Indigenous Knowledge Use in Seasonal Weather Forecasting in Tanzania: The Case of Central Semi-arid Tanzania

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Introduction

- The majority of people (70%) in sub-Saharan Africa depend on rain fed subsistence agriculture (Hellmuth, Moorhead, Thomson and Williams 2007).
- These sub-Saharan countries which are mostly developing countries have in recent years observed rainfall to be erratic.
- Chang'a, Yanda and Ngana (2010) noted that the increase in Climate Variability in most East African countries has resulted in an increase in uncertainty in seasonal rainfall forecasting.

Introduction

- Climate information is accessible from two main sources which are meteorological seasonal climate forecasts (SCFs) and indigenous knowledge-based seasonal forecasts (IKFs) (Ziervogel and Opere 2010) .
- Farmers' access to SCFs and IKFs is of great importance in helping farmers to manage their crops effectively and reduce risks and vulnerability to Climate Variability and Change.

Introduction

- Mutekwa (2009) noted that ignorance of the seasonal climate forecast information prevailed among farmers. Moreover most farmers' did not use this information to make efficient informed on-farm practices.
- This study therefore sought to investigate the existence, reliability and use of IKFs by farmers in the central semi-arid Tanzania to forecast weather.

Literature Review

- IKFs are locally produced by people who have lived in an area based on experiences of both biophysical and spiritual indicators.
- Literature reviewed (Roncoli, Ingram and Kirshen 2002; Chang'a, Yanda and Ngana 2010; Mahoo and Mpeta 2011; Kangalawe, Mwakalika and Masolwa 2011) have shown that farmers use IKFs in predicting weather.

Research Gap

- Despite Mukhala 2000, Kandji, Verchot and Mackensen (2006); Hellmuth, Moorhead, Thomson and Williams (2007) and Ziervogel and Opere (2010) noting the progress in seasonal climate forecasting science, awareness and increased accessibility to many African countries over the past decade, the authors noted most African countries have not observed significant benefits from using the information to lessen climate impacts.

Methodology

- The study was underpinned by Rogers' (2003) Diffusion of Innovations theoretical model.
- The post-positivist paradigm was used.
- Both qualitative and quantitative methods were applied with the former approach dominant and the latter less dominant respectively.
- Semi-structured interviews, in-depth interviews and focus group discussions were used to collect data.

Methodology

- The study population comprised three categories of respondents namely farmers, agricultural extension officers and the Climate Change Adaptation in Africa (CCAA) project manager.
- Purposive sampling technique was used to select sample for study
- Semi-structured interviews were carried out with eighty four (84) farmers from Maluga and Chibelela villages.

Methodology

- In addition, two in-depth interviews were conducted with the district agricultural extension officers and one in-depth interview with the CCAA project manager was completed.
- Two focus group discussions were also conducted, one with farmers in each village studied.
- Quantitative data was analysed using descriptive statistics facilitated by SPSS while qualitative data was analysed thematically.

Key Research Findings

- Farmers used local indicators such as plant phenology, animals, insects, birds, stones, wind direction and astronomical indicators such as sun, moon and stars to forecast weather patterns.
- Plants used were: plum finger leaf (*Vitex ferruginea*), blood wood (*Pterocarpus angolensis*); large-leaved dalbergia (*Dalbergia boehmii*); Acacia tree (*Acacia tortilis*) and Msonankanga and Mgole (local names trees),

Key Research Findings

- Plants used Cont..
- large sour plum (*Ximenia caffra),* large-leaved false thorn (*Albizia versicolor),* flambouyant tree (*Delonix regia),* Myrr tree (*Commiphora sp.), w*ing pod tree (*Xeroderris stuhlmanni),* and Baobab tree (*Adansonia digitata).*

Local Indicators Used in Weather Prediction

- Birds used: cattle egret (*bubulcus ibis*); white-browed coucal (*centropus superciliosus*); wired-tailored swallow (*hirundo smithii*), Kinkiingoma and Yobwa (local names),
- Insects used: millipede (numerous species); termites (*Ancistrotermes sp.)*; Grass-green grasshopper (*Hesperotettix sp.*); Army worms (*Spodoptera exempta);* caterpillar/host larvae (*Melachakajeseri);* Butterflies (various species); Mlilyanondoo (local name); Mbilazi (green predicts imminent rainfall and green scarce rain)

Local Indicators Used in Weather Prediction

- Animals used: Hyena (*Crocuta crocuta*) and frogs (numerous species)
- Wind direction: East to west means rainfall onset
- Stars: Nangakavuji and Nimila

- Appearance of 'Nangakavuji' in mid November and moving from east to west shows a good year

Local Indicators Used in Weather Prediction

- Sun: Positioning of the sun in the South in November, signifies rainfall onset.
- Moon: When there is a small round in a moon, it means rainfall will fall in small quantities but for a long duration
- Special traditional stones: Appearance of special stones in the morning covered with significant quantity of water, signifies immense rainfall

Local Indicators Used in Weather Prediction

- The use of these indicators in weather forecasting by farmers was declining due to:

- The demise of elders.
- A lack of documentation and preservation of IK
- Climate Change and Variability.
- Youth's unwillingness to learn about the indigenous knowledge on weather and climate prediction.

Key Research Findings

- Most (92.9%) farmers possessed Indigenous Knowledge (IK) on seasonal weather forecasting in Maluga and Chibelela villages.
- The study established that elderly farmers possessed IK than youth.
- Despite statistics showing no correlation between age and the possession of IK, age was observed to be a major determining factor in farmers' ability to predict rainfall onset and intensity in Maluga and Chibelela villages.

Key Research Findings

- The majority of farmers (76.2%) in Maluga and Chibelela villages relied on IK for weather prediction.
- Nevertheless, farmers were concerned that the local indicators which they had been using to forecast weather were becoming increasingly less reliable than in the past.
- Indigenous Knowledge was disappearing at an alarming speed yet no initiatives were found that sought to document or preserve this knowledge.

Conclusions

- IKFs is important in mitigating the effects of Climate Change and Variability as it enables farmers to make farming decisions on types of crops to grow in a season or adopting other coping strategies.
- Farmers' decision to adopt an innovation is increased by advancing their confidence in the existing local knowledge which they possess.

Recommendations

- Policy makers should design policies which emphasizes on documentation and preservation of IKFs.
- Knowledge management ICT related strategies should be utilized to foster IKFs application and design of sustainable coping and adaptation plans which effectively respond to local Climate Variability and Change.

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End of Presentation