Exploring gender dynamics on perception of climate change on farming with focus groups in Machakos and Makueni Counties, Kenya

J.W. Kalungu, W.L. Filho and D. Harris[1]

Hamburg University of Applied Sciences, Applications of Life Sciences,
Lohbruegger Kirchstraße 65, Sector S4, 21033 Hamburg, Germany, jwanzuu@yahoo.com
[1]International Crops Research Institute for the Semi-Arid Tropics,
P. O. Box 39063-00623 Nairobi, Kenya

Abstract

This paper presents findings from 16 focus group discussions (FGDs) which took place in June 2012 at Makueni and Machakos Counties with a view to understanding farmers' perception on gender role in regard to climate change in their farming systems. A total of 192 farmers from ten villages were randomly selected to participate in the FGDs. During the discussion, men were found to have noticed increased use of manure and fertilizer for fertility replenishment where as their female colleagues from both Counties noticed increased use of hybrid seeds as a remedy for dealing with impacts of climate change and variability. The farmers suggested that policy interventions aimed at cushioning them against food insecurity and harsh climatical changes taking into account gender sensitive integration measures were necessary.

Key words: climate change and variability, gender, perception, Makueni, Machakos

Introduction

Men are regarded as family heads in Kenya and have a major role in decision making and control of domestic assets. However, women, who play a major role in the household economy through provision of labour for agriculture production as well as for domestic purposes are overshadowed thus their efforts go unnoticed. This gender based inequalities along the food production chain impede an equal attainment of food security for men and women (World Bank *et al.,* 2009). Thus the effects of climate change and variability may increase the existing inequality in the agricultural sector. In addition, climate change and variability will affect agricultural sector with smallholder farmers likely to experience adverse impacts from climate change. This may reverse the achievement gained through the Millennium Development Goals (Habtezion, 2011). This is due to the frequency and severity of both droughts and flood already experienced in the past (Ojwang', 2010). Therefore, efforts to facilitate adaptation are needed to enhance the resilience of the agricultural sector, ensure food security and reduce rural poverty (Bryan, 2011).

In response to changing weather patterns, smallholder farmers have from time memorial been adjusting their farming practices to optimize agricultural production, ensure food security and improve their livelihoods. Some of these farming practices fall under "Climate-smart agriculture". Climate smart agriculture is agriculture that sustainably increases productivity, resilience to harsh climatic conditions and enhances achievement of national food security and development goals (FAO, 2010). The study aims at assessing how men and women view changes taking place in their farming systems which are associated with climate change and variability. This is because due to the existing gender inequality, men and women do not experience climate change and variability equally (Skinner, 2011). Thus climate change may worsen the existing gender in equality (Habtezion, 2011). According to Habtezion, 2011, there is a direct relationship between gender equality, women's empowerment and climate change therefore there is need to focus on how both men and women respond to climate change (Aboud, 2011). Women are said to be more vulnerable due to the fact that they are less educated and are excluded from political and household decision making processes that affect their lives (Habtezion, 2011).

A predominantly semi-arid Ukambani occupied by the Kamba tribe was picked for this study. Generally, rural residents of Ukambani report frequent crop failures and water shortages, and food relief has become a permanent feature of rural life. According to Jaetzold and Schmidt (1983) a community leader in a semi-arid part of Kitui District, classified 51 per cent of the years from 1947 to 1979 as "bad" or "very bad" famine years. The Machakos District was a net importer of maize for 14 of the years between 1942 and 1962 for which data are available, and for eight of the years from 1974 to 1985 (Ackello- Ogutu and Mbogoh, 1991). The ever-present need for food relief has been variously attributed to overpopulation and environmental degradation, to colonization and development, or to insufficient development.

The FGDs therefore was aimed at capturing the changes occurring in their systems and the strategies aimed at meeting these challenges and the implication of these change on gender specific roles at Makueni and Machakos Counties.

Methodology

This paper presents findings from 16 focus group discussions (FGDs) which took place in Makueni and Machakos Counties between 1 and 15 June 2012 and included 192 members from the areas surrounding the Katumani and Kambi ya Mawe Kenya Agricultural Research Institute (KARI) Centers. The farmers were selected across each Location with the assistance of the provincial administration. The 192 members who participated in the FGDs were chosen from a sample of 348 randomly selected households who had participated at CALESA Project (Adapting Agriculture to Climate Change using Promising Strategies using Analogue Options in Eastern and Southern Africa) baseline survey conducted between June – September 2011. In each site, separate FGDs were conducted with women and men separately with four sets of age groups: 18-34 years, 35-44 years, 45-54 years and above 55 years. In each FGDs participants were asked to discuss agricultural practices in relationship to climate change and variability from three different perspectives: changes which have occurred, measures taken and gender role implications. This process allowed an initial open brainstorming discussion to take place followed by a consensus finding exercise where the three most important changes in agricultural practices were identified by the group.

Data analysis

The qualitative study was conducted as described by Ayayo (2004). The analysis was done using Content Analysis in which the data were broken down into themes and summarized to supplement important information with respect to the objectives of the study. Therefore, the descriptive quantitative data are being treated cautiously because the FGDs were initially not intended to be sources of quantitative data and the percentages provided should be seen as indicators of the relative importance of the issues raised by each FGDs (Davis, 2007) and to help direct further research in the quantitative research. The results are estimates based on judgements made by discussants and the author.

Results and discussions

Half of the men and women participants from Machakos County had visited different research centres. The farmers were therefore aware of the activities at KARI-Katumani with most of them indicating that the centre train farmers on crop management, conduct workshops, weather forecast as well as undertaking crop and animal research. The number of the farmers who participated in the FGDs is given in Table 1.

Table 1 : Composition of the participants in the study area

Age (years)	Machakos		Makueni	
	Men	Women	Men	women
18-34	12	12	12	12
35-44	12	12	12	12
45-54	12	12	12	12
Above 55	12	12	12	12

Changes observed in agricultural practices

The focus groups were requested to outline the changes observed over the years in their agricultural practices. The changes are listed in Tables 2 and 3 as reported by both in age and gender.

Table 2 : The most important changes in agricultural practices linked to climate parameters reported by focus group discussions

Observed changes	Frequency of inclusion	Percent groups				
		Total	Male	Female	Male	Female
			Machakos		Makueni	
Increase use of manure and fertilizer	15	81.5	75	75	100	75
Increased use pesticides	14	37.5	25	50	25	50
Increased use of hybrid seeds / changed from local to early maturing variety	11	56.25	25	100	25	100
Water management - terraces increased in their farms	10	56.25	50	75	25	75
Early preparations /planting of farms due to changing rainfall patterns	9	31.25	50	00	75	00
No longer intercrop/monocropping	6	37.5	00	25	25	25
Use of tractor	6	37.5	50	25	25	00
Grow increased crop varieties/ Growing cash crops/ diversification/grafting of fruit trees	5	75	50	00	25	00
Soil erosion control measures	2	25	00	25	00	00
Seed treatment	2	25	00	00	00	25
Adopted tree planting	1	25	00	00	00	00
Use seasonal forecasting	1	00	00	00	00	00

Table 3: Changes in agricultural practices linked to climate parameters per age group (years) in both Counties

Observed changes	Percent farmers			
	Young (18-34 years)	Middle-aged (35-44 years)	Middle aged (45-54 years)	Old (above 55 years)
Increase use of manure and fertilizer	75	100	100	50
Increased use of hybrid seeds / changed from local to early maturing variety	25	100	100	25
Water management (terraces increased in farms)	75	75	50	50
No longer intercrop/mono cropping	25	25	25	50
Use of tractor	75	25	25	25
Early preparations /planting of farms due to changing rainfall patterns	25	00	75	6.25
Soil erosion control measures	25	00	00	00
Increased use pesticides	25	50	25	25
Seed treatment	00	00	00	00
Adopted tree planting	00	00	00	00
Grow increased crop varieties/ Growing cash crops/diversification/grafting of fruit trees	00	25	25	25
Use seasonal forecasting	00	00	00	25

Farmers confirmed to have adapted different farming techniques to keep abreast with the unpredicted climatic changes in order to put food on the Table. The use of manure and fertilizer for improving soil fertility topped the list of measures taken by the farmers to cope with adverse climate changes as it was mentioned in 15 FGDs, followed by use of pesticides (14 FGDs) and increased use of hybrid (eleven FGDs). Generally, the focus groups regardless of gender and age differences identified use of manure and fertilizer to be on the increase (81.5%) due to its easy access followed by increased water management and use of hybrid seeds at 56.25% as shown in Table 2. These results attested to Odame (1997) findings that identified declining soil fertility as a major problem facing Kenya's smallholder farmers. To deal with this challenge, farmers in these two Counties had seen major changes in the increase of the use of manure and fertilizer. Makueni County has been targeted for rainwater harvesting by various organizations due to dry conditions. However a majority of famers had turned to traditional pesticides like use of ash to minimize the effects of fungal diseases on maize and blight on beans and tomatoes.

The major changes for male participants from Machakos County were increased use of manure and fertilizer (75%) with growing of cash crops, use of tractor and early land preparation tying at 50 %. This scenario is similar to studies done in the Congo climate programs where men tend to grew cash crops while women grew food for the family (Hubert, 2013). For the female participants, the major change was increased use of hybrid seeds (100%) with water management, increased use of manure and fertilizer tying at 75%. The male participant from Makueni County considered the three major changes in their agricultural practices which has occurred over the years to be increased use of manure and fertilizer (100%) and early land preparation (75%) with all other mentioned changes tying at 25%. The major changes for female participants from Makueni were use of hybrid seeds (100%), use of manure and water management both with 75%.

The men participants were in agreement that they used higher quantities of manure or different types of fertilizers with an aim of increasing yields while women are more concerned with seeds for planting. These observations are similar to those observed in Colombia where women are custodians of agro-biodiversity and ensure that seed exchanges occur at every community meeting (Aboud, 2011).

Despite biting financial constraints, men sacrificed other family expenses to address decreasing soil fertility. "These days it's a must to use manure or fertilizer if you want to get some yields and nowadays manure is not free as it was 30 years ago' confirmed a male participant form Machakos.

This concurs with observations by Herman (2010) which showed that declining soil productivity has led to decreased food security and increased poverty. It is documented t that manure improves soil structure and increases crop yields (Kihanda *et al.,* 2006). Female participants had increased number of terraces or renewed them at their farms or husband's farm. Low rainfall was linked to the quest for conserving water for the female participants. This was mostly true due to improved maize varieties. Use of hybrid seeds was ranked as the major change for young farmers aged 18-34 years, while use of fertilizer was ranked high for participants aged 35-44 years, and water management for farmers aged 18-34 and 35-44 years.

"Even though I endeavour to use hybrid maize seeds, this is undermined by the presence of fake seeds in the market. There is lack of suitable seeds in the market with the Government seeds distributed one month after we have planted" Said a female participant from Makueni.

Use of pesticides featured high with fourteen of FGDs mentioning it. However, it was not featuring as one of the three major changes.

There has been increase of fungal diseases for maize, and blight in beans and tomatoes, but we use ash to control these pests and diseases' said a female a farmer from Machakos.

Farmers linked the changes occurring at their farms to changes in soil infertility, low rainfall or short and intensive rainfall, high population, high pest and disease infestation and deforestation. There was agreement across the FGDs confirmed that rains had become unreliable such that one was not sure when to plant Unpredictable weather and seasons; increased frequency and intensity of droughts, floods; warmer temperatures resulting in heat stress had all been identified as impacts of climate. All the participants concurred that the changes were bad as it worsened food insecurity. According to Awuor, (2009) some of the identified constrains while implement community projects were sudden attacks of crops by pests and diseases, and erratic weather.

The female participants from Machakos were in concurrence how farming had changed. They remembered how thirty years ago they used to plant local varieties with good yields and they could even know the exact date of planting because rains were reliable. Farmers used manure and you could get it even from neighbours since it was not being sold.

"I started using fertilizer since 2002 and the prices has since increased" a female participant complained". According to the female participants in Makueni, farmers had changed to early maturing varieties and drought resistant varieties. Thirty years ago, the farmers practised intercropping with good harvest due to reliable rainfall and incidences of pest attack were low. In those days, there was no early planting as they planted on the onset of rainfall. "I have started realizing higher yields since I started using fertiliser" said one male farmer from Machakos said.

Even though farmers had different views, they agreed that the best way to deal with changing weather patterns was through the use of hybrid seeds. To cope with short rains experienced in the region, those FGDs also appreciated the use of drought resistant crops like sorghum and cassava to ensure food sustainability. However, farmers lamented over the existence of fake hybrid seeds in the market. They also lacked professional advice on which type of seed to use. Farmers also acknowledged change of lifestyle as a contributing factor had made many farmers abandon indigenous crops that are drought resistant. Many lamented that their children did not like food stuffs from sorghum.

"During my childhood, farming was a clan issue where by everyone helped in weeding and spreading manure, nowadays I have to use a tractor to plough in order to be assured of good yields", said male farmer from Makueni.

Conclusions and recommendation

From the discussions, it was found that men and women perceived changes differently in their agricultural practices irrespective of the age. However, more quantitative analysis is being done to link it to more factors such as education, labour and employment status. Currently, most climate policies treat women as vulnerable beneficiaries and their skills and experience usually go unnoticed. Thus it's important to take into account both the women and men preferences and knowledge when formulating adaptation measures at local level. However quantitative research is being done focused on the challenges climate change and variability presents to women and men farmers. It was also clear that farmers lacked professional advice on effective farming methods like selection of hybrid seeds and pesticides to use in their farms. For this reason, extension services should be improved in these two Counties. In addition, policy makers should take into account the challenges women are facing at households level and raise awareness to enable them get involved in household decision making. Stakeholders should advocate for gender sensitive policies and process that shelter women from being affected by climate change and variability more that the men.

Acknowledgment

This study was funded by the Federal Ministry for Economic Cooperation and Development, Germany (BMZ) as part of the CALESA Project.

References

Aboud G. (2011). The power of local networks for gender aware climate responses in Colombia. INBRIEF, 22 , p. 3. 2011, BRIDGE, Institute of Development Studies, University of Sussex, Brighton, BN1 9RE, UK.

Ackello- Ogutu C. and Mbogoh S.G. (1991). Environmental change and Dry land management in Machakos District, Kenya Production profile. WORKING PAPER 55, Overseas Development InstituteISBN 0-85003-166-4. http://www.odi.org.uk/sites/odi.org.uk/files/odi-assets/publications-opinion-files/6949.pdf.

AMIRAN. (2013). Drip technology inspires farming in arid areas. http://www.amirankenya.com/index.php?option=com_content&view=article&id=374:drip-technology-inspires-farming-in-arid-areas&catid=40:headlines&Itemid=289. Accessed on 12/05/2013.

Awuor C. (2009). Community Resilience to Drought in Makueni District: the Sakai Community's Experience, Kenya. A report for The Centre for Science and Technology Innovation and the Ministry of State for Development of Northern Kenya and Other Arid Lands Arid Lands Resource Management Project, 1-17.

Ayayo A.B. (2004). Quantitative methods for capacity building through partnership and information and communication technology for using indigenous knowledge for nature conservation and natural disaster management. *Information Management & Communication Technology, Vol. 13,* No. 3, 189-202.

Davis P. (2007). Discussions among the poor: exploring poverty dynamics with focus groups in Bangladesh. *Chronic Poverty Research Centre Working Paper* 84-P 9-24. *http://www.chronicpoverty.org/uploads/publication_files/WP84_Davis.pdf*

Food Agricultural Organization (FAO). (2010). Integrating gender issues in food security, agriculture and rural development, UN Joint programmes, Gender, Equity and Rural Employment Division , Economic and Social Development Department .www.fao.org/gender, I1914E/1/11.10, pp.15-20, Accessed on 27/05/2013.

Food Agricultural Organization (FAO). (2000). Population and gender in rural societies from the Perspective of the population programme, Sustainable development project (SD), people-population. http://www.fao.org/sd/wpdirect/wpre0128.htm, Accessed on 25th May 2013.

Herman M.C. (2011). Inorganic Fertilizer vs. Cattle Manure as Nitrogen Sources for Maize (*Zea mays* L.) in Kakamega, Kenya. The Journal of Undergraduate Research at Ohio State 2.1 (2011).

Hubert T. (2013). Male-female roles should factor into Congo climate programs, Center for International Forestry Research Report, Accessed on 27 May 2013.

Jaetzold R. and Schmidt H. (1983). Farm management handbook of Kenya Vol. 2: Natural conditions and farm management information. Part C: East Kenya (Eastern and Coast Province). Nairobi:

Kihanda F.M. (1996). Fertilizer nitrogen recovery efficiency in the sub-humid highlands of Central Kenya. In Edmeades *et al*. (ed). Developing Drought- and Low N- Tolerant Maize (pp. 91-95), El Batán, Mexico. March 25-29, 1996. CIMMYT.

Odame H. (1997). Bio fertilizer in Kenya: Research, production and extension dilemmas." Biotechnology and Development Monitor, No. 30, 20-23.

Ojwang' O. Agatsiva J. and Situma C. (2010). Analysis of Climate Change and Variability Risks in the Smallholder Sector. Case studies of the Laikipia and Narok Districts representing major agro-ecological zones in Kenya. Department of Resource Surveys and Remote Sensing (DRSRS) in collaboration with the Food and Agriculture Organization of the United Nations, Rome, 2010, NRC Publications. Pp. 23-56. http://www.fao.org/docrep/013/i1785e/i1785e00.pdf.

Dimensions of Climate Change," 2010; UNDP, "Africa Adaptation Experiences Gender and Climate Change: Advancing Development through an Integrated Gender Perspective," Vol. 1, 2011.

Skinner E. and Brody A. (2011). Gender and Climate Change: an overview, INBRIEF, 22, , p.1. BRIDGE, Institute of Development Studies, University of Sussex, Brighton, BN1 9RE, UK, bridge bulletin issue 22, 2011.

World Bank, Food and Agriculture Organization; International Fund for Agricultural Development (2009), Gender in Agriculture sourcebook.http://data.worldbank.org/data-catalog/world-development-indicators/wdi-2010. Accessed May 7.

Zerisenay H. (2011). Gender and Climate Change, Africa Policy Brief 1– General Overview Working Draft, UNDP report, 1- 4.