Journal of Animal & Plant Sciences, 2009. Vol. 4, Issue 1: 304 – 310.
Publication date: 15 August 2009, http://www.biosciences.elewa.org/JAPS; **ISSN 2071 - 7024**

Farm resources, gender and water use practices in livestock-based livelihood systems of Kiruhura district, South western Uganda

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Key words
Livestock, gender, production, rangelands, water harvesting

1 SUMMARY

Uganda's south-western rangelands have capacity to improve farm productivity but are hampered by scarcity of water. The purpose of this study was to establish the current status of farm crop and livestock enterprise management systems, gender allocation of livestock, crop and human watering activities and assess prospects for using improved technology for livestock and domestic water storage, conveyance and utilisation, and small scale irrigation. One hundred households were selected from two sub-counties to represent crop-livestock and semi-transhumant cattle systems using purposive, multi-stage and systematic random sampling procedure. Findings of the study indicate that cattle contribute up to 89% of household livelihoods, banana is a dominant crop enterprise in Kazo (5.3 acres) and sweet potatoes are common in Kikatsi (1.4 acres). The main water catchments in the community are by roof catchment (41%) and sloping surfaces (36%). Of the households with the potential to harvest from their roof tops only about 50% exploit this option. The main sources of water for domestic uses, however, are own dams and shallow wells at 34 and 21%, respectively. Regarding gender and water collection, results show that all household members contribute towards water collection but where males are concerned they rely on bicycles (48%) whereas girls and women mostly (75%) carry water on their heads. Livestock watering is largely communal as only about 40% of the farmers have own individual valley dams. The need to have affordable and sustainable water storage and utilization systems particularly for livestock production was determined. By improving water collection and storage at household level not only will labour be released for other activities but the drudgery to which the female folks are exposed will be reduced. Due to increasing sedentarised cattle keeping coupled with extended fencing and exclusion, trespass is a serious offence in the area. Individual valley tanks should therefore be promoted in place of communal dams. The current watering systems that promote siltation of storage systems due to widespread use of mud troughs should be addressed by improved water storage, lifting/pumping and distribution systems. The technologies that may be explored to improve water storage on the farms include roof catchment and surface run off harvesting using ferrocement and polyethene tanks, and individual household preferably polyethene lined valley dams/tanks. Lifting water from storage systems could be enhanced by windmills and treadle (foot) pumps.

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2 INTRODUCTION

Kiruhura district is located in Uganda's south-western rangelands and is part of the cattle corridor. It lies at about 1800 metres above sea level, and receives about 915 mm of rainfall with temperature ranges of 17 to 30^0C. It is mostly covered with savannah woodlands and thorny shrubs.

The district has about 1.1 million cattle of which about 50% are indigenous. It is predominantly inhabited by pastoralists and is poorly endowed with open water bodies particularly lakes (Kiruhura Local Government, 2008). The region's capacity to expand and improve production and productivity of livestock is hampered by scarcity of water for livestock production and household use. The area has enormous potential to produce a lot more livestock and livestock products than is presently the case.

Scarcity of water has been identified as the major constraint to livestock production in the zone. Whereas surface water resources are generally seasonal, groundwater potential is limited as well. Valley dams and tanks constructed in the zone cannot meet the demand and in many cases have insufficient inflow and/or very low storage capacity to prevent them from drying out before the rains of the following season. Scarcity of water has not only limited livestock production but has also promoted normadism and abuse of communal watering points. Many livestock in the zone still trek long distances in search of water. These conditions have in turn precipitated the spread of livestock diseases, overgrazing and land degradation in certain areas, and in some areas insecurity caused by families trying to assert their control and access to water bodies (LSRP, 1999). The effort to establish water resources to take care of livestock and human needs has in the past been undertaken jointly by communities, government and other non-governmental organizations (NGOs). These endeavours have undoubtedly had impact on livestock output, however, the success of these interventions required sustainable management of the facilities by the affected communities. In addition, insufficient unreliable and low intensity rainfall, coupled with poor land and water resource management methods are among the critical factors contributing to the water and pasture shortages in these livestock production systems (AEATRI, 2002).

The purpose of this project therefore was to validate and promote water harvesting, utilization and conservation technologies for enhancing livestock productivity and rural livelihoods in the South-western rangelands zone.

3 METHODS OF DATA COLLECTION AND ANALYSIS

Gender, social acceptability and ecological and economical sustainable are important considerations in developing appropriate rural watering systems. Dairy cattle, goats and bananas were identified as the district priority farm enterprises. The bulk of the data used in the study was obtained from formal surveys based on direct interview using standard data techniques and capture tools. Drawing on purposive procedures Kazo and Kikatsi sub-counties were selected to represent crop-livestock (banana-coffee-maize/beans/ground nuts) - mixed systems (Kazo), and semi-transhumant (Kikatsi) cattle systems, respectively (fig. 1). Using multi-stage and systematic random sampling procedure 50 households were sampled each from Kikatsi and Kazo sub-counties making a total of one hundred (100) households in all. Data were largely analysed using SPSS and Ms Excel programmes to generate descriptive statistics, mainly frequencies and means.

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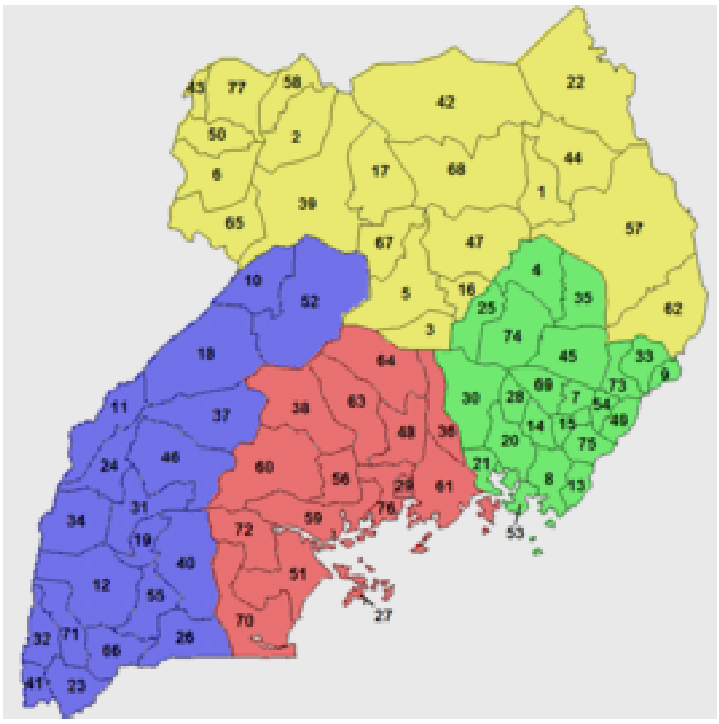

Figure 1: A map of Uganda showing Kiruhura district (40).

4 RESULTS AND DISCUSSION

4.1 Socio-economic characteristics: Findings on socio-economic characteristics of the households are summarised in figure 2. The mean age of the heads of households was 50 years implying that decisions on most farms are taken by individuals who are still economically active and are of sound level of education averaging at 18 years (fig. 2). The household sizes of about 5 persons each suggest that household water needs are reasonable given that each one may require up to 20 litres per day. Also, given that a sizeable proportion may be of school going age, improvement in water storage and collection technology is deemed necessary.

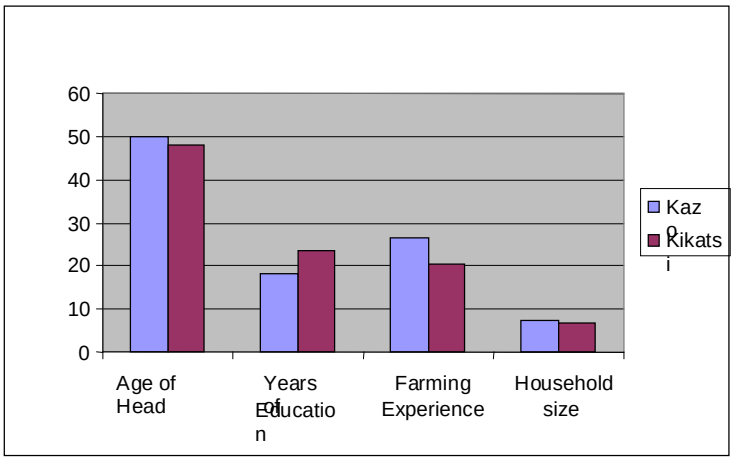

Figure 2: Household size, mean age, level of education and farming experience of household head in south-western Uganda.

Journal of Animal & Plant Sciences, 2009. Vol. 4, Issue 1: 251 - 260.
Publication date: 15 August 2009, http://www.biosciences.elewa.org/JAPS; **ISSN 2071 - 7024**

4.2 Farm enterprise and roof water harvesting catchments: Findings of this study (table 1) indicate that about 73% of the households have potential for harvesting rain water from iron roofed houses. Results on farm enterprises show that cattle contribute about 82 and 95% towards food, income and social capital of livestock based livelihood elements of the community of the households in Kazo and Kikatsi sub-counties, respectively. Household cattle herd sizes were bigger in Kikatsi (48 and 42 heads for local and exotic cattle, respectively) compared to 30 local and 20 exotic heads, respectively, in Kazo (figure 3). This is also reflected by corresponding pasture acreages of 50 and 97, respectively in the two sub-counties.

Overall the cattle enterprise contributes about 89% of household livelihoods in the district. This signifies the need to have affordable and sustainable water storage and utilization systems particularly for livestock production. A Friesian cow requires about 60-75 liters of drinking water per day and 3-5 litres per week for acaricide application. Beside, small ruminants, pigs and free range poultry require regular supplies of clean water, though they are often neglected and mostly live on water already used for other household activities (Bengtsson and Whitaker, 1986; Kabirizi, 2006). Banana is a dominant crop enterprise in Kazo (5.3 acres) and sweet potatoes are the common crop enterprise in Kikatsi (1.4 acres).

Table 1: Farm enterprises and roof types in Kiruhura district (%).

Roof type of main house (%)	**Sub-county**		**Overall**
	Kazo	**Kikatsi**	
Grass thatched	10.0	31.1	21.2
Iron	87.5	60.0	72.9
Tarpaulin	2.5	0.0	1.2
Straw/fibre	0.0	8.9	4.7
Main farm enterprise(%)			
Local cattle	49.0	51.0	50.6
Dairy cattle	33.3	43.8	38.7
Goats	4.4	4.2	4.3
Crops	11.1	2.1	6.5
Major crop enterprises and pastures (acres)			
Banana	1.1	5.3	
Ground nuts	0.4	1.2	
Millet	0.5	0.5	
Sweet potatoes	1.4	1.1	
Pastures	50.4	96.5	

4.3 Farm-level water catchments and sources of water for domestic uses: Findings of the study on water catchments on the farm, sources of water for domestic uses and extent of roof harvesting and crop irrigation are presented in table 2. Overall, catchment sources are dominated by roof areas (41%) and sloping surfaces (36%). Of the households with roof catchment only about 50 per cent of the households harvest rainwater from their roofs.

The main sources of water for domestic uses, however, are own dams and shallow wells at 34 and 21%, respectively. This implies that there is more room for collection and storage of rainwater directly from the houses. In addition, construction of valley dams and valley tanks depending on the slope and terrain conditions is another possible intervention. These technologies will increase volumes and period of water availability for domestic uses, crop and livestock production during dry seasons. Since crop production is not a main source of livelihood it is not surprising that only about 11% of households are involved in some form of small-scale irrigation. With regard to gender allocation of labour for water collection results show that boys (24%) girls (15%), women (13%) and male workers are involved in water collection. It is also worthy to point out that when males are collecting water they use bicycles (48%) whereas girls and women carry water on their head most of the time (75%). This means that by improving water collection and storage at household level not only

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will labour provided by both female and male household members be released for other activities but the drudgery to which the female folks in the households are exposed would be reduced.

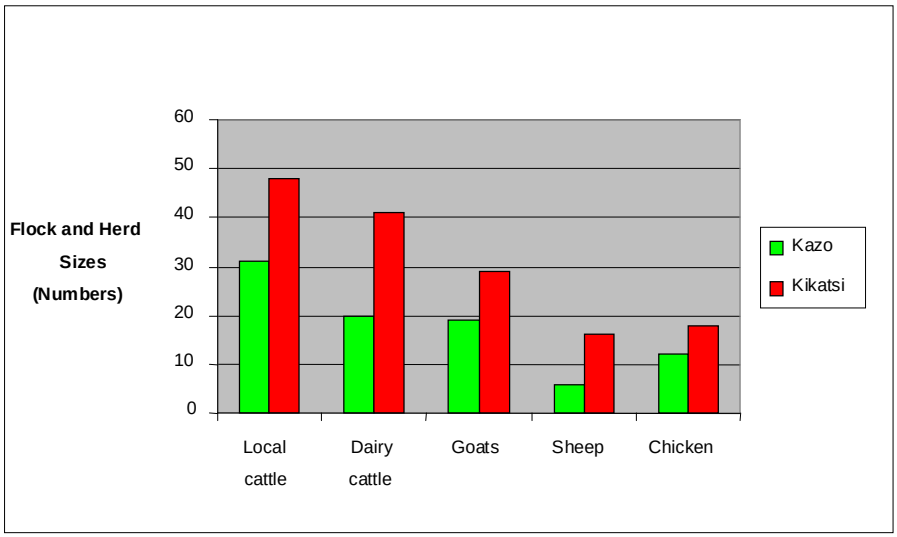

Figure 3: Relative importance of livestock enterprises.

Table 2a: Catchment areas and main sources of water for domestic uses (%)

Catchment type	**Sub-county**		**Overall**
	Kazo	**Kikatsi**	
Farm house roof	36.8	46.4	40.9
Cemented yards	7.9	3.6	6.1
Rock surfaces	5.3	14.3	9.1
Farm sloping surface	44.7	25.0	36.4
Other	5.3	10.7	7.6
Main sources of water for domestic uses			
Rivers	4.7	7.3	6.0
Shallow wells	9.3	34.1	21.4
Spring wells	20.9	0	10.7
Own dams	46.5	22.0	34.5
Collect from rainfall	0	14.6	7.1
Others	2.3	**0**	1.2

Proportion of households involved in irrigation activities was 8.2 and 14 % for Kazo and Kikatsi, respectively. Corresponding figures are 67.3 and 30 % for roof harvesting.

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Table 2b: Household members involved in collecting water for domestic use.

Household member	Sub-county (%)		Overall
Men	11.1	11.4	11.2
Boys	20.0	27.3	23.6
Men & Boys	4.4	6.8	5.6
Women	24.4	**0**	12.4
Girls	8.9	20.5	14.6
Girls & women	**2.2**	**0**	**1.1**
Male workers	24.4	18.2	21.3
Female workers	**4.4**	**4.5**	4.5
Any worker	**0**	**11.4**	**5.6**
Method of collecting water by men and boys, and women and girls (%)			
Head portage	65.0	28.1	42.3
Bicycle	30.0	59.4	48.1
Carts	0	3.1	1.9
Vehicles	**5.0**	**0**	1.9
Other	**0**	9.4	5.8

4.4 Cattle grazing systems and watering: The common grazing systems being practiced in Kazo sub-county were herding (21%), perimeter fenced (21%) and paddock fencing (44%). Paddock fencing (67%) and perimeter fencing (18%) were common in Kikatsi sub-county. The relationship of grazing systems and water source by sub-county is shown in table 3. More than 25% of farms in Kikatsi rely on communal water sources whereas about 60% of the farmers have own valley dam tanks in Kazo. Due to increasing sedentarised cattle keeping trends coupled with extended fencing and exclusion making trespass a serious offence in the area, communal dams should be superseded in priority by individual valley tanks.

Table 3: Grazing systems and associated water sources (%).

Sub-county and system	Main livestock water source						
Kazo	Rivers	Shallow wells	Spring wells	Communal dams	Own dam	Communal valley tank	Total
Herded	14.3				85.7		20.6
Tethered				25.0	75.0		11.8
Zero grazing					100		2.9
Paddock fenced		6.7	46.7	13.3	33.3		44.1
Perimeter fenced			14.3	14.3	71.4		20.6
Total	2.9	2.9	23.5	11.8	58.8		100.0
Kikatsi							
Herded					50.0	50.0	5.1
Paddock fenced	3.8	42.3	3.8	11.5	26.9	11.5	66.7
Perimeter fenced		57.1	42.9				17.9
Mixed systems		75.0			25.0		10.3
Total	2.6	46.2	2.6	15.4	23.1	10.3	100.0

4.5 Cattle watering systems: Results of the study on water lifting/pumping technology for livestock watering are shown in table 4. Lifting water from storage bodies to watering points is largely a

manual activity. Overall 76% of households draw water by manually lowering plastic cans in the water, lift them, carry and pour it into troughs from where animals drink. In most cases (51%) farmers are still using mud troughs. This renders the storage systems prone to siltation and subsequent destruction through weed infestation and receding.

Table 4: Methods of drawing water for livestock (%)

	Sub-county		
	Kazo	**Kikatsi**	**Total**
	Water lifting technology		
Treadle pump	9.1	11.6	10.5
Plastic cans	84.8	69.8	76.3
Sauce pans/drums	3.0	11.6	7.9
Other	3.0	6.0	4.5
	Watering troughs		
Mud	49.0	51.0	50.6
Metallic	33.3	43.8	38.7
Concrete	4.4	4.2	4.3
Others	11.1	2.1	6.5

CONCLUSION: Uganda's south-western rangelands have capacity to improve farm productivity but are hampered by scarcity of water for production. The purpose of this study was to establish current status of farm crop and livestock enterprise management systems, gender allocation of livestock, crop and human water related activities and assess prospects for using improved technology for livestock and domestic water storage, conveyance and utilisation, and small scale irrigation. The need to have affordable and sustainable water storage and utilization systems particularly for livestock production was validated. By improving water collection and storage at household level not only will labour be released for other activities but the drudgery to which the female folks are exposed will be reduced;. To reduce incidences of trespass individual valley tanks should be preferred to communal dams. Improved water storage, lifting/pumping and distribution systems should be promoted to reduce siltation of storage systems. Technologies to improve water storage on the farms may include roof catchment and surface run off harvesting, individual household valley dams/tanks and lifting water from storage systems using windmills and treadle pumps.

ACKNOWLEDGEMENTS: The work was sponsored by the Government of Uganda through NARO's Competitive Grant Scheme (CGS). Kiruhura district administration, farmers and staff of Kikatsi and Kazo sub-counties are appreciated for their contribution..

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