

Research Application Summary

Integration of indigenous knowledge with ICTs in managing effects of climate change and variability in Kajiado County, Kenya

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Abstract

Climate change threatens the stability of agricultural productivity and production. In many areas of the world where agricultural productivity is already low and the means of coping with adverse effects are limited, climate change is expected to reduce productivity to even lower levels and make production more erratic. This is more eminent among indigenous people who have limited adaptive capacity and high dependence on local biological diversity, ecosystem services and cultural landscapes as a source of their sustenance, wellbeing, and resilience. This paper describes research undertaken to assess relevant Indigenous knowledge used by farmers to cope and adapt to climate change and variability effects on agriculture as well as evaluate opportunities for utilizing ICTs in integration of Indigenous knowledge in production practices. The study was carried out at Oloyiankalani and Rombo locations in Kenya. Information and data were collected through formal interviews using structured questionnaires, Farmers group discussions (FDGs) and Key informant interviews. A total of 200 questionnaires were administered to 100 practicing agro pastoralism and 100 pastoralists. Results indicate that farmers have adopted various means to cope with climate change and variability including farming historically known drought tolerant crops (23.6%) such as cowpeas, green grams, dolichos; rain water harvesting through roof catchments (20.6%), Use of organic manure (12.2%) instead of the inorganic fertilizers that were introduced, change in planting time (8.4%), practice pasture preservation through paddocking (4.4%), indigenous food preservation methods by smoking, use of ash and sun drying (5%), migration in search of pasture and water (23.6%) and reduction in herd sizes (2.2%). Respondents are also finding alternative sources of livelihoods such as beadwork business (38%). Information and Communication Technology (ICTs) such as radios and mobile phones are emerging as viable avenues for acquisition, dissemination of information including integration of indigenous knowledge in response to climate change.

Key words: Agriculture, climate change, climate variability, ICTs, indigenous knowledge, Kenya

Résumé

Le changement climatique menace la stabilité de la productivité et de la production agricoles. Dans nombreuses régions du monde où la productivité agricole est déjà faible, et les moyens pour faire face aux effets néfastes limités, les changements climatiques devraient réduire la

productivité à des niveaux encore plus bas et rendre la production plus erratique. Ceci est plus éminent pour les populations autochtones qui ont une capacité d'adaptation limitée et une dépendance élevée de la diversité biologique locale, des services écosystémiques et des paysages culturels comme source de subsistance, bien-être et résilience. Cet article décrit une étude entreprise pour évaluer les connaissances autochtones pertinentes utilisées par les agriculteurs pour faire face et s'adapter aux effets du changement climatique et de la variabilité sur l'agriculture, ainsi que d'évaluer les possibilités d'utilisation des TIC dans l'intégration des connaissances autochtones dans les pratiques de production. L'étude a été réalisée dans les régions Oloyiankalani et Rombo du Kenya. Les informations et données ont été recueillies par le biais de questionnaires structurés, des discussions avec des groupes d'agriculteurs et des interviews avec des personnes ressources. Au total, 200 questionnaires ont été administrés à 100 praticiens agro-pastoraux et 100 pasteurs. Les résultats indiquent que les agriculteurs ont adopté divers moyens pour s'adapter au changement et variabilité climatiques, y compris les cultures traditionnelles connues (23,6%) comme le niébé, le haricot mungo, le dolichos; récupération de l'eau de pluie (20,6%), utilisation de fumier organique (12,2%) au lieu des engrais inorganiques introduits, changement de la période de semis (8,4%), conservation des pâturages par le maintien du cheptel en enclos (4,4%), préservation des aliments indigènes par le fumage, l'utilisation de cendres et de séchage au soleil (5%), la migration à la recherche de pâturages et d'eau (23,6%) et la réduction de la taille des troupeaux (2,2%). Les répondants utilisent également des sources alternatives de moyens de subsistance comme le commerce des perles (38%). Les TIC telles que les radios et les téléphones mobiles émergent comme des voies viables pour l'acquisition, la diffusion d'informations, y compris l'intégration des connaissances indigènes en réponse aux changements climatiques.

Mots clés: Agriculture, changement climatique, variabilité climatique, TIC, savoirs indigènes, Kenya

Background

Climate variability and change has put a significant disruption to the livelihoods of indigenous communities in East Africa. This is because of their limited adaptive capacity. Although indigenous people constitute one of the largest vulnerable segments in contemporary society, they and their knowledge systems have been marginalized mainly because of inadequate mechanisms to identify, package and transfer indigenous knowledge for use. The distinct culture of indigenous people and their identity, their economic activities, religious beliefs, notions, and traditional ways of managing natural resources are often regarded as backward and superstition. They are considered to be absolutely incompatible with modern society and development. The oral and rural nature of indigenous knowledge in Africa has made them largely invisible to the development community and global science. Indigenous knowledge has often been dismissed as unsystematic and incapable of meeting rapid economic growth needs of modern world. In order to adapt to negative impacts of climate change, indigenous people employ traditional indigenous-knowledge based practices, which includes; defined knowledge of

indigenous plant and animal species, especially drought-tolerant and pest-resistant varieties; water harvesting technologies; water conservation techniques to improve water retention in fragile soils; food preservation techniques such as fermentation, sun drying, use of herbal plants, ash, honey, and smoke to ensure food security; seed selection to avoid the risks of drought; mixed- and or intercropping and diversification; soil conservation through no tillage and other techniques; use of early warning systems to predict short, medium and long term climate changes; transhumance to avoid drought and risk loss of livestock; herd accumulation; use of supplementary feed for livestock; reserving pasture for use by young, sick and lactating animals in case of drought; disease control in livestock and grain preservation; use of indigenous techniques in the management of pests and diseases; culling of weak livestock for food; and multi-species composition of herds to survive climate extremes. This local based knowledge, which has evolved over the last 10,000 years with the domestication of plants and animals is critical for responding to climate change related risks at the local level (Otieno, 2002; Leautier, 2004; Arafa *et al.*, 2007; Boko, 2007; Nyong *et al.*, 2007; Osman-Elasha and Downing, 2007; Republic of Kenya, 2007; Agrawal, 2008; Thorne, 2008; United Nations Development Group, 2008; FAO, 2009). However, the use of indigenous knowledge is threatened by the development process, and the World Bank states that indigenous knowledge systems are 'at risk of becoming extinct'. Various authors (Ahmed, 1994; Kothari, 1995) attribute this to the fact that oral paths are being blocked and people are no longer staying in homogenous community blocks. The advent of information and communication technologies and their rapid accession in Africa provides an avenue to harness indigenous knowledge to help communities better adapt to climate change. For instance, the use of mobile phones, the Internet, community radio and participatory video are increasingly part of systems to facilitate climate change responses. Indeed, ICTs have the potential to foster inclusiveness and participation in the design and implementation of adaptation processes; in providing opportunities for capacity building, access to relevant information and social networking; technology transfer to strengthen local livelihoods and enhance natural resource management.

Study Description

Data were collected from pastoralists (Oloyiankalani location) and agro pastoralists (Rombo location) of Kajiado County in Kenya. The study integrated both qualitative and quantitative methods of data collection. Purposive sampling was used to select the participants of the focus group to ensure well representation of the discussion. A total of 200 questionnaires were administered, 100 from each location. Data collected were analysed using Statistical Package for Social Sciences (SPSS) and subjected to descriptive analysis.

Results and Discussions

Existing agricultural production related indigenous knowledge used to cope with and adapt to climate change and variability. Results indicates that 98% of the respondents

still apply Indigenous knowledge in the management of their farms. They argued that traditional knowledge is reliable (53%), accurate (19.5%), familiar (14%) and cheaper (13.5%). Indigenous strategies practiced mostly by the agro pastoralists were agro forestry (9.18 %), irrigation (24.6.%), planting of appropriate crop varieties (14%), preservation of pastures (4.4%), application of organic and inorganic fertilizers (1.96%) and soil and water conservation (4.34%). On the other hand, pastoralists practice migration (19.3%), planting of drought tolerant crops (12%), rain water harvesting (14.3%), keeping of drought resistant animals (17%) and management of pests and diseases (18%).

The FGD results indicated that women from pastoral areas prefer other strategies in coping with drought such as use of shallow wells to draw water, paddocking small piece of land to be used by the milking herd during severe drought, separation of livestock to control breeding as compared to the men who prefer migration of animals during drought in search of water and pastures. This could have been attributed to the facts that, during migration, women and children are left behind while men and boys move with the cattle. In addition, women from agro- pastoralists areas practice indigenous strategies such as traditional methods of food preservation (use of organic manure in their farms, crop rotation and paddocking). This explains the different activities practiced in both areas. The agro pastoralists produce their own agricultural food hence are conversant with indigenous food preservation methods and with the few cattle they keep, they use the organic manure to enrich their soils for optimum food production.

Evaluating the level of application of ICTs in agricultural information use and dissemination. Results indicates that the most popular medium of communication is radio (45%), and mobile phone (30%). However othe means of communication included Television (5%), friends (5%), Internet (3%), and newspaper (2%). Radio was the most preferred communication means because it is easy to interpret the information disseminated, cheap to buy and maintain, portable, as the farmers can go with it to the farm, water point or shopping centre while listening, informative, as it transmits detailed information in the local language which the farmer can follow step by step and doesn't require electricity (Fig. 1)

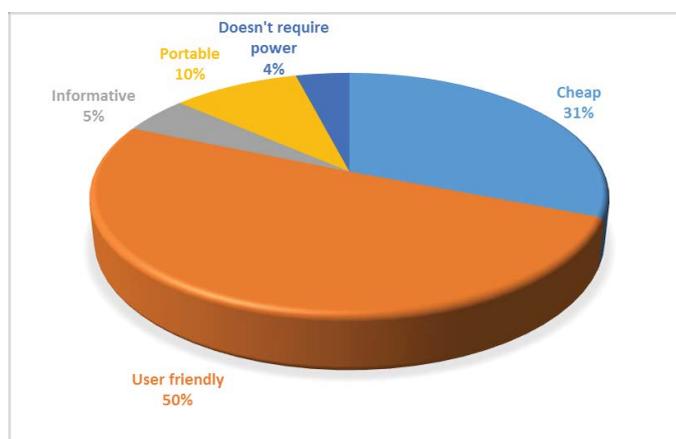


Fig 1: Reasons for radio being the most preferred source of information

Discussion

The most felt impact of climate change and variability among the Maasai community of Kajiado County have been the frequent prolonged droughts which has negatively impacted on livestock production, their main source of livelihoods. This has led them to adoption of coping strategies. Agro pastoralist are now rarely migrating in search of pasture and water as compared to pastoralists who have not yet fully adopted the idea of pasture preservation. ICTs have long been perceived to be for the literate but farmers are still sticking to their old ICTs components such as radio for communication. The only new ICT that has been widely adopted by farmers is the mobile phone, because of its direct communication ability, portability and having features important to the farmers such as money transfer services. However, use of SMS is still very low mainly because of high illiteracy levels of most farmers. With the majority of farmers lacking formal education, use of internet remains significantly low among the farmers in the study area.

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