PARTICIPATORY TRANSHUMANCE MAPPING REPORT

Anticipatory Action & Climate Resilience along Transhumance Corridors in Somalia (AART) project

Prepared for CARE Somalia

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BACKGROUND

Somalia faces a multifaceted humanitarian crisis that has been impacted by climate events, inter-clan disputes, and governance issues. Pastoral and agro-pastoral communities continue to bear the brunt of these impacts. Over 65% of Somalia's workforce relies on pastoralism, underpinning 80% of the country's annual exports. While pastoralists have traditionally navigated extreme climates through long-distance livestock migrations, this crucial resilience is now under threat, as climate change, land use issues, competition scarcity of natural resources, and conflict disrupt the seasonal routines along livestock corridors.

THE AART PROJECT

Employing a 'corridor approach', the **Anticipatory Action and Climate Resilience along Transhumance Cooridors in Smalia (AART)** project aims to strengthen the resilience of vulnerable groups within Southwest Somalia's transhumance corridors through a two-fold strategy. Firstly, it focuses on rehabilitating and restoring crucial infrastructure along the corridors, including water stations, pasture zones, and fodder banks, thereby reviving the disrupted seasonal movements within the livestock corridors, supplemented by direct support to the farming communities within the corridors. Secondly, the project aims to establish an effective early warning system specifically designed to cater to pastoralists' needs, enabling them to make informed decisions about their movement.

INTRODUCTION

Transhumance, or the seasonal movement of livestock herds, is a critical livelihood strategy in Somalia. The spatial nature of these movements is particularly complex and often defined by the intersection of resource availability, climate change, market dynamics, customary access rights, and conflict. In this context, CARE Somalia and the members of the Somali Resilience Program (SOMREP) endeavored to map the seasonal livestock movements as part of the AART programme. As AART's intervention focuses on livestock corridors, this exercise was a foundational element of AART's planning as it allows the project to identify specific corridors.

Transhumance in Somalia is primarily defined by the seasons, listed here:

Gu
The main rainy season

Xagaa
Cool, dry season with some coastal showers

Deyr
The secondary rainy season

Jilaal
The hottest dry season

While security, access rights, and market conditions influence movements, those factors remain secondary to seasonality as a determinant of mobility. Herding communities will often pick between "normal" routes and "crisis" routes in case of a drought. Like most pastoralist societies, Somali herders have a practice of planning transhumant movements at the start of the season. In Somali, this practice is referred to as the *Sahan* (translates roughly to "scouting" or "survey"). During the *Sahan* process, pastoralists will monitor the conditions of rain, vegetation, and water of potential grazing areas. This process of evaluation might also account for pests or insects, as well as infrastructure and insecurity. Families will also decide whether and how to split herds (for instance, a smaller portion of the herd may stay at home while a larger portion will travel for grazing with part of the family (usually younger men). It is during the *Sahan* that herding families will decide whether they will use the normal or crisis routes. As a result, this study is first and foremost concerned with the seasonality of movements.

This study, using participatory data collection, provides an overview of the seasonal movements of pastoralist communities between the Juba and Shabelle rivers. The "normal" and "crisis" movements are outlined for each season.

AREA OF INTEREST

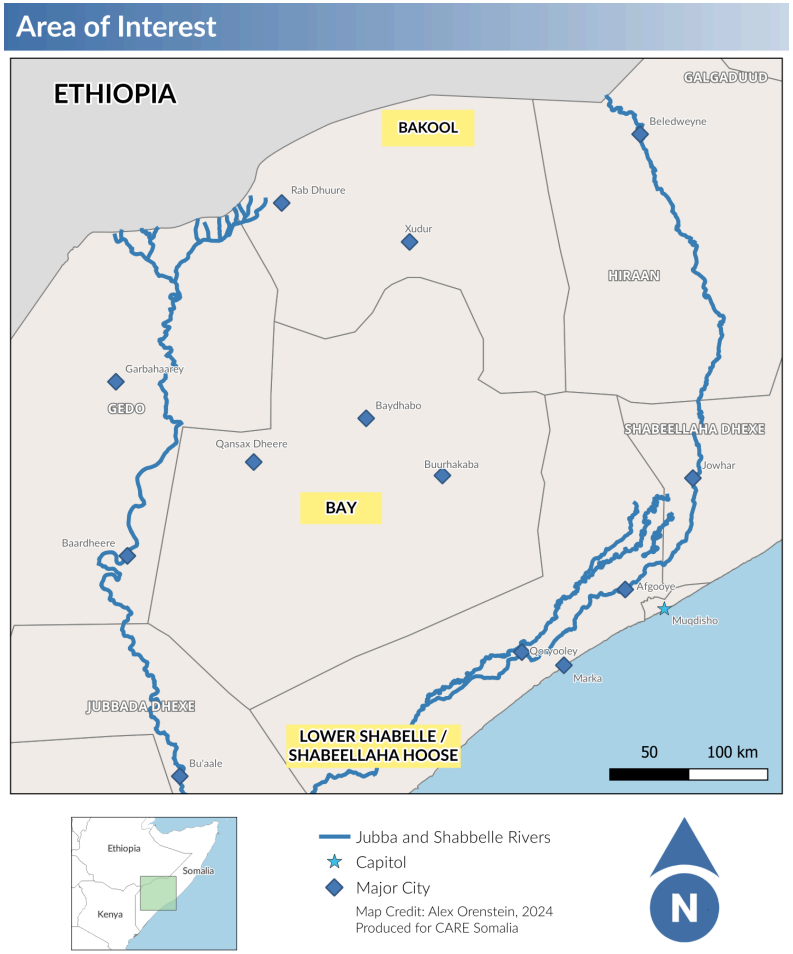


Figure 1: Map of the Area of Interest

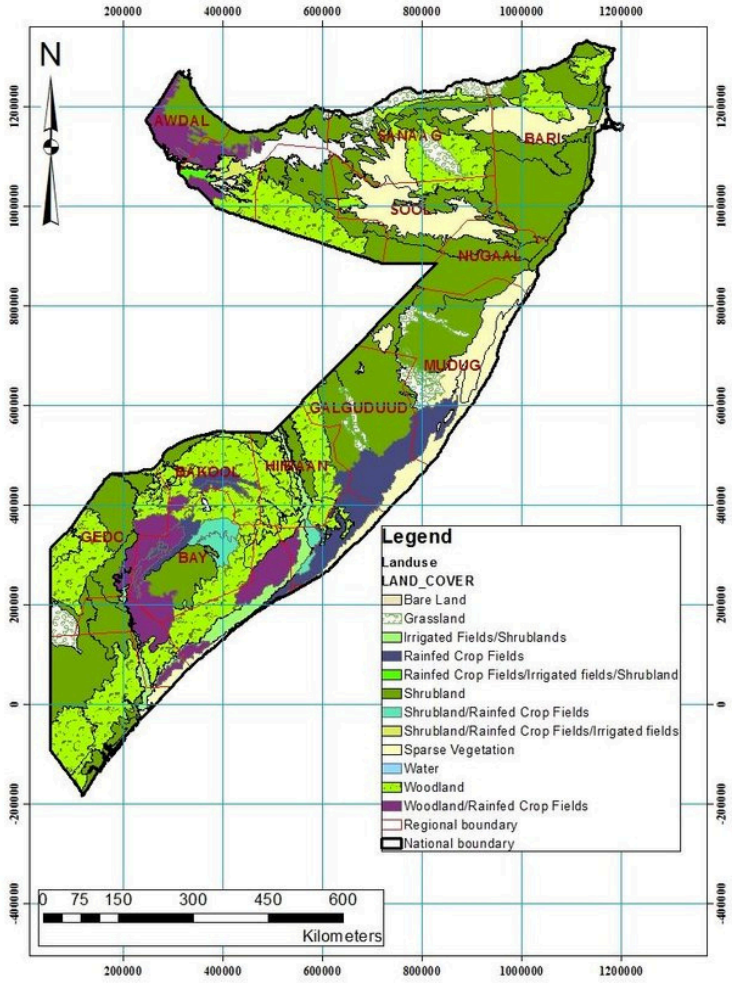


Figure 2: Land Cover classes across Somalia (FAO SWALIM, 2007)

Figure 1 shows the area of interest (AOI) of the project, which encompasses 80,000 km² between the Juba and Shabelle rivers. It includes the regions of Bay, Bakool and Lower Shabelle (the entirety of South West State, Shabeelaha Hoose). These are the main areas of intervention for the AART project. Baidoa (Baydhaabo) is the main urban center of the AOI, but the zone also includes Beledweyne, Jowhar, Balcad, Afgooye, Marka and Xudur, which are important destinations for market routes..

Figure 2 provides an overview of land cover across Somalia. The study's area of interest has a noticeable concentration of rain-fed agricultural land alongside wide swaths of grassland in the Bay Region. The Lower Shabelle region contains the largest presence of irrigated crop fields, but also a considerable mix of grassland and rainfed fields. Bakool, being the most semi-arid area, is dominated by grassland.

AREA OF INTEREST

In all three regions, rainfall peaks in April and October, as shown by the average annual rainfall data in **Figure 3.** When comparing the cumulative seasonal averages across all three regions of interest in. **Figure 4**, it should be noted that Lower Shabelle has a lower seasonal rainfall during the Gu, Deyr and Jilaal than Bay, though the region uniquely benefits from small showers during the Xagaa in the coastal areas. It should also be noted that Bakool, as the most northern and arid region, receives considerably less rainfall than Bay monthly, and cumulatively during each season.

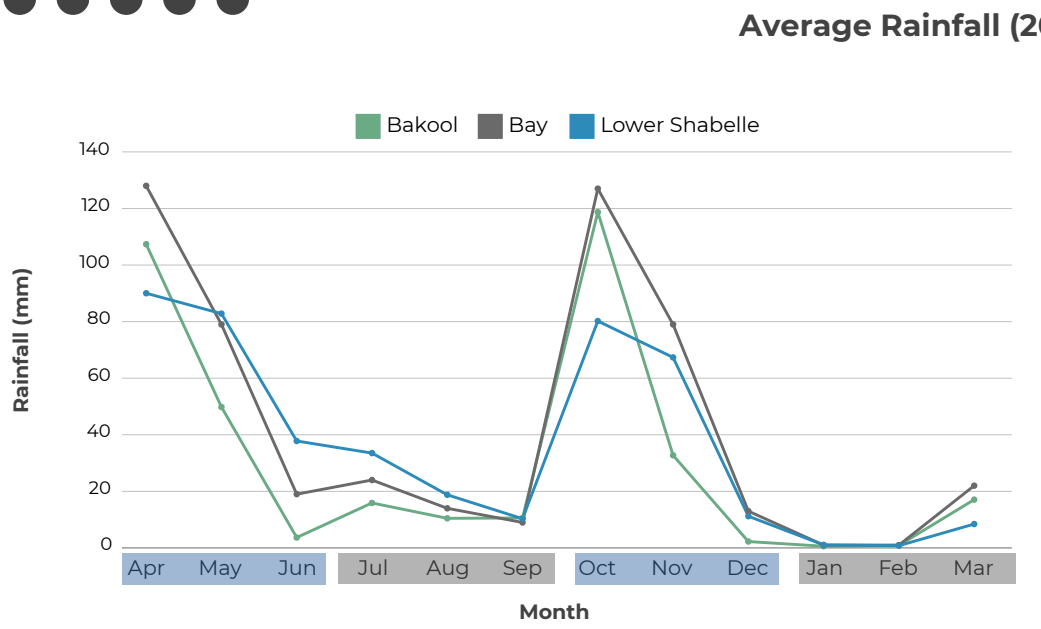


Figure 3: Average Annual Rainfall for the areas of interest (FEWSNET, 2024)

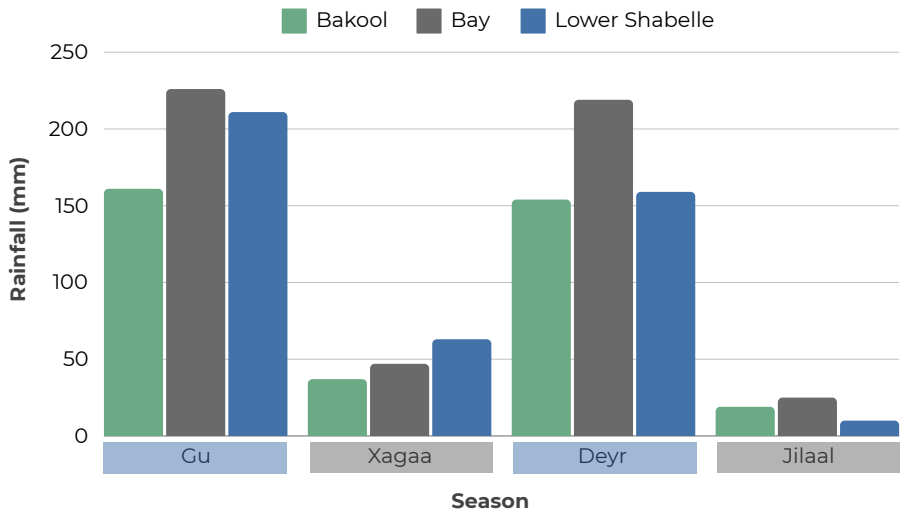


Figure 4: Cumulative Seasonal Rainfall for the areas of interest based on annual data

METHODOLOGY

The objective of the corridor mapping exercise is to broadly delineate the transhumance routes of a given area through Participatory Transhumance Mapping (PTM). PTM builds on the tradition of Participatory Rural Appraisal (PRA) methods that have been incorporated into Participatory Vulnerability and Capacity Assessments (PVCA/ CVCA) over the years. The goal of the corridor mapping is not necessarily to define spatially explicit corridors, but to understand broad movement patterns of transhumant communities. Representatives from the herding communities typically draw these maps in group exercises, with the end result being the creation of maps that show seasonal transhumance movements.

PTM follows in the tradition of PRAs and PVCAs, which have often employed the use of hand-drawn maps by participants. These maps, sometimes called hazard maps, typically rely on participants to draw a map of their village and their access to different resources. This method has been used to map rangeland resources and community land-use participatively (Irwin et al., 2015). The creation of these maps is usually contextualized by discussion groups and physically visiting the area of interest (transect walk). Often in these exercises, participants will collectively map resources and locations by placing locally sourced items such as rocks or twigs in the ground and drawing lines in the sand to represent different boundaries. These are then interpreted by a designated map-drawer, who visually charts this data on paper.

METHODOLOGY

PTM differs from this approach in that the areas mapped are typically vast, often covering thousands of square kilometers. Transect walks and the collection of precise field data are thus not possible in this context. Likewise, while participants will draw the routes, they do not draw the map from scratch. They draw on a pre-prepared base map that helps the participants situate different landmarks across vast spaces. In PTM, dry-erase markers and laminated base maps are key as there is not a single "map-drawer", but instead many participants draw on the map simultaneously. This is important because while PCVA maps typically are drawn from a single community, PTM participants typically represent a variety of different pastoralist communities with different, specialized knowledge of transhumance practices.

PTM likewise differs from other spatially explicit methods such as aerial photography or GPS tracking (most commonly done with drones and animal collars). Unlike PTM, these methods can map the precise location of a corridor,- which can be important in the case of a specific land use dispute. However, unlike PTM, they are logistically complicated to implement. Tracking herds via collar requires a sophisticated sampling technique to ensure that most communities are represented.

Furthermore, such tracking can take many years to complete. Aerial photography requires significant resources to produce a single image, and many images would be required to understand seasonal movements.

In situations where transhumant movements need to be mapped over a wide area, PTM remains the most effective method. It is cost-effective, timely and most importantly, centers the experience of the pastoralists themselves.

LITERATURE REVIEW

In spite of pastoralism's importance to the economy, livelihoods and culture of South West Somalia, very few studies have been published on livestock mobility in the area. Among these, maps of livestock movement are even rarer. Much of the existing published literature predates the 1991 collapse of the Siad Barre Regime, an event which fundamentally transformed livelihoods across the country.

The anthropologist I.M. Lewis' body of work is foundational in ethnographic studies of pastoralism in Somalia, though his work has come under scrutiny in recent decades for its colonial background (Kapteijns, 2011) . In the 1960s, Lewis observed that the area was primarily populated by the Rahenwein and Digil clans. Most communities were sedentary farmers; however, at the time, a minority practiced mobile pastoralism. That said, by 1985, up to 70% of the population was practicing mobile pastoralism (Water Development Agency, 1985). Grazing access to farmland was negotiated between communities and could cut across clan lines. Herders would usually provide milk, money or dung in exchange for post-harvest access to fields for their livestock to graze on residue (Lewis, 1967).

Ahmed et al. (2023) provide a recent overview of mobility patterns. Mobility is identified as the key adaptation strategy, practiced by the majority of livestock keepers in Somalia. The presence of localized droughts is widespread enough in Southern Somalia that herders need to adjust grazing patterns every 4-5 years. However, in spite of shifts, permanent water bodies and boreholes remain a constant destination for itinerant herds during times of drought. Likewise, herds are typically broken up during transhumance with milking cows or weaker livestock staying home with families while the majority will travel to graze.

LITERATURE REVIEW

M.A. Hussein: Animal Husbandry and Management

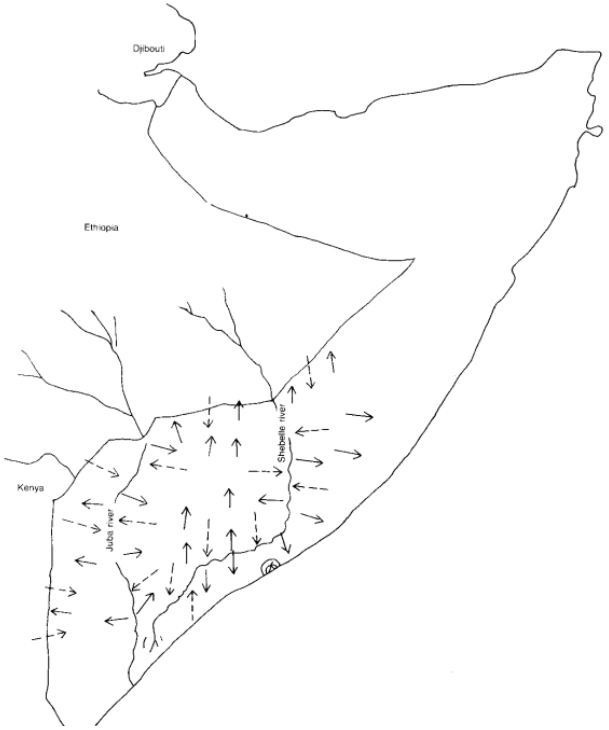


Figure 5: Map of Seasonal Camel Movements in Southern and Central Somalia (Hussein, 1988)

Tempia et al. (2010) offer the only study that mapped livestock movements in the past 40 years. However, it is limited to a market route between Afmadow and Garissa. The authors used GPS trackers and professional drovers to map the routes, focusing exclusively on the cattle trade.

Mohamud et al. (2022) offer a broad overview of the Somali livestock sector and an outline of the dominant breeds of cattle, camel and sheep across the country. However the study does not go into detail about mobility or transhumance.

Hussein (1988) offers the most detailed study on camel husbandry in Somalia. Critically, the author included a rough map of seasonal camel movements divided by wet and dry seasons (**Figure 5**).

LITERATURE REVIEW

Unruh (1991) provided a detailed overview of pastoral livelihoods in the immediate lead-up to the civil war. That said, many of the observations are still applicable today. In 1991, it was estimated that 80% of the Somali population was engaged in pastoralism, with most herds engaging in some kind of mobility. At the time, the Lower Shabelle region had one of the highest livestock densities in the country due to it being a regular destination for itinerant herds in the dry season, which would typically concentrate there from October until April. At the start of the rains, herds would head into the semi-arid parts of the Bay region to take advantage of abundant pasture and avoid tsetse flies in riverine areas.

Much like today, when herds would return to the river during the dry season, camels tended to maintain a distance of at least 15-20km from the shore, as direct access was often blocked by the presence of farms. When herders would access farms for post-harvest grazing, they did so through a series of access negotiations. In most cases, these negotiations were honored and the grazing carrying capacity of the farms was not overloaded. Small-holders were more likely to allow visiting herds to graze than large plantations.

The International Organization for Migration's (IOM) recent work provides an overview of developing the Transhumance Tracking Tool (TTT), an adaptation of their existing Displacement Tracking Matrix (IOM, 2023). The TTT tracks origin and destination points for livestock herds and provides estimates of livestock numbers in transit using community informants. However, the TTT does not map the routes traveled in transhumance.

EXERCISE BREAKDOWN

Training

Prior to the start of the Participatory Transhumance Mapping (PTM) exercise, facilitators were trained in the method. A total of 7 co-facilitators were trained over the course of a single day. The full content of the training is detailed in the training manual provided as an annex to this report.

Discussions

Seasons

Upon arrival of the participants, introductions were made, and a discussion was held to ensure participants and facilitators had a shared understanding of the goals of the exercise. The first element discussed was seasonality. A group discussion focused on defining the timing of the main four seasons. This was particularly important as many participants had differing ideas on the start and end of each season. Some participants felt that the start of the Gu was fixed in early April, while others felt it had a flexible start, depending on the arrival of the first rains. Following an hour-long discussion, all participants agreed on fixed dates for each of the four seasons. Participants were asked how the current Gu compared to previous seasons and participants agreed this Gu was normal to favorable in terms of rainfall. The current Gu was thus used as a benchmark for a “normal” season.

Landmarks

Following the seasonal discussion, participants discussed the most important landmarks used in describing locations (such as which landmarks are used during the Sahan) and how locations were described (for instance, using soil color, types of vegetation). This was important to ensuring that participants would have a common understanding of geography and space.

EXERCISE BREAKDOWN

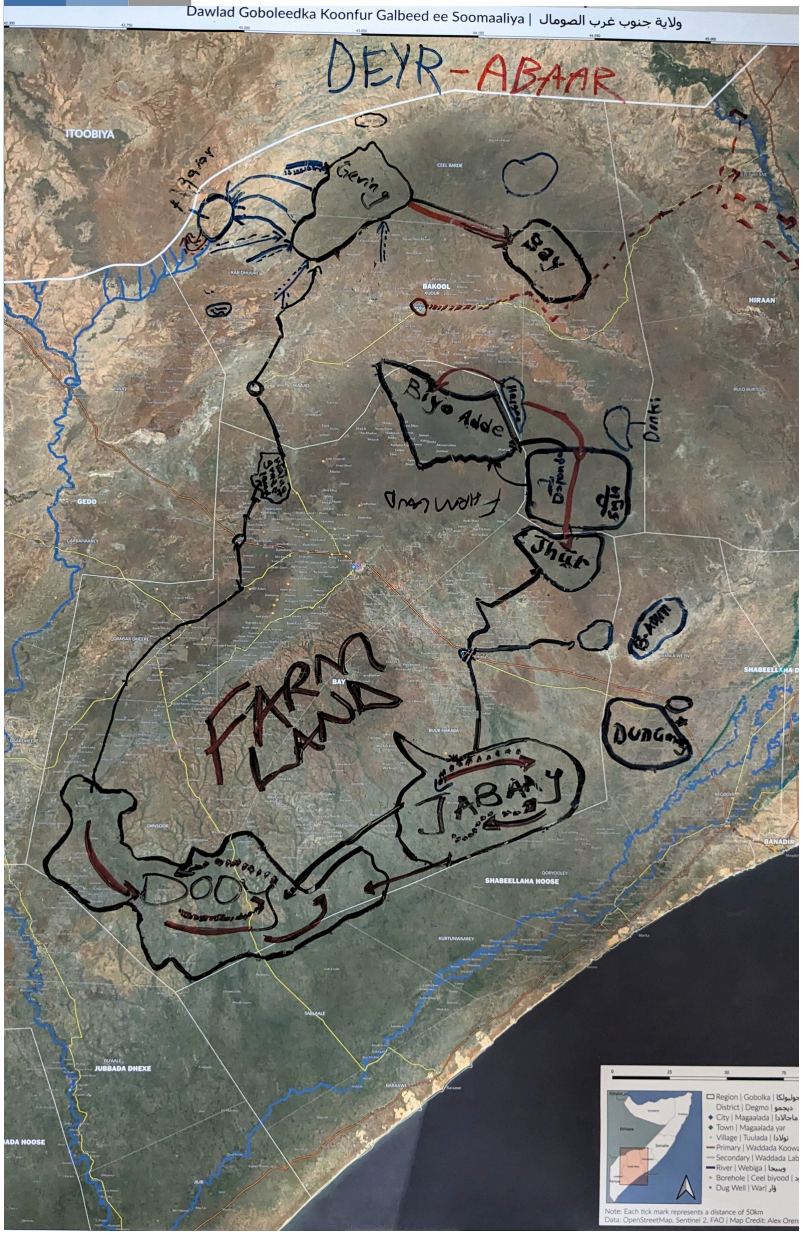


Figure 6: Example of a map drawn for the Jilaal (Dry season)

Map Orientation

The final step in the introduction phase was a map orientation. Participants were given time to study the map and all of its legend items were clearly explained. Participants were then tasked with marking their home villages and several of the landmarks they had mentioned in the previous discussions (boreholes, hills and bridges). Participants would also discuss among themselves (with the assistance of a facilitator) to ensure that the locations were correctly marked.

Participatory Mapping

Following the orientation process, the participants were split into three groups based on their home region: Bay, Bakool and Lower Shabelle. Each group was given a map of their region. Participants were then instructed to map the livestock movements for this current season (Gu). Market routes and grazing routes were differentiated. Likewise, movements for cattle were marked with a dotted line while movements for camels were marked with a solid line. In addition to the movements, participants drew shapes representing the largest extent of each grazing area or destination. Once the participants were finished, all three maps were copied and combined into a single large map showing all three regions. Participants then discussed and debated the map, correcting any errors. **Figure 6** shows a map at this stage of the process.

Once the map had been validated by the group, the participants repeated the process, but this time marking the movements that would happen if the rains were insufficient or a drought was occurring.

Following validation of the drought/crisis movement map, the process was repeated for the other three seasons. The maps were then digitized in QGIS following the workshop.

BASE MAP

Several base maps were prepared, each printed and laminated on an A0 format poster. The lamination is important as participants must draw directly onto the map and must be able to erase and correct during group discussion. The maps included major villages, known boreholes, roads and rivers. As depicted in **Figure 7**, the base of the map itself was a true-color, cloud-free satellite image from the Sentinel 2 satellite. The use of a satellite image base map was important as participants were able to distinguish between types of land cover such as forests, bare soil and grassland.

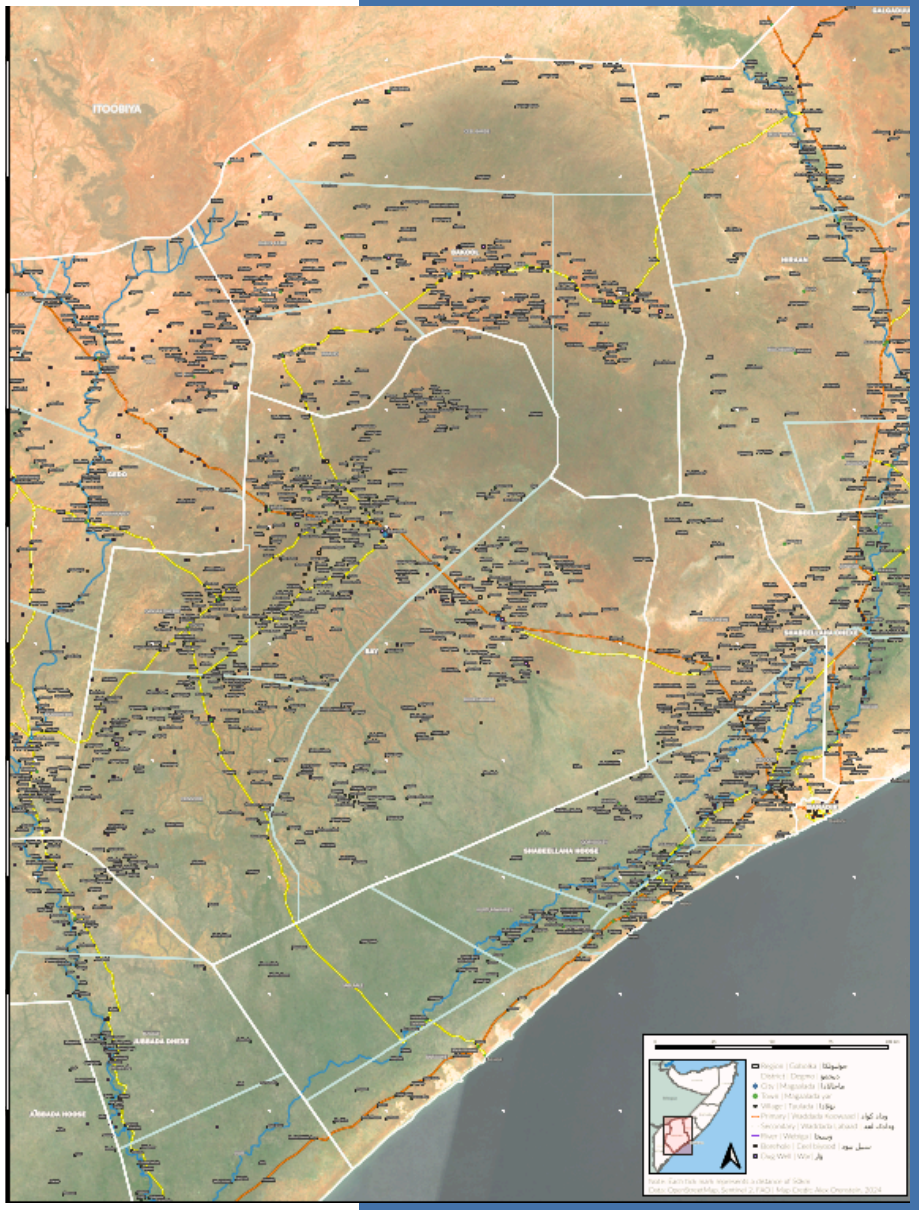


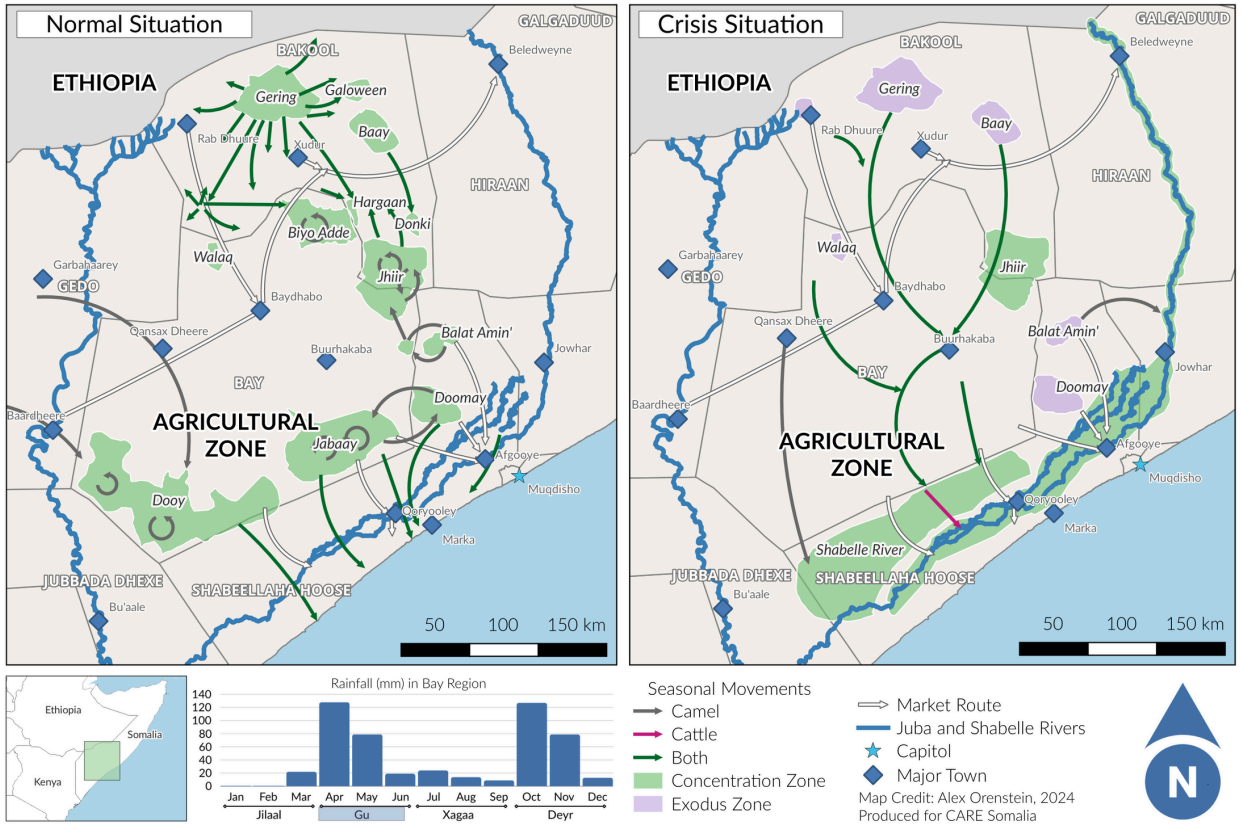
Figure 7: Example of a base map that was printed onto A0 format for the study

RESULTS

GU

The results of the mapping exercise for the Gu season indicated that the main destinations consisted of 14 well known grazing areas throughout the area. During the arrival of the rains, herds would move away from humid or agricultural zones in order to get to grazing areas. However, during situations of drought, herds would move away from these zones, focusing instead on the area around the Shabelle river. In such situations, cattle will concentrate in the river's immediate surroundings, whereas camels will graze further away in a zone to the north of the river, coming to the river every few weeks for 1-2 days only for watering. However, the river is rarely a destination during the Gu as it is considered a destination of last resort when rains are abnormally low.

Transhumant Movements- Gu Season



During this exercise, the market routes were mapped. These are distinct from grazing areas for several reasons. The first is that they run all year. There is no specific seasonal route for markets. Likewise, these routes are rarely traveled by families or pastoralists, they are usually taken by professional drovers, Gaadleys (merchants who sell in a single market) or Gedisleys (merchants who practice arbitrage between multiple markets).

Three main market routes were identified: 1) the Baidoa-Mogadishu route which is predominantly camels. This is for both domestic consumption and international export, 2) The Baidoa- Beledweyne route. This route is exclusively for camels and is predominantly for international export. Camels are moved from Beledweyne to the ports of Bossasso or Berbera. 3) the Baidoa- Afmadow- Garissa route. This route is exclusively for cattle which are exported to Kenya. Garissa is the wider gateway into the Kenyan market.

XAGAA

The Xagaa is a season with a diversity of movements which differs sharply from the main dry season, the Jilaal. While the majority of the area receives no rainfall in the Xagaa, there are typically light showers along the coastal areas during the Xagaa. This, combined with the presence of salt in the area, makes it an important destination for both cattle and camels. Transhumant livestock come to the coast during the Xagaa for the abundance of fresh water, pasture and salt (which is an important supplement for both camels and cattle).

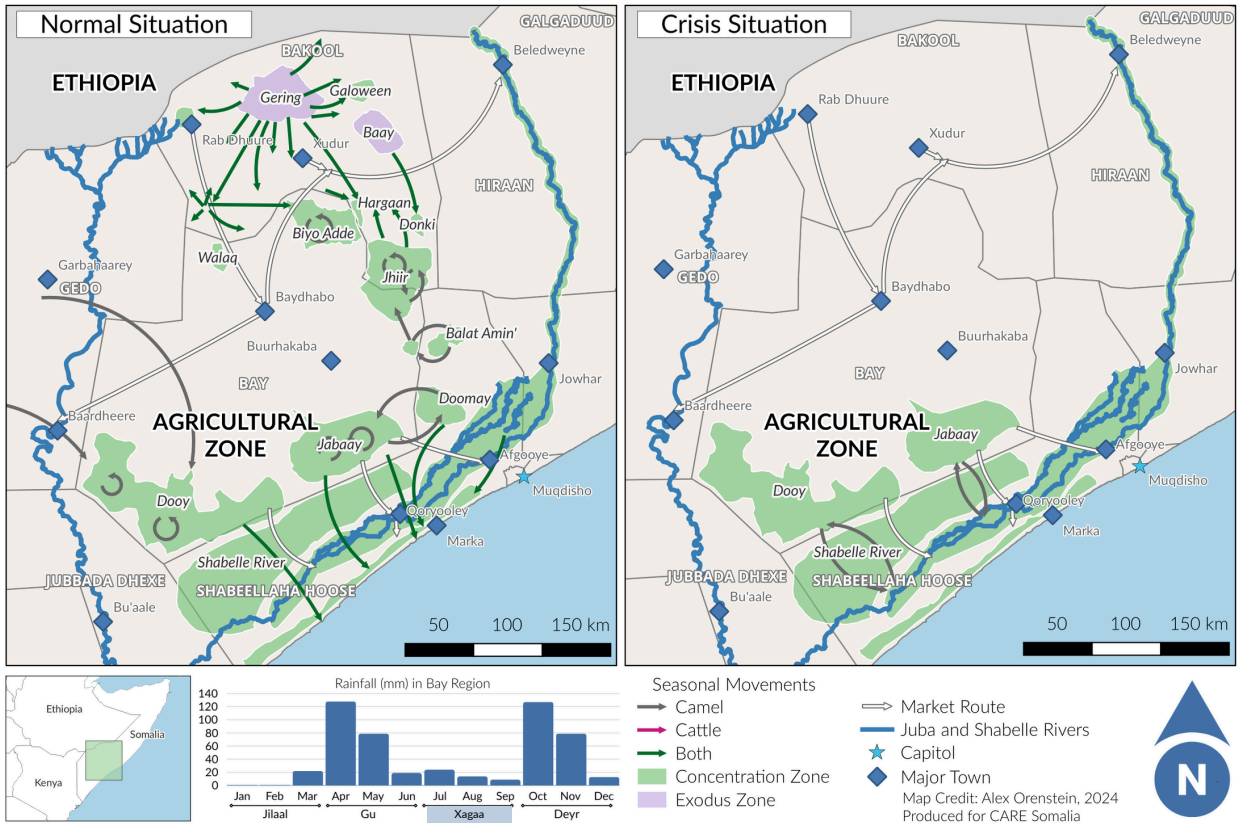
In most cases of a normal Xagaa (that is to say, where the Gu rains were favorable), livestock will remain within the main grazing areas to which they traveled during the Gu. A notable exception to this fact can be found in Bakool. The two main grazing areas - Gering and Baay- are typically emptied of their herds during the Xagaa due to their lack of permanent water sources. During the Xagaa, herds in these zones will move towards areas with permanent water. Grazing areas with red soil like the Hargaan are important destinations because of the quality of their groundwater.

As the map indicates, there are no “crisis movements” during the Xagaa for Bakool. This can be explained by the fact that in case of a drought (unfavorable rains during the Gu), transhumant herds will have already left Bakool by the arrival of the Xagaa (see the previous map showing crisis movements during the Gu).

However, in the case of a drought, herds from lower shabelle might move towards the river during the Xagaa. This is especially the case for camel herds, which may graze in the Dooy and Jabaay areas and descend to the river every few weeks for 1-2 to take water. Cattle will be more concentrated around the river.

Furthermore, foreign camel herds from Kenya will enter the Dooy grazing area during the Xagaa passing through Gedo and Baradheere.

Transhumant Movements- Xagaa Season

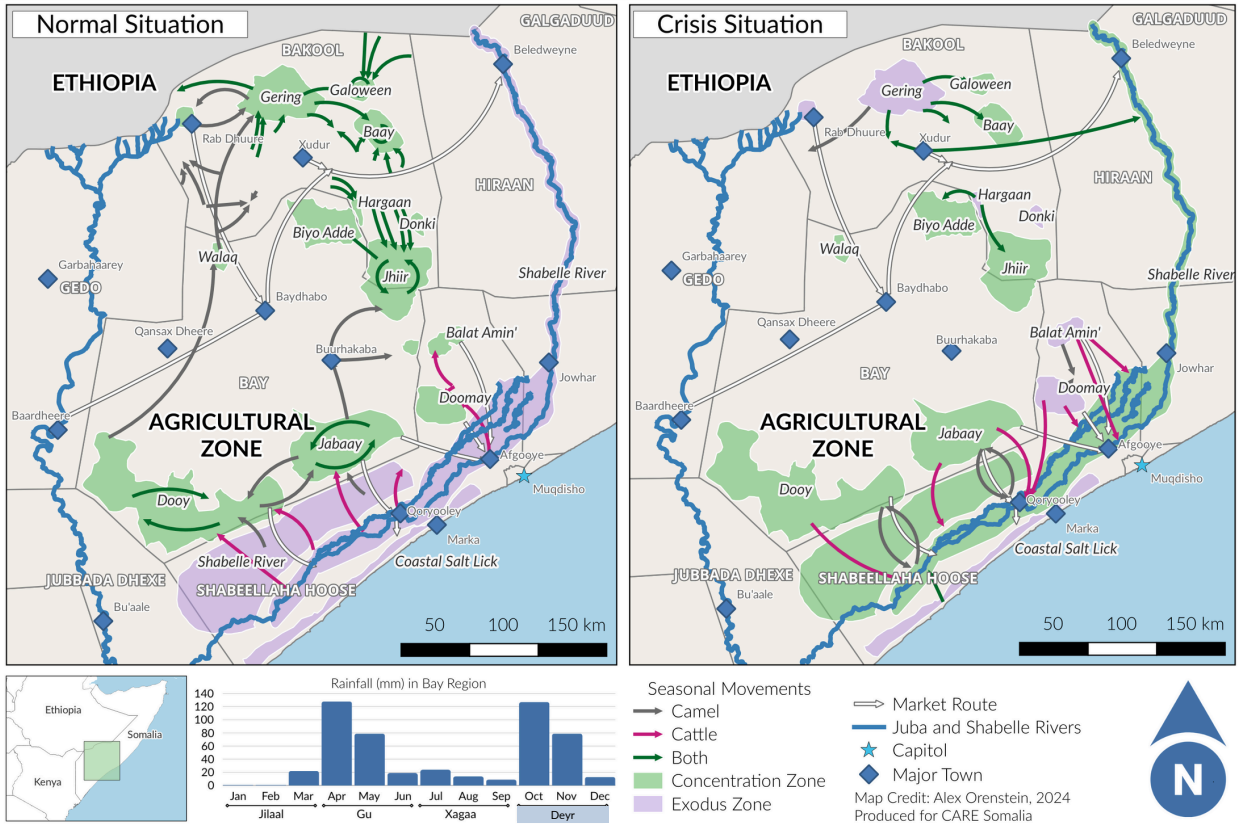


DEYR

The Deyr is the second rainy season and constitutes an important movement back to the home territories of pastoralists. During this season, herds tend to follow a very strict movement pattern, sticking to predefined corridors so as to avoid the herds grazing in agricultural areas. Herders based in the Bay and Bakool areas will typically head back to their home areas to both benefit from an abundance in grazing resources and be close to their own agricultural fields. Herds will not move towards the river or humid zones unless they are in a major drought situation.

Herds in Bakool will spread far and wide aross their traditional grazing areas. However in cases of a drought, or less favorable Deyr rains, they will head to zones with well-known permanent

Transhumant Movements- Deyr Season



(boreholes) notably: Galoween, Baay, Teed, Gubey, El Garab and Jhiir. The grazing areas of Hargan, Perenti and Agaraari (a well known salt lick) do not have permanent water sources and are only targeted by transhumant herds in the case of a favorable Deyr. Herders from Bakool who traveled to the Dooy during the Gu or Xagaa follow a strict route back to their zone which terminates in the Gering Grazing area. The route typically follows the main road, passing through Berdale, Walaq and Wajir before finally reaching Garas Wiine, which is effectively the gateway to the Gering. This route from the Dooy to the Gering takes up to 7 days.

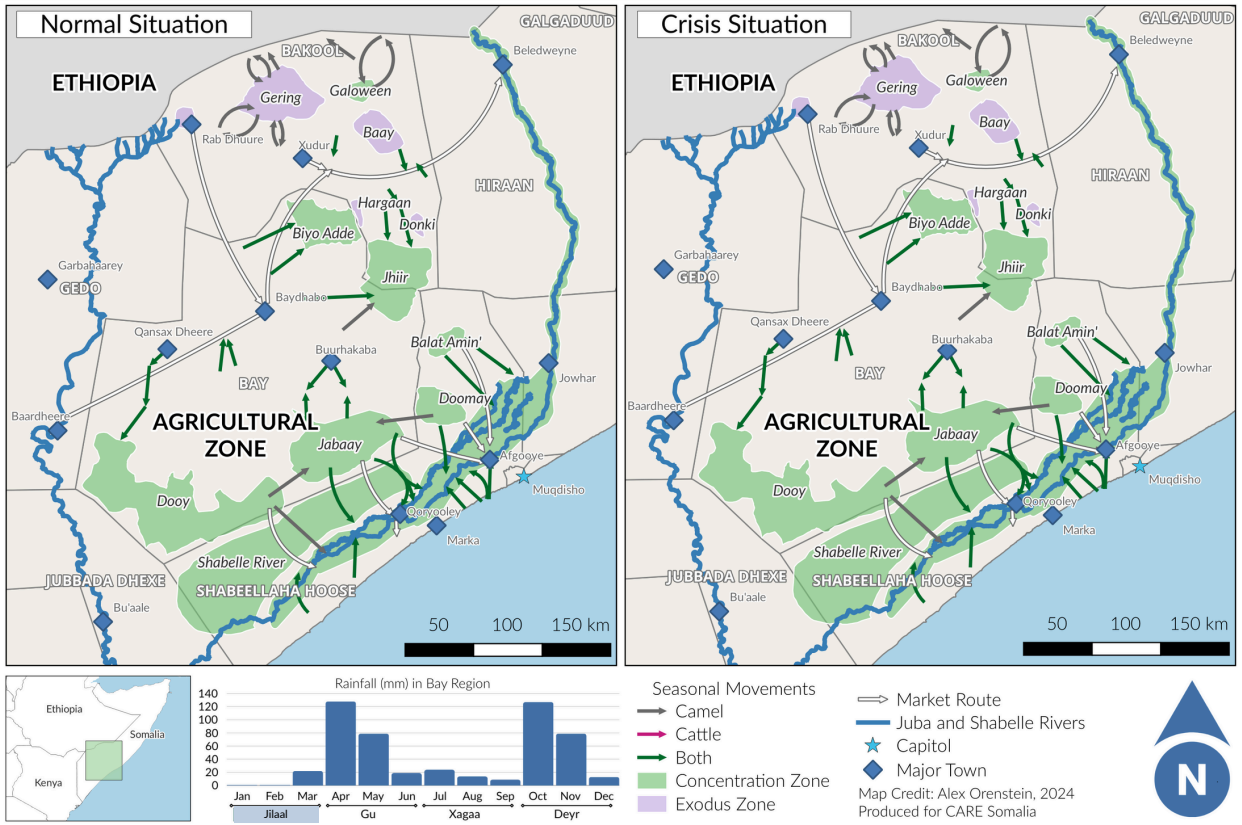
Herds in Bay follow particualrly strict corridors to avoid agricultural areas and will normally stick to predetermined village stop points. For instance, the voyage from the Jabaay grazing area to Buur Hakaba typically follows a road from the Jabaay to Koranbod to Waraabo Bedow before reaching Buur Hakaba. However, herders from Bay that moved into the Dooy during the Gu or Xagaa may stay in the area, coming back only to their home areas for the harvest of their personal fields.

Lower Shabelle herds will typically stay within grazing areas, unless the Deyr rains are severely deficient (or the season failed to materialize), in which case they will follow the same crisis movements as they would in the Xagaa or Gu and move directly to the river. Agricultural residue after the harvest near the river constitutes an important source of fodder for animals.

JILAAL

During the Jilaal, a noticeable and important phenomenon is the lack of specialised drought/crisis movements. That is to say, herds will move in exactly the same way whether there is a drought or not. The Jilaal is the most difficult of the two dry seasons and herders will move directly towards areas of permanent water availability no matter what. For herders in Bay, they will stay near boreholes or permanent surface water bodies in the Dooy and Jabaay areas primarily.

Transhumant Movements- Jilaal Season



For herders in the Lower Shabelle, the river remains the main destination. Herds based in Dubay, Balat Amin, Jabaay, Doomay or Dooy will typically move towards the river. As in prior seasons, camels will maintain a distance whereas cattle will be concentrated near the river. Even in severe cases where the river has dried, it is one of the few areas with a guarantee of vegetation and water access (though it may need to be accessed via digging).

For herders in Bakool, the lack of surface water makes movement planning a delicate exercise in the Jilaal. Boreholes are the main destinations. For instance, in the Jhiir grazing area, herds will often concentrate around the two known boreholes (Dalandolo and Sigla). Northern grazing zones, (Notably the Gering) will continue to host some camel herds which venture outside the range to take water at boreholes, however in most cases it is an exodus zone as most herds will leave the zone during the Jilaal.

DISCUSSION AND RECOMMENDATIONS

This study offers the first known transhumance map for South West Somalia since the start of the 1991 Civil War. As a result, this represents an important opportunity to better understand seasonality and the dynamics of pastoral livelihoods. The delineation of specific corridors will allow humanitarian actors to plan projects enhancing the resilience of transhumant communities, such as infrastructure improvements and feed stocks.

It should be noted that this study does have several limitations. The first being that it lacked participants from Jubaland and as a result, movements along the Juba river are not mapped. Secondly, this study should not be taken as a full census of livestock movements. As a participatory tool, they are based on the collective perception of a community. While they can provide deep insight into livestock movements, they should not be taken as a substitute for a spatially explicit map of exact corridors (as one would get from GPS collars).

DISCUSSION AND RECOMMENDATIONS

This study can offer the following recommendations

National coverage of corridor mapping:

This study can be replicated across the entirety of Somalia. Collecting data on transhumance routes across the country could lead to a better understanding of seasonal herding patterns. Likewise, pastoralism remains an important livelihood across the entire country and mapping routes should not be limited only to south-west state. In instances where more precise data is needed at a local level, areas with fewer security constraints can be prioritized to allow exercises to be conducted within herding communities.

Sahan-centric early warning systems:

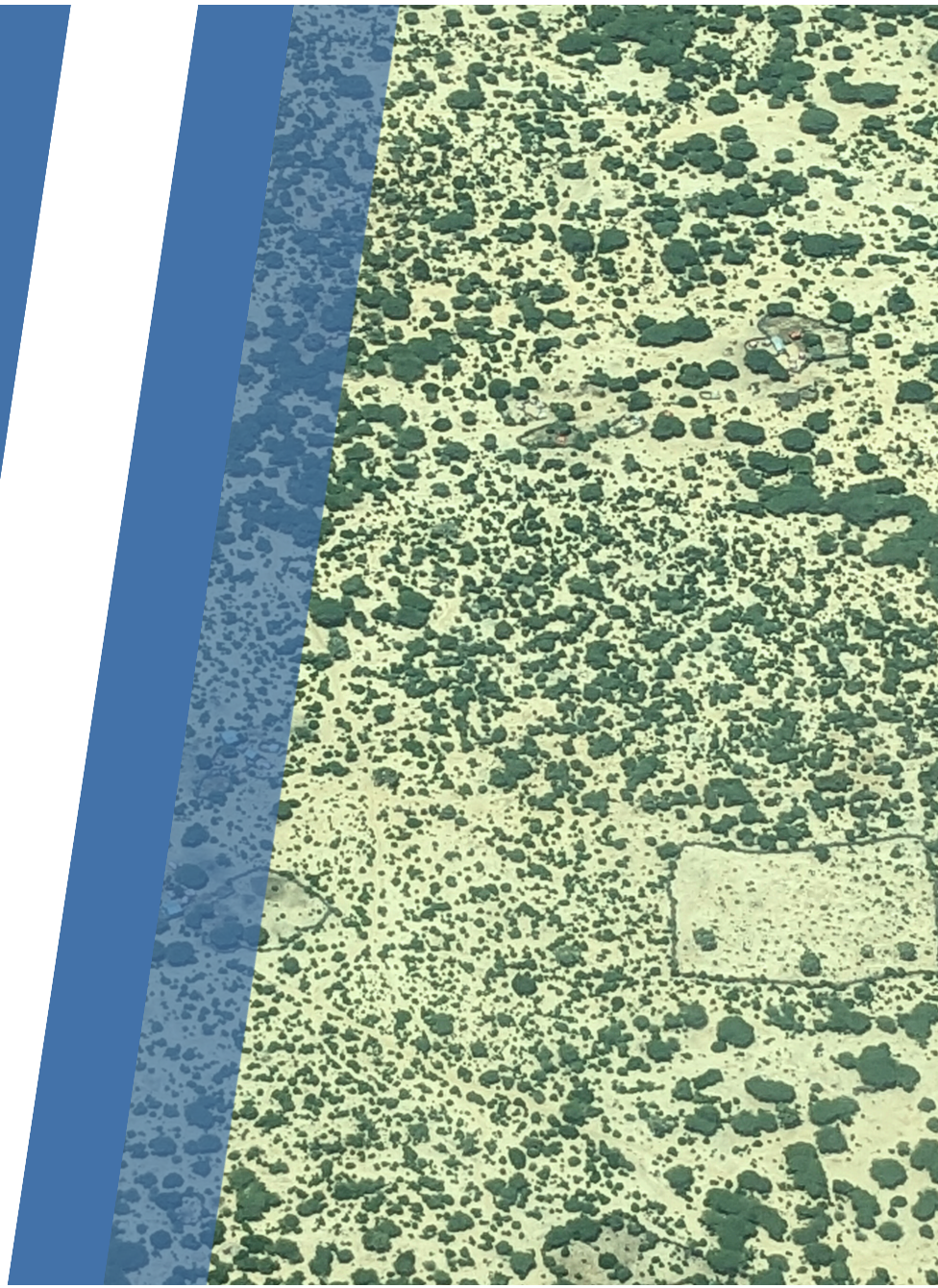
This exercise demonstrated that pastoralists' endogenous information systems are robust and wide-ranging. Pastoral communities regularly collect data on natural conditions of grazing areas and corridors and possess intricate geographic knowledge of their areas. The Sahan (the pastoralist system of collecting data to plan transhumance) should be centered in the development of any early warning system. Examples of work that have integrated endogenous pastoral information systems with modern big data or remote sensing imagery include AFRISCOUT and GARBAL.

Seasonal resilience programming:

AART will need to account for seasonality in its programming. For instance, if AART rehabilitates boreholes, targeting areas critical to pastoralists during the Xagaa and Jilaal seasons would be advisable, since that is when the water shortages are most acute. The same can be applied for feed banks or vaccination campaigns (which may be timed to anticipate wet season movements when mosquito-borne illnesses are most prevalent).

CONCLUSION

This study outlined the seasonal movements of herds during the four major seasons of Somalia, focusing on South West State. The study mapped market routes and grazing routes for both cattle and camels. The study further outlined the differences between normal movements and crisis movements in cases of drought. Participatory Transhumance Mapping (PTM) was used to delineate these movements, revealing vital grazing areas and market routes. Despite limitations like the exclusion of Jubaland and the absence of precise GPS data, the study provides critical insights for planning resilience-building interventions, marking the first comprehensive transhumance mapping since the 1991 Civil War.



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