Innovative use of sheep and goats by women in climate smart villages in Kenya

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Summary

The Nyando Basin in Kenya, a rich agricultural flood plain around Lake Victoria with a population density exceeding 400 persons per square kilometre, has been adversely affected by extreme weather events that include droughts and floods. Literacy levels are low. Land sizes are small, generally less than one hectare, and poverty rates are high. Through a partnership around collective action, seven villages have been selected to pilot climate smart integrated crop and livestock production. The approach focusses on improving local knowledge of climate risks, variability in seasonal rainfall, and targeted introduction of technologies to increase productivity of crops and livestock in order to enhance livelihoods. Given the household composition and differential access and control over resources by men and women in the communities a gendered approach was adapted for sheep and goat improvement. Men generally control practices around goats, while women have a greater say on sheep. Past uncontrolled breeding of sheep and goats, closed to introduction of animals from elsewhere has resulted in smaller sized animals that take long to mature, and do not fetch good market prices. The CGIAR led project thus introduced improved strains of resilient but more productive indigenous breeds of Gala goats and Red Maasai sheep for crossbreeding with the local breeds and has resulted in women taking a lead in community led breeding programmes resulting in crosses with better performance and desirable traits.

Keywords: sheep and goats, climate change, community breeding programme

Introduction

The people of the Nyando Basin, a rich agricultural flood plain located around Lake Victoria, western Kenya are traditionally a farming community who rely heavily on farming for food and income. In recent years however, this region has been affected by climate change which is manifest through frequent prolonged dry spells followed by short and heavy rains that lead to flooding and subsequently environmental degradation. This has resulted in low agricultural productivity making the area food insecure. Reports indicate that approximately 81% of the families go for between one and two months with limited food, while 17% of the families experience 3-4 months in a year when their farms are totally unproductive (Mango et al. 2011). The challenge of food production is compounded by the fact that the Nyando Basin has one of the highest population densities of rural localities in East Africa, with more than 400 persons per square kilometre (Macoloo et al. 2013). The HIV infection rate in the adult population of the area

is high (at approximately 7.5%) resulting in a large number of widow and orphan headed households. It is estimated that half of the population in the area lives below the poverty line (NASCOP and NACC 2007).

In order to assist this community mitigate the adverse effects of climate change and increase their food security status, the CGIAR research program on Climate Change Agriculture and Food Security (CCAFS), in collaboration with World Neighbors, Vi Agroforestry and Kenya's Ministry of Agriculture, Livestock and Fisheries has since 2011, been implementing a portfolio of promising climate change adaptation, mitigation and risk management interventions for small-holder farmers grouped into "Climate Smart Villages" (CSV). One such intervention has been the introduction of improved strains of indigenous sheep and goats alongside capacity building of community members to manage sheep and goat populations in order to improve the productivity of the animals kept by households within the Nyando Basin. The roles the sheep and goats can play to improve the income of smallholder farms of Kenya has been demonstrated (Kosgey et al. 2008; Ojango, et al., 2010). This study provides insights on the role of the women in small holder farming sytems adopting breeding management practices and implementing a community breeding programm.

Material and methods

Study area, sampling procedure and data collection

The study was conducted in the Nyando Basin located in Kisumu and Kericho Counties of western Kenya (Figure 1). One hundred and thiry nine households were randomly selected from seven villages were selected from a total of 106 villages within a 10x10 block of land (Mango et al. 2011). The sample size was chosen to enable measurement of changes in a series of pre-determined indicators over a 5-to-10-year period. Among the households identified, those rearing sheep and goats were were selected to participate in sheep and goat improvement activities as reported by Ojango et al. (2016). Data was collected using a participatory systems research approach. Individual household data was collected using the "Open Data Kit" (ODK) information technology platform (https://opendatakit.org/).

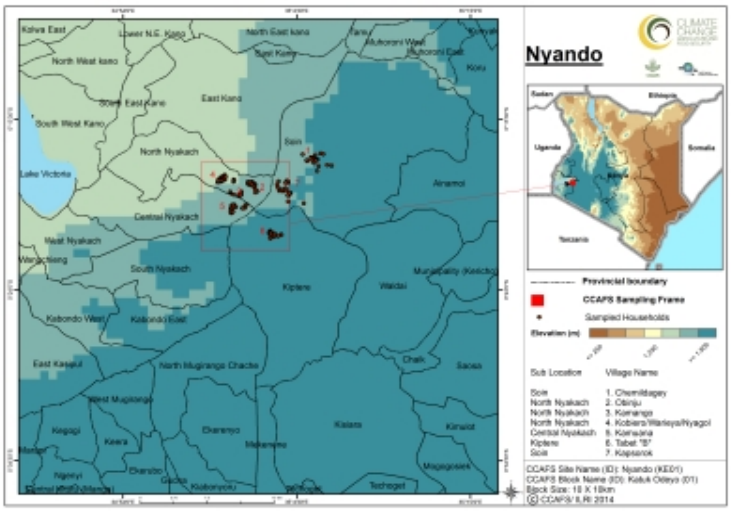

Figure 1: Map of Kenya highlighting the Nyando Basin

Results and Discussion

The landsizes owned by the farmers in Kisumu and Kericho Counties were small with 58% of the households owning less than one hectare of land on which to grow crops and rear indigenous livestock. Innovative adoption of livestock management practices were required in order to realize a positive change in crop and livestock productivity.

In Kisumu County significantly more households ($p<0.005$) were headed by women compared to Kericho County. These women had either a primary school level of education or none at all (***Table 1***). Understanding the characteristics of the head of the households was important as this would be the person making key decisions on sheep and goat breeding and improvement.

Table 1. Level of education of the head of the household (HH)

Gender of HH Head	**Level of Education**	**Kisumu**		**Kericho**	
		n	%	n	%
Male	No formal education	5	9.43%	5	10.87%
	Primary School	30	56.60 %	30	65.22%
	High/Secondary school	18	33.96 %	11	23.91%
	Sub-Total	***53***		***46***	
Female	No formal education	13	37.14 %	7	43.75%
	Primary School	18	51.43 %	8	50.00%
	High/Secondary school	4	11.43%	1	6.25%

Sub-Total	***35***	***16***

The farmers in both counties kept both sheep and goats, often alongside cattle, poutlry and donkeys (***Table 2***). The largest proportion of indigenous livstock kept in both counties by either men or women, were indigenous poultry, with a greater proportion of indigenous poultry being kept in Kisumu compared to Kericho. Most of the indigenous poultry (63%) were kept by women in Kericho County unlike in Kisumu where they were kept by the men (63%). All the cross bred poultry in Kericho county were kept by men, while more women in Kisumu County kept cross-bred poultry (67%) compared to the men.

The sheep and goats reared in both counties were mainly indigenous breeds (**Table 2**). The specific breed-type reared was dependent on the gender of the household head. A higher proportion of female headed households prefering the introduced pure Red Maasai sheep breed and their crosses (either Red Maasai x Dorper in Kisumu or Red Maasai x Blackhead Persian in Kericho) to the indigenous local sheep or goat breeds. Though the Red Maasai sheep and Galla goat breeds are indigenous breeds kept in other regions of Kenya, improved lines have been developed through successful selective breeding programmes. The improved breeds were introduced in the Nyando Basin to provide a genetic lift to the local indigenous breeds rather than using exotic breed-types as has been the widely adopted practice in many breeding programs found in developing countries. The women of Nyando preferred the resultant cross bred animals because of their quick adaptability to the environment while exhibiting more desirable traits than the pure bred local sheep and goat breeds. The crossbred animals have been able to withstand the heat stress, recover from drought periods by exhibiting compensatory growth, utilize the forage available in the area, and are able to attain market weights within shorter periods of time compared to the local breeds that take up to four years to reach a marketable weight (Ojango et al., 2015).

Following practical training through community groups, women have taken a lead role in implementing planned rotational mating of the improved animals, monitor their performance through recording details on their performance over time, and influence the pricing and marketing of the improved animals. Improved productivity and market access for sheep and goats is evident alongside better management of the ecosystem. Demand for improved animals with performance records and the average selling price for sheep has more than doubled (changing from an average of KSH 3,500 to KSH 7,800). This is leading to a positive change in the livelihoods of women in the communities. A community breeding program incorporating gender integrated innovative technologies and a stronger product market chain is thus being designed and implemented for the climate smart villages using indigenous breeds.

Table 2. Number and different species of animal kept and the respective proportion of households keeping them disaggregated by gender

Animal Species	Total No. of animals	No. of Households (N)	% of N by Gender of Household head		Mean herd size ±SD	Max Herd Size
			Male	Female		
Kisumu county						
Indigenous Cattle	285	59	63	37	4.83±3.34	20
Indigenous Sheep	370	62	65	35	5.97±6.22	
Indigenous Goats	184	60	63	37	3.07±2.01	8
Indigenous Poultry	633	62	63	37	10.21±8.08	40
Indigenous Donkeys	10	4	75	25	2.50±0.58	3
Cross-bred Cattle	40	14	71	29	2.86±1.70	7
Cross-bred Sheep	48	13	46	54	3.69±3.33	11
Cross-bred Goats	103	32	72	28	3.22±2.12	8
Cross-bred Poultry	20	3	33	67	6.67±3.51	10
Kericho County						
Indigenous Cattle	200	47	70	30	4.26±2.75	14
Indigenous Sheep	71	24	46	54	2.96±2.91	15
Indigenous Goats	223	43	77	23	5.19±3.09	11
Indigenous Poultry	242	27	37	63	6.54±3.87	20
Indigenous Donkeys	35	28	71	29	1.25±0.59	3
Cross-bred Cattle	75	17	94	6	4.41±2.62	10
Cross-bred Sheep	32	10	60	40	3.20±1.32	6
Cross-bred Goats	169	27	89	11	6.26±6.45	29
Cross-bred Poultry	21	2	100	0	10.50±13.4	20

Conclusion

Participatory breeding programs for sheep and goat production can be adapted for poor smallholder farmers living under challenging environmental conditions. Through involving women in community training activities, animal management practices that contribute to improving productivity and hence increased incomed from the sheep and goats were readily adopted. The climate smart breeding and management interventions for sheep and goats have enabled a sustained improvement of livelihoods for poor small-holder farmers in Nyando

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