impacts on land fertility	The expansion of cultivated land is also estimated to have a negative influence on the impact on land fertility.

In summary, the expansion of cultivated land could have mixed, but mostly negative influences on the impacts of mobile livestock systems.

The Covid-19 pandemic

	Influence on the impacts described in sections 4.1.2-4.1.4, without accompanying policies (or remaining on the same level as today)
Contributions to GDP	The Covid-19 pandemic resulted in closed or less accessible livestock markets, closed borders for animals and/or people, and reduced incomes for the population, and thus less demand for livestock products. All these elements together have meant a negative influence on the contribution to GDP of mobile livestock systems. Even if the market restrictions are almost all removed later, some border restrictions remain in place, and the incomes of the global population, and thus their demand for livestock products, are still negatively influenced by the pandemic.
Fiscal contributions	Consistent with the negative influence on the contribution to GDP, the influence on the fiscal contributions of mobile livestock systems at the West African level is expected to be negative.
Contribution to poverty reduction	Consistent with the negative influence on the contribution to GDP, the influence on the contribution to poverty reduction of mobile livestock systems in West Africa is expected to be negative.
Contribution to equality	Consistent with the negative influence on the contribution to GDP, the influence on the contribution to equality of mobile livestock systems in West Africa is expected to be negative.
Contribution to food security	Consistent with the negative influence on the contribution to GDP, the influence on the contribution to food security of mobile livestock systems in West Africa is expected to be negative.
Contribution to social welfare	Consistent with the negative influence on the contribution to GDP, the influence on the contribution to social welfare of mobile livestock systems in West Africa is expected to be rather negative, with lower incomes allowing less schooling and fewer opportunities for youth.
Contribution to cultural identity	Consistent with the negative influence on the contribution to social welfare, the influence on the contribution to cultural identity of mobile livestock systems in West Africa is expected to be rather negative, with disruptions of traditional ways of life.
Impact on animal welfare	-
Impacts on security and relations between different ethnic groups	-
Impacts on (illegal) migration as well as	-

on trafficking in illegal products	
Contribution to employment	Consistent with the negative influence on the contribution to GDP, the influence on the contribution to employment of mobile livestock systems in West Africa is expected to be negative.
Impacts on climate change	In section 4.1.4 the impact of mobile livestock systems on climate change was estimated as mixed, with a neutral balance. The influence of the pandemic on this contribution is poorly known and probably mixed.
Impacts on water quality and quantity	-
Impacts on biodiversity	-
Impacts on desertification	-
Impacts on land fertility	-

In summary, the Covid-19 pandemic could have rather negative influences on the impacts of mobile livestock systems.

The increase in ruminant numbers

	Influence on the impacts described in sections 4.1.2-4.1.4, without accompanying policies (or remaining at the same level as today)
Contributions to GDP	The increase in ruminant numbers, including in mobile livestock systems, means that these systems can increase their contribution to regional GDP.
Fiscal contributions	Consistent with the positive influence on the contribution to GDP, the influence on the fiscal contributions of mobile livestock systems at the West African level is expected to be positive.
Contribution to poverty reduction	Consistent with the positive influence on the contribution to GDP, the influence on the contribution to poverty reduction of mobile livestock systems in West Africa is expected to be positive.
Contribution to equality	Consistent with the positive influence on the contribution to GDP, the influence on the contribution to equality of mobile livestock systems in West Africa is expected to be positive.
Contribution to food security	Consistent with the positive influence on the contribution to GDP, the influence on the contribution to food security of mobile livestock systems in West Africa is expected to be positive.
Contribution to social welfare	The influence on the contribution to social welfare of mobile livestock systems in West Africa could be positive because of the higher incomes that allow more schooling and more opportunities for youth, and because of the insurance and savings function of animals that would allow households to absorb shocks. However, the larger numbers could also contribute to more pressure on pastoralist-farmer relations, and thus more conflict, a negative aspect of social welfare.
Contribution to cultural identity	Consistent with the influence on the contribution to social welfare, the influence on the contribution to cultural identity of mobile livestock systems in West Africa could be mixed as well. Pastoralists will have more

	animals, the stresses to which these larger numbers will contribute will probably force changes in their lifestyles.
Impact on animal welfare	Increasing ruminant numbers in mobile livestock systems will also mean more suffering in terms of animal welfare.
Impacts on security and relations between different ethnic groups	Increasing ruminant numbers in mobile livestock systems will mean more pressure on pastoralist-farmer relations.
Impacts on (illegal) migration as well as on trafficking in illegal products	-
Contribution to employment	Consistent with the positive influence on the contribution to GDP, the influence on the contribution to employment of mobile livestock systems in West Africa is expected to be positive.
Impacts on climate change	In section 4.1.4 the impact of mobile livestock systems on climate change was estimated to be mixed or neutral. The influence of increasing ruminant numbers in mobile livestock systems on this contribution is poorly known and probably mixed.
Impacts on water quality and quantity	Larger numbers in mobile livestock systems will also mean greater use of water resources.
Impacts on biodiversity	Larger numbers in mobile livestock systems will also mean a greater impact on biodiversity.
Impacts on desertification	As described in section 4.1.4, mobile livestock systems are estimated to have a positive impact on combating desertification. Larger numbers in mobile livestock systems could also mean a larger positive impact on combating desertification.
Impacts on land fertility	In the same way that increasing the number of ruminants in mobile livestock systems is estimated to have a positive influence on the impact of mobile livestock systems on combating desertification, increasing the number of ruminants in mobile livestock systems could also have a positive influence on the impact on land fertility.

In summary, the increase in ruminant numbers in mobile livestock systems could have mixed influences on the impacts of mobile livestock systems, but especially positive influences on economic impacts.

Estimated combined influence of change factors and accompanying public policies

The table below estimates the influence of the six drivers combined with the different impacts of mobile livestock systems, as well as the policies that are currently in place. In the right-hand column the table also suggests accompanying public policies that could be implemented to maximise the positive impacts and minimise the negative impacts.

	Influence without accompanying policies (or no change from the current situation)	Accompanying public policies that could be implemented to maximise positive impacts and minimise negative impacts
Contributions to GDP	Even if some factors have negative or mixed influences on the contribution of mobile livestock systems to GDP, mainly due to increased ruminant stock numbers	-Improved governance and social engineering so that conflicts are reduced, the potential for synergy between mobile livestock systems and sedentary

	(including to meet the increased demand for animal protein) mobile livestock systems could contribute more to GDP. However, restrictions on herd movements, especially across borders, and semi-sedentarisation will mean that some of the stock in mobile livestock systems will be transferred to sedentary livestock systems (and thus a lower contribution to GDP from mobile systems), and that there will be a reduction of animals in big amplitude transhumance mobile livestock systems to small amplitude transhumance mobile livestock systems.	agricultural and livestock systems is realised, and economic benefits are maximised. It would also involve land policies that allocate rights to transhumant people, and the implementation of these policies. And it would also imply a greater role for transhumant representatives in local governance and a greater role for POs representing transhumants. -Development of value chains, including livestock markets -Development and maintenance of pastoral water infrastructure -Marking of stock routes, grazing areas and water infrastructures Facilitation of cross-border transit so that the feed resources of different countries are optimally used -Economically sustainable investment (users pay) to contribute to the management and regeneration of pastoral resources.
Fiscal contributions	Consistent with the contribution to GDP, the fiscal contributions of mobile livestock systems are expected to increase due to the increase in livestock numbers, but they are also likely to be reduced due to the transfer of livestock to sedentary systems.	-See 'Contribution to GDP'. -Better market management Develop fair, honest and transparent local taxation mechanisms for pastoral resources, allowing for better management of resources, respect for pastoral areas and the long-term maintenance of hydraulic works, marking of grazing areas and access corridors.
Contribution to poverty reduction	Consistent with the contribution to GDP, the contribution to poverty reduction of mobile livestock systems is expected to increase through increased numbers, but they are also likely to be reduced through transfers to sedentary systems. The activities of sedentary households are not necessarily more remunerative than before.	-See 'Contribution to GDP'. -Creating alternative economic opportunities for young pastors
Contribution to equality	Consistent with the contribution to GDP, the contribution to equality of mobile livestock systems is expected to increase due to increases in numbers, but they are also likely to be reduced due to transfers to sedentary systems. The activities of sedentary households are not necessarily more remunerative than before.	-See 'Contribution to GDP'. -Creating alternative economic opportunities for young pastors
Contribution to food security	Consistent with the contribution to GDP, the contribution to food security of mobile livestock systems is expected to increase due to increased numbers, but it is also likely to be reduced due to transfers of numbers to sedentary systems. The	-See 'Contribution to GDP'.

	activities of sedentary households are not necessarily more remunerative than before.	
Contribution to social welfare	The influence of the combined factors on the contribution of mobile livestock systems to social welfare could be mixed. The semi-sedentarisation of some pastoralists will potentially improve schooling opportunities for their children, and the land tenure security they could potentially obtain is positive too. However, if conflicts increase because of the expansion of cultivated land and the increase in numbers, this would have a negative impact on social welfare.	<p>-Improved governance and social engineering so that conflicts are reduced, the potential for synergy between mobile livestock systems and sedentary agricultural and livestock systems is enhanced, and economic benefits are maximised. It would also involve land tenure policies that recognise and secure the collective use rights of transhumant people, and the effective implementation of these policies. And it would also involve a greater role for transhumant representatives in local governance and a greater role for POs representing transhumants.</p> <p>-Securing stock routes, grazing areas, rest areas and access to water points and hydraulic infrastructures</p>
Contribution to cultural identity	The semi-sedentarisation of transhumants could have a negative influence on their cultural identity (isolation of households belonging to the same mobility group). This would probably lead to new forms of social organisation transforming the social capital built for mobility.	<p>-Taking into account cultural aspects in semi-sedentary strategies of transhumants in the northern zones of coastal countries.</p> <p>-Encouraging ways of associating farmers and livestock breeders to strengthen shared know-how</p>
Impact on animal welfare	Increasing ruminant numbers in mobile livestock systems will also mean more suffering in terms of animal welfare, and increased heat waves due to climate change are considered negative as well.	<p>-Promotion of better equipped modes of transport, especially in terms of shade and access to water and feed, which could probably bring economic benefits too.</p> <p>-Development and maintenance of pastoral water infrastructure</p>
Impacts on security and relations between different social groups	<p>Due to the increase in cultivated land and the increase in ruminant numbers, the relationship between transhumant and farmer and between transhumant and semi-sedentary livestock breeders is expected to remain under pressure.</p> <p>Policies to restrict herd movements reduce this pressure in some areas, as well as awareness raising and conflict management policies.</p>	<p>-Improved governance and social engineering so that conflicts are reduced, the potential for synergy between mobile livestock systems and sedentary agricultural and livestock systems is realised, and economic benefits are maximised. It would also involve land tenure policies that allocate rights to transhumant people, and the implementation of these policies. And it would also imply a greater role for transhumant representatives in local governance and a greater role for POs representing transhumants.</p> <p>-Securing pastoral land, stock routes, grazing areas, rest areas, pastoral zones</p>

		and sustainable maintenance of hydraulic infrastructures
Impacts on (illegal) migration as well as on trafficking in illegal products	-	-Creating alternative economic opportunities for young pastors
Contribution to employment	Consistent with the contribution to GDP, the contribution to employment of mobile livestock systems is expected to increase through increased numbers, but they are also likely to be reduced through the transfer of households to sedentary systems.	-See 'Contribution to GDP'.
Impacts on climate change	In section 4.1.4 the impact of mobile livestock systems on climate change was estimated to be mixed with a neutral balance. The influence of increasing ruminant numbers in mobile livestock systems on this contribution is poorly known and probably mixed.	-Research and pilot changes in ruminant husbandry and feeding that are suitable for mobile livestock systems, and that also bring economic benefits.
Impacts on water quality and quantity	The combination of the different drivers of change is expected to result in larger numbers in mobile livestock systems, which will also mean a higher use of water resources.	-Development and maintenance of pastoral water infrastructure -Securing land and pastoral areas for sustainable development of pastures through easier access to water
Impacts on biodiversity	The combination of different drivers of change could result in larger numbers of animals in mobile and other livestock systems, which would also mean more animals grazing in reserves and national parks, also because there will be less grazing available elsewhere, due to expansion of cultivated land and security problems.	-Improve management of grazing resources in nature reserves and parks, and limit access of transhumant herds so that carrying capacity is not exceeded
Impacts on desertification	As described in section 4.1.4, mobile livestock systems are estimated to have a positive impact on combating desertification. The combination of different drivers of change could lead to higher numbers of animals, but the numbers of animals in mobile livestock systems are likely to be reduced because of the transfer of animals to sedentary systems as a result of sedentarisation.	-Monitor the greening of very dry areas and conduct research on the relationship with transhumant herds in order to promote pastoral management methods that are better adapted to these areas
Impacts on land fertility	The combination of the different drivers of change could result in higher numbers of animals, but numbers in mobile livestock systems are also likely to be reduced by shifts to sedentary systems due to semi-sedentarisation. Expansion of cultivated land creates tensions between pastoralists and farmers that could reduce the	Promote synergies between mobile livestock systems and agricultural systems, including by developing more intensively the use of organic matter for their land, and by facilitating these exchanges between transhumants and farmers (agroecology through the

	<p>availability of organic matter from mobile livestock systems used for land fertility.</p>	<p>association of farmers and livestock breeders). -Improved governance and social engineering so that conflicts are reduced, the potential for synergy between mobile livestock systems and sedentary agricultural and livestock systems is enhanced, and economic benefits are maximised. It would also involve land tenure policies that recognise the rights of transhumant people, and the effective implementation of these policies. And it would also involve a greater role for transhumant representatives in local governance and a greater role for POs representing transhumants.</p>
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Photo 15 Loading cattle from a quay at a livestock market in Gogounou/Benin (P. Onibon)

5 Conclusions and recommendations

We are now reaching result 4 of the terms of reference: *A synthesis of results 2 and 3 is prepared and recommendations are formulated with a view to limiting the negative impacts and maximising the positive impacts. This synthesis will be used to introduce the following work, in particular the regional workshop on the future of mobile livestock systems in West Africa and the Sahel, thus making it possible to (i) feed the dialogue to build a shared vision between public and socio-professional actors, and (ii) to think about national and regional anticipation and support policies to be promoted.*

Chapter 4 dealing with the regional level already provides a summary of the expected results and we will focus here on the conclusions and recommendations from this impact assessment work.

Conclusions and recommendations

Mobile livestock systems make diverse and complex contributions that by their nature are difficult to quantify. Only GDP could be quantified in this study, but this is only one indicator of the economic importance of the livestock sector and of mobile livestock systems in particular. The economic contributions to employment, poverty reduction and food security, although not quantifiable, are clearly of a much higher order of magnitude. Investing in the livestock sector and in particular in mobile livestock systems is therefore one of the most appropriate ways to support equitable economic development and mitigate ongoing social transformations, while at the same time providing employment to a significant part of the population.

Recommendation 1: ECOWAS and its member states should therefore continue and strengthen their investments in a regulatory framework that creates an enabling environment for the development of the livestock sector, including mobile livestock systems which play a key role and whose transformation they must accompany in a controlled manner.

Mobile livestock systems contribute to the fertility of agricultural land and the provision of draught animals, which is an essential element in the development of sustainable agriculture based on agroecology. The latter is as essential for the rural economy as for food security. However, the relationship between pastoralists and farmers is under pressure due to the large and uncontrolled increase in cultivated land in hosting and transit areas, including stock routes, and access to water infrastructure and rivers. Increased livestock numbers would also potentially be a contributing factor, but there is no evidence that this translates into more animals on transhumance. Changes in land use through cultivation of grazing lands deprive pastoralists of their rights to use communal grazing lands. It can be a political choice to support this transformation, which deprives traditional users of their land use rights. But if this were the case, such a policy would have to accompany this 'depastoralisation' of livestock farming and the regional economy by taking full account of its very serious social, economic and political implications not only on a national scale but also on a regional scale, since it would put an end to one of the main regional trade systems in the region.

Recommendation 2: Only a major change in the governance of agro-pastoral spaces and lands could curb the growing tensions often attributed to transhumance but much more related to the excesses of local politicians and to inequitable and non-transparent, not to say corrupt, governance. Easing conflicts, securing land tenure by developing stock routes, grazing areas and water infrastructure for pastoralists can promote the peaceful coexistence of agriculture and mobile livestock systems, which is too often ignored even though it remains a social and economic force that is still largely active. To maximise the economic and food security impacts, it is crucial to strengthen without delay the policies that accompany this transition of the agrarian system. In order to implement such policies, the involvement of transhumants in local decision-

making and an expanded role for producer organisations representing transhumants seems very important. Thus, the promotion of the use of manure for fertilisation of agricultural land, and of animal-drawn agriculture, can contribute both to the profitability of crops, and to an increase in the environmental and economic benefits of mobile livestock systems.

In fact, coastal countries are increasingly putting in place measures to regulate/restrict livestock movements, particularly along their borders, and this type of measures has intensified since the COVID pandemic. East-West flows (Benin and Côte d'Ivoire) are also concerned and some decentralised administrations are increasingly developing movement bans (Nigeria). Some of these restrictions go against the letter and spirit of the regional regulatory framework (PEPISAO, 2020). These measures are also sometimes taken in a stigmatising manner, targeting one community or another, and reflect the largely negative perceptions of transhumance that are out of step with its multiple social and economic contributions. Some restrictions concern all transhumance, others just foreign transhumants, and some just the conveyance on foot of animals for slaughter. Some coastal countries have made the sedentarisation of mobile livestock a top priority, but have no real strategy for dealing with all the social, land tenure and economic implications.

Recommendation 3: Regional regulations should be updated to better correspond to the reality that coastal countries want to put in place, in particular a limitation on the movement of herds and people. Under these conditions, the countries would have the obligation to give good reasons for the implementation of such regulations at the level of their borders, by agreeing in advance on the modalities with the neighbouring countries concerned. The sudden and unanticipated announcement of the implementation of these restrictions cannot be applied without having communicated widely with the pastoralists concerned and exchanged with them on the adaptation measures to be put in place.

While access to pasture was free in the past, forms of monetisation of these common resources are developing, particularly in the northern areas of coastal countries, in very different forms. The gradual semi-sedentarisation of pastoralists in these areas, which very often maintains a small-scale transhumance, also means that pastoral resources in these areas are generally used more intensively and continuously. The consequences lie in the risks of land degradation and the reduction of its forage value due to the reduced mobility of the herds

Recommendation 4: National administrations should support the establishment of collective management systems for common grazing lands, managed by local users and subject to a land tenure status that is enforceable against agricultural expansion on these often low-fertility lands. In this context, innovative local tax mechanisms should make it possible to finance the restoration and preservation of these forage resources in connection with their recognised and delimited land status and with the corresponding facilities (water and sanitation).

The LSIPT and GLEAM tools can be used to estimate the different economic, social and environmental impacts of the livestock sector and mobile livestock systems in particular. The data available in West African countries do not currently allow the different parameters of the LSIPT tools to be filled in. The option of estimating these parameters on the basis of partial and punctual surveys is not satisfactory, as significant investments are mobilised for data that will very quickly be outdated, as is the case with general livestock censuses.

Recommendation 5: The consortium formed by CIRAD, FAO, and ILRI for the extension of the LSIPT tools, and CILSS (which is to support, with the help of the consortium, national livestock

government departments³⁵ of Sahelian countries under the second phase of PRAPS) should first agree with the countries concerned on the adaptations of the statistical systems to be made to the livestock sector. The aim should be to adapt and if necessary add indicators that are collected³⁶ (annually or as part of a livestock sector census). But it will be necessary to set up monitoring systems at a lower cost so as not to depend solely on external financial contributions. Ideally, the facilitation of these discussions would also make it possible to homogenise to a certain extent the indicators collected by the different West African countries. FAO's statistical services should be fully involved in these discussions as well, to ensure that the indicators collected will at the same time meet its needs and criteria to the maximum extent possible. CILSS should not limit this exercise to the countries covered by PRAPS. It should also cover the other ECOWAS member countries, in coordination or collaboration with PACBAO, PREDIP and the next phase of PRIDEC.

Some important indicators, such as the number of animals crossing borders for transhumance and trade, are complicated to report by individual countries without consistency with neighbouring countries.

Recommendation 6: In order to provide information on animal flows between countries, it is recommended that CILSS and/or ECOWAS facilitate brief but structured exchanges between each service on either side of the borders, in order to estimate the annual size of flows in a consensual manner. The aim of this exercise is to estimate the size of flows as best as possible, without getting too hung up on statistical data from one country and the other, which often results in underestimating the real movements. These exchanges could also be an opportunity for each pair of neighbouring countries to jointly evaluate the previous transhumance campaign and to anticipate the organisation of the next campaign. These exchanges could be organised in preparation for the High Level Concertations on peaceful transhumance, and on an annual basis to facilitate related analyses.

Another key issue for the application and use of the results of the LSIPT tools in countries is how to categorise livestock systems. The LSIPT tools propose to use the Seré and Steinfeld typology practised by FAO and other actors at the international level. However, this typology is currently little used at the national level in West African countries. The application of the LSIPT tools requires the estimation of many different parameters for the different livestock systems present in the country. Currently, if the data distinguish different systems, it is mainly the distinction between 'traditional' and 'modern' systems and between mobile and sedentary systems for ruminants that is proposed and that is insufficient for our analysis.

Recommendation 7: In the exchanges on the use of the LSIPT tools in West African countries, CILSS and FAO should also address the issue of livestock system typology. A comparison of typologies is made in this study between the typologies practiced in Benin and Côte d'Ivoire and the international typology of Seré and Steinfeld. It could serve as a basis for discussion. The application of the subdivision of mobile livestock systems into transboundary and non-transboundary systems would provide disaggregated results that estimate the contributions of these systems.

³⁵ Mauritania, Senegal, Mali, Burkina Faso, Niger and Chad.

³⁶ Ideally also integrating socio-economic indicators such as poverty and the number of households involved (taking into account the overlap when a household has several types of animals)

If West African countries, coordinated by CILSS with technical support from the FAO/CIRAD/ILRI consortium, manage to implement the LSIPT tools, it will be possible to utilise very relevant data at this regional level.

Recommendation 8: Data production should be clearly linked to decision making, to ensure that countries see the full value of the data and remain prepared to continue to pay for its production. This issue arises primarily at the national level, where LSIPT tools should be presented primarily as decision-support tools. At the regional level, CILSS activities related to the promotion of the LSIPT and GLEAM tools must be fully integrated into the objective of establishing a regional observatory³⁷. This observatory, which should have a mandate to cover the wider livestock sector, should publish its results annually, combining other relevant sources of information (e.g. 'SIM-bétail' systems, Agrhymet, and estimates of the available biomass). These annual data should be complemented in some years by an assessment of public policy developments related to the livestock sector, including transhumance. These analyses will report on the progress made in implementing the regional strategy to be adopted shortly with the support of the PEPISAO project. This publication could be called "The State of the Livestock Sector and Pastoralism in West Africa", and could be jointly written by ECOWAS, CILSS and FAO. The conceptual framework that was developed for this study could be used as the basis for the analytical framework of this publication, possibly integrated into a broader food systems analysis.

Based on the analysis of the influences of the drivers of change³⁸ and current policies on the impacts of mobile livestock systems in West Africa, public policies have been identified to maximise the positive impacts and to mitigate the negative impacts. These policies are as follows:

- Improving local and cross-border governance so that conflicts are reduced, and complementarity between mobile livestock systems and sedentary agricultural and livestock systems is enhanced, to maximise economic benefits. This would also imply land tenure policies that recognise and secure transhumant use rights, and the effective implementation of these policies. It would also imply a greater role for transhumant representatives in local governance, as well as POs representing transhumants.
- Value chain development, including governance of livestock markets
- Development and maintenance of pastoral water infrastructure
- Marking of stock routes, grazing areas and water infrastructures
- Facilitating cross-border cooperation processes for the optimal use of forage resources in the different countries
- Economically sustainable investments by users in pastoral resources to reverse the degradation of these resources, through the development of appropriate taxation
- Better, transparent and sustainable management of markets
- Creating alternative economic opportunities for young pastoralists
- Consideration of cultural aspects in the semi-sedentary strategies of transhumants in the northern zones of coastal countries.
- Promotion of better equipped modes of transport, especially in terms of shade and access to water and feed, which are likely to have economic benefits too.

³⁷ C/REG.3/01/03, articles 2 and 3

³⁸ 1) Worsening security situation, 2) Climate change, 3) Increasing and changing demand for animal protein, 4) Continued expansion of cropland, 5) The Covid-19 pandemic, and 6) Increasing ruminant numbers

- Researching and piloting changes in ruminant diets, which are suitable for mobile livestock systems, and which also have economic benefits.
- Improve the management of grazing resources on the periphery of reserves and national parks, and limit the access of transhumant herds so that carrying capacity is not exceeded
- Monitoring the greening of very dry areas and conducting research on the relationship with transhumant herds
- Promote synergies between mobile livestock systems and agricultural systems, integrating in particular the value of organic matter for sustainable land use, and facilitating exchanges and social agreements between transhumants and farmers.

However, if these policies are implemented in isolation, they can be ineffective.

Recommendation 9: A shared vision at regional level is a *prerequisite* for creating a viable environment for livestock breeders and economic agents involved in value chains. This does not mean that a single regional policy would suffice, but that national policies are only meaningful, relevant and effective if they are part of a clearly stated regional coherence. There is an urgent need for in-depth political dialogue between countries and with stakeholders to define this medium- and long-term vision, taking into account the mutations underway (demographics, evolutions in production systems, evolutions in forage resources, evolutions in protein demand, political and social dynamics, deterioration in the security environment, etc.). It is on the basis of this vision, fuelled by foresight work and strong participation of livestock breeders', pastoralists' and farmers' organisations as well as other stakeholders (States, cross-border local authorities, stakeholders in the livestock-meat value chains, etc.), that countries and ECOWAS will be able to define policies that anticipate and support the necessary changes and fully exploit the economic, social and environmental potential of livestock production in a sustainable manner.

The LSIPT tools allow for the simulation of quantifiable indicators of certain impacts, but these simulations were not carried out in this study. The quantification of current impacts was already very difficult and remained limited as explained above. A condition for successful simulations of prospective impacts is that current impacts are first well quantified and ideally validated by a group of stakeholders. Even then, a prospective simulation remains highly indicative, because they will be based on broad assumptions. It is above all the comparison between prospective simulations of different scenarios that would be interesting. This could be the comparison between the trend scenario (with today's public policies) and scenario(s) with one or more sets of public policies that influence the impacts.

Recommendation 10: For the application of the LSIPT tools by CILSS as envisaged under the regional component of PRAPS 2, CILSS should prioritise the estimation of current impacts.

The frameworks that were used for data collection in the capitals and in the host and transit areas, and consequently the case study reports on Benin and Côte d'Ivoire, focused mainly on (market) dynamics and governance in the areas concerned. The drivers of change were crossed with the impacts only at the time of synthesis (see section 4.1.5). For the national consultants who carried out the case studies, it was sometimes difficult to distinguish the influences of the different drivers of change. In general, the level of detail and rigour of the results was limited by the fact that the methodology was still being developed, by the diversity and complexity of the different themes to be covered, and by the geographical scope of the study. However, it is hoped that this initial comprehensive analysis provides a base to build on.

Recommendation 11: If a possible follow-up study is to use the same data collection framework, it should give more priority to impacts, to address them directly in the reporting. With regard to drivers of change, it is recommended that these be crossed with the impacts and that accompanying policies be identified earlier in the study by integrating these analyses into the data collection framework.

Answers to key questions, by way of conclusion

In the TOR the following key questions were identified. At the end of this study, it is possible to provide the following answers as a conclusion of this work.

At the level of the conceptual framework of analysis and the first impact assessment :

Should the usual categorisation of livestock systems be revised to better reflect the diversification and complexity of systems and their interactions with agricultural systems?

As described in different sections, the internationally frequently used Seré-Steinfeld typology does not easily apply to situations in West Africa. The government services of West African countries use different typologies, which mainly distinguish between 'traditional' and 'modern' systems. There is a wide variety of mobile livestock systems in West Africa, which are constantly adapting to changing situations and public policies. Each categorisation is a simplification, but is necessary to facilitate analysis. For the envisaged application of the LSIPT tools by CILSS in supporting livestock services at the national level, it is therefore recommended to adapt the Seré and Steinfeld typology based on the adaptations made for this report. It will then also allow the contributions of cross-border mobile livestock systems to be isolated.

What are the indicators to be taken into account to assess the diversity of effects and impacts on (i) employment, (ii) economic activity, (iii) people's income, (iv) tax revenues, (v) natural resources and the environment (vi) trade (vii) food security in its various dimensions (viii) social cohesion and conflicts, etc. ?

In Chapter 2, the main impacts are identified, and for some of these impacts, indicators are identified. This initial proposal forms the basis of an analytical framework, which should be constantly reworked, integrating new elements that will be acquired through the data collected.

What are the sources of information and methods of collection for these different indicators?

The LSIPT tools of CIRAD, FAO and ILRI, especially for economic and social impacts, and the GLEAM tool of FAO for environmental impacts, are well suited to quantifying indicators. However, it is the comprehensive analysis that takes into account the impacts for which there are no quantified indicators available, which is the most important.

What are the methods for processing and analysing this information, at the level of a defined territory, at the national level, at the regional level?

Analyses are difficult to apply at the level of a defined territory because of the lack of data to fill in the different parameters that are necessary to carry out an analysis adapted to the particular situation of the territory in question. However, if the number of animals in the territory is known, as well as their distribution between the different livestock systems, it is possible to carry out an indicative analysis, using the same parameters as those used at national level. At the regional level it is possible to conduct a real analysis, using the estimates of the regional parameters, or by

aggregating the results of the different analyses at the national level³⁹. In doing so, it would be useful to take the recommendations in section 5.1 and Annex 2 into account.

How to apprehend (methodology, crossing of sources) the importance and variability of transhumance flows from year to year as a function of (i) forage availability in Sahelian countries, and (ii) host country regulations on transhumance, (iii) other factors (security, social ties, hosting infrastructure, etc.). ?

The difficulty here is to obtain the various data to be able to carry out a complete analysis. It will therefore be particularly important for the transhumance observatory provided for in C/REG.3/01/03, articles 2 and 3, to establish relationships and structures that facilitate effective and regular collection from the various institutions concerned. By publishing the results annually, even if they are not complete, the providers of these data will be better able to understand the importance and will be more willing to contribute. More detailed observations on the challenges of the different parameters are described in Annex 2.

Which actors should be questioned: livestock breeders, farmers, elected representatives of local authorities, heads of POs and POEs, heads of market management committees; economic actors/agents: livestock traders, livestock feed, etc.; local/transboundary transhumance management commissions; decentralised government services: customs, security services, agriculture, livestock breeding, etc;

All these actors are important to integrate for a good understanding of the complex dynamics and multiple drivers of change that interact in a given country or territory. This is therefore required for a sound perspective on the quantitative results.

In terms of analysis of the main drivers of change

What are the main changes since the early 2000s?

- ***in terms of facilities: stock routes, watering points, grazing areas, market infrastructure***

Several relatively scattered initiatives are reported; improvement of stock routes, watering points and grazing areas. However, pastoralists' access to these facilities appears to be increasingly limited, especially in the northern parts of the coastal countries, due to the expansion of cultivated land and the lack of sufficiently recognised land tenure status for these pastoral commons. Improvements in market infrastructure have been compromised in some cases by poor involvement of local actors in the design and implementation of improvements. Important lessons have been learnt and focus on improving market governance for the benefit of stakeholders, particularly pastoralists.

- ***relations between farmers and transhumants: access to crop residues, extension of cultivated areas, social agreements, etc.***

The expansion of cultivated land is often mentioned as the main reason for tensions in relations between farmers and transhumants. However, the correlation between land use density and tensions between farmers and livestock breeders is not verified. Other factors such as the existence of long-standing inter-community social relations, the quality of local governance and the nature of the dominant cropping systems contribute to the complexity of these relations. In general, the tensions between farmer-livestock breeder and agriculture-livestock interactions are essential for

³⁹ There are detailed methodological issues to consider. For example, for our analysis at the regional level cross-border transhumance between West African countries was always considered as cross-border in the distribution of livestock on the systems, but imports and exports of livestock products between West African countries were not considered as imports and exports at the regional level.

sustainable development, as well as for strengthening the socio-economic links of these areas where both livestock and agriculture are in transition.

- ***local livestock held by sedentary people (size and composition), and transhumant livestock (size and composition)***

A transformation is underway towards forms of progressive semi-sedentarisation of pastoralist families anxious to secure even a timid form of land tenure. Part of the herd, particularly dairy cattle and some small ruminants, remain on these settlements in the northern areas of coastal countries as well as in peri-urban areas. Certain public policies implemented by governments show a radical desire to sedentarise livestock farming in the face of the accelerated migration of certain transhumant animals fleeing the insecurity of certain Sahelian countries and certain Nigerian states. The deployment of several settlements on either side of a border is also a strategy for adapting certain groups to the restrictions imposed on cross-border movements by the countries. These adaptations are a gradual process, with newly semi-sedentary transhumants often first practising a small amplitude transhumance. The distinction between sedentary and transhumant systems is often difficult to make. But in general, according to the stakeholders, there has been at least a relative reduction in numbers in large amplitude transhumance systems, and an increase in numbers in small amplitude transhumance systems and sedentary systems. More intensive systems such as fattening and peri-urban dairy systems are reported to have increased in numbers as well, but remain low in numbers. Because of security problems and the expansion of cultivation, there are fewer small ruminants in the large amplitude transhumance herds, because they are more difficult to manage and less quick to move. It should be noted that these views from the coastal countries on the trends towards a reduction in large transhumance contrast enormously with the observations that can still be made today in the good pastoral areas of the Sahelian countries in June, July and August, where the arrival of transhumants from the coastal countries remains massive in central-eastern Niger or in the Sahelian zone of Chad.

- ***at the level of differences and conflicts between users of space and resources: what are the sources/origins? how have the mediation mechanisms evolved?***

The initial cause is the expansion of cultivated land into areas that have long been used by transhumants as grazing areas and stock routes. The risk of crop damage has increased sharply, especially when these crops occupy the edges of pastoral water schemes and streams that are used by transhumants for watering. The increase in livestock numbers could also be a factor, since the density of livestock has also increased in agricultural areas. However, it should also be noted that the factors of governance and corruption that are often associated with this, greatly aggravate situations and are often the source of frustration and disregard for the law, which can lead to tension and violent conflict. Generally speaking, transhumants are good at avoiding areas of high agro-pastoral tension when they can find alternatives to their route.

Mediation mechanisms have also evolved, with an increasingly limited role for the traditional authorities and representatives of transhumants (particularly the *Rugga*), and a growing role for the POs, which are trying to represent transhumant and sedentary livestock breeders. The transhumance committees that have been set up and the experiences of cross-border cooperation can constitute innovations if these structures are supported over time and with rigour in their missions.

- ***at the level of local finances: what are the different levies/taxes paid by pastoralists? who collects? what are the uses of these revenues?***

See section 4.2.2

- ***at the social level: how are alliances between transhumant and sedentary people formed, and what changes have occurred? What actors and what roles do they play in welcoming transhumants to the host areas?***

As already mentioned on several occasions, relations between transhumant and sedentary people have become increasingly tense in some areas. Moreover, transhumance can only take place through multiple alliances and negotiations between communities, authorities and institutions that are increasingly numerous and interested in the landscape. Links with newly semi-sedentary livestock breeders can also facilitate negotiation of access to grazing in host areas. However, a large proportion of institutional actors have a very negative view of transhumance and quite systematically play down its positive impacts. On the other hand, they do not fail to take advantage of it, as shown by the work on transhumance and corruption. In any case, the 'taxation-corruption' mechanisms of transhumance should be studied in greater depth and be subject to real control. Without this, one can only recognise that the multiple frustrations among farmers and livestock breeders as well as the unfair treatment carried out illegally by those in charge constitute a major fuel for the flare-up of tensions.

What roles do transhumant livestock play in the cross-border area and the host territory?

- ***at the economic level: what are the trades induced by or benefiting from the presence of pastoralists? what is the contribution of transhumant herds (i) to the supply of draught animals (ploughing), (ii) to the supply of animals to fatteners? what are the local expenses made by pastoralists (i) for human consumption, (ii) for the maintenance of animals (forage, animal feed, veterinary products, water, guarding) (table of the structure and estimation of the average expenses of pastoralists);***

Farmers (through manure contracts, the sale of animal feed and the procurement of draught animals), brokers, traders, and other trades related to livestock markets, restaurateurs, transport service providers, and telephone credit card vendors, benefit from the presence of transhumants.

Transhumant breeding stock herds make an essential contribution to the supply of sufficiently robust bulls for draught, as well as to the supply of older males for slaughter to fatteners. These major contributions of pastoralist stock breeding could not be quantified due to lack of specific data. Local expenditure by pastoralists has not been quantified either, although the seasonal presence of transhumance in localities and markets allows the local economy to soar, as evidenced by the market tax statements when they are communicated.

- ***At the commercial level: which markets are supplied by pastoralists (quantification, seasonality)? which types of markets are supplied (intermediate markets, consumer markets)?***

These issues have been addressed in Chapter 3 for the areas studied in the two case studies in Benin and Côte d'Ivoire and in the corresponding specific reports, but they are only partially quantifiable at this stage.

- ***In terms of employment: can we evaluate the jobs directly and indirectly induced by transhumant livestock farming in the cross-border territory?***

The jobs directly and indirectly induced by transhumant livestock for the coastal countries of the transboundary territories are assessed in Chapter 3 for the areas studied in the two case studies in Benin and Côte d'Ivoire and in the corresponding reports.

- ***At the level of the environment and natural resources: what are the negative and positive impacts of the presence of livestock (soil fertility, biodiversity, water quality, pollution, etc.)?***

The negative and positive environmental impacts are described in the corresponding sections of chapter 4 at national and territorial level for the two case studies in Benin and Côte d'Ivoire, and in section 4.4 the environmental impacts are summarised at regional level.

At the level of prospective analysis

What are the main parameters to be included in a prospective analysis?

The main parameters to be included in a quantified prospective analysis are the same as those identified for the analysis of current impacts. For a qualitative prospective analysis, which should precede the quantitative analysis, the main drivers of change should be identified, as well as the combined effects of these drivers, and the public policies currently implemented. The interdependencies between the major drivers of change identified also need to be clarified for a better understanding of their nature and interactions.

What broad scenarios can be outlined that will help structure the foresight dialogue?

Three main scenarios should be outlined and discussed: 1) a trend scenario that assumes the continuation of observed trends, 2) a scenario that assumes the implementation of accompanying policies that maximise positive impacts and minimise negative impacts, and 3) a scenario that assumes that the limitations on herd mobility already implemented by some countries would be generalised and applied to end transhumance.

What lessons can be drawn from recent trajectories (since 2000) and from the transformations at work to feed the elaboration of scenarios?

Some drivers of change have been at work for a long time and will continue to play an important role (e.g. expansion of cultivated land and climate change). Other drivers of change are relatively sudden, and can have abrupt and multiplier effects. This is the case recently with the Covid-19 pandemic and the deterioration of the security situation in large areas subject to armed violence. The effective implementation of mobility restrictions, even if localised and temporary, can also have very significant effects, as was observed during the latest drought episodes between Nigeria and Niger in 2009.

What actions can West African countries take to minimise the negative impacts of mobile livestock systems and maximise their positive impacts, building on the observed drivers of change?

The analysis of the influences of the drivers of change combined with current policies on the impacts of mobile livestock systems in West Africa, leads to diverse and sometimes extreme public policy orientations. Some of these can maximise positive impacts and mitigate negative ones and are discussed in section 4.5. These actions are summarised in section 5.1, just before recommendation 9. But generally speaking, it is the discordance of policies between countries in the region that is evident and denounced by various recent studies. There is in fact a significant form of asymmetry between the policies of securing pastoral mobility promoted in the Sahelian countries and the increasingly assertive policies of banning transhumance in certain coastal countries. Even if many of these policies are not accompanied by effective support measures for pastoralists, they may contribute to the deep confusion surrounding the current and largely distorted image of transhumance in the territories on either side of the borders of the region's states.



Photo 16 Crowded cattle market day in Petit Paris, Benin (P. Onibon)

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7 Annexes

Annex 1: Terms of reference

Analysis of the social, economic and environmental impacts of mobile livestock systems in West Africa, the main drivers of change and long-term perspectives

TERMS OF REFERENCE

I-Context

I-1-Importance of livestock in West Africa

West Africa is characterised by a combination of diverse and complementary agro-ecological zones, mainly determined by climate. The rainfall gradient varies from less than 200 mm in the Sahelo-Saharan areas to more than 3000 mm in the coastal strip of the Gulf of Guinea countries.

The ruminant herd is estimated at more than 346 million head in West Africa (Kagoné, 2019), of which 21% are cattle, 77% sheep and goats, and 1% camels⁴⁰. These numbers are mainly located in the Sahelian countries and Nigeria. Traditionally, ruminants are the only means of exploiting arid and semi-arid areas (apart from mining sites) by transforming herbaceous and woody biomass into products that can be consumed or used by humans (milk and meat, hides and skins). However, this type of extensive livestock farming is subject to strong variability in the availability of forage and water resources, both in time and space, and depends on mobility. These systems are particularly vulnerable, but they are also particularly resilient and competitive.

The bioclimatic conditions of the Sudanian areas make these zones (south of the Sahelian countries and centre/north of the coastal countries) places where herds are welcomed in the dry season (intra-national or cross-border transhumance).

The contribution of livestock to national economies varies greatly. In landlocked Sahelian countries, livestock generally accounts for 35-40% of agricultural GDP and its contribution to overall GDP is around 15%. This contribution is much lower in coastal countries, in the order of 4 to 6% of agricultural GDP, resulting from the major importance of crop production and the low development of livestock. This importance of livestock in economies can be compared to the public expenditure allocated to it. Although state budgets in general spend little on livestock, Sahelian countries, which mainly comprise pastoral and agro-pastoral areas, devote a much larger share of the overall agricultural budget to livestock production than do coastal countries, which are mainly composed of agricultural areas.

I-2-Livestock in pastoral and agro-pastoral areas: an activity of major economic and social importance

In pastoral and agro-pastoral areas, livestock production is a major activity for rural households, but also for urban households in secondary towns (especially sheep fattening). It is therefore a

⁴⁰ The numbers are still very poorly known due to the lack of recent censuses in many countries.

significant, if not almost exclusive, part of livelihoods, food security (directly through milk, indirectly through income) and household resilience in the event of a shock (rapid disposal of an animal that can be used for health costs or ceremonies).

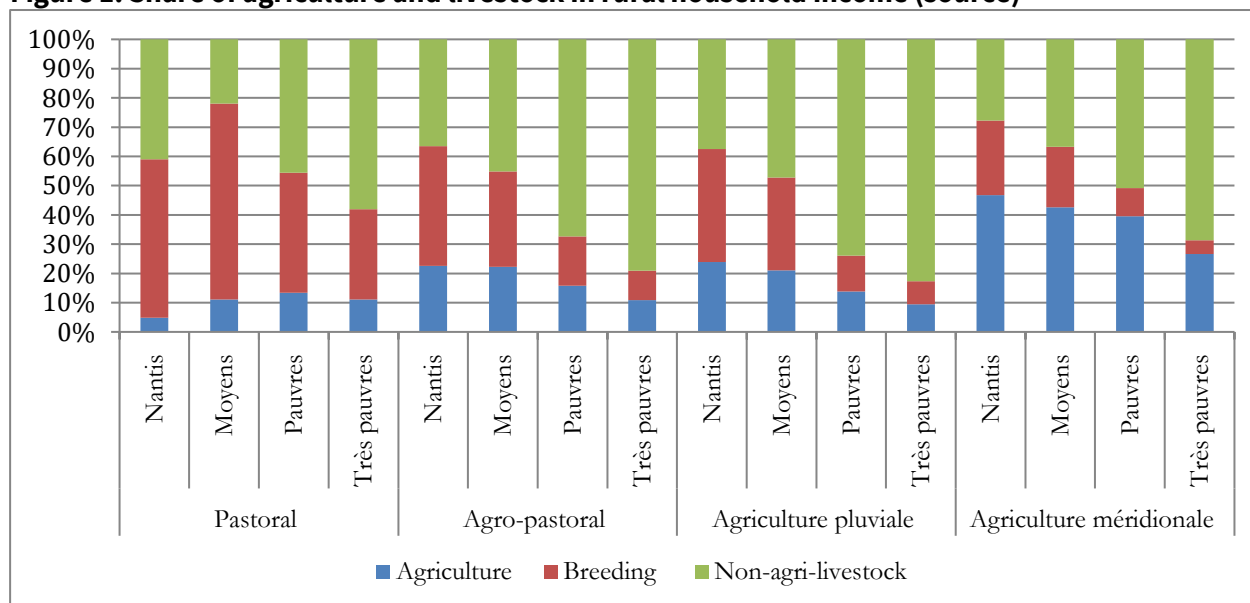
Livestock breeders and pastoralists (pastoral and agropastoral systems) derive a significant proportion of their income from livestock products, regardless of wealth class (very poor, poor, middle-income and wealthy)⁴¹. However, very poor livestock breeders have an average of only 4.1 Tropical Livestock Units (TLU) per household, and derive only 29% of their resources from the marketing of animal products (milk, cattle). The same applies to the category of poor livestock breeders, who, with an average of around 8.6 TLU, receive only 41% of their income from livestock.

In both categories, the level of income per household member is very low, at \$52 and \$77 per person per year respectively for very poor and poor households, or \$0.14 and \$0.21 per person per day, far from the extreme poverty line. Only among middle-income and wealthy households with livestock, and only among the middle-income and wealthy households with larger livestock holdings, in several areas of Chad and the Democratic Republic of Congo, the livestock sector is the main source of income. In several areas of Chad and Niger, this share exceeds 80%. The per capita incomes of these household categories are also significantly higher.

I-3-Livestock development in agricultural areas

In agricultural areas, livestock farming now accounts for a significant proportion of activity and income, particularly on 'affluent' and 'medium-sized' farms, because of the ability of these farms with a sufficiently large land base to invest in livestock.

Figure 1: Share of agriculture and livestock in rural household income (source)



In addition to its importance in diversifying the sources of income of farming households, the expansion of livestock in these areas has led to the substitution of complementarity between agriculture (southern Sahelian countries/northern coastal countries) and pastoral livestock farming, via the mobility of herds (soil fertility transfers, draught power, etc.), by the development

⁴¹ These four categories form the basis for classifying households into a homogeneous livelihood zone in the Household Economy Approach (HEA) surveys

of farming systems that combine animal and crop production within the same farm. Consequently, the growing difficulties of pastoralism (conflict over access to forage and water resources, harvest residues, etc.) are fuelled by this mutation in agricultural systems. However, this mutation represents an efficient transformation of production systems, an improvement in productivity and a diversification that leads to economic security for farms. The development of livestock farming in these agricultural areas is also accompanied by the development of transhumance during the winter period, with flows of livestock - confided by the farmer-livestock breeders to shepherds - to pastoral areas to free up crop fields, reduce parasitism, and take advantage of the quality of pastures in pastoral areas. This is known as the 'pastoralisation of farmers' phenomenon.

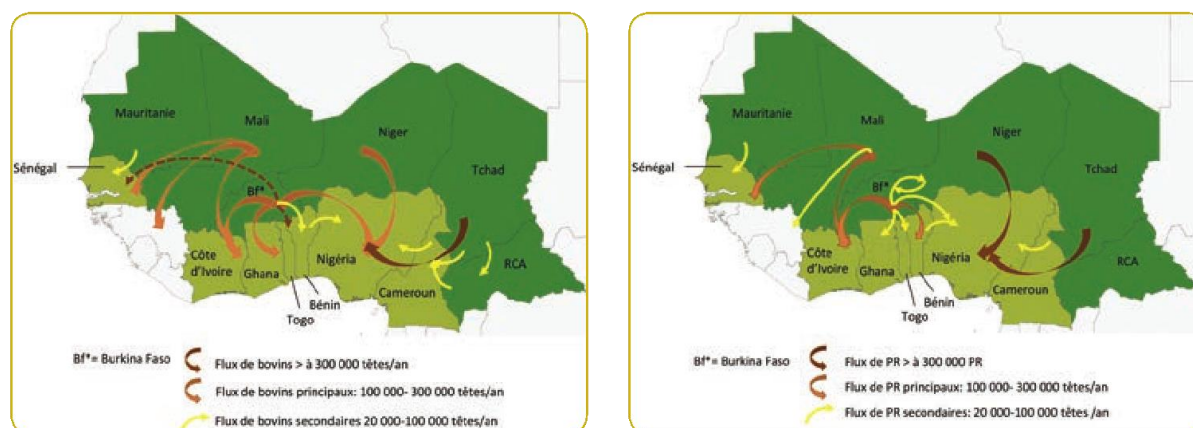
Rural population growth in agricultural areas in the absence of significant productivity improvements, which results in a strong expansion of cultivated areas (of the order of 10% every 3 years) on the one hand, and also the 'natural' growth of livestock on the other hand, rapidly amplify this competition over resources. The environmental impacts of extensive livestock systems are therefore mainly perceived as negative due to the intrusion of animals into classified forests and protected areas, tree pruning, etc. However, a detailed analysis of the relationship between animals and the environment, biodiversity management and natural resource renewal, protection and improvement of soil fertility and its impact on carbon capture, etc., shows that the issue is far more complex to understand and document.

I-4-The markets for animal products in West Africa

According to official data, regional trade in livestock and, more broadly, in all livestock products and by-products is the largest item in monetary terms in regional trade in agro-pastoral products and the second largest item in terms of all products, after petroleum products. Despite multiple barriers to cross-border trade, it is estimated that over 1.5 million head of cattle are traded regionally, two-thirds of which are absorbed by the Nigerian market. These flows are fed (i) by strictly commercial circuits structured from markets in pastoral production areas to terminal markets located in the immediate vicinity of slaughterhouses in consumption areas in coastal countries, via cross-border assembly and *allotment* markets according to the specificities of consumption markets, and (ii) by the marketing of 'finished' animals, in transhumance in coastal countries, sold before the herds return. It is therefore difficult to distinguish between transhumance flows and commercial flows from the point of view of statistical data, especially as information systems are not very good at accurately reporting these flows (animals not passing through authorised entry points, random checks by veterinary services, non-systematic registration at customs posts, etc.).

However, the region remains highly dependent on imports from outside the community. The Sahelian countries have a large surplus of meat, while the coastal countries have a large deficit. And all the countries are major importers of dairy products, mainly milk powder for reconstitution. Animal products as a whole represent between 15 and 20% of the region's agri-food imports, in value.

Les principaux flux régionaux de bétail (bovins et petits ruminants)



Sources : IRAM-Issala-LARES d'après Josserand-ATP-Cebevirha-Tradehub, 2013

The supply of animal products is a crucial element of food security. The average individual consumption of animal proteins (milk and meat) remains low on average in the region - higher in the Sahelian countries, much lower in the coastal countries - but it is increasing due to a fourfold phenomenon: (i) urbanisation, which results in a modification and diversification of diets; (ii) an improvement in the purchasing power of a part of the population (now called the "middle class"); (iii) a supply of processed dairy products at low prices and with packaging that makes them accessible to poor households; and finally, (iv) the social status that it confers. In addition to strong population growth, the outlook for demand for animal products is particularly dynamic.

1-5-The diversity of impacts of cross-border animal flows

Whether it is transhumance or livestock trade, cross-border flows have a significant impact on the local economy, jobs and income. Hosting mobile livestock breeders generates numerous jobs and direct and indirect income linked to the provision of a range of services (trade in consumer products, guarding, supply of feed and veterinary products, all trades linked to physical markets, etc.). The development of cross-border markets is also an important vector of trade-related activities, as well as a strong source of local taxation for local authorities. These impacts are relatively well identified from a qualitative point of view (diversity of trades, etc.) but little information is available on a quantitative level.

This set of interdependencies between Sahelian and coastal countries, long considered virtuous and 'win-win', has been called into question for several years. There are many reasons for this: increasing pressure on resources linked to the extension of cultivated areas and the development of livestock farming within farms, competition for access to water, the segmentation of areas and the development of urban and communication infrastructures, etc. To this can be added the desire expressed by most coastal countries to promote more offensive livestock farming development policies aimed at reducing the deficit in animal proteins. These 'objective' factors are reinforced by more subjective factors: ethnic tensions, insecurity, etc., all of which fuel a rise in conflicts and their degree of violence. The conventions and social agreements that governed relations between mobile and host communities are being called into question without new forms of regulation always managing to take over (transhumance management committees, conflict regulation bodies, recourse to justice, etc). The weakening of the many links of sociability between mobile and sedentary communities affects integration and social peace in a regional area that has to deal with the rise of violence.

The dynamics of transformation of (i) agricultural economies, (ii) pastoral and agro-pastoral economies, (iii) territories and infrastructures, particularly in relation to demography, are accelerating at a rate that the region has never experienced in the past. They lead states to be generally in a reactive position. Under these conditions, it is difficult to develop anticipation strategies. The lack of knowledge about these transformations fuels misunderstandings and conflicts.

I-6-Some consensus and several points of debate about the impacts of transhumance

The various mobile livestock systems are at the heart of debates that currently involve almost all stakeholders in West Africa and the Sahel. The discussions are often controversial, reflecting the different perceptions that the parties involved have of livestock systems in general and of some of their modalities, transhumance in particular. The debates are all the more intense because the three main issues at stake - economic, social and environmental - have been compounded by the security challenge that the region has been facing for several years.

- ✚ On the economic impacts, there is a consensus on the positive effects of mobile livestock systems. Most stakeholders in both host countries and countries of origin now agree that mobile livestock systems contribute to the densification of the economy at different levels: local, national and regional. From market integration, to the contribution to food security, to the functioning of many related value chains, the livestock and pastoralism sub-sector is credited with an important role in the region's economy. However, no one is in a position to say exactly what its real contribution is. This lack of documentation partly explains the sometimes questionable positions of some actors, particularly host countries, some of which are planning to develop their own livestock sub-sector;
- ✚ The importance of the social capital that mobile livestock systems have contributed to develop between the socio-cultural groups of the region. While the market networks and the forms of sociality that structure them have been well documented, the relationships that link pastoralists to farmers are much less well known. However, it is indeed a whole social capital of alliances that is necessary to be able to move during transhumance, particularly in a host country. In many cases, they are the basis of the friendly banter (or 'cousins in jest') that Fulani communities maintain with other socio-cultural groups in the region. This relationship has allowed the development of endogenous mechanisms for conflict prevention and management, which are undermined by a number of factors. The evolution of this relationship, which was once the basis of coexistence between the populations, deserves to be better documented in order to strengthen peaceful coexistence;
- ✚ The environmental impact of pastoralism and transhumance is more controversial. There are two fundamentally opposed theses. For some analysts, in addition to the fact that pastoralism is the only production system that makes it possible to enhance the value of immense desert territories, it would make it possible to maintain biodiversity, while contributing to the restoration of the fertility of degraded land, or to the maintenance of this fertility in agricultural areas. The association of agriculture and livestock is thus considered a form of agro-ecology for Sahelian systems. For others, pastoralism in general and mobility is a major source of environmental degradation: anarchic pruning of trees, degradation of protected areas and animal loads sometimes beyond the capacity of pastures. These latter arguments are often put forward by certain countries to limit the

areas where transhumance can be practised. These different impacts also need to be documented;

- ✚ The consequences of the insecurity that plagues the West African region on mobile livestock systems. In addition to the fact that it leads to an increasingly marked descent of large flows of livestock, it could transform transhumance into a kind of more or less definitive migration, thus contributing to making immense Sahelian and desert territories inhospitable.

II-Justification and objectives of the study

In this context, ECOWAS has set itself the objective, through PEPISAO, to build a shared vision of livestock development in West Africa with the States, socio-professional actors and decentralised authorities in the medium to long terms. This vision should help inform national and regional policies capable of realising it.

Developing a shared vision implies having a sufficiently clear perception of (i) the positive and negative impacts of the multifunctionality of mobile livestock systems; (ii) identifying the main trends at work; (iii) identifying the changes at work, particularly in production systems (herding, farm management), which can serve as a basis for considering changes of scale and responding to the new challenges that are emerging.

The objective of the study is therefore to build an analytical framework to better measure the effects and consequences (positive and negative) of mobile livestock systems (pastoral and agro-pastoral) on the environment, space and land, the economy and society (social and inter-community links, integration of peoples), food and nutritional security. The objective of the study is also to i) provide an initial global assessment of these impacts, ii) analyse the changes/transformations underway in pastoral and agro-pastoral livestock systems and iii) examine the way in which these changes contribute to the densification of the economy of the territories through the emergence of new value chains, the introduction of technological innovations, etc. Finally, based on the identification of current impacts and main drivers of change, the study aims to highlight the long-term perspectives of mobile livestock systems and to formulate recommendations. These analyses will be placed in the general context of the livestock sector in West Africa.

Given the lack of available information on the one hand, and the limited resources available for this study on the other, the aim is not to carry out an exhaustive review, but to construct an analytical framework and to inform or illustrate it through an ambitious literature review two case studies on representative cross-border areas⁴² and transit areas.

At the end of this study, it should be possible to provide decision-makers in the region with answers to the following questions

- What is the economic contribution of mobile livestock systems?
- What are the effects, positive and negative, of these livestock systems on the environment?

⁴² This term covers the Sudanian zones that host transhumant livestock in the dry season. However, these areas are now also departure areas at the end of the dry season/beginning of the winter season when farms have to clear their fields for sowing, and organise the departure of animals to pastoral areas where the forage biomass is of good quality and parasite problems are much less than in the wetlands

- Do mobile livestock systems play an important role in ensuring social cohesion between different ethnic groups, or are conflicts between pastoralists and farmers a source of instability?

III-Expected results of the study

With regard to the objectives pursued, five results are expected from the study:

R1. A relevant analytical framework is available to capture the multiple impacts of mobile livestock production, the main developments that will influence these impacts, and the prospects for the development of mobile livestock production systems and their impacts by 2040

R2: This conceptual framework is put into the perspective of the West African regional space as a whole, in order to provide a first draft of a global assessment and to identify the information gaps that need to be filled in order to refine the assessment and knowledge of impacts;

R3: This conceptual framework is applied to two cross-border territories, representative of transhumance and trade flows, and makes it possible to assess the diversity of impacts on specific territories to be assessed and the adaptation strategies of mobile livestock systems to be documented, which provides information on the changes and transformations underway and provides food for thought for the reflection on the trajectories and the future of these systems ;

R4. A synthesis of results 2 and 3 is prepared and recommendations are formulated in order to limit the negative impacts and maximise the positive impacts. This synthesis will be used to introduce the following work, in particular the regional workshop on the future of mobile livestock systems in West Africa and the Sahel, thus making it possible to (i) feed the dialogue to build a shared vision between public and socio-professional actors, and (ii) to think about national and regional anticipation and support policies to be promoted.

IV-The main issues identified in relation to the objective of the study

At the level of the conceptual framework of analysis and the first impact assessment :

- Should the usual categorisation of livestock systems be revised to better reflect the diversification and complexity of systems and their interactions with agricultural systems?
- What are the indicators to be taken into account to assess the diversity of the effects and impacts on (i) employment, (ii) economic activity, (iii) people's income, (iv) tax revenues, (v) natural resources and the environment(vi) trade(vii) food security in its various dimensions(viii) social cohesion and conflicts, etc. ?
- What are the sources of information and methods of collection for these different indicators?
- What are the methods for processing and analysing this information, at the level of a defined territory, at the national level, at the regional level?
- How to apprehend (methodology, crossing of sources) the importance and variability of transhumance flows from year to year as a function of (i) forage availability in Sahelian countries, and (ii) host country regulations on transhumance, (iii) other factors (security, social ties, hosting infrastructure, etc.). ?
- Which actors should be questioned: livestock breeders, farmers, elected representatives of local authorities, heads of POs and POEs, heads of market management committees; economic actors/agents: livestock traders, livestock feed, etc.; local/transboundary transhumance management commissions; decentralised government services: customs, security services, agriculture, livestock breeding, etc;

In terms of analysis of the main drivers of change

- What are the main changes since the early 2000s?
 - o in terms of facilities: stock routes, watering points, grazing areas, market infrastructure
 - o relations between farmers and transhumant livestock breeders: access to crop residues, extension of cultivated areas, social agreements, etc.
 - o local livestock held by sedentary people (size and composition), and transhumant livestock (size and composition)
 - o at the level of differences and conflicts between users of space and resources: what are the sources/origins? how have the mediation mechanisms evolved?
 - o at the level of local finances: what are the different levies/taxes paid by pastoralists? who collects? what are the uses of these revenues?
 - o at the social level: how are alliances formed between transhumant and sedentary people, and what evolutions have occurred? What actors and what roles do they play in welcoming transhumants to the host areas?
- What roles do transhumant livestock play in the cross-border area and the host territory?
 - o at the economic level: what are the trades induced by or benefiting from the presence of pastoralists? what is the contribution of transhumant herds (i) to the supply of draught animals (ploughing), (ii) to the supply of fatteners? what are the local expenses made by pastoralists (i) for human consumption, (ii) for the maintenance of animals (forage, animal feed, veterinary products, water, guarding) (table of the structure and estimation of the average expenses of pastoralists);
 - o at the commercial level: which markets are supplied by pastoralists (quantification, seasonality)? which types of markets are supplied (intermediate markets, consumer markets)?
 - o in terms of employment: can we evaluate the jobs directly and indirectly induced by transhumant livestock farming in the cross-border territory?
 - o the environment and natural resources: what are the negative and positive impacts of the presence of livestock (soil fertility, biodiversity, water quality, pollution, etc.)?

At the level of prospective analysis

- What are the main parameters to be included in a prospective analysis?
- What broad scenarios can be outlined that will help structure the foresight dialogue?
- What lessons can be drawn from recent trajectories (since 2000) and from the transformations at work to feed the elaboration of scenarios?
- What actions can West African countries take to minimise the negative impacts of mobile livestock systems and maximise their positive impacts, based on the observed drivers of change?

V-Methodology

The study will combine several complementary steps and approaches:

1. **A literature review.** It will first focus on **the methods for assessing the impacts and effects** both at the macroeconomic level on the scale of one or more countries, and at the level of a more limited territory, including a cross-border territory (understanding the impacts of cross-border dynamics). This literature review will also identify **analyses and assessments of the impacts of mobile pastoral and agro-pastoral systems in all the thematic fields or areas already covered** (economy, jobs, income, use of spaces, natural resources and the environment, land tenure dynamics and issues, market supply, food security, social dimensions, etc.); This synthesis will include interviews with resource persons who have a global view of the evolution of livestock systems at the regional level: project managers; livestock PO managers; regional organisation executives; experts. This

synthesis will distinguish between trends common to the whole region and specificities that emerge in certain sub-areas. Wherever possible, maps will be used to illustrate this spatial differentiation.

2. **Data collection and analysis from officials in the Ministries of Economy and Finance, Agriculture, Livestock and Environment**, Interior and Security of ECOWAS member countries, Mauritania and Chad. As far as possible, these data will make it possible to quantify the various social, environmental and economic impacts at national level.
3. **A series of field interviews in two selected cross-border areas to understand and illustrate the impacts on at least two major production and trade sub-areas**, using data collected locally and interviews with local actors and institutions: herders' and pastoralists' organisations, agricultural producers' organisations, cross-border transhumance management committees, local authorities, market managers, etc. These surveys will also focus on the main developments conceived, and the adaptation strategies of the various actors :
 - Eastern" sub-area: Benin / Niger / Nigeria border area.
 - Western" sub-area: Guinea/Mali border area.

This multi-stakeholder approach will combine a territorial approach and an approach based on commodity chains (livestock, meat, by-products), with three main areas of analysis: (i) economy, employment, communal resources, markets, etc., (ii) environment (including biodiversity, fertility, water), land-use planning and management, land tenure; (iii) social links.

The two border areas⁴³ were selected to cover, as well as possible, the diversity of situations while taking into account the practical obstacles, in particular in terms of security, to collecting data on the ground.

4. **The presentation of the synthesis of the results of this work will take place** in the framework of a regional workshop on the future of mobile livestock systems in West Africa and the Sahel with the participation of representatives of regional institutions, socio-professional organisations, governments of six countries in the region, NGOs and resource persons.

VI-Organisation and timetable

The study will include the following main steps implemented as soon as the team is in place:

1. Start-up meeting involving the DARD, the PEPISAO Coordinator and the experts mobilised: general framing, methodological deepening. This stage will be completed by the production of a preliminary methodological report.
2. Detailed literature review and national data collection
3. Development of interview frames in the two field areas (households, different categories of actors)
4. Joint mission of regional and international experts to the capitals of the two coastal countries (Benin and Guinea): interviews with key actors (administrations, POs, TFPs, etc.) and further development of the field survey methodology.
5. Conducting surveys in the two selected border areas.
6. Exploitation of the data collected, synthetic analysis and drafting of the summary report and the note to decision-makers
7. Workshop to discuss the results of the study (as an integral part of the regional strategy formulation process)

The main stages of the study are set out in the timeline below.

⁴³ Where possible, the study will draw on the results of research on similar issues carried out by CIRAD and FAO in the Burkina/Togo border area.

	2019		2020					
	N	D	J	F	M	A	M	J
Setting up the team								
Start-up meeting and preliminary methodology report								
Literature review								
National data collection								
Development of interview frames								
Missions to the capitals of the two coastal countries and surveys in the border areas								
Processing of interviews, summary report and note for decision makers								
Workshop to discuss the results of the study								
Delivery of final reports								
English translations								

VII-Composition of the team

The study will be led by a team of two international experts combined with two regional experts.

The team of international experts will include (i) a zootechnician/agroeconomist, specialised in the multidisciplinary analysis of livestock systems, and (ii) a sociologist/pastoralist (specialised in mobile livestock systems and/or natural resource management and the environment). These experts will be responsible for steering the study as a whole, dealing with methodological issues and supporting the regional experts.

They should combine the following skills

- Experience in multidisciplinary analysis,
- Knowledge of pastoral and agropastoral systems,
- Knowledge of the livestock sector in general,
- Experience in economic analysis (including value chain analysis),
- Experience in social analysis,
- Experience in territorial and environmental analysis,
- Experience in regional integration issues, including regional trade and health issues.

The team of regional or national experts will include two senior experts (one for each of the two study areas) specialising in livestock and/or pastoralism, in charge of conducting field surveys and stakeholder interviews;

The number of days required for the different experts for the different stages is shown in the table below.

	Locations	IE 1	IE 2	RE 1	RE 2
Kick-off meeting and preliminary methodology report	desk	2	2	2	2
Literature review	desk	4	4	-	-
Development of interview frames	desk	1	1	1	1
Missions to the capitals of coastal countries (interviews, data collection, in-depth methodology)	country	8	8	8	8
Surveys in border areas	country			16	16
Processing of interviews, summary report and note for decision makers	desk	8	8	4	4
Workshop to discuss the results of the study*.		-	-	-	-

Delivery of final reports	desk	1	1	-	-
English translations	desk	2	-	-	-
Sub-totals		26	24	31	31
Totals		50		62	

IE=International Expert, RE=Regional Expert

* The participation of international and regional experts in this workshop meeting will be charged to the budget of this activity.

VIII-Deliverables

The study will result in the production of four products :

1. A report on the conceptual framework for impact assessment and analysis.
2. One report on each of the two selected cross-border areas (two reports).
3. A general synthesis report including impacts, main drivers of change, and prospective analysis.
4. A summary note focusing on key points and support for decision making (note for decision makers) .

Annex 2: Conclusions and detailed recommendations on analytical methods

This annex provides detailed conclusions and recommendations on the methods of analysis, mainly in relation to the application of the LSIPT tools, and also highlights the information needs to be addressed for a better assessment of the impacts.

For the application of some of the LSIPT tools at the national level in Benin and at the regional level in West Africa, these tools have been integrated into a single Excel file. The respective tool files offer options to import data from other files, which can be a factor of vulnerability and malfunction. The consortium that has been formed to promote the LSIPT tools, consisting of FAO, CIRAD, and ILRI, is planning to convert the tools into a web-based format to facilitate the use of the tools.

Detailed recommendation 1: A web-based format may indeed offer sufficient flexibility to users depending on their particular situation and the availability of data. An alternative option could also be implemented in parallel. It would be to combine some of the key tools for national level analyses in an Excel file (building on what has been done for this study) and to streamline and simplify the different sheets and their interactions.

Some key parameters, such as the nutrients contents of animal products, are very difficult to report at the national level, but probably do not vary much between countries.

Detailed recommendation 2: It is recommended to pre-fill some parameters in the tools, leaving open the option to adapt them if more accurate information sources are available. This concerns especially the nutrients contents.

The identification of livestock systems is probably also difficult to do by national services, and it would be in the interest of CILSS and ECOWAS to have a single harmonised livestock systems typology used in ECOWAS member countries. This could then ensure better harmonisation and comparability of results.

Detailed recommendation 3: CILSS, with the support of the LSIPT consortium, should agree with member countries on a harmonised typology of livestock systems to be used by the livestock services of member countries. The typology developed for this study could inspire the construction of this harmonised typology.

As explained above, a quantified prospective analysis could not be carried out for this study with the selected tools of the LSIPT toolbox. These tools offer the possibility of a forward-looking analysis, in which the number of animals is varied, without changing the parameters of production, price and value chains. In theory, it would be possible to vary these parameters by duplicating the entire file. The DYNAMOD model, one of the LSIPT tools, offers the option of varying the detailed production parameters. However, this tool is not sufficiently articulated with the other tools, as the detailed production parameters are difficult to enter in a consistent manner. For these reasons this tool was not selected for this study.

Detailed recommendation 4: The LSIPT consortium could consider the option of varying certain production and price parameters for prospective analyses. They could then also be more easily used for cost-benefit analyses for projects and programmes.

For estimates of the contribution to GDP in the sectors, as well as contributions to nutritional needs, it would be necessary to take into account imports and exports of live animals (excluding

transhumant animals). However, the data available for these imports and exports differ greatly between the different sources. Broadly speaking, there are data from the country's government (Benin in this case), and data from the FAO. The FAO data is normally obtained from the same government, yet there are significant differences. There are also important differences between the different categories of FAO data. Finally, for Benin the 2013 government data was used. For cattle there were more exports than imports, and the animals produced for the chain by the largest of the systems (BLGA/H-PA) was reduced with this difference. For sheep, goats, pigs and poultry, imports are higher than exports. Additional tabs have been added to calculate the value added in the chains linked to these flows.⁴⁴ Intermediate costs at production level are not known for live animal imports.

Current imports and exports are probably much higher than the government's 2013 statistics (125,303 and 152,782 head respectively). In Savè, a key transit point for the cattle trade between Mali and Burkina to Nigeria, staff interviewed mentioned around 200,000 head using this route alone.

Under the category 'Trade' FAO STAT contains different databases in this framework:

- 'Live animals'.
- 'Detailed trade matrices'.

However, compared to government data and given the knowledge of the large flows of live animal imports and exports, this database appears largely incomplete.

Detailed recommendation 5: In preparation for the use of LSIPT tools by national livestock services in West Africa, coordinated by CILSS and supported by the CIRAD/FAO/ILRI consortium, it would be important to consider better integration of live animal imports and exports in the LSIPT tools.

Detailed recommendation 6: As part of the application of the LSIPT tools in West Africa, it will be important to conduct a discussion between the FAO statistical services, national livestock services, CILSS, and the LSIPT tools consortium, in order to be able to provide information on live animal imports and exports.

A key parameter in the calculations of the different tools is the number of transhumant animals that cross borders. In Benin and Côte d'Ivoire, as probably in other coastal countries, these animals are considered foreign. They are therefore not included in the statistics on the numbers of different types of animals.⁴⁵ The only data that exist to estimate these parameters are often unreliable. For some years now, countries participating in the 'Concertations de Haut Niveau pour la Transhumance Apaisée' (High Level Concertations for Peaceful Transhumance) between Sahelian and coastal countries have been proposing estimates of the numbers of animals crossing their borders. However, these statistics often do not distinguish the origin and/or destination of these animals. These data are in principle collected by official border posts where herdsmen are formally obliged to register. Aided by the fact that herds often travel overnight, and that they often have an interest in avoiding these official posts in order to avoid the payment of fees and checks on their eligibility to enter, the statistics produced by these posts are often underestimates.

⁴⁴ The percentages of the numbers in the tabs for the value added calculations in the sectors no longer make sense, because there are imports/exports of live animals included, which have an 'exploitation rate' of 100%.

⁴⁵ In reality there are probably also animals from coastal countries that are sent with the transhumant herds when they return to the Sahelian countries after the dry season.

For Benin, while the official entry statistics were 370,000 head in 2017 and 320,000 in 2018, the regional expert estimated the number of cross-border transhumant cattle at at least 350,000⁴⁶. However, for the calculations with the tools this estimate was doubled to around 700,000 head in an attempt to be as close to reality as possible. Probably the numbers of official cattle entries in 2019 were significantly lower than in previous years due to the introduction of entry taxes. In 2020 the situation was even more complicated because of the Covid-19 pandemic. It probably reduced official entries even more, and probably also the real entries. For 2020 Benin had also concluded an agreement with Niger that was supposed to limit the number of entries to 50,000 head. In the end, most of these animals did not arrive, probably because of the Covid-19 pandemic. According to information from the regional expert, the number of sheep and goats entering the country has been greatly reduced in recent years. This is the insecurity that forces herdsmen not to bring in these small ruminants, which cannot run fast enough to escape danger, unlike the much more agile and fast cattle.

Recommendation 6, see section 5.1 which addresses these detailed findings.

The question of considering and estimating its value remains a very complex exercise. FAOSTAT data on animal manure and its application to pasture and agricultural soils, assume that one third of the organic matter produced by mobile livestock systems would be used on agricultural land in exchange for crop residues. An estimate of the nitrogen content of a Beninese study was taken into account in these estimates. For the average price per kg of organic matter, no reliable and representative source could be identified. This was estimated at 0.5 FCFA per kg⁴⁷ by the author. The LSIPT tools add the direct and indirect value of organic matter to the value added by the livestock sector (and to the value added by mobile livestock systems and cross-border mobile livestock systems for the analyses of these sub-sectors). However, it would also be possible to argue that in reality the part of the value that is applied to pastureland is in fact already included in the value of the products from mobile livestock systems. In this case, it can be estimated that the corresponding value would thus be double counted.

Detailed recommendation 7: The methodological issues of the treatment of the value added by organic matter should be discussed by CILSS, the livestock services of the member countries, and the LSIPT consortium. This concerns not only the part applied on pastureland, but also the part applied on cropland. The aim should be to find an approach that is as close to reality as possible and that is scientifically established, so that it can be applied in a harmonised way by the different countries and the CILSS.

During the application of the LSIPT tools in Benin and West Africa, several other small adaptations were made to the tools to allow their application to the situation in Benin and West Africa. These have been marked as such in the Excel file. Some of these adaptations could be considered for future updated versions of the tools.

Another important issue that arose during the application of the tools and the drafting of the synthesis report was the official estimate of the contribution of the livestock sector to GDP. For the application of the tools in Benin, data from the government statistical service were used. However, for the analysis at the regional level such an official reference does not exist. Also, as an official

⁴⁶ If 'Beninese' cattle and transhumant cattle together are considered 100%, transhumant cattle represent 12.4% of the total. A 2016 FAO publication (Revue Des Filières Bétail/Viande & Lait Et Des Politiques Qui Les Influencent Au Benin) mentioned a percentage of 7.88% of transhumant cross-border animals of the total number.

⁴⁷ For all types of animals for all systems except poultry

reference, a combination of FAO and WB data had to be used. But these data are not complete and the calculation method can thus be largely questioned. The treatment of the value added by the value chains linked to the livestock sector after the production stage is also important.

Detailed recommendation 8: The FAO and/or WB statistical services should publish data on the added value of the livestock sector, clarifying that this refers specifically to the added value that corresponds to the production stage on the one hand, and specifically also to the rest of the value chains of livestock production.

Annex 3: Interview schedules for coastal country capitals

A- Interview framework

The planned country investigations should be structured around six main lines of enquiry, summarised below and then developed in terms of methodology:

	Steps	Objectives	Contact persons
1	Framing and diagnosis of transhumance at the country level	National understanding, livestock systems and seasonal transhumance flows	Ministries of Livestock, Agriculture, Trade, Environment, Statistics, POs, NGOs, private sector, and identified resource persons
2	Analysis of market dynamics in relation to transhumance	Assessing market dynamics in relation to transhumance	Ministries of Livestock, Agriculture, Trade, Environment, Statistics, POs, NGOs, private sector, and identified resource persons
3	Practices and evolution of the farming-livestock association	Assessing the evolution of the relationship between the country's agricultural systems and transhumant livestock systems	Ministries of Livestock, Agriculture, Trade, Environment, Statistics, POs, NGOs, private sector, and identified resource persons
4	Governance of spaces and management of agro-pastoral disputes	Understand and assess the impacts of transhumance in terms of the conflicts that may be associated with it	Ministries of Livestock, Agriculture, Trade, Environment, Statistics, POs, NGOs, private sector, and identified resource persons
5	Current impacts of mobile livestock systems	Quantifying the impacts of transhumance	Ministries of Livestock, Agriculture, Trade, Environment, Statistics, POs, NGOs, private sector, and identified resource persons
6	Key drivers of change and long-term prospects	Understand and assess the main drivers of change and the long-term prospects for transhumance from a general perspective and summarising	Ministries of Livestock, Agriculture, Trade, Environment, Statistics, POs, NGOs, private sector, and identified resource persons

B- Step 1: Global approach to transhumance at the country level

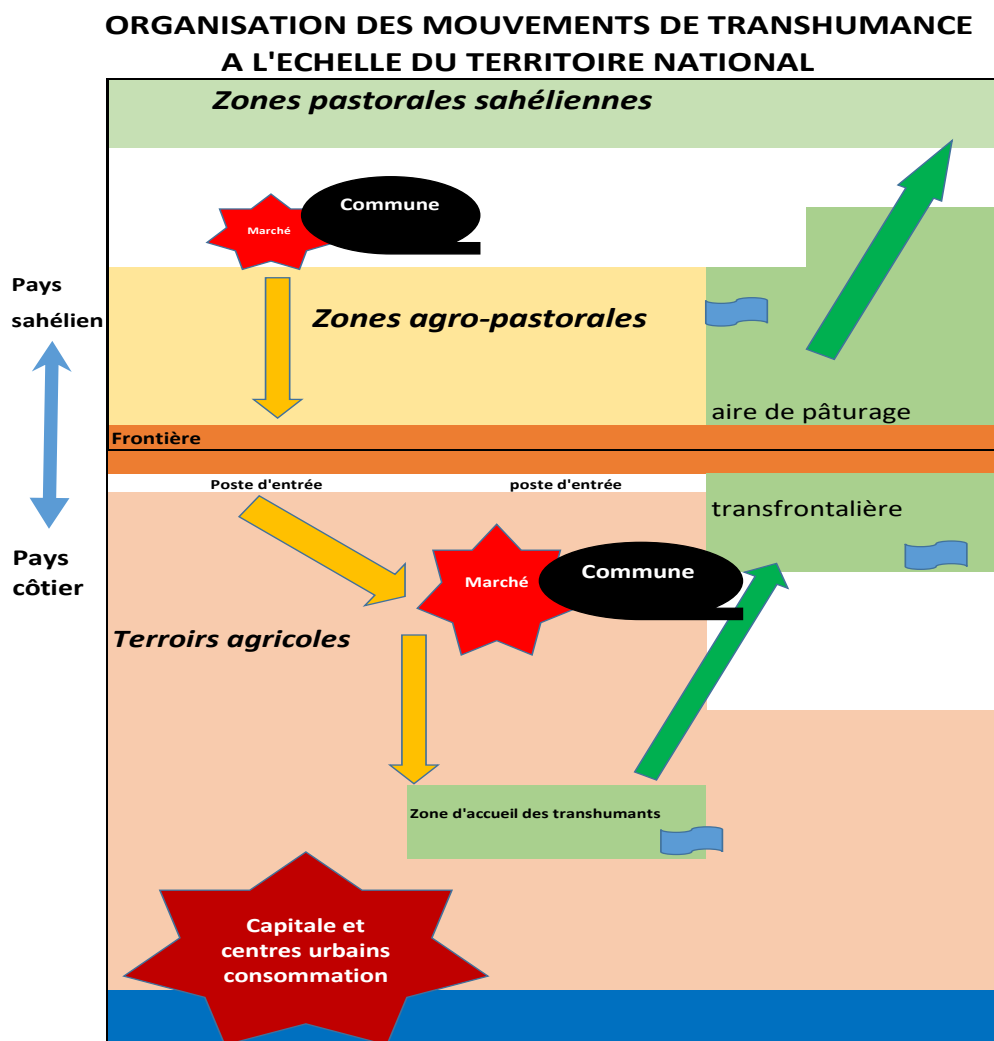
	Steps	Objectives	Contact persons
1	Framing and diagnosis of transhumance at the country level	National understanding, livestock systems and seasonal transhumance flows	Ministries of Livestock, Agriculture, Trade, Statistics, POs, NGOs, private sector, and identified resource persons

Objectives: This first stage aims to gain an understanding of the place of transhumance in the country.

Unit of observation: the coastal country

Targeted interlocutors: this stage is carried out through interviews with the Ministries of Livestock, Agriculture, Trade, Statistics, POs, NGOs, private sector, and identified resource persons
Livestock technical services, elected officials, national POs

Questioning and indicators to be collected



1-Mapping and timing of transhumance in the country

Using a map of the country, the main strategic sites and areas for transhumance are identified with the stakeholders:

- entry and exit points,
- axes of passage,
- grazing areas or areas of attraction for grazing
- watering areas
- livestock market
- axes of conveyance by foot or by lorry
- transhumance hosting areas
- ...

What is the timetable for this transhumance? Entry period, exit period.

What changes have been observed, since when? Under the influence of which factors?

2-Updated typology of livestock systems in the country defined by the Ministry of Livestock

What is the typology of livestock systems in the country?

What is the proportion in terms of numbers of animals of the different types?

When did the last census take place?

What are the most recent estimates of livestock numbers in the country?

How is this estimate made (what percentages of annual growth have been assumed?)

Do the latest census and subsequent estimates include animals owned by foreign livestock breeders, which arrive each year during the campaign?

Do the latest census and subsequent estimates include animals owned by country-based owners who leave each year after the campaign?

Referring to the figures collected for the annual report in the framework of the High Level Concertations on peaceful transhumance between Sahelian and coastal countries: Are there precise statistics on the number of animals entering and leaving during each annual campaign, distinguishing between countries of origin and destination?

What are the developments over the last ten/twenty years?

For the discussions with the interlocutors, a hypothesis of typology based on mobility and the association of agriculture and livestock is presented below:

1-Sahelian transhumant pastoral system of great amplitude in coastal countries): 10%.

(system approaching FAO type 1LG – Grassland based -Arid/Semi-Arid System (north of 1MR - Mixed Rainfed-Arid/Semi-Arid System) -

2- Farming system associating animal traction agriculture and cattle herd practising a low amplitude transhumance: 10%.

(approaching 2LG - Grassland based systems - wet/sub-humid and arid/semi-arid (south of 1MR - Rainfed mixed system - arid/semi-arid)

3- Agro-pastoral cereal system and transhumant herd in the Sahel zone: 5%.

1MR - Mixed rainfed - arid/semi-arid system

4- Farming system associating livestock farming with animal-drawn cultivation (purchase of draught oxen from transhumants): 65%.

2MR - Mixed wet/subhumid system

5-Sedentary ranch or local farm system (state and private ranches): 5%.

1OF - Fattening system -

6-Peri-urban dairy cattle systems linked to herd mobility: 5%.

1OM - Peri-urban dairy system

3-Importance of transhumance flows

What data are available to assess the nature of transhumance flows? How are they recorded? By whom?

What data sets are available to characterise the entry into the territory? What about transhumant exits?

What factors have influenced the size of the inflows over the last ten years?

What are the factors that have influenced the size of the outputs over the last ten years?

4-Impacts on the environment and natural resources

What are the positive impacts of the presence of livestock (soil fertility, biodiversity, etc.)?

What are the negative impacts of the presence of livestock (water quality, pollution, etc.)?

Bushfires: What is their practice in the country? Are they used mainly for local animals or for large amplitude transhumant animals? Or for local sedentary and transhumant animals?

How is the carrying capacity of pastoral resources assessed at the country level?

How is capacity deduced?

How can the method and tools be improved for a more reliable approach?

...

C-Step 2: Analysis of market dynamics in relation to transhumance

	Steps	Objectives	Contact persons
2	Analysis of market dynamics in relation to transhumance	Assessing market dynamics in relation to transhumance	Ministries of Livestock, Agriculture, Trade, Statistics, Decentralisation, POs, NGOs, private sector, and identified resource persons

Objectives: To assess and quantify the dynamics of markets in relation to transhumance and its evolution.

Unit of observation: This phase of analysis focuses on livestock markets in the coastal country

Targeted interlocutors: This stage is carried out through interviews with the Ministries in charge of Livestock, Agriculture, Trade, Decentralisation, statistical services, POs, NGOs, the private sector, and resource persons and TFPs... For Benin, some of the actors identified are ANOPER, development associations, FADEC Agriculture (CONAFIL National Commission on Local Taxation), municipal

offices (through contacts with the 'intercommunalités' GIC and ACAD ADECOB APIDA...), TFPs (Swiss Cooperation invested in livestock markets, SNV...). For the second country, this work will also be done with the regional expert.

Questioning and indicators to be collected:

1. Seasonal market dynamics and numbers of animals traded

What registrations are made at livestock markets?

What are the numbers of animals presented and sold?

Annual reconstruction of numbers presented and sold per year by species

Can a distinction be made between local livestock and transhumant or trade livestock on foot?

What estimate can be made depending on the time of year?

What are the changes observed in market activity? To what factors are they linked?

Are the FAO STAT statistics on imports and exports of animal products more or less correct?

2. Taxation of livestock markets

Estimate of financial resources collected by market taxes, per week (maximum - minimum depending on the season, per year...)

Who benefits from this taxation? What are the distribution keys?

What developments have been observed?

3. Economy induced by the animation of markets by the presence of transhumance on a national scale

Assessment of economic activities induced by transhumance

What are the occupations induced by or benefiting from the presence of pastoralists? What is the contribution of transhumant herds?

- (i) the provision of draught animals (ploughing)?
- (ii) to the supply of fatteners?

What are the local expenses incurred by pastoralists?

- (i) for human consumption?
- (ii) for animal maintenance (forage, feed, veterinary products, water, guarding)? (table of the structure and estimation of the average expenditure of pastoralists)

Which value chain actors are mobilised in the livestock market?

What are the benefits for these actors, both direct and indirect, in relation to transhumance?

D- Step 3: Analysis of practices and evolutions in the association between agriculture and livestock in the country

	Steps	Objectives	Contact persons
3	Practices and evolution of the farming-livestock association	Assessing the evolution of the relationship between the country's agricultural systems and transhumant livestock systems	Ministries of Livestock, Agriculture, Trade, Statistics, POs, NGOs, private sector, and identified resource persons

Objectives: To assess the evolution of the relationship between the country's agricultural systems and transhumant livestock systems

Unit of observation: This phase of analysis focuses on the level of agricultural and agro-pastoral holdings by evaluating the links with transhumance (manure contracts, sale of residues, animal purchases, sale of cereals, etc.).

Targeted interlocutors: This stage is carried out through interviews with the Ministries in charge of Livestock, Agriculture, Trade, statistical services, POs, NGOs, the private sector and identified resource persons.

Questioning and indicators to be collected

1-Description and analysis of the different systems

- type of system; description of different livestock systems
- data

2-Agricultural and livestock association practice

How do the links between local agricultural and agro-pastoral systems and transhumant systems work?

What forms do they take in practice?

How do they evolve? Under the influence of which factors?

How can they be strengthened?

How to assess the amount of organic matter contributed by cattle?

How important is this input to cropping systems?

...

E- Stage 4: governance of areas and management of agro-pastoral disputes

	Steps	Objectives	Contact persons
4	Governance of spaces and management of agro-pastoral disputes	Understand and assess the impacts of transhumance in terms of the conflicts that may be associated with it	Ministries of Livestock, Agriculture, Trade, Statistics, POs, NGOs, private sector, and identified resource persons

Objectives: To understand and assess the impacts of transhumance in terms of the conflicts that may be associated with it

Observation unit: This analysis phase focuses on the various agro-pastoral disputes supposedly linked to transhumance

Targeted interlocutors: This stage is carried out through interviews with the Ministries in charge of Livestock, Agriculture, Trade, statistical services, POs, NGOs, the private sector and identified resource persons.

Questioning and indicators to be collected

1-Treatment of agro-pastoral disputes

Nature of the problems posed by transhumance.

Typology of existing agro-pastoral disputes?

Evolution of agro-pastoral disputes and conflicts specific to transhumance?

Who is involved in managing these agro-pastoral disputes?

How to reduce tensions in agriculture and livestock farming?

2-Evolution of sedentary and transhumant social links

How do alliances between transhumant and sedentary people develop? What actors and what roles do they play in welcoming transhumants to the host areas?

What changes in agro-pastoral tensions?

What factors are behind these developments?

How can we strengthen the recognition of complementarities?

How can social links, alliances and complementarities between transhumants and local farmers be strengthened?

What responsibility do elected officials have in preventing agro-pastoral disputes?

F- Step 5: Current impacts of mobile livestock systems

	Steps	Objectives	Contact persons
5	Current impacts of mobile livestock systems	Quantifying the impacts of transhumance	Ministries of Livestock, Agriculture, Trade, Statistics, POs, NGOs, private sector, and identified resource persons

Objectives: To quantify the impacts of transhumance

Unit of observation: This phase of analysis focuses on livestock in the coastal country as a whole. We start with cattle, and try to cover also other ruminants in the following order: sheep, goats, camels. If possible, we also try to cover pigs and poultry to complete the livestock sector.

Targeted interlocutors: This stage is carried out through interviews with the Ministries in charge of Livestock, Agriculture, Trade, statistical services, POs, NGOs, the private sector and identified resource persons.

General

Do livestock department officials know about the Livestock Sector Investment and Policy Toolkit (LSIPT)? Have they (potentially in partnership with CIRAD, FAO ILRI or others) ever used this toolkit?

Economic

For the analysis of the current economic impacts with the Excel tools of LSIPT⁴⁸ developed by CIRAD/FAO/ILRI the next data/parameters are needed. These data can be filled in the Excel tools directly if possible.

Parameter	Data currently used if available	Best source of data suggested by respondent and value	Remarks
Numbers of individual animals	Workforce 2018 FAO		
Percentages of the number of different animals in the different systems	<p>1LG – Grassland based-arid/semi-arid system (north of 1MR - Mixed rainfed/arid/semi-arid system) - Transhumant Sahelian pastoral system of large amplitude in coastal countries) (subdivided between transnational and national)</p> <p>2LG - Grassland based - wet/sub-humid and arid/semi-arid systems (south of zone 1MR - Mixed rainfed - arid/semi-arid system) - Agricultural system combining animal traction and cattle herding with low amplitude transhumance</p> <p>1MR - Mixed rainfed - arid/semi arid system - Cereal agro-pastoral system and transhumant herd in the Sahel zone</p> <p>2MR - Mixed rainfed/wet/subhumid system - Farming system combining livestock farming with animal traction (purchase of draught oxen from transhumant farmers)</p> <p>1OF - Fattening system - Sedentary ranch or local farm system (state ranch and private ranch)</p> <p>1OM - Peri-urban dairy system - Peri-urban dairy</p>		

	systems linked to herd mobility		
Statistics and/or estimates of animal numbers in the large amplitude transhumant system (1LG) that depend on border crossings (assuming that these numbers are not included in the coastal countries' numbers)	Statistics collected at official entry points		
Production: For meat and other products (milk, eggs, hides and skins, wool, organic matter, energy (traction) the different parameters requested by the model for the different systems of the different animals, as for example for meat: Exploitation rate (%), average weight (kg/head), carcass yield (%), self-consumption (%), direct sale (%), barter trade (%), from the value chain (%), average meat price (per kg), % intermediate costs (meat)	Productivity parameters: FAO, Cattle and small ruminant production systems in sub-Saharan Africa - A systematic review Price: FAO STAT		
Milk : - Rate of reproductive females in the herd - Milk production per reproductive female (litres/year) - self-consumption - direct sale % barter exchange - % from the sector - Average milk price (per litre) - Intermediate costs (milk)			
Eggs : - Number of table eggs per head per year - self-consumption - direct selling - % barter exchange - % from the value chain - Average price of an egg - Intermediate costs (eggs)			
Hides and skins : - kg/head - self-consumption - % from the value chain - Average price of hides (per kg)			
Wool : - kg/head - self-consumption - % from the value chain - Local currency/kg			
Organic matter : - Manure/droppings production in kg/head/year - % self-consumption (indirect)			

- direct selling - % barter exchange - % from the value chain - Average price of OM (per kg)			
Energy (traction) : - % of draft animals - days/year - % self-consumption (indirect) - direct selling - barter (non-monetary) - Average cost per day of traction - intermediate costs (energy)			
Chains: Unit value (selling price per unit) and Intermediate consumption (per unit) of the different stages of the value chains for the different products for the different animals in the different systems	Producer prices: FAO STAT		
Chains: Sector volumes assessed from existing data	-		
Indirect contribution of the livestock sector to GDP (value chains, excluding production level) based on existing data	-		
Average taxes paid per head for the different animals in the different systems			

Social

Parameter	Data currently used if available	Best data source suggested by respondent and value	Remarks
Elasticity of demand/income for different products			
Nutrient content in terms of energy, protein, and lipids for the different products			
Exports and imports of different products in tonnes			
Average employment (pers/month per year) - Number of households - Family labour force - Hired labour Per head for the different animals for the different systems			
- Number of households - Net income from livestock per capita - Total net household income per capita			

- livestock income - Incidence - Number of households below the poverty line - Household size - Net income from livestock (whole system) in thousands - of net income from livestock			

Environmental

Parameter	Data currently used if available	Best data source suggested by respondent and value	Remarks
- Manure/droppings production in kg/head/year			

G- Step 6: Key drivers of change and long-term perspectives

5	Key drivers of change and long-term prospects	Understand and assess the main drivers of change and the long-term prospects for transhumance from a general perspective and summarising	Ministries of Livestock, Agriculture, Trade, Statistics, POs, NGOs, private sector, and identified resource persons
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Objectives: To understand and assess the main drivers of change and the long-term prospects for transhumance from a general perspective and by summarising

Unit of observation: This phase of analysis focuses on livestock in the coastal country as a whole, and in particular transhumance. Being the most important animals in transhumance, this phase focuses mainly on cattle, and less on sheep and camels. But depending on the factor of change, it can affect other animals as well.

Targeted interlocutors: This stage is carried out through interviews with the Ministries in charge of Livestock, Agriculture, Trade, statistical services, POs, NGOs, the private sector and identified resource persons.

By letting the respondents answer first, and if he/she does not cover all the factors listed below, comments are requested on the factors not mentioned. Factors mentioned by respondents that are not listed are added below in the table.

Main drivers of change	How has this factor affected livestock systems in the last 10 years?	How is this factor estimated to affect livestock systems and their economic, social and environmental impacts over the next 20 years? (Without policy changes)	What public policies can be implemented to mitigate negative impacts and maximise positive impacts?
The worsening security situation in various West African countries, which restricts the movement of pastoral herds			

<p>Climate change, which for the moment in the Sahel is expected to be characterised by a decrease in rainfall occurrences and a maintenance of annual rainfall levels. In the humid zones in general, a decrease in annual rainfall levels is expected. In general, it would result in an increase in exceptional events: drought and flooding</p>			
<p>Continued demographic growth and urbanisation</p>			
<p>Continued expansion of cultivated land and therefore less grazing land available for mobile herds and, as a result, continued tensions between pastoralists and farmers over land tenure issues.</p>			

By showing the numbers in the last 20 years of FAOSTAT with graphs, we ask how the numbers are expected to evolve in the next 20 years (considering the perspectives of the table above), for the situation without policy changes.

In which years did the last cattle census take place?

Annex 4: Interview schedules for border areas and transhumance reception areas

A- Interview framework

The investigations envisaged in the cross-border territories should be structured in four main stages, summarised below and then developed in terms of the methodology:

	Steps	Objectives	Contact persons
1	Framing and diagnosis of the territory	Understanding territory, livestock systems and seasonal transhumance flows	Technical services for livestock, elected representatives, regional POs
2	Analysis of market dynamics in relation to transhumance	Assessing market dynamics in relation to transhumance	Members of the local municipal council Professional organisations involved in the market Rugga 'lodgers' of transhumants
3	Practices and evolution of the farming-livestock association	To assess the evolution of the relationship between the agricultural systems of the territory and transhumant livestock systems	Farmers and transhumant livestock breeders Agricultural and livestock officers
4	Governance of spaces and management of agro-pastoral disputes	Understand and assess the impacts of transhumance in terms of the conflicts that may be associated with it	Territorial governance actors: elected officials, village and traditional leaders, technical services, police and gendarmerie services Rugga representatives of transhumant livestock breeders
5	Current impacts of mobile livestock systems	Quantifying the impacts of transhumance	Technical services for livestock, elected representatives, regional POs Rugga representatives of transhumant livestock breeders
6	Key drivers of change and long-term prospects	Understand and assess the main drivers of change and the long-term prospects for transhumance from a general perspective and summarising	Technical services for livestock, elected representatives, regional POs Rugga representatives of transhumant livestock breeders

B- Step 1: Global approach of the territory and transhumance

	Steps	Objectives	Contact persons
1	Framing and diagnosis of the territory	Understanding territory, livestock systems and seasonal transhumance flows	Technical services for livestock, elected representatives, regional POs

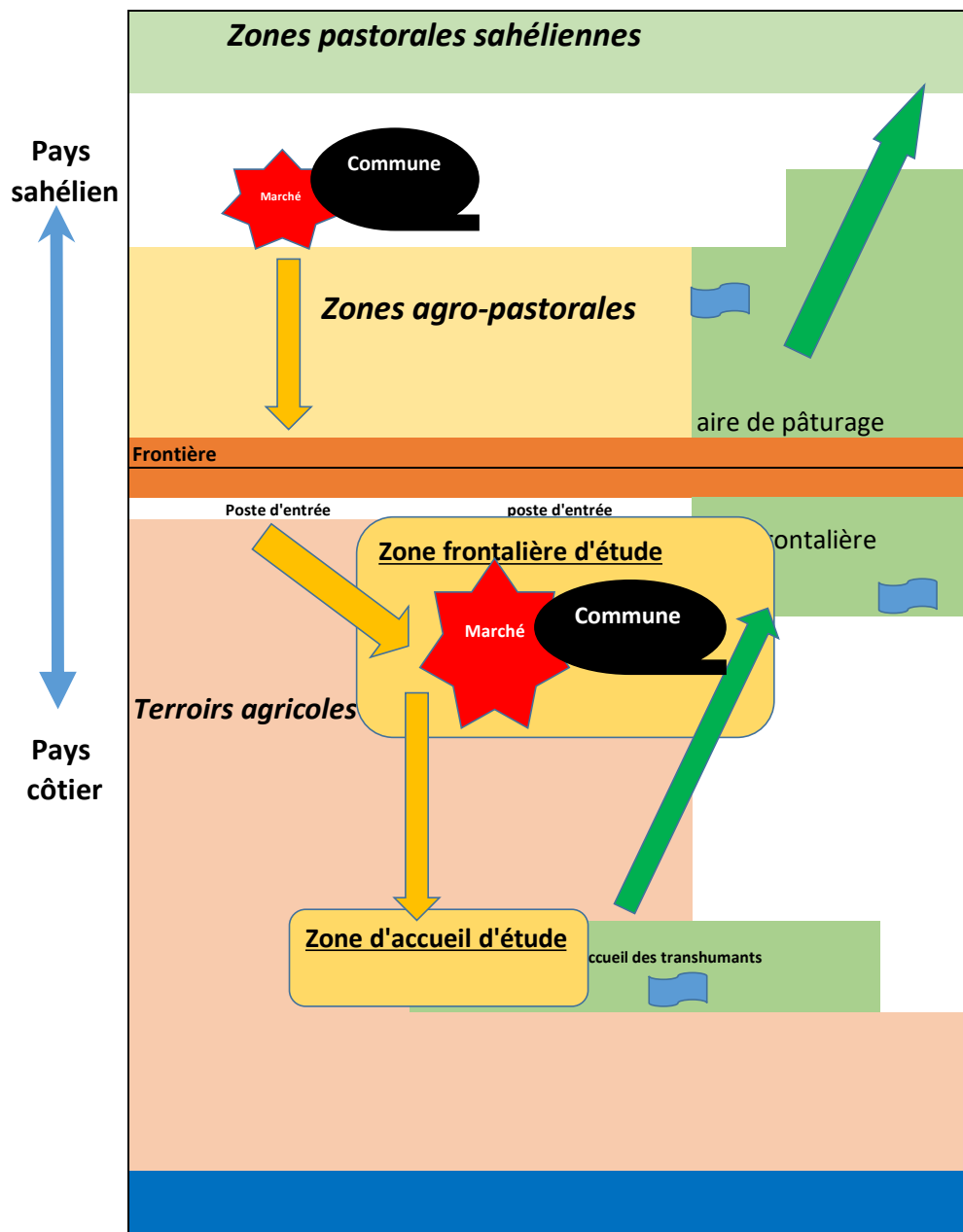
Objectives: This first stage aims to gain an understanding of the place of transhumance in the territory.

Observation unit: the cross-border territory pre-identified in the preparatory phase

Targeted interlocutors: this stage is carried out through interviews with the technical services of the livestock sector, elected representatives, regional POs

Questioning and indicators to be collected :

ORGANISATION DU TERRITOIRE D'ETUDE



1-Mapping and calendar of transhumance in the territory

Using a map of the cross-border territory, the main strategic sites and spaces for transhumance are identified with the stakeholders:

- entry and exit points,
- axes of passage,
- grazing areas or areas of attraction for grazing
- watering areas
- livestock market
- axes of conveyance by foot or by lorry
- ...

What is the timetable for this transhumance? Entry period, exit period.

What changes have been observed, since when? Under the influence of which factors?

2-Updated typology of the territory's livestock systems

What is the typology of livestock systems in the area?

What is the proportion? The number of livestock in the area?

What are the developments over the last ten years?

3-Importance of transhumance flows

What data is available to assess the nature of transhumance flows? By whom?

What data sets are available to characterise the entry into the territory? What about exits of the transhumants?

What are the factors that have recently influenced the size of entries over the last ten years?

Which of these have influenced the importance of outputs over the last ten years?

4-What impacts on the environment and natural resources?

What are the positive impacts of the presence of livestock (soil fertility, biodiversity, etc.)?

What are the negative impacts of the presence of the herds (water quality, pollution, etc.)

What are the practices of burning for pasture management? Do they occur mainly for local animals or for large-scale transhumant animals?

...

C- Step 2: analysis of market dynamics in relation to transhumance

	Steps	Objectives	Contact persons
2	Analysis of market dynamics in relation to transhumance	Assessing market dynamics in relation to transhumance	Members of the local municipal council Professional organisations involved in the market Rugga 'host' of transhumant livestock breeders

Objectives: To assess and quantify the market dynamics in relation to transhumance and its evolution.

Unit of observation: This phase of analysis focuses on the livestock market in the territory in question

Targeted interlocutors: The specific interlocutors are the members of the local council, the professional organisations involved in the market, the technical services

Questioning and indicators to be collected :

1. Seasonal market dynamics and numbers of animals traded

What registrations are made at livestock markets?

What are the numbers of animals presented and sold?

Annual reconstruction of numbers presented and sold per year by species

Can a distinction be made between local livestock and transhumant or livestock traded on foot?

What estimate can be made depending on the time of year?

What are the developments in market activity, and what factors are they linked to?

2. Livestock market taxation

Estimate of financial resources collected by market taxes, per week (maximum - minimum depending on the season, per year...)

Who benefits from this taxation? Distribution keys?

What developments have been observed?

3. Economy induced by the animation of markets by the presence of transhumance in the territory

Assessment of economic activities induced by transhumance

What are the trades induced by or benefiting from the presence of pastoralists? What is the contribution of transhumant herds?

- (iii) the provision of draught animals (ploughing),
- (iv) to the supply of fatteners?
- (v) the supply of breeding stock ?

What are the local expenditures made by pastors

- (iii) for human consumption,
- (iv) for animal maintenance (forage, feed, veterinary products, water, guarding) (table of the structure and estimation of the average expenditure of pastoralists);

Which value chain actors are mobilised in the livestock market?

What are the benefits for these actors, both direct and indirect, in relation to transhumance?

D- Step 3: Analysis of practices and developments in the agriculture-livestock association

	Steps	Objectives	Contact persons
3	Practices and evolution of the agriculture-livestock association	To assess the evolution of the relationship between the agricultural systems of the territory and transhumant livestock systems	Farmers and transhumant livestock breeders Agricultural and livestock officers

Objectives : To assess the evolution of the relationship between the agricultural systems of the territory and transhumant livestock systems

Unit of observation: This phase of analysis focuses on the level of agricultural and agro-pastoral holdings by evaluating the links with transhumance (manure contracts, sale of residues, animal purchases, sale of cereals, etc.)

Targeted stakeholders : Farmers and transhumant livestock breeders, and agricultural and livestock officers

Questioning and indicators to be collected

1-Description and analysis of systems

-System type

-data

2-Agricultural and livestock association practice

How do the links between local agricultural and agro-pastoral systems and transhumant systems work?

What forms do they take in practice?

How do they evolve? Under the influence of which factors?

How can they be strengthened?

...

E- Stage 4: governance of areas and management of agro-pastoral disputes

	Steps	Objectives	Contact persons
4	Governance of spaces and management of agro-pastoral disputes	Understand and assess the impacts of transhumance in terms of the conflicts that may be associated with it	Territorial governance actors: elected officials, village and traditional leaders, technical services, police and gendarmerie services

Objectives: To understand and assess the impacts of transhumance in terms of the conflicts that may be associated with it

Observation unit: This analysis phase focuses on the various agro-pastoral disputes supposedly linked to transhumance

Targeted interlocutors: Territorial governance actors: elected officials, village and traditional chiefs, technical services, police and gendarmerie services

Questioning and indicators to be collected

1-Treatment of agro-pastoral disputes

Nature of the problems posed by transhumance.

Typology of existing agro-pastoral disputes?

Evolution of agro-pastoral disputes and conflicts specific to transhumance?

Who is involved in managing these agro-pastoral disputes?

What are the mechanisms and tools for conflict resolution and prevention?

How to reduce tensions between agriculture and livestock farming?

2-Evolution of sedentary and transhumant social links

How do alliances between transhumant and sedentary people develop? What actors and what roles do they play in welcoming transhumants to the host areas?

What changes in agro-pastoral tensions?

What factors are behind these developments?

How can we strengthen the recognition of complementarities?

How can social links, alliances and complementarities between transhumants and local farmers be strengthened?

What responsibility do elected officials have in preventing agro-pastoral disputes?

F-Step 5: Current impacts of mobile livestock systems

	Steps	Objectives	Contact persons
5	Current impacts of mobile livestock systems	Quantifying the impacts of transhumance	Technical services for livestock, elected representatives, regional POs Rugga representatives of transhumant livestock breeders

Objectives: To quantify the impacts of transhumance. (This step attempts to complement the data that is collected at the national level).⁴⁹

Unit of observation: This phase of analysis focuses on ruminants in the border and host areas, but within the framework of livestock production in the coastal country as a whole.

Targeted interlocutors: Technical services for livestock, elected officials, regional POs, Rugga representatives of transhumant livestock breeders

Focusing on the parameters of the LSIPT tools described under step 5 of Annex 3 that are not yet filled in, relevant questions are asked to the relevant interlocutors, in order to estimate these parameters. In border areas, this will concern in particular the numbers of animals arriving and departing from/to the different neighbouring countries.

G-Step 6: Key drivers of change and long-term perspectives

6	Key drivers of change and long-term prospects	Understand and assess the main drivers of change and the long-term prospects for transhumance	Technical services for livestock, elected representatives, regional POs Rugga representatives of transhumant livestock breeders
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Objectives: To understand and assess the main drivers of change and the long-term prospects for transhumance

Unit of observation: This phase of analysis focuses on livestock in the border area and in particular on transhumance. Being the most important animals in transhumance, this phase

⁴⁹ As described in section 2.2.5 'Collection of national statistical data' and Step 5 of 'Annex 3 - Draft interview schedules for coastal country capitals - Step 4'.

focuses mainly on cattle, and less on sheep and camels. But depending on the factor of change, it can also affect other animals.

Targeted interlocutors: Technical services for livestock, elected officials, regional POs, Rugga representatives of transhumant livestock breeders

By letting the respondents answer first, and if he/she does not cover all the factors listed below, comments are requested on the factors that have not been mentioned. Factors mentioned by respondents that are not listed are added below in the table.

Main drivers of change	How has this factor affected livestock systems in the last 10 years?	How is this factor estimated to affect livestock systems and their economic, social and environmental impacts over the next 20 years? (Without policy changes)	What public policies can be implemented to mitigate negative impacts and maximise positive impacts?
The worsening security situation in various West African countries, which restricts the movement of pastoral herds			
Climate change, which for the moment in the Sahel is expected to be characterised by a decrease in rainfall occurrences and a maintenance of annual rainfall levels. In the humid zones in general, a decrease in annual rainfall levels is expected.			
Population growth and further urbanisation.			
Continued expansion of cultivated land and therefore less grazing land available for mobile herds and, as a result, continued tensions between pastoralists and farmers over land tenure issues.			

How are livestock numbers expected to evolve over the next 20 years, for the situation without policy changes?