GLOBAL LIVESTOCK CRSP

The Influence of Water Stability on Livestock Migration in Northern Kenya

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The Livestock Information Network and Knowledge System (LINKS) and the Livestock Early Warning System (LEWS) projects have determined that water availability and stability are major factors in pastoralists' decision making about livestock movement. To obtain information on the water situation in the LEWS (Livestock Early Warning System) monitoring sites in northern Kenya, LINKS launched the study described in this brief. The location of the water sources used by LEWS communities, particularly those that dry up and are abandoned during prolonged dry season or drought periods, were mapped to enable assessment and monitoring of water availability using forage deviation data. The information gathered will be used alongside the forage advisories as a basis for decision making and intervention by pastoral communities, development/relief agencies, and other stakeholders.

Background

The LEWS/LINKS projects have determined that water stability influences livestock migration in northern Kenya. Monitoring and characterizing water availability (particularly in areas of unpredictable drought) is an important component of a livestock early warning system. The purpose of the study described in this brief was thus to obtain information on the water situation in the LEWS (Livestock Early Warning System) monitoring sites in northern Kenya. Team members mapped the location of the water sources used by LEWS communities to relate the time (month and dekad) when water sources dried up with the corresponding forage deviation in order to enable assessment and monitoring of water availability using forage deviation data.

In the LEWS monitoring zones, the districts that had been affected by drought over the previous two years were identified. Within these districts, specific areas (sites where people and their livestock actually moved or migrated for various reasons) were selected; these were areas where it was likely that some or all the water sources either dried up or were abandoned. Pastoral communities and other key informants in the selected monitoring sites were interviewed by administering a single questionnaire in a focus group discussion. Single subject interviews were conducted to verify some of the responses with key informants.

The specific objectives of the survey included: 1) to identify and characterize the water sources available to pastoral and agro-pastoral communities in the LEWS monitoring sites, and 2) to establish the role of water stability in influencing decisions on livestock movement.

Preliminary Findings

The respondent communities were able to articulate the issues of forage, water and livestock movement very well in all sites for the period in question (January 2004 – May 2006). In all sites, the meetings were facilitated by Ministry of Livestock and Forestry Department (MoLFD) staff, the area Chief or community monitor.

Livestock Movement

Forage situation and livestock movement. The forage situations in the northern Kenya districts of Isiolo, Samburu, Marsabit and Laikipia were generally below normal over the survey period. At the time of the survey during the long rainy season in May 2006, only a few areas had adequate forage. Most areas had not recovered from drought, and conditions were deteriorating fast, as was the case in Tiemamut in Laikipia, where livestock were being moved out due to scarcity of forage. In northern Kenya, almost all the grazing resources are communally owned.

In all sites, the pastoralist communities moved their livestock from normal grazing areas in search of water and pasture during times of stress such as dry season and drought periods. In one site (Baragoi) out of seven (14.3%) only cattle were moved to satellite herding camps locally known as 'fora,' while camels, sheep and goats grazed within the home area. In Sibiloi-Gas, camels were moved separately while cattle and small stock were moved together. The movement patterns and grazing areas were different. Cattle were also moved quite early because, as grazers, they are usually the first to be affected by shortage of forage and water. A few lactating animals (camels and goats) are usually left behind during

migration to provide milk for household consumption. In all sites, the homesteads ('manyatta') are sedentary, while only the livestock migrate along with the herders.

Reasons for movement. In five sites (71.4%), shortage of forage was a primary consideration and inadequate water for livestock a major factor in the decision to move to other grazing areas. Only in one out of 40 total movements (2.5%) was water cited as the primary reason for movement whereby forage was a lesser factor. Insecurity/conflict was cited in three (42.9%) of the sites (Sibiloi-Gas, Baragoi and Serolevi) as a reason why people moved. Pastoralists in Sibiloi-Gas recounted how 341 camels were stolen in a village called Moite near Lake Turkana in January 2006, forcing them to vacate the area. In all sites, livestock returned home as soon as forage conditions improved with the onset of the rainy season. If the rains are scanty, however, some (especially cattle) might not return for prolonged periods.

Migration distances and duration away from homestead. Mobility is the single most important tool used by pastoralists to manage and utilise rangelands. A total of 40 movements away from respective home grazing ranges were made in the seven sites over the 28-month survey period (January 2004 to April 2006). Of these, 11 involved all livestock species, 12 for cattle and small stock, 10 for cattle and seven for camels only. The average duration away from home was 4.7 months with a range of two to 28 months across livestock species. The period covered by the survey was generally unfavorable in terms of forage, culminating in severe drought from November 2005 to April 2006. In normal years, only cattle are moved during the dry season, but camels and small stock utilize nearby grazing areas.

Distances covered per migration movement varied widely between sites and livestock species. The overall range was seven to 110 kilometers (km) with an average of 56 km. The shortest distances of 10 km were in Baragoi, Kiwanja and Serolipi, and the longest of 120 km in Tiemamut, Wamba and Maikona. Distances increased as the adverse period of forage scarcity advanced. Cases of insecurity were reported as the livestock moved outside their traditional grazing areas leading to conflicts with neighboring communities.

Livestock mortalities during the November 2005 to April 2006 drought were high in some parts of Isiolo and Marsabit, but not so much in Samburu and Laikipia districts. Most affected were Sericho and Merti divisions, while the least affected was Kinna division. Isiolo district is a net migration area for livestock from North Eastern province. In 2005, there was also a huge influx of livestock from other areas into Baragoi division due to the poor rains received that year in the rest of Samburu (Waso, Maralal) and Marsabit districts.

Migration routes: description, determinants and problems. In 42.9% of the sites, all livestock were moved together along the same route when migrating. Different species, however, move at different speeds and have various requirements of feed and water. The major determining factor of the chosen route is availability of water and pasture en route and at destination (71.4%) because of long distances and slow pace of movement. In Laikipia, the migrating herds have to follow established roads to avoid trespassing into the many private ranches.

Wildlife menace, insecurity, shortage of water, and pasture along the trek route were each cited in 42.9% of the sites as the main problems encountered en route. Other obstacles included disease and rough terrain in 28.6% of the sites. Although most pastoralists are used to frequent migration, those left behind may have limited or no access to milk and other food items. Food scarcity and risk of starvation are thus a possibility; and the household might have to rely on food relief to survive the prolonged periods when livestock are away.

*Table 1. Water constraints in the key survey sites. *(K=Kiwanja, SE=Serolevi, M=Maikona, SB=Sibiloi-Gas, B=Baragoi, W=Wamba, T=Tiemamut Group Ranch).*

No.	Constraint	K*	SE	M	SG	B	W	T	Frequency (%)
1	Long distance to water	x	x	x	x	x			71.4
2	Inadequate/ seasonal water	x	x	x	x	x	x		85.7
3	Parasites (liver flukes) in water	x							14.3
4	Grazing areas have no water			x					14.3
5	Contamination/ poor sanitation	x	x						28.6
6	Competition from wildlife		x				x	x	42.9
7	Disease transmission		x						14.3
8	High labour needs in dry season							x	14.3
9	High watering charges					x			14.3
10	Lack of water along trek routes							x	14.3
11	Water for human use far away			x					14.3

Water Sources

Characteristics of available water sources. The type, number and characteristics of water sources vary from site to site. Wells, the most common type, comprised 37.5% of the water sources in northern Kenya followed by dams (18.8%), rivers (14.6%), boreholes (12.5%)

*Table 2. Interventions to improve access to water for livestock. *(K=Kiwanja, SE=Serolevi, M=Maikona, SB=Sibiloi-Gas, B=Baragoi, W=Wamba, T=Tiemamut Group Ranch).*

No.	Intervention	K*	SE	M	SG	B	W	T	Frequency (%)
1	Develop new water sources in grazing areas without water	x	x	x		x		x	71.4
2	Develop sand dams along laggas		x	x			x	x	57.1
3	Improve forage availability in areas with sufficient water			x	x	x			42.9
4	Rain water harvesting at strategic points and storage tanks						x	x	28.6
5	Regulate use of river water upstream	x							14.3
6	Improve town sewage disposal and treatment	x							14.3
7	Deepen wells that produce little water				x				14.3
8	Create awareness on best use, treatment and conservation of water						x		14.3
9	Protection of water sources e.g. fencing dams						x		14.3
10	Develop rock catchment dams to collect mountain water						x		14.3

and springs (6.3%). Others were Lake Turkana, seasonal rivers ('lagga'), surface ponds and rock catchments. Unlike the other water sources, wells are found in most grazing areas because they are easy to develop and can be deepened as the need arises.

Different water sources are important at different times of the year; however, the order of use is site specific and depends on availability of other water sources in the grazing area. The seasonal rivers are usually used first because they have water only when it is raining. They are followed by dams/pans, wells and finally the permanent sources. Wells are mostly used during the dry season after the other sources are exhausted because they are labour intensive.

The duration of water at a source varies widely. The lake, all springs and boreholes, five of the seven rivers, and 72.2% of the wells have water rated to be sufficient for livestock throughout the year. Only two-thirds of the dams hold water for more than three months in a year, and only one-third of them produced adequate water. Most water sources are communally owned, except some boreholes managed by water user associations on behalf of the pastoralists that may require some maintenance charges to water livestock.

Although not the primary consideration in decisions to move livestock, water availability was still an important determining factor. In most cases, livestock were grazed in the proximity of water sources within a radius of up to ten km. With implementation of grazing management plans, areas without reliable water such as Segel, Hurri hills and Dida Galgallu in Marsabit district were utilized during the wet season when livestock requirements for water were low and surface rain water was accessible. Such areas were also utilized during extreme dry season and drought periods when there is no grass elsewhere, forcing livestock to trek for 30 to 50 km to and from grazing and water sources.

Constraints and coping strategies in providing water to livestock. The major constraints in provision of water to livestock and humans in pastoral areas of northern Kenya were inadequacy and long distances to the watering points (Table 1). Due to low and erratic rainfall and lack of permanent sources, water availability in most areas is seasonal and dries up after a few months. Livestock then must be moved to other areas or trek long distances between watering points and grazing sites, as most trek routes do not have water en route.

Other coping strategies include digging and deepening wells along dry river beds. Competition and interference from wildlife, especially elephants, and contamination of water sources by parasites and sewage effluent were other noted constraints. Animals can contract diseases at common watering points when infected herds mix with others, affecting both livestock and human health status. Raising awareness on proper sanitation and parasite control, however, may reduce the impact of these problems.

Interventions to improve access to water for livestock. Most communities interviewed felt that water supply for livestock use could be improved by developing more water sources, e.g. developing sand dams, regulation or deepening wells (Table 2). Improving pasture availability in areas with adequate water but little or no pasture was also cited as a viable intervention, e.g. in Hurri hills and Segel areas in Marsabit district. This could be done through implementation of grazing management plans by the respective environmental management committees, range rehabilitation, and the timely delivery of early warning information to pastoral communities. Rain water harvesting is a feasible option particularly for domestic water. Above all, however, the communities acknowledged that water development is costly and should be done strategically to prevent range degradation.

Practical Implications

Forage and water availability and disease are currently the most important limiting factors for livestock production in ASAL. They are made worse by the insecurity arising from resource-based conflicts, political strife, livestock rustling and banditry. When drought sets in, water sources dry up, forage dwindles, and animal health deteriorates very fast.

Migration is the most important strategy for pure pastoralist communities but is not always invoked in time or in patterns optimal for resource productivity. Pure pastoralists, in general, have set migration routes and only diverge from existing patterns in the face of severe drought or outbreak of disease epidemics. Water management, especially the use of alternative water sources and change of watering frequency, is another coping strategy. But, how viable, timely, efficient, adequate or sustainable these strategies are today given the increasing frequency of drought episodes remains questionable. Reliable information for early warning on the status of forage and water availability, coupled with planned migration patterns have a very important role to play in sustainable development of rangelands.

Availability of reliable sources of water is still a major constraint to livestock productivity in the rangelands of northern Kenya. There may be room for development of more water sources in some areas, but the distance between them should be large enough to discourage concentration of large numbers of livestock on inadequate land area, thereby causing rangeland degradation and reducing the carrying capacity. Thus, permanent water sources should be widely spaced (no closer than 20 km apart), while temporary sources could be interspersed to allow effective dispersal of herds to control overgrazing and degradation. Water sources, where possible, should be integrated into community-based resource management systems, and close-by human settlement should be discouraged through community regulatory systems.

Further Reading

Stuth, J. et al., 2003. "Integrating Information and Communication Technology for the Livestock Early Warning System (LEWS) in East Africa." *Research Brief 03-01-LEWS*. Global Livestock Collaborative Research Support Program (GL-CRSP), University of California, Davis.

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The GL-CRSP Livestock Information Network and Knowledge System (LINKS) project developed from the GL-CRSP Livestock Early Warning System (LEWS) project established in 1997. The LEWS project developed and applied a suite of information communication technology to provide a regional decision-support framework for livestock early warning. The LINKS project is placing LEWS technology inside a broader livestock information and analysis system that is designed to improve livestock markets and trade, thereby enhancing the well-being of pastoralists in eastern Africa. The project was led by Dr. Jerry W. Stuth, Texas A&M University until his death in April 2006. The project is now led by Dr. Paul Dyke, Texas A&M University. Email: dyke@brc.tamus.edu.

The Global Livestock CRSP is comprised of multidisciplinary, collaborative projects focused on human nutrition, economic growth, environment and policy related to animal agriculture and linked by a global theme of risk in a changing environment. The program is active in East and West Africa, Central Asia and Latin America.

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