Management of River Systems for the Future

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Research Brief
Adapting Livestock to Climate Change Collaborative Research Support Program

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Abstract

In West Africa, pastoralists seasonally move along transhumance corridors to provide feed for their herds. Our research describes and maps movement patterns along these corridors. We identify some land and resource management challenges that arise from these corridors, and describe how our findings will be used by local communities to improve local management of natural resources.

Mapping Transhumance Corridors in West Africa

Background

Livestock husbandry is an important part of the Sahelian economy, and livestock mobility is a vital strategy to gain access to seasonal availabilities of high quality forage and to reduce vulnerability of livestock to local rainfall deficit. Herd mobility follows a seasonal pattern called *transhumance* along specific paths called *corridors*. Passing through agricultural areas, corridors vary between 5 and 20 meters in width, allowing livestock to move through cultivated zones without removing significant amounts of land from agricultural production.

A local pastoralist moves livestock along a transhumance shed to seasonal grazing areas. (Photo by Matthew Turner)

Mobility is north-to-south oriented with coordinated seasonal movements that allow both crops and livestock to use key resources. During the rainy season, livestock move to northern pastures to take advantage of the sparser, but higher quality vegetation found there. During the dry season, livestock move along corridors to the south where agricultural pressure is often, but not always, higher.

Livestock progress along transhumance corridors between relatively well-defined resting points, generally close to water. The length of time that livestock remain at these resting points varies from one day to several weeks. Each day, herders take livestock to graze and or water in the area then return to resting points in the evening. The attractiveness of a resting point, the length of the stay of a herd, and the size of the herd present in any given year is strongly affected by the availability of forage and water in a 4 km radius surrounding the point.

Transhumance is vulnerable to corridor blocks and the loss of pastures around encampment and water points due to encroachment by crop fields. Corridor management is thus a major issue for village and commune-level government because of the competing needs of farmers and herders. In cases where corridors are closed because of the growth of cultivated areas, local authorities may seek to identify alternative corridors through their jurisdictions. Unfortunately, these decisions are often made without consideration of how local corridors connect to regional networks or how

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corridors connect to water and forage access. As a result, the usefulness of many corridor stretches has deteriorated, increasing the vulnerability of regional livestock and the potential for farmer-herder conflict.

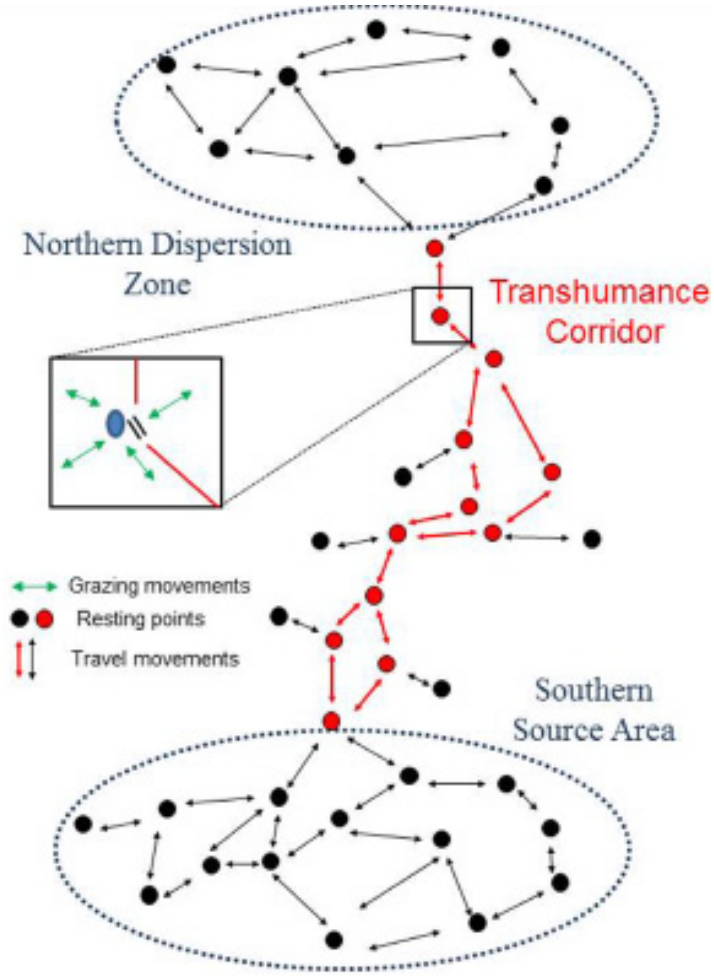
> *"Corridor management is a major issue for village and commune-level government because of the competing needs of farmers and herders."*

Multiple stakeholders (government ministries, NGOs, elected and appointed officials, village chiefs, pastoral clan leaders, farmers, herders, etc.) do not have necessary information about the pastures, corridors and the water points that make up larger transhumance systems, so it is difficult to determine the broader regional importance of a particular water point, pasture, or pathway. This information is important for national-level planners who need to convey these concerns to local management groups that recognize and protect these resources.

We developed an approach for systematically gathering and disseminating information about corridors, water points, and resting points and their importance to all stakeholders to facilitate these policy interactions and decisions. To illustrate our approach, we introduce the concept of a *transhumance shed*, an area serviced by a set of transhumance corridors connecting a sparsely populated pasture area with a heavily populated, cultivated area. A transhumance shed encompasses a number of administrative districts so many local land use management officials are involved in decisions about corridor paths, resting points, pasture, and water points.

Livestock grazing near a resting point on a transhumance corridor. (Photo by Matthew Turner)

Model of a Transhumance Shed



Within a transhumance shed, herds seasonally move between a group of home villages in the south to a northern dispersion zone along specific corridors. These corridors consist of relatively well-defined resting points, represented by the red and black circles in the figure. Red arrows indicate points and movements that define the corridor, black indicates points and movements that feed into the corridor.

Methods and Goals

Our goals were to identify the locations of corridor stretches, resting points, and water points servicing key transhumance sheds in Mali and Senegal; describe the physical status of these features; document the level of social and legal recognition of these features by local inhabitants and present the information in the most effective way to all stakeholders to facilitate decision-making.

We studied four administrative districts in Mali (Cercles of Koro, Mopti, Tenenkou, and Douentza) and three administrative districts in Senegal (Départments of Goudiry, Matam, and Bakel). Research assistants along with MLPI-2 and GSFA / RIVERS Malian and Senegalese counterparts, participated in an initial workshop in January 2011. Participants were trained to collect geo-referenced data with GPS units and information on the corridors within the shed.

In each of the seven study areas, pastoralist leaders were identified and a series of meetings were held between them and local administrators to outline the goals of the project. We then worked with them to identify 10-25 transhumance corridors (and associated resting points and water points) on which the study area's livestock depend to reach outside destination areas to the north or south, depending on the season.

Our assistants followed these corridors by motorcycle with the help of an informant, tracing these paths through continual collection of

A meeting held between pastoralist leaders and local administrators. (Photo by Matthew Turner)

Collecting field data on transhumance corridors. (Photo by Matthew Turner)

GPS points along their length. We collected information about the physical state of resting points and the corridors leading to them (presence of fields, water quality, and pasture quality). In addition, social characteristics were collected such as the users, managers, and future land use patterns of corridors, resting points, and waterpoints. Using the Magellan Explorist 510 GPS unit, the assistants took geo-referenced digital photographs points of interest and recorded verbal descriptions of effective corridor widths.

The data in the memory of the GPS unit and the survey forms are collected periodically by our partners the Near East Foundation (NEF) in Douentza, Mali, the Institute d'Economie Rurale (IER) in Mopti, Mali and the Yaajeende project in Tambacounda, Senegal. The GPS data is uploaded to a FTP site housed at the University of Wisconsin-Madison and the scanned forms are sent as attachments to e-mails.

Future Steps

We are currently developing provisional maps of corridors and encampment points using the GPS data and survey forms. These will be used to interview officials of the administrative districts (Communes and Communautés Rurals) crossed by corridors about the level of recognition and formal protection of corridors, resting points, and water points within their commune, any management problems that exist, and the accuracy of what we have mapped given their knowledge of the transhumance system.

This geo-referenced data will then be provided to different stakeholders for their feedback. A digital web-based interactive map will be produced and presented to national-level stakeholders. The maps will be sufficiently "user friendly" to allow updates and additions as new transhumance sheds are added, for example, after the end of this study. Flat maps at different scales and designs will be produced to test the most useful formats for local stakeholders.

Local stakeholders will use these maps to develop "conventions locals," integrated land use management plans that are community-designed

"Our research will help open discussion about overlapping rights to natural resources."

and enforced. We intend to work with the communities and our development partners to use the transhumance corridor mapping as a basis for discussion. Our research will help open discussion about overlapping rights to natural resources (for example, water for livestock is also used for irrigation fish habitats) that often relate to ethnic identity and gender (for example, the Bozo and Subalbe people fish and women largely grow dry season irrigated vegetable crops). Overlapping claims to natural resources will need to be addressed within the management plan of the local convention.

In Douentza, Mali we will build on the existing local conventions and experiment with *Scenario Planning* with our Near East Foundation partner. NEF implemented corridor mapping with us and is also funded by USAID to conduct work related to climate change adaptation. The work we are currently planning would use local conventions as a baseline, but work with communities to develop contingent plans based on likely climate change scenarios.

Further Reading

Adriansen, H.K. and T. T. Nielsen. "Going Where the Grass is Greener: On the Study of Pastoral Mobility in Ferlo, Senegal" Human Ecology, 30(2): 2002

Bassett, T.J. and M. D. Turner. "Sudden Shift of Migratory Drift? FulBe Herd Movements to the Sudano-Guinean Region of West Africa." Human Ecology 35(1): 33-49 2007

Sy, O. La Transhumance Transfrontalière, Source de Conflits au Ferlo (Sénégal). M@ppemonde. 98. http://mappemonde.mgm.fr/num26/articles/art10201.pdf. 2011

Management of River Systems for the Future (RIVERS)

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The RIVERS project was initiated to understand vegetative impact of climate change in riverine systems, estimate the costs/benefits of converting land to irrigated rice cultivation in riverine systems, and document transhumance patterns in multiple communities using riverine resources.

Riverine systems in arid and semi-arid lands serve as key resources that support livestock and crop production. For herders, rivers flowing through drylands are critical for producing dry season grazing reserves and essential sources of permanent water. For cultivators, the waters allow cultivation both though recessional cultivation of floodplains and irrigated cultivation using river water. Due to increased population pressure and changing rainfall patterns in the Senegal and Niger River basins, the agricultural economy based on these riverine systems has already come under the kinds of stresses that climate models predict may become more widespread in the future. This makes study of these systems a priority, as understanding what they have already experienced will be critical in understanding likely outcomes in similar environments. This project is designed to investigate three linked questions: what has been the impact of climate change on the vegetation of riverine systems to date; what are the benefits and costs of different methods of increasing food security though irrigated rice production noting the impact on livestock production; and what are the key points on transhumance corridors as identified by herders. We believe that, while the conversion of large areas of land to rice production is inevitable and if done correctly desirable, the costs imposed on livestock production systems and the conflict induced by conversion need to be managed. Ultimately the results of the RIVERS project will allow for the design of management options based on the existing conditions, including mechanisms that allow adaption to climate change.

The Adapting Livestock Systems to Climate Change Collaborative Research Support Program is dedicated to catalyzing and coordinating research that improves the livelihoods of livestock producers affected by climate change by reducing vulnerability and increasing adaptive capacity.

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