International Scholars Journals

Advanced Journal of Environmental Science and Technology ISSN 7675-1686 Vol. 2 (1), pp. 001-005, January, 2011. Available online at www.internationalscholarsjournals.org © International Scholars Journals

Full Length Research Paper

Traditional strategies used by pastoralists to cope with la nina induced drought in Kajiado, Kenya

Mworia, J. K. and J. I. Kinyamario

[1]School of Biological Sciences, University of Nairobi, Kenya.
[2]School of Biological Sciences, University of Nairobi, Kenya.

Accepted 12 December, 2010

Pastoralists traditionally relied on herd mobility to cope with drought. In the pastoral areas of Kajiado, Kenya this strategy is now threatened by increased individual land ownership as compared to communal access. Drought frequency as related to El-Nino and Southern Oscillation (ENSO) is predicated to increase with climate change. The aim of the study was investigate the use of herd mobility strategy in the ENSO related 1999/2000 la Nina induced drought under different land tenure types and varying household cattle wealth. The study found that despite changes in land tenure, herd mobility was used as a coping strategy. Households rich in livestock applied the herd mobility strategy more than the poorer ones by moving a larger proportion of their herds. Poorer households applied the strategy of keeping drought resistant animals more than richer ones by having a higher proportion of goats and sheep than cattle. Institutional land units of Kiboko Range Research Station and Chyulu National Reserve which had higher herbaceous biomass were the most favored refuge areas for livestock during the drought. In conclusion poorer families are likely to be impacted more from increased incidents of ENSO droughts due inability to use the herd mobility option.

Key words: La-Nina, climate change, drought, pastoralist, herd mobility, land use type.

INTRODUCTION

Kajiado District of Kenya is predominantly occupied by Maasai pastoralists. In the last few decades important land tenure changes have occurred characterized mainly by sub-division and fragmentation of communal grazing into individual smaller parcels (Kimani and Pickard, 1996). Also, there has been an increase in cultivation especially in areas of moderate rainfall that were traditionally used as dry season grazing reserves (Lamprey and Reid, 2004). Another important change has been the delineation of protected wildlife conservation areas such as the Amboseli National Park, Chyulu National Park and Nairobi National Park. The key strategy of pastoralists to cope with drought is herd mobility which aims to exploit spatially different areas of vegetation type and productivity (Galvin et al., 2001). Drought not only leads to decline in grass biomass but can also induce dramatic shifts in botanical composition (Fynn and O'Connor, 2000; Mworia et al., 1997).The access to different vegetation communities and productivity ensures maintenance of livestock population stability and body condition (Ellis and Swift, 1988). Herd mobility as a strategy requires a favorable environment in terms of land tenure and land use to allow resource access.

Drought related to the La Nina effect of the El Nino and Southern Oscillation (ENSO) phenomenon is predicted to increase in frequency as a result of climate change (Adger et al., 2003). The problem therefore is whether the continuing changes in land tenure regimes allow traditional drought coping mechanisms to be practiced. Currently, significant global efforts, through the UN framework Convention on Climate Change, are focused on identification of strategies for adaptation to climate change and mitigation measures episodes. Strengthening coping strategies of local communities could be more

*Corresponding author. E-mail: kjmworia@yahoo.com.

Table 1. Herbaceous dry biomass (gm/m2) variation in the study area.

Land use type	Seasons				Land use means
	Dry November 1998	**Wet** April 1999	**Dry** August 1999	**Wet** February 2000	
Conservation area	84	141	91	286	146c
Group ranch	56	82	51	93	71a
Small scale ranches	62	167	51	118	100b
Small scale farms	29	49	23	120	55a
Season means	57	109	54	154	

effective in targeting vulnerable households as compared to expensive infrastructural adaptation measures (Orindi and Eriksen, 2005) . All strategies should aim at reducing vulnerability which is key aspect of reducing climate change risk (O'Brien et al., 2006).

This study addressed the question of whether traditional herd mobility is still practiced in south-eastern Kajiado as a coping mechanism in the La Nina induced 1999/2000 drought. Climate change characterized by extreme weather episodes such as increased frequency of droughts will have the worst impacts on people who are least able to cope (Adger et al., 2003) . Therefore besides identifying whether mobility is used as mechanism it also important to know which category of pastoralists uses it. Indeed vulnerability to these impacts is thought to be driven mainly by poverty and marginalization and may reinforce unequal economic structures (Kates, 2000). The study also investigated whether changes in land tenure regimes that occurred in 1980's an 1990's influenced the use of herd movement as a coping strategy in La nina induced drought.

In Kenya the short rains, which occur during the months of October to December, were extremely enhanced during the 1997-1998 ENSO episode. This episode was followed by the 1999/2000 drought which was described as one of the worst recorded in Kenya's history (WFP, 2000).

The main objective of this study was to investigate whether traditional herd movement patterns are used as a strategy to cope with severe drought despite recent changes in land tenure systems.

MATERIALS AND METHODS

Study area

The distribution of vegetation communities and species in the study area is closely related to soils, altitude and rainfall (Touber, 1983). The main vegetation communities comprised wooded grassland, open grassland, bushed grassland and wooded bushland. Rainfall in the study area is distinctly bimodal but highly variable in amount and duration. The short rains are received from October to December while the long rains fall from March to May. Data from Makindu meteorological station was used to assess rainfall trends. During the period 1990 - 2000, two droughts were experienced in the periods 1993/94 and 1999/2000, while only 8 droughts were recorded between 1926 and 1985 (Musembi et al., 1986) . Heavy rains attributed to the El-Nino in 1997/98 were 1,488 mm and were followed by a severe drought attributed to the La Nina phenomenon with 291 mm in 1998/1999.

Data collection

The land use types compared were; (1) Conservation areas of Chyulu National Reserve and Kiboko Range Research Station. (2) Small Scale agropastoral farms in Muuni settlement scheme. (3) Communal grazing area of Kiboko Group Ranch. (4) Small Scale Ranches in Olkarkar area. To determine responses to the drought a questionnaire was run at the household level.

Sampling was done in Muuni settlement scheme where the area was divided into 3 sections and an almost equal number of questionnaires administered in each. Households were identified by taking transect across the section and sampling after every other homestead. A total of 43 households were surveyed in Muuni small scale farms. In Kiboko group ranch and Olkarkar individual ranches the whole population of 126 and 67 was surveyed, respectively.

RESULTS

Pastoralists moved 84% of the cattle out of their legally designated areas to other areas in search of forage. The communal group ranch moved out the highest proportion of the livestock (89%) while the small scale ranches and small scale mixed farms moved out 79 and 48% respectively. This indicates that forage biomass was too low to support livestock especially in the communal grazing areas. This was evident from the variation of grass biomass during the period (Table 1)

Pastoralists commenced the massive movement of livestock in search of better pasture at around August 1999 when grass standing crop fell to a mean of 51 g/m^2 in the small scale ranches of Olkarkar and communal group ranch.

Most cattle from pastoral areas of Kiboko group ranch and Olkarkar small scale ranches were moved to conservation and research areas of Chyulu National Reserve and Kiboko Range Research Station (Figure 1).

Out of the cattle that was moved in search of pasture a total of 40% was taken to Kiboko Range Research Station while 24% was taken to Chyulu National Reserve. The remaining 36% was taken either further to the South of Kajiado or to Makueni on the East which is predomi-

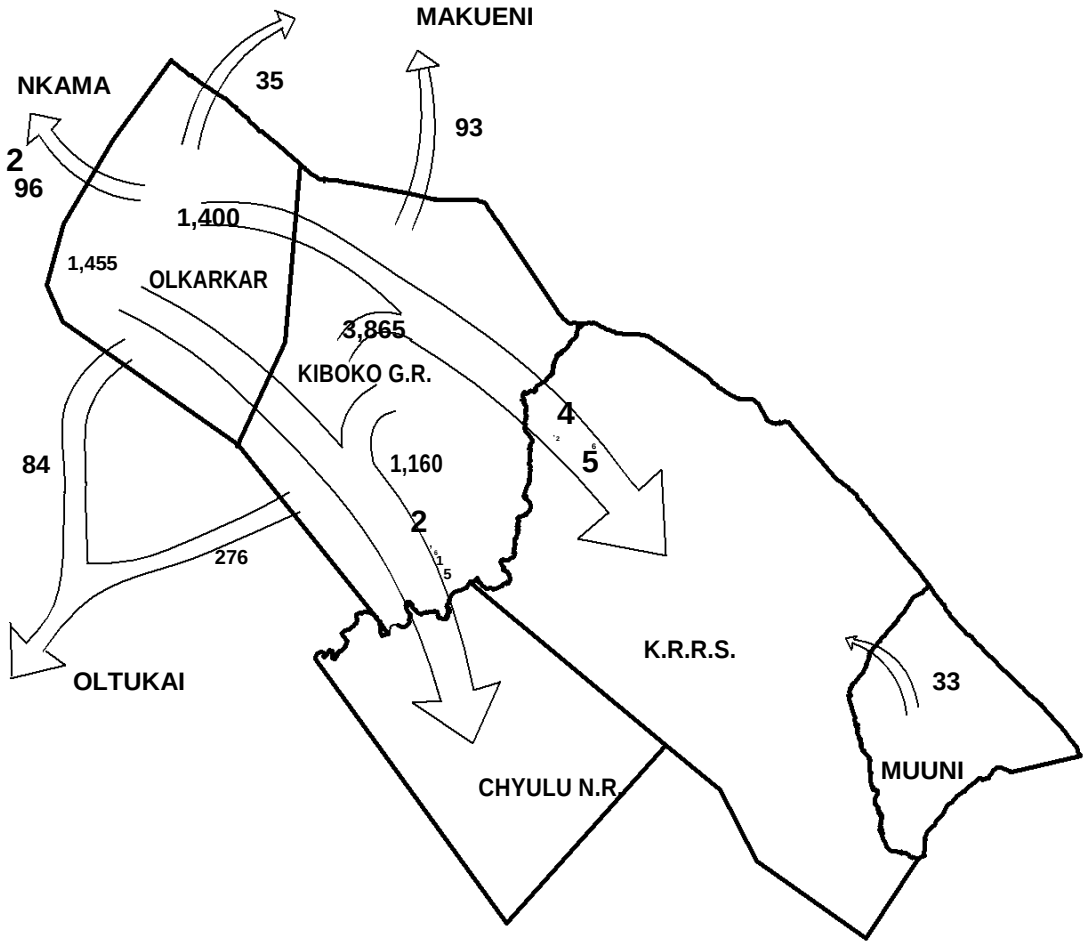

Figure 1. Livestock movement patterns in response to the 1999/2000 La Nina induced drought.

nantly occupied by the sedentary agropastoral Akamba community. This indicates that boundaries in land ownership and tribal occupation were broken during La Nina and that government managed land units were most preferred which could be partly due to the higher grass biomass.

The wealthiest category of households in terms of livestock ownership utilized the herd mobility strategy more than middle and poorer households to cope with effects of La Nina (Figure 2). It is noted that Kiboko Range Research Station officially charges a fee per animal to allow access to forage and water within its borders

Further, out of the households that used the herd mobility strategy the poorer households left a larger proportion of their livestock at home than the richer households with an average of 39 and 8% respectively. This has implications on vulnerability in that the poorer households stood a higher chance of loosing a higher proportion of their herds with worsening drought and falling forage availability in their home areas.

The herd composition of households poorer in livestock consisted of more goats and sheep which are more resistant to drought hence require less mobility as compared to cattle. Households that own 0-25TLU were the majority (52%) in the study area while those with 25 - 50 and >50TLU constituted 25 and 23% of the households respectively. Among this 3 classes percentage ownership of different types of livestock also varied (Figure 3).

This result shows that strategies to cope with La Nina were not uniform with the livestock poor households relying more on drought resistant animals as compared to the richer households.

DISCUSSION

Our study showed that despite changes in land tenure, traditional herd mobility patterns were used as a coping strategy to the severe la Nina induced drought. Similarly, Campbell (1999) noted that despite increased diversification of livelihood sources in South east Kajiado after the 1972 - 1976 drought characterized by expansion of rain fed agriculture, horticulture and tourism, during the 1994 - 1995 drought traditional strategies of herd movement and use of wild fruits were still applied. Other studies have

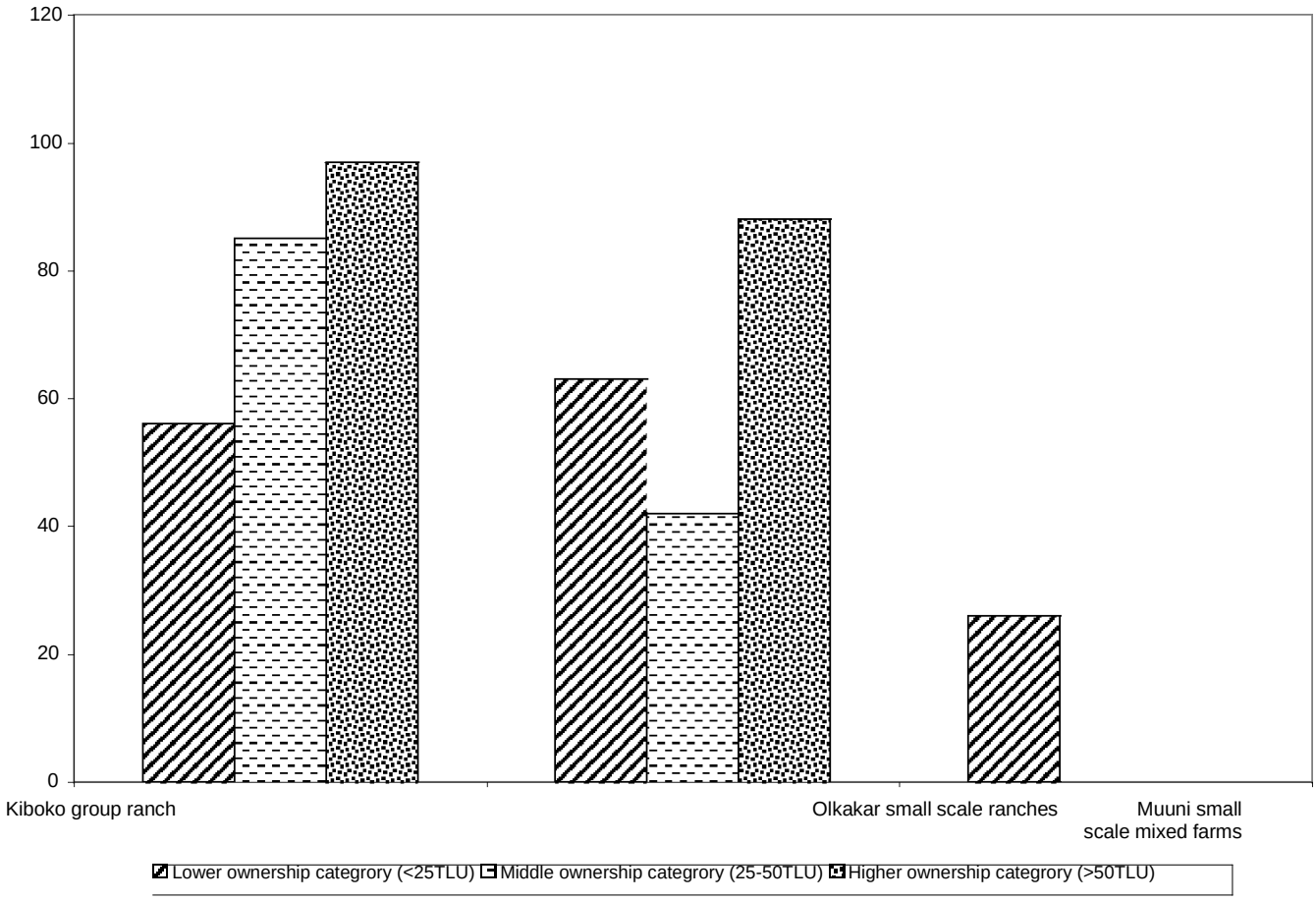

Figure 2. Proportion of household (%) that used herd mobility as strategy to cope with effects of La Nina.

correctly indicated that traditional strategies are currently constrained by rising human populations along with land tenure changes that have squeezed pastoral livestock onto land areas that are too small to be sustainable for pastoral production (Galvin et al., 2001). Indeed in many cases traditional local coping strategies by pastoralists may no longer be sufficient during prolonged drought seasons (Oba, 2001).

Households poorer in livestock were least able to use the herd mobility strategy making them more vulnerable. Other studies have shown poorer households have limited access to favored coping options due to lack of capital, skills or labor (Eriksen et al., 2005). The option of moving cattle to better pasture requires additional resources such labour (Grandin et al., 1991). Inability of poorer households to apply coping strategies may increase vulnerability and widen gap between the rich and the poor (Kates, 2000). Furthermore even though diversification of income in rural sub-saharan Africa has increased in the last decade (Start, 2001) options vary by wealth catergories with the rich and middle-wealth groups engaging in activities that require higher start up costs (Little et al., 2001).

Among the implications that can be drawn from this study is that the established drought coping strategy of herd mobility still play an important role even in events of severe La Nina droughts. Hence established existing strategies should be enhanced as a mechanism for coping with climate change effects alongside other efforts. Another implication is the importance of access to resources as integral component in coping strategies to climate change despite changes in land tenure and use. This is drawn from the importance of Chyulu National Reserve as a refuge in severe droughts for pastoralists in our study area and those in adjacent areas (Campbell, 1999). Lastly specific mechanisms should be developed to help poor households cope climate change effects since their capacity to use established strategies and other diversification strategies is limited.

In conclusion the study showed that established traditional mechanisms were used against La nina induced drought, whose occurrence is predicted to increase with climate change. Also, poorer households were least able to apply the coping strategy hence were more vulnerable. We recommend that enhancement of established strategies, access to resources and mechanisms to support the poor be incorporated as an integral part in the development of strategies to cope with climate change.

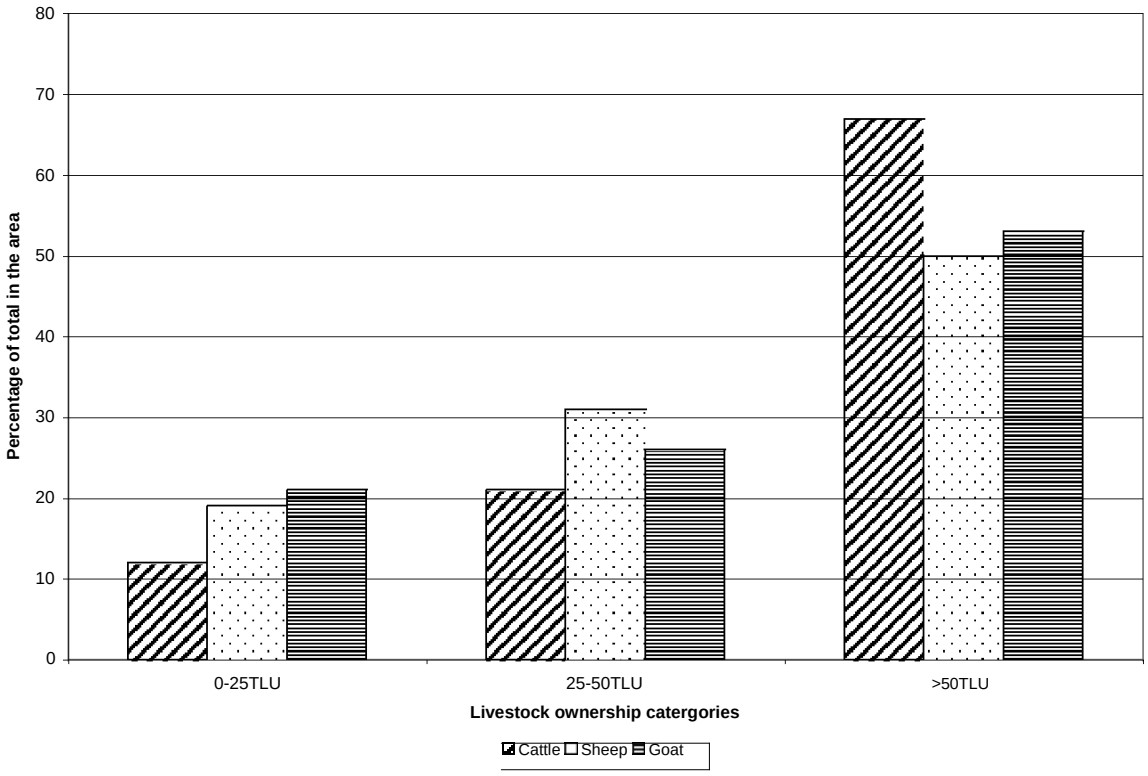

Figure 3. Variation in herd composition with livestock ownership categories.

ACKNOWLEDGEMENTS

The authors are very grateful for the financial support received from the Global Livestock Collabrative Research Programme through Colorado State University and African Academy of Sciences. We also thank the Maasai community and Muuni farmers for supporting the study.

REFERENCES

Adger WN, Huq S, K Brown, D Conway, M Hulme (2003). Adaption to climate change in the developing world. Progress in Development Studes 3(3):179-195

Campbell DJ (1999). Response to drought among farmers and herders in Southern Kajiado District, Kenya: A comparison of 1972-1976 and 1994-1995.

Ellis JE, Swift D (1988). Stability of African pastoral ecosystems: Alternate paradigms and implications for development. J. of Range Manage. 41(6): 450-459

Eriksen SH, K Brown, PM Kelly (2005). The dynamics of vulnerability: locating coping strategies in Kenya and Tanzania. The Geogr. J. 171(4):287-305

Fynn RWS, TG O'Connor (2000). Effect of stocking rate and rainfall on rangeland dynamics and cattle performance in a semi-arid savanna, South Africa. J. of Applied Ecol. 37:491-507

Galvin KA, Boone RB, Smith NM, Lynn SJ (2001). Impacts of climate variability on East African pastoralists: Linking social science and remote sensing. Climate Res. 19:161-172.

Grandin BE, PN de Leeuw and M de Souza (1991). Labour and livestock management. In: Bekure de Leeuw, Gradin BE, PJH Neate. (eds) Maasai herding: an analysis of the livestock production system of Maasai pastoralists in Eastern Kajiado District, Kenya,: ILCA systems Study 4. ILCA (International Llivestock Centre for Africa), Addis Ababa, Ethiopia. pp. 21-37

Kates RW (2000). Cautionary tales: adaptation and the global poor. Climate change 45:5-17.

Kimani K, J Pickard (1998) Recent trends and implications of group ranch sub-division and fragmentation in Kajiado District, Kenya. The Geogr. J. 164(2):202-213

Lamprey RH, RS Reid (2004). Expansion of human settlement in Kenya's Maasai Mara: what future for pastoralism and wildlife. J. of Biogeogr. 31:997-1032

Little PD, K Smith, BA Cellarius, DL Coppock , CB Barret (2001). Avoiding disaster: Diversification and risk management among the East African Herders. Development and Change 32:401-433

Musembi DK, Too DK , JK Mworia (2000). The analysis of periodicities in rangeland rainfall and the implications on drought management strategies in low potential areas of Kenya. Paper presented at the APSK symposium 2001 on 7th to 18th March 2001, Egerton University, Njoro, Kenya.

Mworia JK, WN Mnene, DK Musembi ,RS Reid (1997). Resilience of soils and vegetation subjected to different grazing intensities in a semi-arid rangeland of Kenya. Afr. J. of Range & Forage Sci. 14(11):25-30.

O'Brienn G P, O'Keefe J, Rose, B Wisner (2006). Climate change and disaster management. Disasters 30(1):64-80.

Oba G (2001).The effect of multiple droughts on cattle in Obbu, Northern Kenya. J. of Arid Environ. 49 (2): 375-386.

Orindi VA, S Eriksen (2005). Mainstreaming adaptation to climate change in the development process in Uganda. Ecopolicy series no. 15. Acts Press, Nairobi, Kenya.

Start D (2001). The rise and fall of the rural non-farm economy: poverty impacts and policy options. Development Policy Rev. 19(4):491-505.

Touber, L (1983). Soils and vegetation of the Amboseli -Kibwezi area. Kenya Soil Survey. Reconnaissance soil survey report, No. R6

World Food Program (cited as WFP) (2000). Kenya's drought: No sign of any let up. WFP, Rome, Italy; available at www.wfp.org/news-room/in_depth/Kenya.html.