



Tropentag 2019, Kassel, Germany
September 18-20, 2019

Conference on International Research on Food Security, Natural Resource
Management and Rural Development
organised by the Universities of Kassel and Goettingen, Germany

Livestock Feeds Assessment in southern highlands in Tanzania

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Introduction

Livestock contributes significantly to Tanzania's agricultural GDP being the second country in Africa after Ethiopia in cattle population (Thornton *et al.*, 2002). Like in most African countries, inadequate feed resources contribute to the underperformance of the sector. Animals are under fed, and therefore genetic potential not fully utilized (Mwendia *et al.*, 2018.). Feeds and forages contribute significantly to the requirements of a successful livestock enterprise. Up to 70% of the costs involved are attributed to feeds and forages (Odero-Waitituh 2017) conversely implying importance of addressing the feeding component. Albeit the need to improve use of suitable forages, understanding the agricultural context in question is paramount. This includes looking at the livestock systems, matching forages with the correct ecologies and the social-cultural background of the communities involved in order to increase chances of adoption.

The work reported here was therefore set out to assess the farming context and role of livestock involvement in household incomes in three districts in Tanzania highlands in order to inform subsequent forage interventions.

Material and Methods

Tanzania southern highlands were selected for the agricultural potentials in the area that includes livestock rearing. Three districts namely; Mufindi, Njombe, Rugwe in were selected in consultation with Tanzania Livestock Research Institute (TALIRI) and after taking a scoping study to confirm livestock production in the area. In every district, two wards were randomly selected for the study. To collect data, procedure of the Feeds Assessment Tool (FEAST-<https://www.ilri.org/feast>) (Duncan *et al.*, 2012) was implemented in each of the wards. The tool contains two major sections; Focused Group Discussions (FGD) and Individual Farmer interviews in the same sitting. However, the procedure was modified to capture responses for women and men separately hence the FGD was done separately for women and men. Largely, FGD captures information on farming system, land sizes categories, livestock feeds availability and while individual interviews capture livestock species, household incomes and feeds and forages currently in use.

Results and discussion

Compared among the three districts, land size in either small medium or large categories were perceived differently by men and women. However, few farmers are regarded to own large farms across the districts and by either men or women (Table 1). Majority had either small or medium sized farms. For either men or women, small land size was generally <7 acres in Mufindi, <5 acres Njombe and <3 acres in Rugwe. Medium size ranged 3–15 acres (Mufindi), 2–15 acres

(Njombe) and 1–10 acres (Rugwe). Large farms were in acreage of at least 5 acres in Mufindi and Njombe, and >3 acres in Rugwe. Among the 3 districts, farm sizes were smaller in Rugwe than in Mufindi or Njombe both of which had more or less similar perceptions.

Table 1. Perceived land size categories by men and women in Mufindi, Njombe and Rugwe districts in Tanzania. Numbers in brackets denote the percentage of households in that land category

District	Ward	Men			Women		
		Small	Medium	large	Small	Medium	large
Mufindi	Mtwango	<3 (80)	3 – 5(15)	>5(5)	<6(70)	6–10(20)	>10(10)
	Igowole	<7(30)	7–15(50)	>15(20)	<2(30)	3–5(50)	> 6(20)
Njombe	Ibumila	<2(20)	2–10 (70)	>10 (10)	<5(35)	5–10(50)	>10 (15)
	Ikuna	<2(30)	2–5(60)	>5 (10)	<5 (40)	5–15 (55)	>15(5)
Rungwe	Kiwira	<1(20)	1–3(70)	>3(10)	<2(40)	2–4(55)	>4(5)
	Lufingo	<3 (58)	3–10 (40)	>10 (2)	<1(75)	1–3 (20)	>3 (5)

Across the districts and gender, improved dairy cattle had the highest tropical livestock units (TLU), followed by local dairy cattle. For pigs, goats and poultry, none attained 1 TLU by either men or women (Table 2). Improved dairy cattle across the districts ranged 1–5.19 TLU compared to 0.45–2.07 for local dairy, although men in Kiwira and, both gender at Lufingo did not think there were any local dairy.

Table 2. Mean tropical livestock unit (TLU) in Mufindi, Njombe and Rugwe districts in southern highlands of Tanzania.

Livestock type	Mufindi		Njombe		Rugwe	
	Igowole		Ibumila		Kiwira	
	Women	Men	Women	Men	Women	Men
Improved Dairy Cattle	2.48	2.13	2.52	2.52	1.05	3.6
Local Dairy Cattle	1.95	2.07	1.22	1.22	0.45	-
Goat	0.49	0.34	0.18	0.18	0.03	-
Pig	0.18	0.15	0.24	0.24	-	1.06
Poultry village condition	0.09	0.10	-	-	0.08	0.07
Local bulls	-	-	0.62	0.62	-	-
	Mtwango		Ikuna		Lufingo	
Improved Dairy Cattle	3.73	3.73	2.54	2.54	3.36	5.19
Local Dairy Cattle	0.61	0.61	1.53	1.53	-	-
Pig	0.43	0.43	0.25	0.25	0.36	0.30
Goat	0.11	0.11	0.35	0.35	0.05	0.05
Poultry - Village Conditions	0.08	0.08	-	-	0.11	0.11
Improved bulls	-	-	0.61	0.61	-	-

Contribution of livestock to house hold incomes ranged 18–51% across the districts (Table 3). Differences among the wards and gender were observed. While men in Mtwango estimated income from livestock was 47%, women in the same area thought it was half of it, which was different in Igowole (same district) where women estimated livestock contribution to be 31% and 18% by men. In Njombe, however, livestock was perceived to contribute higher than in the other two districts, and contributed the most, except as estimated by men in Ikuna Ward. In Rugwe, contribution within wards were closest between men and women with a difference of only 2%. However, growing other crops lead in house hold incomes followed by livestock.

Table 3. Relative percentage (%) livestock contribution to household incomes in Mufindi, Njombe and Rugwe districts of southern highland in Tanzania

Income category	Mufindi		Njombe		Rugwe	
	Igowole		Ibumila		Kiwira	
	Women	Men	Women	Men	Women	Men
Livestock	31	18	45.6	51.7	36	34
Cropping	46	35	41.7	23.3	60	58
Business	9	18	6.7	22	4	-
Paid labor	7	15	1	2.8	-	-
Other	7	14	-	-	-	-
Remittance	-	-	5	-	-	8
	Mtwango		Ikuna		Lufingo	
Livestock	24	47	46.1	29.7	23	24
Cropping	56	46	33.9	46.0	68	76
Business	1	6	11.1	24.3	9	-
Paid labor	13	-	2.2	-	-	-
Remittance	3	-	-	-	-	-
Other	4	-	6.7	-	-	-

Across the districts three forage grasses are utilized for forage and 3 fodder legumes (Figure 1). While Rhodes grass and Napier grass were mostly in Mufindi and Njombe districts, Napier grass was the only in Rugwe. Fodder legumes were only in Njombe and none in the other two districts. The area allocated to these forage per household was < 0.37 ha, only Rhodes grass attained 0.3 ha in Njombe. In Mufindi, both wards and for either men or women, had the least land allocated to forages compared to Njombe and Rugwe. All the listed forages occupied 0.13 of a hectare or less.

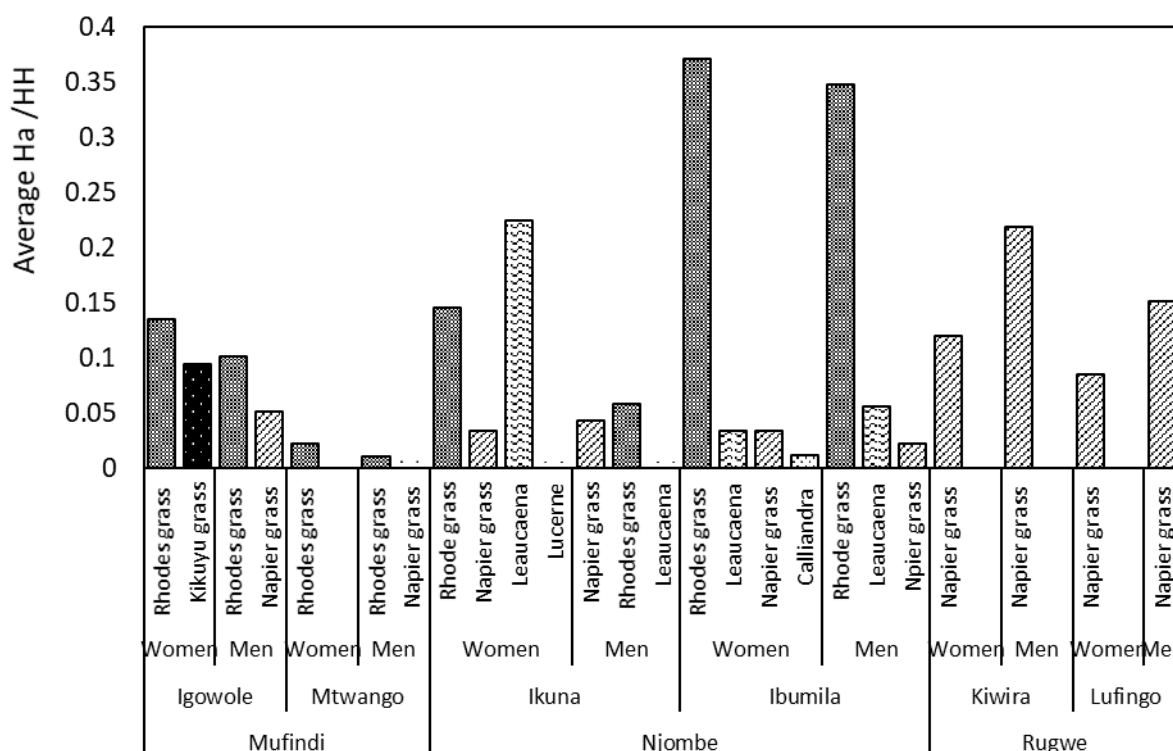


Figure 1. Mean cultivated fodder (Ha) in Mufindi, Njombe and Rugwe districts of Tanzania Southern highlands disintegrated by gender and in two Wards, in each District.

While livestock contribution to developing economies is significant, productivity is often a concern. Contribution of 18–51% in household incomes across the districts is significant enabling meeting other household needs through livestock. With the projected increase in demand for

livestock products (Delgado 2003), it is likely that the contribution of livestock to the incomes may increase.

The apparent low attention to use of cultivated forages contribute to low productivity, and possibly the genetic potential of the already existing cattle is not fully exploited (Mwendia et al. 2018), that were mostly reported as improved dairy cattle across the districts (Table 2). Under-feeding is likely to be the scenario. Going by amount of land allocated to forage/fodder production compared to land available show little attention to fodder cultivation. For example in Njombe district that appeared to have more forage options that farmers mentioned to be in use (Figure 2), compared to the other two districts, it is only 2–12 % of the land available is allocated to forages and fodder, with the lower value for large farms which are at least 15 acres. This dismal cultivation of forages' inevitably contribute to low animal production (Cohen, 2006), given the biggest cost of about 70% in livestock is related to feed and forages (Odero-Waitituh 2017). The need for sustainable intensification (Lee et al. 2012) provide an opportunity for smallholder farmers to engage in forage production, for own use and sale.

Conclusions and Outlook

Livestock plays an important role in the area of study, but inadequate feeding due to low feed availability in part of the year most likely contribute to low livestock productivity especially the cattle. Farmers have not engaged fully in forage cultivation necessary to improve livestock productivity. Improving and promoting forage cultivation, through awareness, demonstration approaches and piloting involving farmers' would be desirable.

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