

Farmers' Preferences of Phenotypic Traits in Cattle Production and Marketing: A Case Study in Central Ethiopia

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Introduction: Production and marketing decisions in the semi-subsistence cattle keeping systems of Ethiopia are principally influenced by farmers' preferences for cattle phenotypes. Eliciting the preferences and quantifying the economic worth of these traits would reinforce efforts in the production, marketing, and sustainable use and conservation of animal genetic resources (AnGR). This study explored traits preferences of farmers and farmer-buyers' for cattle traits when they make decisions to buy, sell or maintain cattle.

Methodology: This study was done in Dano district in western Ethiopia, some 250 km west of Addis Ababa. Participatory surveys and semi-structured individual interviews were applied to generate data from a sample of 44 livestock keepers and/or buyers. Descriptive statistics including Spearman's non-parametric correlation coefficient of ranks were applied to analyze the data. The Spearman's correlation coefficient was computed using the formula:

$$r' = 1 - \frac{6\sum d^2}{n(n^2 - 1)}$$

where d denotes the difference between ranks of corresponding pairs of the two farmers, and n represents the number of observations.

Result: For farmers, age, origin and draft power were highest ranked attributes of oxen, whereas for buyers in markets the highest ranking traits were ploughing strength, age, origin and calf strength. Fertility as measured by short calving intervals, age and calf strength were ranked highest when buyers were asked in the markets about cow traits. Origin, age, milk yield and fertility were highest ranked traits of cows by buyers (mainly farmers) in the market. Body size was found to be a second rate trait for both farmers and buyers Color and

horn shape were uniformly ranked least by both groups for both cows and oxen (Tables 1 and 2).

The trait rankings reveal that both oxen and cows are evaluated in a distinct way both in the market and on the farm. In fact, age and origin dominate the preferences of farmers as cattle keepers and cattle buyers with ploughing added for oxen and fertility added for cows. The Spearman's non-parametric rank correlation coefficients calculated for the rankings of farmers (both as keepers and as buyers) show that covariations of the rankings are strong and mainly occur along the upward slant. This implies that trait preferences are consistent and vary in the same direction (Tables 3 to 6).

Conclusion: The results indicate that cattle keeping farmers have clear and consistent trait preferences for their oxen and cows, and that the evaluation of such traits starts at early age of the animal, as in the case of calf strength. Such empirical evidence on livestock trait preferences is useful to make better informed decisions in developing interventions to improve the contribution of cattle to livelihoods of their keepers. These interventions could be in the form of short-term management improvements or longer-term activities for genetic improvement. Therefore, the identification and evaluation of such trait preferences should be based on comprehensive understanding of not only the relative importance attached to each phenotypic trait but also of the ways in which cattle keepers and consumers perceive and measure these traits.

Table 1. Count of rankings for oxen traits on the Farm (FA) and in the Market (MA)

Trait Rank	Color		Age		Origin		Body size		Horn type		Draft power		Calf strength	
	FA	MA	FA	MA	FA	MA	FA	MA	FA	MA	FA	MA	FA	MA
1			5	4	6	2	1				3	5	1	2
2			3	2	1	3	1				3	1		3
3	2	1	1	4	1	2	2	5			4	4	3	2
4	1	1	2	1	1	1	3	2	1		1	1	2	
5	4	2			1	2	2	4					3	2
6	4	7				1	2		2				2	2
7					1				8	11				

Table 2. Count of rankings for cow traits on the Farm (FA) and in the Market (MA)

Trait \ Rank	Colour		Age		Origin		Body Size		Horn type		Fertility		Milk yield		Calf strength	
	FA	MA	FA	MA	FA	MA	FA	MA	FA	MA	FA	MA	FA	MA	FA	MA
1			4	2	2	5		1			6	2	1	3	3	1
2			3	5	3	1		2			1	1	1	1	1	3
3			2		2	1	2	1			2	3	1	1	2	2
4				2	1	1	2	4			1	3	7	1	5	
5			1	2	3		3	1			1	1		4		2
6		3	1			2	4	1				1	1	1		3
7	11	8				1		1								
8									11	11						

Table 3. Correlation of farmer's rankings of oxen traits on the farm

	Farm1	Farm2	Farm3	Farm4	Farm5	Farm6	Farm7	Farm8	Farm9	Farm10
Farm'2	.556									
Farm3	.750	.546								
Farm4	.764*	.364	.600							
Farm5	.075	.038	.019	.556						
Farm6	.566	.377	.434	.630	-.077					
Farm7	.835*	.339	.615	.955**	.299	.748				
Farm8	.472	-.139	.315	.618	.604	-.151	.523			
Farm9	.655	.873*	.837*	.571	.111	.556	.541	.000		
Farm10	.417	.639	.278	.709	.755*	.340	.532	.306	.600	
Farm11	.849*	.585	.811*	.927**	.385	.692	.898**	.434	.815*	.679

*Correlation is significant at the 0.05 level, **Correlation is significant at the 0.01 level (2-tailed).

Farm' = farmer

Table 4 - Correlation of farmer's rankings of oxen traits in the market

	Farm1	Farm2	Farm3	Farm4	Farm5	Farm6	Farm7	Farm8	Farm9	Farm10
Farm2	.500									
Farm3	.482	.519								
Farm4	.667	.667	.692							
Farm5	.927**	.519	.692	.692						
Farm6	.357	.929**	.371	.378	.371					
Farm7	.429	.750	.593	.252	.519	.857*				
Farm8	.655	.746	.887**	.881**	.811*	.527	.564			
Farm9	.306	.955**	.411	.600	.337	.919**	.649	.633		
Farm10	.909**	.636	.245	.615	.736	.546	.436	.509	.505	
Farm11	.929**	.607	.741	.757*	.964**	.429	.571	.855*	.396	.764*

*, ** same as above.

Table 5 - Correlation of farmer's rankings of cow traits in the market

	Farm1	Farm2	Farm3	Farm4	Farm5	Farm6	Farm7	Farm8	Farm9	Farm10
Farm2	.952**									
Farm3	.561	.575								
Farm4	.071	.073	.537							
Farm5	.190	.220	.512	.952**						
Farm6	.830*	.825*	.575	.244	.317					
Farm7	.91**	.765*	.605	.205	.265	.778*				
Farm8	.690	.659	.366	.381	.405	.903**	.663			
Farm9	.548	.561	.220	.524	.571	.488	.434	.714*		
Farm10	.929**	.952**	.512	.071	.262	.683	.771*	.500	.524	
Farm11	.317	.400	.775*	.830*	.878**	.525	.346	.439	.366	.366

*, ** Same as above.

Table 6. Correlation of farmer's rankings of cow traits on farm

	Farm1	Farm2	Farm3	Farm4	Farm5	Farm6	Farm7	Farm8	Farm9	Farm10
Farm2	.629									
Farm3	.875**	.403								
Farm4	.878**	.331	.952**							
Farm5	.457	.808*	.346	.325						
Farm6	.531	.739*	.457	.446	.963**					
Farm7	.679	.926**	.383	.410	.707*	.616				
Farm8	.753*	.702	.531	.663	.689	.744*	.799*			
Farm9	.756*	.847**	.439	.524	.735*	.699	.952**	.916**		
Farm10	.659	.847**	.366	.452	.843**	.807*	.916**	.916**	.976**	
Farm11	.975**	.710*	.821*	.801*	.583	.621	.735*	.735*	.801*	.726*

*, ** Same as above.