Research Application Summary

Integration of indigenous knowledge and perception of effectiveness of communication systems for adaptation to climate change by smallholder farmers of Kilifi district, Kenya

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Abstract

This study aimed at identifying indigenous knowledge and perception of effectiveness of communication systems for adaptation to climate change by smallholder farmers in Kilifi District, Kenya. It also aimed at determining the extent to which agricultural information and communication systems (AICS) have integrated indigenous knowledge for climate change adaptation by information end users. Purposive and systematic random samplings were used to select 167 study subjects (smallholder farmers). Data from both primary and secondary sources were collected using observations and interviews with the help of a semi-structured questionnaire. Findings indicated that 84% of the respondents have had contact with extension providers. Nevertheless, farmers have not perceived AICS to be effective in disseminating knowledge regarding climate change management strategies. The study was able to identify existing ITK that farmers use. Based on the results of this study, it is recommended that policy interventions be employed in creating strategies that would encourage integration of ITK into scientific agricultural practices that would enable farmers to plan for and cope with current climate risks and adapt to future climate change. This would ensure sustainability and vitality in improving agricultural production for food security.

Key words: Adaptation, agricultural information and communication systems, climate change, Indigenous technical knowledge, integration

Résumé

Cette étude visait à identifier les connaissances indigènes et la perception de l'efficacité des systèmes de communication pour l'adaptation au changement climatique par les petits agriculteurs dans le district de Kilifi, au Kenya. Elle visait également à déterminer l'ampleur à laquelle l'information agricole et les systèmes de communication (AICS) ont intégré les connaissances indigènes pour l'adaptation au changement climatique par les utilisateurs finaux de l'information. Les

prélèvements aléatoires déterminés et systématiques ont été utilisés pour sélectionner 167 sujets de l'étude (les petits exploitants agricoles). Les données provenant de sources primaires et secondaires ont été recueillies à partir d'observations et d'interviews en administrant un questionnaire semi-structuré. Les résultats ont indiqué que 84% des répondants ont eu le contact avec les fournisseurs d'extension. Néanmoins, les agriculteurs n'ont pas perçu l'information agricole et les systèmes de communication (AICS) pour être efficace dans la diffusion des connaissances sur les stratégies de gestion du changement climatique. L'étude a pu identifier la connaissance technique indigène (ITK) existant que les agriculteurs utilisent. Sur base des résultats de cette étude, il est recommandé que les interventions politiques soient employées dans l'élaboration de stratégies qui favoriseraient l'intégration de l'ITK dans les pratiques agricoles scientifiques qui permettraient aux agriculteurs de planifier et de faire face aux risques climatiques actuels et à s'adapter aux changements climatiques à venir. Cela permettrait d'assurer la durabilité et la vitalité dans l'amélioration de la production agricole pour la sécurité alimentaire.

Mots clés: Adaptation, information agricole et systèmes de communication, changement climatique, connaissances techniques indigènes, intégration

Background

Kilifi, one of the Arid and Semi-Arid Lands (ASAL) districts in coastal Kenya, faces serious food insecurity. Over the years, food production in this area has been declining and this has persisted with continued changes in climate.The district has one of the highest incidences of poverty countrywide with nearly 70% of its residents falling below the poverty line despite a mean monthly household earnings of Ksh. 7,432 (US$ 88.10). Ganze, one of the poorest constituencies in the country, with nearly 84% of its populace living below the poverty line (Kahindi *et al.*, 2003) is found in this district. In Coastal Kenya, farmers apply a lot of indigenous knowledge during their farming practices. This knowledge may hold crucial leads towards sustainable management of climate change related stresses to farming. However, communication systems devoted to food production strategies have not been keen on incorporating feedback from information users, and have therefore missed out on the benefits of ITK.

Literature Summary

Lately, there has been an increasing drive in Kenya to put more emphasis on farmer-centered and community-based extension, which encourages participation, facilitation, partnership and sustainability (Davis and Place, 2003). Though these noble concepts are generally accepted, they are rarely practiced. There is a powerful case that favours the use of available farmers' indigenous knowledge in climate change adaptation strategies. ITK together with knowledge from researchers, extensionists and documented science can form a basis of modelling the influence of a vast range of technologies in climate change adaptation. This however requires a platform that combines and integrates this information from different sources and representing it in an appropriate way (Sinclair and Walker, 1998). Integrated climate change information coupled with an appropriate information flow can be expected to be a key resource for planning and implementing research and development programs. Relevant programmes are more likely to be achieved where planned with due regard for the farmers' perspective on needs and priorities.

Study Description

The study was carried out in two divisions of Kilifi district (Ganze and Kikambala). The average annual rainfall in the district ranges from 38 mm (Ganze) in the upper zones to 220 mm (Kikambala) in the lower zones per year, occurring biannually with long rains (April-June) being heavier than short rains (October) (Ministry of Agriculture, 2008). Temperatures range between 24^{o} and 35^{o} C. Soils change from sandy to sandy-loam as one moves away from the coastal line. The district has remained food deficit for a long time with about 30% food sufficiency when cereals alone are considered, resulting in some divisions receiving relief food from the Government and Non-Governmental Organisations (NGO) (Ministry of Agriculture, 2008). The study was carried out using a purposive, multi-stage random sampling technique. Thus the study relied on a set of structured and standardised questions which were administered to the respondents through personal interviews using questionnaires. Using the design the study sought to determine and describe the relationships between the dependent and independent variables. Focused group discussions were also held with selected respondents to authenticate information given by farmers on the importance of ITK. The discussions were also to enhance and supplement information got from the questionnaires. Information also came from the Kenya Agricultural Research Institute (KARI), Mtwapa and agricultural extension officers from Kilifi district. The design

focused on the effectiveness of agricultural information and communication systems by smallholder farmers in Kilifi district, with the objective of trying to understand how the incorporation of their feedback and ITK into the agricultural information systems could enhance food production, with the prevailing changes in climate. The existing ITK among the farmers clearly came out for further study recommendations.

Within Kilifi district, Kikambala and Ganze divisions were purposively selected based on their diverse agricultural practices. The two divisions were also rich in indigenous knowledge. From the two divisions, random sampling technique was used in selecting four locations (Palakumi, Ganze, Mtwapa and Junju). The target population comprised of all smallholder farmers from the two divisions. Ganze has a population of 52,330 persons while Kikambala has 60,040 persons (Ministry of Agriculture, 2008; Central Bureau of Statistics, 2001). A sample frame consisting of smallholder farmers from the study area was developed. To select the desired sample size from the total population, a random sampling was done and the number of respondents was arrived at using the following formula from Yamane (1973):

$n=z^2pqN/ (z^2pq+Ne^2)$

Where z= the standard deviate

p= the proportion of the population with the desired characteristics,
q= 1 - p
N= total population in the two divisions,
e= desired degree of accuracy
n = required sample.
(z=1.96 for 96% confidence level, p=1/8, q=7/8, N= 112,370, e= 0.05)

Research Application

The results as shown in Tables 1, 2 and 3 indicate that the existing agricultural information and communication systems are not perceived to be effective in disseminating agricultural knowledge to farmers. It was also clear that the agricultural information and communication systems being used by extension providers encourage feedback from information users. However, this feedback does not translate into farmers' needs and priorities being incorporated in research agendas. Indigenous technical knowledge was found to play a big role in addressing many problems and farmers in Kilifi integrate it into scientific methods

Table 1. Change in yield compared to the duration of contact with extension providers.

Duration of Contact (Yrs.)	Change in yields (%)		
	Decrease	No change	Increase
Less than 1	0	4.3	0
1-5	10.7	4.3	3.6
5-10	7.1	15.9	21.4
10-15	21.4	23.2	32.1
Over 15	60.7	52.2	42.9

Chi-square =7.75, p-value=0.459 (p> 0.05), Not significant. Source: Survey data, 2011.

Table 2. Extent to which feedback is encouraged by locations (%).

Extent of feedback	Locations			
	Palakumi	Ganze	Mtwapa	Junju
Never	0	0	1.8	8.3
Very little	41.7	0	7.1	16.7
When I offer it	0	16.7	35.7	33.3
Often	50.0	50.0	35.7	16.7
Always	8.3	33.3	19.6	25.0

Chi-square = 26.587, p-value = 0.009 (p> 0.005), Not significant. Source: Survey data, 2011.

Table 3. The extent to which ITK has been integrated into scientific climate change adaptation practices by locations (%).

Extent of integration	Locations			
	Palakumi	Ganze	Mtwapa	Junju
Never	0	3.4	2.7	0
Very little	43.3	20.7	6.8	50.0
A little	13.3	24.1	24.7	27.8
Often	33.3	31.0	49.3	11.1
Always	10.0	20.7	16.4	11.1

Chi-square= 31.033, p-value= 0.002 (p< 0.005), Significant. Source: Survey data, 2011

of managing climate change challenges such as floods, drought, erratic rainfall, pest incidences, and heat on crops.

Acknowledgement

Special thanks to the field guides, the staff from Kenya Agricultural Research Institute (KARI), Mtwapa and District Agricultural Office, Kilifi and the farmers of Ganze and Kikambala divisions for assisting during the field work.

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