



Evaluating agro-ecological adaptation, farmers' preferences and socio-ecological niches of tropical forages in Sud-Kivu, DR Congo



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Introduction

In eastern Democratic Republic of Congo (DRC), farmers traditionally practice mixed crop-livestock systems. Livestock feed scarcity in both quantity and quality is a persistent constraint to their productivity, especially in the dry season.

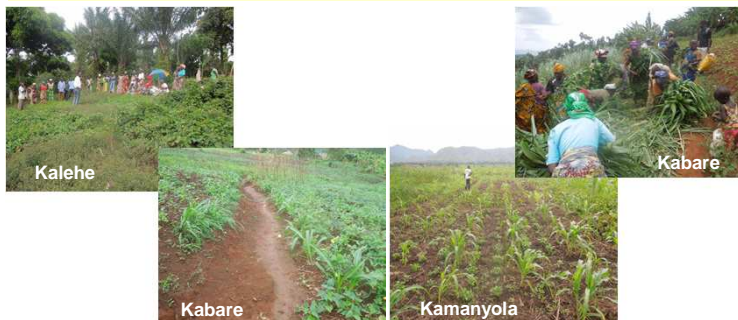
Grazing on natural pastures and collection of roadside grasses constitute the main feeding system, while only 37% of farmers cultivated forages on small plots contributing 6% to livestock diet.

Improved forages could play an important role in improving livestock production while decreasing soil erosion and improving nutrient cycling. This study includes researcher-managed

- Demo plots for agro-ecological adaptation of improved forage grasses and legumes;
- Assessments of farmers' preferences for improved forage species; and
- Determining on-farm niches for forage grass and legume cropping.

Results

- There is differential agro-ecological adaptation of grasses and legumes (Table 1).
- Farmers' choices depended mainly on biomass produced but also on other criteria like animal preference.
- Integration of forage legumes and grasses into cropping systems depended on the topography, land availability, land tenure and livestock production system.



Materials and Methods

The study was conducted in 4 sites representing typical agro-ecological conditions of South-Kivu (Table 2):

Table 2: Study site characteristics

Sites	Altitude (m)	Longitude	Latitude	Slope (%)	Soil fertility	Erosion
Kabare/Nyacibimba	1955	02°29'	028°47'	>10	Low	Strong
Kalehe/Muhongoza	1548	02°04'	028°54'	5-10	Medium	Medium
Kamanyola	940	02°44'	029°01'	<5	High	None
Tubimbi	1100	02°47'	028°35'	<5	Low	None

Three approaches were used:

- Two demonstration trials for forage legumes and grasses from October 2012 to April 2013.
Legumes tested: *Canavalia brasiliensis* CIAT17009, *Stylosanthes guianensis* CIAT11995 and *Desmodium uncinatum* cv. Silverleaf;
Grasses tested: Napier (*Pennisetum purpureum*) cv. French Cameroon, local Napier, and Guatemala (*Tripsacum andersonii*).
- 63 Farmers individually ranked forages among the legumes and grasses that they preferred according to their own selection criteria.
- On-farm testing niches was carried out from October to December 2013. Two packages were available to each of 79 farmers: one of forage legume seeds (*C. brasiliensis* CIAT17009, *S. guianensis* CIAT11995, *Lablab purpureus* CIAT22759 and *Desmodium distortum*) and one of grass splits (Guatemala, and Napier cv. French Cameroon and local).

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Conclusion

- The legumes *Canavalia brasiliensis* and *Desmodium uncinatum* and Napier grass cv. French Cameroon may have highest potential for adoption due to their high biomass production.
- In high altitude sites (Kabare and Kalehe), grasses were most preferred and farmers planted them on field edges and against erosion (land scarcity).
- In low altitude sites (Kamanyola), forage legumes were most preferred and mainly associated with maize and cassava. This was due to land ownership (seasonal rental) and scavenging animals. In Tubimbi, farmers tended to create a forage plot near the homestead.

Results

Table 1: DM yield (kg ha⁻¹) of the tested forage legumes and grasses species

Species	Sites			
	Kabare	Kalehe	Kamanyola	Tubimbi
Legumes				
Canavalia	2117.94b	3213.99a	6887.49a	1522.35a
Greenleaf Desmodium	5433.02a	2611.50a	6091.97a	322.08a
Stylo	1642.28b	4153.36a	6690.96a	2128.58a
F	23.038**	3.15ns	0.19ns	2.52ns
LSD _{0.05} interaction=1691.2				
LSD _{0.05}	1689.9	1717.9	3738.5	2275.9
Grasses				
Napier cv. French Cameroon	5594.20ab	3455.17ab	10119.70a	3586.82a
Local Napier	7479.61a	6203.56a	-	1918.16b
Guatemala	1261.63b	2369.82b	2586.18b	2414.53a
F	4.81ns	4.92ns	53.09**	0.37ns
LSD _{0.05} interaction=16.14				
LSD _{0.05}	5710.9	3499.9		5541.9

Values followed by different letters are significantly different at a ≤ 0.05.

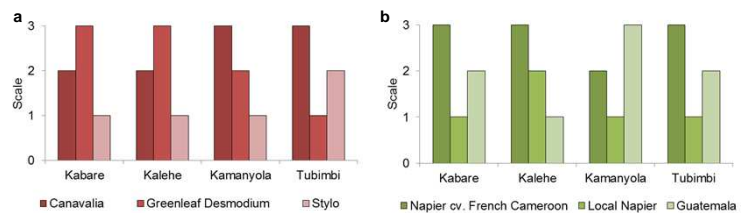


Figure 1: Participatory variety selection of (a) forage legumes and (b) forage grasses on a scale from 1 = low to 3 = high

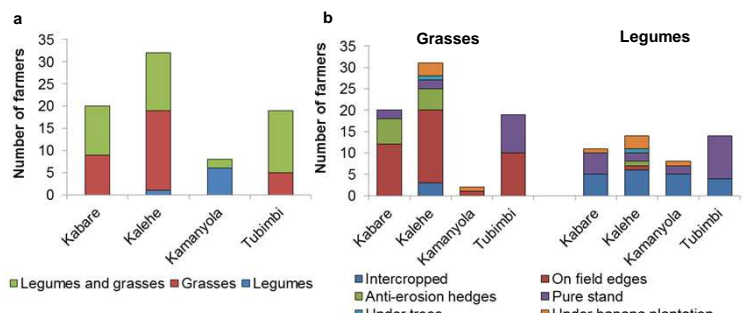


Figure 2: Forages types (a) cultivated and (b) integrated into farming systems according to site

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Reference:
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