

BIBLIOGRAPHIC NOTE FROM D'A26

Mobile and pastoral production systems

1. Pastoralism

Pastoralism is a way of life based mainly on the shared use of natural grazing land in so-called marginal areas. These areas are considered 'marginal' for various reasons: scarce water, poor soil quality, extreme temperatures, steep slopes or remote locations, and other factors that make these areas unsuitable for agriculture or other forms of development. Examples include steppes, tundras, arid and semi-arid climates, as well as cold and mountainous areas of the planet. Pastoralism is thus practised in a wide variety of environments, on all continents, and in very diverse socio-economic contexts. These pastoral systems play an essential role in the development of the natural spaces and resources of these areas. In addition to feeding humans and animals, pastoral livestock farming also provides a subsistence income for populations that would otherwise be unable to survive in these regions, which are generally unsuitable for agriculture. There is a wealth of technical and scientific literature on pastoralism around the world and its many benefits (see Box 1).

Figures on the importance of pastoralism on a global scale – although difficult to verify – vary according to different studies but are telling:

- According to Leclerc and Sy (2011), there are 20 million pastoral households on the planet. In sub-Saharan Africa alone, approximately 20 million people depend on a pastoral system, and 240 million on an agro-pastoral system.
- According to the FAO¹, 200 million pastoralists raise livestock (cattle, sheep, goats, camels) in arid regions that cover more than a third of the Earth's surface.
- According to VSF International (2016), 200 million people worldwide practise pastoralism on nearly half of the Earth's land area covered by marginal zones. A large proportion of them are found in sub-Saharan Africa, but this activity is also central to the arid zones of central and southern Asia, the South American Altiplano, the Tibetan plateau and the tundra of northern Europe and Asia, for example.

Pastoralism refers to a form of production in which "the material existence and social reproduction of a human group are organised **around the ownership, exploitation and mobility of livestock**". Regardless of where it is practised, there are "comparable characteristics, both in terms of social and family organisation and in the techniques used, in the spirit of the relationship between humans and animals and in the relationships between societies and other social groups. (Toutain *et al.*, 2012). Regardless of the area in question, pastoralism relies on (Jacquemot, 2023; VSF International, 2016; Toutain *et al.*, 2012):

- **shared resources** (pastures, water points, rangelands, forests);
- **social and customary agreements** that allow for the negotiation of access to and use of resources (particularly through shared land rights);
- the temporal and spatial **mobility** of people and animals, which is one of the key concepts of life in these areas with uncertain climates and which is part of highly diversified ways of life.

It is this last point – mobility – that we will develop in the rest of this note, as an essential condition for the resilience of pastoral systems to environmental changes and climatic hazards such as droughts.

Box 1. Relevance of pastoralism

In many regions, pastoralism is the only form of sustainable use of natural resources. By adjusting the number of animals to the amount of available feed, livestock mobility reduces the risk of vegetation and soil degradation associated with grazing; this adjustment helps herds adapt to the effects of climate change (Hiernaux *et al.*, 2018). Pastoralism has thus shaped landscapes and today contributes to maintaining ecosystems and preserving the biodiversity of pastures. It also provides ecosystem services such as soil fertility, fire management, carbon storage, etc.

¹ See www.fao.org/pastoralist-knowledge-hub/fr (accessed in May 2025). See also FAO, 2018.

Pastoral systems contribute to food security in some of the harshest environments on the planet by providing food (milk, meat), energy (transport, animal traction), and exchangeable or marketable products (live animals, milk, processed products). Pastoral systems supply commercial networks with products that can be of high commercial value (milk, red meat, hides) and derivative products (e.g. handicrafts). Mobile herders thus make a considerable contribution to local economies, benefiting a wide range of actors (notably through the economic spin-offs linked to mobile herders' expenditure on livestock feed). The income generated by the sale of transhumant livestock can be considerable and directly reinvested in the local economy of the host areas to cover expenses. In addition, mobile herders supply markets at the local, national and even international levels (e.g. the export market from Sahelian countries to coastal African countries). Pastoral livestock farming thus contributes "to the densification and diversification of the economy of many regions through the operation of livestock markets, multi-service collection centres, mini dairies, cheese factories and the strengthening of regional economic integration. It is also an important source of agricultural energy, a provider of organic matter to fertilise the soil, and represents the main form of savings for rural households with little access to the banking system. Furthermore, non-commercial livestock exchanges are an essential factor in social integration and cohesion. Pastoral livestock farming is also an important source of employment (CILSS *et al.*, 2024).

The technical know-how, cultural wealth and social ties developed by pastoralists (between members of pastoralist communities but also with other communities, particularly agro-pastoralist communities) constitute a real social capital. The maintenance and transmission of a variety of technical and cultural knowledge plays an important role in pastoral societies. **Ultimately, pastoralism helps to keep vast marginal regions inhabited while managing natural resources sustainably.**

Sources: Djohy *et al.*, 2024; CILSS *et al.*, 2024; Jacquemot, 2023; Thébaud *et al.*, 2018; VSF International 2016; Toutain *et al.*, 2012

2. Mobility: definition, forms and roles

"Pastoralism means mobility; mobility means pastoralism." Borana proverb

Mobility in pastoral contexts is defined as "the movement of herds and their keepers in order to optimise the use of resources and avoid overexploitation of natural resources. It allows pastoralists to adapt to spatial and temporal variations in resource availability, particularly in arid areas where rainfall is unpredictable. For thousands of years, pastoralists have developed various strategies adapted to both difficult climatic conditions and the dispersion of pastoral resources (Leclerc and Sy 2011); pastoral mobility is one such strategy. This allows pastoralists to **take advantage of the uneven distribution of natural resources in constrained environments, ensuring optimal use of available fodder and water** (see Box 2). Mobility also has broader implications for sustainable land management and biodiversity conservation. It is also an essential factor for economic integration in the sub-region where it takes place. It provides a considerable supply of animals to the sales channels that feed the sector. Whether for production or marketing, "mobility is a profitable strategy for producing meat at a competitive price, especially in the face of competition from imported meat" (Thébaud *et al.*, 2018).

Box 2. The necessary pastoral mobility

An adaptation strategy to avoid the many risks faced by livestock farmers...

"Significant variations in fodder availability in a given location and over time in dry regions require livestock to be constantly mobile in order to seek out resources wherever they may be found. The distances travelled around the camp (small-scale mobility) in a single day vary according to the season and the availability of water and fodder resources. Seasonal mobility (or transhumance) is a change of grazing region in response to seasonal variations in resources. It leads livestock farmers to move their herds on foot every year over considerable distances (sometimes several hundred kilometres). The degree of mobility of a group is never definitive: it is flexible and fluctuates according to economic variables. [...] Uncertainty about resources and this mobility go hand in hand with collective access to grazing land, which, in these difficult contexts, allows resources to be shared over vast areas and, in cases of localised and temporary shortages, reciprocal access. Mobility also enables groups of livestock farmers living in sparsely populated areas to facilitate exchanges with other social groups: selling

products, purchasing cereals in agricultural areas and other goods for the family, exchanging services for fertilisation or transport, social gatherings, etc. (Toutain *et al.*, 2012).

...and which enables animal production and the preservation of livestock in drought conditions

Transhumance allows animals to access good quality pastures and better watering conditions, especially if they are taken to regions where the rainy season starts earlier and ends later. Faced with often late winters, but also with a growing reduction in pastoral resources in their home territories, dry season mobility thus makes it possible to keep animals in good condition, increase their productivity and, in crisis situations, save them. The preservation of family herds and, in doing so, national livestock stocks was particularly evident in 2014-2015**. After a long transhumance, families who had left the drought-affected areas returned with their livestock intact. (Thébaud *et al.*, 2018).

** The study from which this quotation is taken is located in the Sahel.

There are different types of mobility, characterised by the following factors (Toutain *et al.*, 2012):

- the geographical extent of the movements (from a few kilometres to several hundred, or even nearly 1,000 km);
- the social scale of mobility (individual herders or entire families move);
- fixed points and territorial and land anchors in areas of habitual retreat during the hot dry season;
- the seasonal value of forage species and salt licks;
- water resources, whose accessibility is central to the use of grazing land once the period of free surface water in the rainy season has passed;
- markets, given their decisive role in the valuation of animals and milk, as well as in the supply of cereals and household necessities;
- social ties, which facilitate movement.

Thus, **types of pastoral mobility vary greatly** according to region, ecosystem, context, cultural traditions and social or strategic choices. In the literature (Djohy *et al.*, 2024; Toutain *et al.*, 2012; Faye, 2018; Leclerc and Sy, 2011), we find the following types of mobility:

Daily mobility takes place during the rainy season. Daily movement (relatively low) helps to disperse the animals across the pasture.

Seasonal mobility (or **transhumance**, or **residential mobility**, depending on the author) takes place during the dry season, although this period may vary depending on geographical location, climatic fluctuations and other environmental conditions. It involves a change of grazing region between a "home" area (during the rainy season) and "host" areas during the dry season, over distances ranging from a few dozen to several hundred kilometres (e.g. 800 km between eastern Chad and central-eastern Niger). In this type, transhumant herders maintain a permanent attachment to specific places during the different seasons (Faye, 2018); they have attachment points, usually one for the dry season (main residential area) and another for the rainy season. Transhumance can include vertical movements between mountain and valley pastures and horizontal movements between rainy season and dry season pastures (Moritz, 2024; Xiao *et al.*, 2015). The family, or part of the family, may move with the herd. This type of mobility is found in various regions of the world: in West Africa (Xiao *et al.*, 2015; Dangbet, 2024), North Africa (e.g. Algeria, see Gaci *et al.*, 2021), Central Africa (e.g. Cameroon, Xiao *et al.*, 2015), but also in Europe (particularly in the Swiss and Spanish mountains, etc., Liechti and Biber, 2016), Asia (particularly in the Himalayan regions), South America (e.g. the Peruvian Andean regions, see Charbonneau, 2008), etc. According to the FAO (2018), transhumant pastoralism involves a large number of people (e.g. 20 million in semi-arid Africa) and animals worldwide (it is estimated to account for 70% of livestock in semi-arid Africa).

Itinerant mobility (or nomadism) is characterised by the mobility of the entire household without any fixed abode (e.g. Bedouin communities in the Middle East and North Africa, Faye, 2018, or Mongolian nomadic herders, etc.). It is continuous throughout the year, but intensifies during the dry season when water and fodder resources become scarce. Nomadism is based on the movement of families and their herds according to the availability of pasture and access to water, but also sometimes other factors such as markets or social networks (temporary camps). With **semi-nomadic mobility**, herders may have seasonal residences (Faye, 2018). Part of the group may remain in a semi-permanent location while another part moves with the herds. Grazing areas vary according to rainfall (and therefore available resources, B. Faye, 2018 also calls this "adaptive mobility"), while retaining a home territory. This type reflects a semi-nomadic lifestyle in which pastoralists adjust their grazing areas according to rainfall and resource availability while retaining a home territory.

Djohy *et al.*, 2024, in their bibliographic review on Africa, describe the following additional forms of mobility, in addition to the three types mentioned above:

- **The emigration of herders and emergency or forced mobility** occur mainly in response to adverse conditions or extreme weather events. It is generally linked to specific sudden crises (natural disasters, armed conflicts, economic pressures, etc.). It involves a change in the home territory of the entire household. Unlike seasonal and daily mobility, it is unpredictable and unplanned.
- **Cross-border mobility** of herders often follows the same dynamics as internal transhumance, but involves movement beyond national borders. This mobility is mainly aimed at finding pasture and water, but it is also influenced by political, security and economic factors. It is encountered to varying degrees in all countries of West and Central Africa (Corniaux *et al.*, 2018; IOM, 2023).
- **Commercial mobility** involves travelling to sell livestock or to obtain supplies needed for livestock farming. It is influenced by economic, climatic and cultural factors, with intensification at certain times of the year, depending on market needs, festivities, agricultural seasons and environmental conditions. According to Bernard Faye (2018), this type of mobility can be opportunistic or contractual, with movements motivated by market demand or contractual trade agreements, such as livestock exports.
- **Opportunistic mobility** refers to movements without a fixed itinerary or schedule, depending on available resources and grazing conditions. Pastoralists adopt this approach in response to climatic events or the urgent needs of their animals.

Thus, mobility patterns vary according to the distance travelled, the number of trips, the length of stay in each location, the direction of movement at the change of season, etc. Mobility must therefore be analysed **at different spatial and temporal levels**, from daily movements to pastures and water points to seasonal transhumance movements between rainy and dry season grazing areas, and even cross-border migrations over several decades (Xiao *et al.*, 2015).

It should be noted that a group's type of mobility is never definitive; it is flexible and fluctuates according to economic variables. Thus, within a single region, there is often a wide variety of mobility systems, which combine or compete for access to resources (Toutain *et al.*, 2012).

3. Mobility and resilience of pastoral systems

3.1. Factors influencing the choice of mobility

Various factors – often combined – influence pastoralists' choice of mobility, from ecological conditions to socio-economic and political contexts. Pastoral mobility is therefore **a complex and dynamic practice, shaped by a multitude of socio-economic and environmental factors** (Djohy *et al.*, 2024). **These different factors interact to guide pastoralists' movement choices in response to changing environmental and socio-economic conditions affecting pastoral territories.** Usual mobility patterns can be altered, sometimes drastically, as observed in the case of cross-border transhumance in Mali (see Box 3).

Among environmental factors, as already mentioned, pastoral mobility is mainly driven by the need to optimise the use of natural resources, particularly in response to temporal and spatial variations in rainfall and forage availability. The availability of water and forage resources thus dictates migration routes and practices. Pastoralists move to areas where grazing conditions are better during seasonal changes, but also during unforeseen events such as epidemics or natural disasters (*Ibid*; Elhadary, 2015; Adriansen, 2005; Manzano *et al.*, 2020). Studies have demonstrated a causal link between climate change and migration, with corresponding changes in pastoral societies, dating back thousands of years (Leclerc and Sy, 2011).

Economic factors that strongly influence pastoral movements include the availability of and access to markets for the sale of livestock or livestock products, economic opportunities, travel costs, and the effects of economic policies (Manzano *et al.*, 2020; Djohy *et al.*, 2024). "Pastoralists with better market access are often more likely to move their herds to areas where prices are more advantageous or demand is higher, which influences migration routes and periods of movement. Mobility thus allows them to reach various markets and maximise their economic opportunities." (Djohy *et al.*, 2024). Socio-

economic transformations, such as urbanisation, demographic pressure and market changes, can also alter the traditional dynamics of pastoral mobility.

Furthermore, mobility is deeply rooted in the cultural practices of pastoral communities. It is not simply a practical necessity, but also a way of life that shapes their social structures, relationships and identity. The ability to move freely across landscapes is an integral part of their cultural heritage and community cohesion (Nori and Scoones, 2019). Thus, **social factors** such as social networks, cooperation, conflicts, traditional knowledge and practices, and social status have a significant influence on pastoral mobility. Indeed, mobility is facilitated by strong **social networks** within herding communities that enable the sharing of information on the best transhumance routes, available water points and grazing conditions (Djohy *et al.*, 2024). **Community solidarity**, meanwhile, is crucial in addressing the challenges associated with the variability of pastoral resources. **Cultural identity and traditional practices** also play an important role in defining mobility patterns. The cultural significance of certain grazing routes and seasonal migrations can dictate how and when pastoralists move (Adriansen, 2005). **Pastoralists' traditional knowledge of available resources** and herd management practices is essential for their adaptation to changing conditions. "This local knowledge enables them to navigate complex environments effectively and make informed decisions about the mobility of their herds" (Djohy *et al.*, 2024). Pastoralists may also move for **social reasons**, such as participating in community events or establishing social networks.

Political, legal and regulatory factors significantly influence pastoral mobility patterns, particularly by altering access to pastoral resources and imposing restrictions on movement (Djohy *et al.*, 2024). The availability of and access to grazing land play a decisive role in pastoral mobility. Land legislation can constrain pastoral mobility by restricting pastoralists' ability to access essential resources for their livestock (through appropriation, privatisation, land grabbing, etc., see §4). One example is the 1970 Unregistered Land Act in Sudan, which reclassified communal land as state property, undermining the traditional land rights of pastoralists (Elhadary, 2015). Land ownership systems, whether private or collective, influence pastoralists' freedom of movement (Djohy *et al.*, 2024). In addition to land regulations, natural resource management policies, government support programmes (particularly rural development), conflict management policies, climate change adaptation policies, pastoral infrastructure installation policies, among others, play a key role in mobility, particularly government policies aimed at encouraging pastoralists to settle down² (Djohy *et al.*, 2024).

Conflicts over land and resources have a significant impact on mobility, as pastoralists may face restrictions due to territorial conflicts or government interventions aimed at controlling movement (Manzano *et al.*, 2020). The expansion of agricultural occupation – and the tensions between farmers and herders that often result – is another motivation for mobile herders to leave (Thébaud *et al.*, 2018). Land use conflicts and rivalries over resources drive pastoralists to migrate to regions where social relations are more harmonious and access to resources is less contentious (Djohy *et al.*, 2024).

Security factors in certain regions, such as insecurity linked to conflicts with farmers and local authorities, armed conflicts, the presence of unidentified armed groups, etc., play a decisive role in pastoral mobility dynamics. Growing insecurity has forced herders to adopt mobility strategies to secure their herds by moving to safer areas (Djohy *et al.*, 2024). They are thus forced to change their routes, impacting their traditional practices.

Finally, pastoral mobility is closely linked to **technical and zootechnical factors**. The relationships between **zootechnical factors** (availability and quality of pastoral resources, animal health, etc.) and pastoral mobility are complex and interconnected, influenced by climatic conditions, resource availability, and animal health and reproductive needs (Djohy *et al.*, 2024).

Technical factors (information technology, pastoral infrastructure, etc.) are also intrinsically linked to pastoral mobility. Access to information and services, such as weather forecasts, facilitates the adoption of adaptive strategies, such as pastoral mobility. Thanks to this information, pastoralists can anticipate and plan their movements according to climatic conditions. "The ability to move quickly depends on a functional network of tracks that can transport livestock to host areas in both good and bad years. Access to information is therefore crucial for managing risks. [...] Mobile herders have a detailed knowledge of climatic factors, both in their home territory and in the host areas they visit. Organising transhumance is

² It should be noted that in the Sahel, there is no salvation in sedentarising herds, which would see their productivity collapse and production costs skyrocket by producing expensive artificial fodder that competes with food crops for humans. Sedentarisation of pastoral communities would require them to have access to secure agricultural land, which has long been attempted in Nigeria, causing enormous tension and rejection by the sedentary communities concerned (B. Bonnet, personal communication).

therefore demanding and information is crucial. Transhumant herders therefore use a number of information networks. Among other things, mobile phones enable regular contact with lodging providers, livestock traders and herders' associations." (Thébaud *et al.*, 2018). Furthermore, "knowledge of transhumance routes and pasture management techniques is essential for optimising movements and ensuring the survival of livestock. The use of modern technologies, such as geographic information tools, facilitates the planning of movements by mapping available resources and avoiding risk areas, which is crucial for pastoral mobility" (Djohy *et al.*, 2024). Market infrastructure can also influence herders' decisions about selling or moving their livestock. Other important factors include livestock trail and rangeland networks and the presence and distribution of pastoral water structures.

It should be noted that in their bibliographic review of pastoral mobility in Africa, Djohy *et al.* (2024) report that **environmental and socio-economic factors are the most frequently cited, with** the availability of essential resources (water, pasture) **at the top of the list**. These are followed, in descending order, by land, security, political and legal, technical, technological and zootechnical factors.

Box 3. Example of cross-border transhumance in Mali

A study was conducted by the International Organisation for Migration (IOM) in 2021-2022 on cross-border transhumance in Mali, the main findings of which are as follows:

- Over the last 20 years, 53% of transhumant herders surveyed reported that their month of departure had been significantly delayed from one year to the next in order to adapt to the availability of pasture. 44% reported that their month of arrival had also been delayed.
- 15% of the transhumant herders surveyed changed their routes, including 8% to cope with difficulties in accessing water or pasture.
- It seems difficult for the transhumant herders surveyed to maintain their usual transhumance routes in a context of environmental degradation and climate change, compounded by other factors such as insecurity, restrictions on cross-border movements and changes in agricultural policy.
- Routes and departure dates are decided in consultation between transhumant herders and according to their needs, either in advance or during the journey. Route decisions are based on information obtained by word of mouth, radio and social networks/media, or through intermediaries, administrative authorities and their own observations in the field.
- The routes taken are becoming less predictable due to the difficulty of accessing natural resources in a context of environmental degradation and unpredictable rainfall.
- In host areas where agricultural fields have expanded considerably, there is a shortage of space for the number of livestock present, causing degradation of the area and overexploitation of pastures and water resources, and even the silting up of ponds.
- Early and prolonged movements can lead to tensions or conflicts between herders and farmers and other communities that depend on the same resources for their survival. Nevertheless, the risk of conflict with agro-pastoralists is decreasing thanks to better coordination between stakeholders.
- Conflicts and tensions can also be resolved through the courts or amicably under the supervision of local authorities such as the village chief, depending on the transit areas.
- The survival of pastoral communities and their contribution to the economy depends on their mobility. Given the difficulties faced by herders in planning and maintaining a set itinerary, transhumance practices are becoming more complex.
- Faced with the many difficulties mentioned above, some herders prefer to settle down.

Source: IOM, 2023.

3.2. An essential practice for the resilience of pastoral systems

While the conditions for pastoralism are becoming increasingly difficult and complex (see §4), pastoralism still exists today because it has a great capacity to adapt thanks to various strategies (Toutain *et al.*, 2012):

- the evolution of mobility strategies towards new areas (more humid southern regions);

- the partial sedentarisation of families, allowing them to settle on land, with herds being tended by shepherds;
- the evolution and diversification of production systems (particularly agriculture in addition to pastoral livestock farming), activities and income. Mobile livestock farming is thus integrated into complex systems of life (livestock farming, agriculture, trade, crafts, contributions from migrants). The more diversified the economic activities, the greater the capacity to recover from climatic shocks (Thébaud *et al.*, 2018, see Box 4);
- Changes in production techniques (herd composition, animal species, partial sedentarisation of the herd);
- The commercialisation of livestock and livestock products.

The variety of forms of pastoral mobility (see §2) illustrates how pastoralists adapt and diversify their mobility strategies according to environmental, socio-economic and political conditions, demonstrating the flexibility and resilience of their way of life.

Mobility is one of the pastoral practices specific to constrained environments. Uncertainty about fodder and water resources requires livestock farmers to use specific techniques and practices to preserve their production capital (livestock, ecosystems, Toutain *et al.*, 2012). Mobility, one of several pastoral strategies³ in response to seasonal changes and resource availability (spatio-temporal adaptation: adaptation of movement schedules, but also of circuits), enables livestock farmers to guarantee fodder and water for their livestock (Elhadary, 2015; VSF International, 2016). **Pastoral mobility is indeed an effective strategy for coping with the spatial and temporal variability of resources**, typical of arid and semi-arid ecosystems (Xiao *et al.*, 2015). "Strategic livestock mobility enables the integration of agriculture and livestock farming on a large spatial and temporal scale, across all production systems rather than at the level of individual farms. It is on a large scale that pastoral systems optimise their performance and resilience: key resources such as nutrients and water are only available in ephemeral and unpredictable concentrations, such as certain grasses in northern areas, which can only be exploited through mobility. Agriculture and livestock farming have been integrated between distinct and specialised groups of farmers and herders who are able to interact on a transregional (or even transnational) scale thanks to pastoral mobility. This higher order of organisation of the two production systems enhances productivity, sustainability and resilience on both sides: it is a system configuration based on pastoral mobility. Where it is hindered, this organisation collapses. (AFD, 2014).

Pastoral mobility is considered a strategy for adapting to unpredictable environmental and socio-economic changes (see the bibliographic summary by Djohy *et al.*, 2024). It is much more than simply moving herds; mobility is a key resilience strategy for pastoralists in environments that are often hostile, unpredictable and changing, particularly due to climatic hazards (e.g. drought, Nori and Scoones, 2019). "Mobility acts as a lever for strengthening resilience in the face of severe climate shocks, while preserving the sustainability of livestock capital and the viability of the livestock sector for national economies." (Thébaud *et al.*, 2018). As such, pastoral systems are receiving increasing attention as an example of resilience to climate change (AFD, 2014). Pastoral mobility also makes it possible to adapt to other risks (conflict, security, urbanisation, etc.), thus responding to the need to leave places that have not only become less productive, but also overpopulated or unsafe: movements are extending to wetter regions, sometimes to new regions or even new countries.

Mobility also opens up economic opportunities for pastoralists by allowing them to adapt to changing market demand and take advantage of new economic prospects. By moving from one region to another, they can access different markets, obtain better prices for livestock and participate in commercial networks, etc. As pastoral systems become increasingly linked to globalised trade networks, mobility enables pastoralists to respond to the demands of informal and formal markets, which often require flexibility in their movements and practices (Nori and Scoones, 2019). Furthermore, "mobile livestock farming is part of complex systems of life that combine many other activities: agriculture, but also trade, transport and crafts. Added to this are remittances from migrants. The more diversified these activities are, the greater the family's resilience to recover from climate shocks tends to be" (Thébaud *et al.*, 2018). Indeed, "diversification of activities and income

³Pastoral mobility is one of the techniques for adaptive management in constrained or changing conditions, but there are others not discussed in this note: the selection and combination of various species of herbivores adapted to these environments and this type of livestock farming, particularly long-distance movements; the use of various fodder resources (herbaceous, tree and shrub fodder), etc. Combining different species replicates the cohabitation found in nature among several types of herbivores, which makes it possible to exploit different niches and make efficient use of diverse natural resources. "One of the ways in which livestock farmers adapt to fluctuations in their economic capacity or environmental conditions is by changing the composition of their herds and the animal species they rear." (Toutain *et al.*, 2012).

has become widespread in response to years of climate crisis or due to declining productivity in pastoralism. These may include trade, crafts, or paid work in agriculture, livestock farming or any other field, including in cities, on a seasonal basis or by certain family members who then send funds to their families from their country of migration." (Toutain *et al.*, 2012).

Finally, **pastoralists draw on community knowledge and shared experiences** to develop strategies for coping with uncertainty. This collective approach helps them pool their resources and ideas, thereby strengthening their resilience in the face of challenges (Nori and Scoones, 2019; VSF International 2016). "Even though pastoralists' practices seem to have remained unchanged since ancient times, the pastoral system has always been in constant evolution: today's pastoralists draw on knowledge passed down through tradition, but they apply it in ways that are adapted to their context in order to quickly seize opportunities and cope with the constraints they encounter. This is a condition for survival." (Toutain *et al.*, 2012). Mobile herders thus manage climatic imbalances marked by increasingly frequent extreme events (Thébaud *et al.*, 2018). They have a detailed knowledge of climatic factors, both in their home territory and in the host areas they visit. Information is crucial and is obtained through numerous information networks (scouts, contacts with market traders, landlords in host areas, etc.).

In summary, pastoralists have developed unique strategies, such as mobility, to live with uncertainty, enabling them to thrive in uncertain environments by helping them adapt to changing conditions and seize new opportunities.

Box 4. Pastoral mobility in West Africa

Over the past 50 years, livestock farming in West Africa has undergone profound changes. From the 1970s onwards, droughts gave agropastoralism a vital role in adapting to climate risk. Pastoral communities invested in agriculture to recover more quickly from crises and rebuild their herds, while the acquisition of livestock enabled farmers to secure their family economy in bad years and invest their agricultural income in good years. Recent decades have also seen a southward shift in certain livestock systems, reflected in the increasing adaptation of zebu cattle to trypanosomiasis. Long confined to the typically pastoral areas of the north, livestock farming has thus spread to the southern Sahel regions, while also playing an increasingly important role in coastal countries.

For the vast majority of pastoralists (including those in coastal countries), livestock mobility has remained an absolute necessity in the face of scattered, unpredictable and uneven grazing resources from one season or year to the next. By allowing animals access to different types of grassland and wooded pastures, mobility increases livestock productivity, maintains reproductive capital and strengthens resilience in times of crisis. Mobility also optimises exchanges with local communities in host areas and provides access to markets for selling animals and dairy products. In the event of drought, livestock mobility also plays an essential role in protecting livestock capital, especially in the current climate context, marked by increasingly frequent extreme events. However, mobile livestock farming should not be approached solely through the lens of transhumance. Although these pendulum movements have become particularly widespread since the 1980s – especially towards coastal countries – mobility can take various forms that do not necessarily involve large-scale displacement. During the winter, it is primarily the ability to move animals from one area to another in line with the farming cycle that makes it possible to maintain livestock, some of which will later leave for seasonal dry-season transhumance.

Source: Thébaud *et al.*, 2018

4. Constraints on the mobility of pastoral systems

Several particularly decisive factors of change impact the existence and functioning of mobile livestock systems (CILSS *et al.*, 2024), including:

- **Droughts and climate change** – increased frequency and intensity of extreme weather events (floods, temperatures, etc.), interannual variability – can be destabilising for pastoralists and seriously affect those most exposed, even if the pastoral system has a great deal of flexibility and adaptation mechanisms. Possible impacts include: mass livestock mortality, reduced productivity of grazing lands, destabilisation of trade and the spread of livestock diseases (Opitz-Stapleton, 2023).

- **Policy challenges:** "Policies specifically addressing the pastoral sector are relatively rare (the African Union's Framework for Pastoralism Policy in Africa is an exception). In addition, many policies concerning livestock farmers also apply to other regions and population groups, which means that they are often ill-suited to the pastoral situation. There is a significant asymmetry in public policies between Sahelian and coastal countries, but much has been done in terms of pastoral land tenure in Niger, Mauritania, Mali and, more recently, Senegal to enable the recognition of pastoral land rights since the 1980s⁴. The weakness lies in the fact that, apart from Niger, these texts do not establish institutions responsible for their implementation. Several countries have also adopted national pastoral water strategies: Niger, Mali, Chad, etc. Ultimately, the implementation of these policies is insufficient (CILSS *et al.*, 2024).
- **Land tenure, access and use of resources:** land rights define the rules governing access, exploitation and control of land and renewable resources. Management systems for common pastoral areas are characterised by forms that integrate the regulation of access to pasture through the control of water points. Generally, non-exclusive priority rights are recognised for resident groups, while incorporating the rights of third parties with whom solidarity and reciprocity of rights must be cultivated. This form, based on negotiated non-exclusive rights, is characteristic of the common management of pastoral areas in the Sahel (Barrière *et al.* 2023). For example, in West and Central Africa, "mobile herders must request permission to graze if they are in areas with crops and to use wells that are not public or over which they have no control. In strictly pastoral regions, water points determine access to surrounding grazing lands, but their status varies, sometimes being freely accessible and sometimes under the authority of an entity or clan. Grazing livestock does not confer any rights to the land, unlike agriculture, which produces through tillage, resulting in an asymmetry of usage rights that is often a source of conflict (Toutain *et al.*, 2012). Land tenure legislation varies considerably from one country to another, but many formal legal systems do not recognise or guarantee customary occupancy rights (Leclerc and Sy, 2011). Private ownership of land (or even wells) has emerged in pastoral areas usually governed by collective usage rights. The owners are not necessarily livestock farmers; this removal of resources from collectives contributes to the fragmentation of pastures and the reduction of pastoral areas. In addition, several types of land rights coexist, such as (in the case of West and Central Africa) customary law, Islamic law and "modern" law applied by administrations, which can limit pastoralists' access to traditional grazing areas. Customary land rights can compete with national policies or private initiatives, which can lead to tensions and conflicts (Toutain *et al.*, 2012). Land grabbing (agricultural exploitation rights granted to foreign companies and states over large areas of land) can also represent the plundering of resources and create areas that are inaccessible to livestock farmers, thus limiting their mobility.
- **Reduction of pastoral areas and agricultural densification in a context of strong demographic growth:** The reduction of pastoral areas under the effect of agricultural pressure continues in the absence of strong and widespread measures to secure pastoral land (CILSS *et al.*, 2024). "The need for new land for cultivation is primarily met by encroaching on pastoral areas. Even transhumance routes, which in principle are reserved for livestock, are sometimes restricted or even blocked by fields. The areas around wells rich in manure also tend to be encroached upon" (Toutain *et al.*, 2012). In the past, the absence of official rights was irrelevant, as pastoral land was considered "vacant and ownerless". But things have since changed. Agriculture (but also gold panning and the creation of nature reserves and parks) have sparked interest in pastoral regions. These activities often take place on the best-irrigated land, denying livestock farmers access to the pastures and water sources on which they depend during the dry season (Leclerc and Sy, 2011). In addition, "so-called 'structural' projects (drilling, hydro-agricultural developments, the Great Green Wall, etc.) for land use and occupation add to the constraints on mobility. The lack of understanding of mobility mechanisms on the part of administrative decision-makers and perhaps also certain prejudices on the part of development agents are undoubtedly contributing factors" (Leclerc and Sy, 2011).
- **Strong population growth** can also lead to greater demand for animal products, and therefore market changes, as well as **rapid urbanisation** and, *ultimately*, increased competition for access to agro-pastoral resources (CILSS *et al.*, 2024). These socio-economic transformations – urbanisation, demographic pressure, market changes – are

⁴ The strategic importance of livestock production mobility is increasingly recognised in policies, for example: the African Union's Policy Framework for Pastoralism in Africa (2010), pastoral laws and codes (Niger, Kenya, Mali, Mauritania, Burkina Faso, and currently being developed for Chad), and the Economic Community of West African States (ECOWAS) International Transhumance Certificate, which facilitates cross-border mobility in the fifteen member countries. In addition, Niger, Mali and Chad have developed a national pastoral water strategy. Chad, Niger, Mali, Burkina Faso, Senegal and Mauritania have undertaken large-scale renovation of pastoral infrastructure. These approaches are based on consultation and securing transhumance routes (CILSS *et al.*, 2024).

altering the traditional dynamics of pastoral mobility (Djohy *et al.*, 2024) and access to natural resources is becoming increasingly competitive among users of rural areas.

- **Relations between pastoralists and between pastoralists and farmers:** traditionally, there have been genuine complementarities between pastoralists and farmers, and even long-standing alliances between nomadic groups or families and villages (Toutain *et al.*, 2012). With population density and increasing pressure on resources, these complementary relationships have diminished and competition has emerged in various forms: clearing and cultivation of pastoral land, monopolisation of pastoral water points by groups of farmers, damage caused by animals in fields, etc. The use of pastures has become a source of increasingly serious competition between groups of livestock farmers on the one hand, and disputes between farmers and livestock farmers, and even conflicts, on the other. In the Sahel, for example, these tensions over resources regularly degenerate into deadly conflicts that have a considerable impact on development and inter-community relations (Ferdi and URD, 2023).
- **Insecurity and violence in pastoral areas:** insecurity combines violence from armed groups, banditry and inter-community conflicts, resulting in reduced mobility, for example through the erection of border barriers, the closure of livestock markets and an increase in livestock theft. The sharp increase in insecurity, particularly in rural areas of the Sahel and West Africa, is "the expression of a global crisis in the governance of these areas, which now provide fertile ground for armed groups to thrive by recruiting among pastoralists, whom they promise to repay for the multifaceted injustices they suffer. This can lead to mistrust and stigmatisation of all pastoralists, fuelling a vicious circle of frustration and marginalisation and undermining social cohesion in these areas" (CILSS *et al.*, 2024). We should also mention Islamist terrorism (particularly in the northern Sahel), which is turning grazing areas into zones of lawlessness and underdevelopment. The prolonged security crisis is taking a heavy toll on pastoralists (Jacquemot, 2023).
- **Poor image of pastoralists and marginalisation:** Although several Sahelian countries (Mauritania, Niger, Mali, Chad) and Mongolia attach importance to pastoral societies, pastoralists are marginalised in most parts of the world (Leclerc and Sy, 2011) and suffer from a lack of attention and dialogue. Indeed, mobile herders have traditionally suffered – and continue to suffer – from persistent prejudice against them. This poor image is linked in particular to environmental criticism of pastoralism (GHG emissions from livestock, degradation of vegetation and soil, etc.). Pastoralism is considered, particularly by policy makers, to be archaic, the result of outdated traditions, economically irrational because it is unproductive, even useless and a source of conflict. It is said to be destined (and therefore mobility with it) to disappear with the modernisation and "rationalisation" of livestock farming. "For administrators, pastoralists are difficult to control, 'vagabonds by pleasure', 'perpetually wandering', elusive. They are resistant to national integration, taxation and conscription." (Toutain *et al.*, 2012) For sedentary populations, they would have little respect for local rules, or would be perceived as "invaders and competitors". States may thus be led to express themselves increasingly in favour of measures restricting mobility. Some coastal countries, such as Côte d'Ivoire, Ghana and Benin, are considering closing their borders (Thébaud *et al.*, 2018). Some governments or politicians are trying to persuade them (sometimes by force) to settle down. Pastoralists may want to make their voices heard, but they do not have the opportunity to do so and lack the capacity or tools to organise themselves to gain political influence. Pastoralists report that they are rarely consulted on policies that affect them (Leclerc and Sy, 2011).
- **Border restrictions:** The establishment of artificial borders has complicated cross-border pastoral movements (Davies *et al.*, 2018). Many national borders have been drawn in sparsely populated pastoral regions, cutting across traditional grazing lands or migration routes (Leclerc and Sy, 2011).
- **Socio-economic issues:** "Despite their important economic role in developing difficult areas, [Sahelian] pastoralists continue to face particularly high transaction costs and obstacles: long distances to market their products, an insufficient number of livestock markets in some regions, the weight of negotiations over resource access rights, information asymmetry in transactions, and the fledgling presence or even absence of financial services for pastoralists (e.g. microcredit and insurance)" (Toutain *et al.*, 2012). The financial costs associated with moving herds (transport costs and animal management expenses) during travel limit the ability of pastoralists to be mobile (Djohy *et al.*, 2024).
- **Zootechnical and infrastructural constraints:** animal health remains a crucial and constant problem for mobile herders, while access to care remains insufficient. "The absence of certain practices (vaccination, deworming, stocks of veterinary products) sooner or later highlights the inadequacy of service provision and the vital importance of ensuring local services." (Thébaud *et al.*, 2018). Mobility can play an important role in the transmission of disease, which can have serious impacts on livestock farmers as well as other significant socio-

economic impacts at the regional or local level (Xiao *et al.*, 2015). Access to quality medicines and animal health professionals remains problematic. In terms of infrastructure, livestock markets and commercial facilities may also be inadequate or poorly functional where they exist (VSF International, 2016).

All these constraints are interrelated and mostly concurrent (see Box 5), complicating the practice of mobility. "These factors – ranging from the lack of land rights and land use for pastoralists to policies favouring agriculture, the expansion of agricultural land and urbanisation – reduce livestock mobility and climate resilience" (Opitz-Stapleton, 2023).

However, despite these multiple constraints, it is clear that pastoral systems have not disappeared in the face of the major crises they have experienced. On the contrary, all over the world, they have been able to adapt and reinvent themselves...

Box 5 – The growing difficulties of pastoralism

The example of cross-border transhumance in the Sahel: a real obstacle course

" Transhumant families find it increasingly difficult to be mobile. Harassment at border crossings, restrictions on access to water or grazing land, encroachment on fields, cattle theft, armed attacks and blockades on corridors are all difficulties that can lead to conflict and whose resolution often entails costs (money, animals). Social ties with local populations and the mobilisation of key actors (civil society, decentralised authorities) are crucial to managing these problems, but are increasingly facing limitations. Access to host areas is closing and landlords are tending to withdraw, faced with the proliferation of actors involved in the management of transhumance. [...] The vast majority of transhumant families surveyed report the precarious conditions they face when moving with their animals. Marked trails are often non-existent or frequently blocked by fields. Their level of infrastructure (water points, rest areas, access routes to ponds, grazing areas, markets) is insufficient. Forced exits are therefore inevitable and a source of potential conflict. Transhumant herders point out that securing local mobility is just as important as securing regional mobility. Furthermore, depending on climatic conditions, the routes taken may change from one year to the next, and a certain degree of flexibility is necessary.

Source: Thébaud *et al.*, 2018.

Focus on cross-border transhumance in Mali

Cross-border transhumant livestock farming has undergone significant changes in recent decades. Previously confined mainly to the Sahel countries, severe droughts and population growth in the 1970s and 1980s led to the expansion of transhumance activities in the coastal countries of West Africa, notably Benin, Togo, Ghana and Côte d'Ivoire (Alidou, 2016). In addition, a multitude of factors have significantly altered transhumance mobility patterns (UNOWAS, 2018; Corniaux *et al.*, 2018). Insecurity is now the factor that is leading to a reconfiguration of spaces and generating major upheavals between Sahelian and coastal countries. We should also mention [...] "changing environmental conditions, increasing restrictions on cross-border movements and changes in agricultural policy (e.g. protectionist national policies in coastal countries to reduce dependence on imports from the Sahel), which have forced changes in the seasonal routes of herders, making them more unpredictable and irregular. At the same time, climate variability, demographic pressure, increased pressure on land and natural resources, rising population densities and the decline in pastoral areas and available water have led to growing competition for resources (water and land). The gradual transformation of agricultural systems with the development of agriculture is also challenging the traditional agreements between farmers and herders (free access to fields after harvest) (ECOWAS, 2014). Pastoral systems are indeed vulnerable to climate change* and increased climate variability (Dasgupta *et al.*, 2014; Sloat *et al.*, 2018; Stanimirova *et al.*, 2019). Changing seasonality, increased frequency of droughts and rising temperatures are negatively affecting pastoral systems. Combined with other factors, this tends to reduce the mobility of transhumant herds. (Lopez-i-Gelats *et al.*, 2016; IPCC, 2022). In this context, tensions and violent clashes between herders and farmers have become more frequent and have taken on considerable proportions (ECOWAS, 2018; Human Rights Watch, 2018; CESA, 2021)."

Source: IOM, 2023

* It should be noted that pastoral systems are much less vulnerable to climate change than agricultural systems due to the mobility of herds. They are sensitive to the increase in temperature observed in the southern Sahara, but cereal productivity is much more sensitive (see Hiernaux et al., 2018).

** This is not the case in the Sahel, where rainfall is increasing (re-greening of the Sahel).

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