

Research Application Summary

Livelihoods under climate variability and change: An analysis of the adaptive capacity of rural poor to water scarcity in Kenya's drylands

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Abstract

Rainfall, which is the main source of water in Kenya's drylands areas, shows very high spatial and temporal variability. Crop, forage and livestock production closely follow rainfall trends thus putting livelihoods of a number of households at risk. This study was carried out by administering questionnaires to agro-pastoral households in Kibwezi district of Kenya. Most (98%) of the respondents mentioned increased dry conditions occasioned by recurrent droughts as the main unusual climatic events. In response to climate variability, the households had developed both short and long term adaptive mechanisms which included planting of drought tolerant and early maturing crops, early or dry planting, water harvesting through range pits and roof catchments and run-off harvesting.

Key words: Adaptation, climate variability, drylands, Kenya

Résumé

Les précipitations, qui sont la principale source d'eau dans les zones arides du Kenya, montrent de très fortes variabilités spatiales et temporelles. La production de la cultures, de fourragère et l'élevage suit de près les tendances des précipitations mettant ainsi les moyens de subsistance d'un certain nombre de ménages à risque. Cette étude a été réalisée en administrant des questionnaires aux ménages agro-pastoraux dans le district de Kibwezi du Kenya. La plupart (98%) des répondants ont mentionné que l'augmentation des conditions sèches, occasionné par des sécheresses récurrentes ont été les principaux événements climatiques inhabituels. En réponse à la variabilité du climat, les ménages ont développé à la fois à court et à long terme des mécanismes d'adaptation qui comprennent la plantation de tolérantes à la sécheresse et de plantes à maturité précoce, des

semis précoces ou à sec, récupération de l'eau par des puits et des bassins versants du toit large et le ruissellement de récolte.

Mots clés: Adaptation, la variabilité du climat, les terres arides, le Kenya

Background

Communities living in the drylands have been experiencing crop failures and diminishing household herd sizes, the latter being attributed to high mortality rates (Ellis, 1998). Livestock loss in the drylands has mainly been due to severe and persistent droughts which have led to tremendous human suffering. These communities have developed traditional water harvesting systems in response to the increasingly frequent droughts (Orindi *et al.*, 2008). Techniques such as half moon pits and contour stone bunds are popular among farmers. Water harvesting in dry lands has resulted in more vegetation cover, due to increased infiltration rate resulting from slowed water movement on land (IIRR, 2002). It has also enabled vegetable production to meet household requirements and farmers are able to diversify their activities thus contributing to food security and wider nutrient base in these communities.

Literature Summary

Climatic variability has affected livelihoods of people in many ways chief among them being the dwindling water resources. Water is the most limiting factor in crop and livestock production in arid and semi-arid lands (ASALs) of sub-Saharan Africa (Mude *et al.*, 2007). ASALs receives annual rainfall of less than 1500 mm and are characterized by limited water supply, low and highly variable rainfall, and recurrent droughts (Ellis, 1998). Global warming with its influence on climatic change is rendering the climatic conditions of some regions drier and more variable and unpredictable (Parry, 1990). Even where surface waters accumulate, it is not easily retained due to high temperatures and intense precipitation that cause water loss through evaporation and run off, respectively (Little *et al.*, 2001; IIRR, 2002). Water harvesting has contributed to land rehabilitation enabling communities to cope with highly variable climate, with the subsequent reduction of poverty (Orindi *et al.*, 2008).

Study Description

The study was carried out in Kibwezi district in Kenya which is a semi-arid area characterized by low, erratic and unreliable rainfall. The average annual rainfall, evaporation and temperatures are 600mm, 2000 mm and 23°C, respectively. A questionnaire containing dichotomous, multiple choice and open-

ended questions was used. A sampling frame which included 5 households per sub-location, 3 sub-locations per location, 3 locations per division, and 3 divisions per district was adopted to attain a sample size of 135 households. Farmer portraits to provide details on specific activities carried out by individual family members on a seasonal and historical basis were conducted. The data were subjected to descriptive statistical analysis to generate means, frequencies, which were then presented in graphs.

Research Application

Over 89% of the farmers reported increased frequency of droughts as one of the indicators of climate variability and change observed in the last 2-3 years. The other unusual climatic events reported included increased floods, strong winds, changes in rainfall patterns and increased temperatures. The reported climatic events have resulted in the drying up of surface and sub-surface water sources, thereby complicating lives of communities in these areas (Fig. 1a). A number of the farmers responded to water stress by constructing dams to conserve water, digging of shallow wells, rainwater harvesting using roof catchments, directing runoffs into the farms as well as buying water for domestic use (Fig. 1b).

Majority (87%) of the respondents indicated that the measures undertaken by households to ameliorate water problem, especially during prolonged droughts were not satisfactory. Many households that used roof catchments to harvest rain water indicated that their efforts were hampered by lack of storage containers. As reported in the case of crops, 69% of the respondents indicated that some of the measures taken to cope with water stress competed with other household operations for limited resources hence lack of capacity in rain water harvesting was a great impediment.

Recommendation

Rain water harvesting using simple inexpensive techniques should be encouraged and the technologies that have proved effective should be outscaled and upscaled for adoption by more families in these areas. There is therefore need for training and capacity building for these communities.

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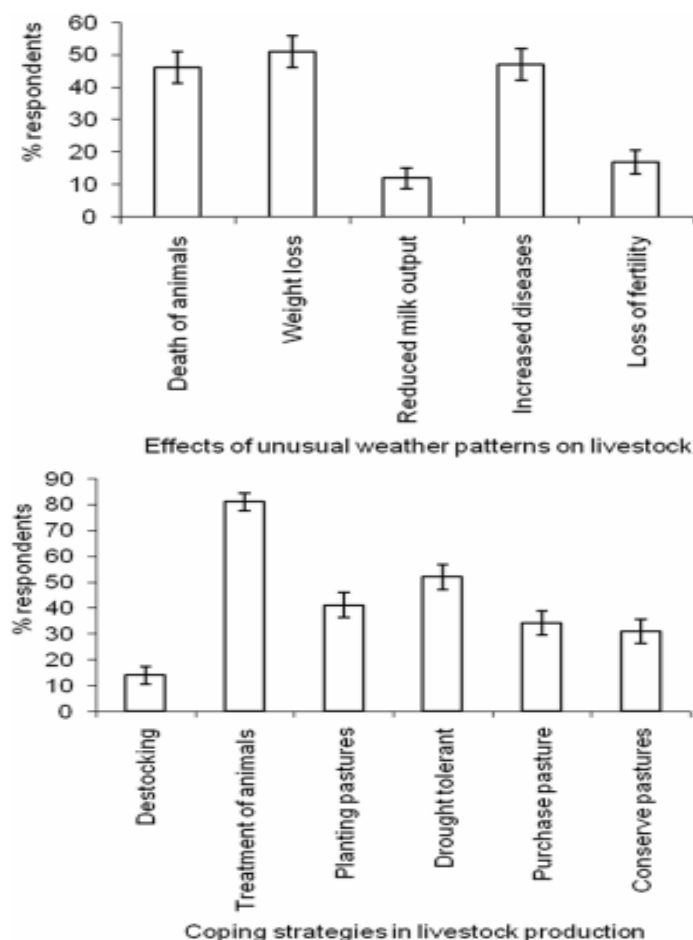


Figure 1 (a). Effects of unusual climatic events on livestock production. (b) Coping strategies adopted by households to mitigate the effects of unusual climate on their livestock.

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