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Participatory Characterization of the Woyto-Guji Goat and Its Production Environment around Northern Omo, Ethiopia

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ABSTRACT

Community based Participatory characterization of Woyto-Guji goat population around Northern Omo river (Loma) was undertaken to identify breeding objectives and trait preferences, document indigenous knowledge, traditional breeding system and husbandry practice, and characterize goat breed in its environment and production system. Range of participatory tools, including Focal Group Discussions, participatory mappings and transect walks, were employed to study the local community's Indigenous knowledge and practices in animal breeding. The breeding objective was defined in a participatory manner through own-flock ranking experiments. Physical description of the goat population was made based on the "key characteristics" concept used by the community to distinguish their goat type among other breeds. The Loma community maintains a perception of special association towards the Woyto-Guji goat type, claiming a historic role in its development and adaptation. Local myths persistent in the community associate the origin of the Woyto-Guji goat breed with the communal ethno-history. The community generally practices selective pure breeding employing rather complex indigenous knowledge and traditional practices aimed at polishing the gene pool towards the dictates of the environment. The 91.2% goat showed plain colour patterns while as 6.3% were patched. The head profile exhibited was straight (80.6%), slightly convex (15.2%) and concave (4.2%). The goat population showed either semi-pendulous (69.8%) or horizontal (30.3%) ear type. However, the ear formation was either long ear (97.0%) or short ear (2.3%). Goats were kept for multifaceted purposes ranging from products like meat and milk to functions in socio-cultural and financial state of affairs.

Keywords: breeding objectives, community-based breeding, indigenous knowledge.

INTRODUCTION

Ethiopia is home for diverse indigenous goat populations, numbering 22.78 million heads (CSA, 2011) and 15 breeds of goat (IBC, 2004) that have traditionally been an integral part of the farming systems in all agro-climatic conditions. It has been estimated that about 70% of the goat population is found in the low lands and the rest 30% is found in the highlands (Alemayehu, 1993). Moreover, goats play an important role in the livelihood of resource-poor farmers and they provide a vast range of products and services such as meat, milk, cash income, skin, manure and security (insurance), banking and gifts (Adane and Girma, 2008; Tesfaye, 2010). The indigenous goat breeds have relatively a better

advantage in their natural habitat (Dereje, 2011).

Identification, characterization and understanding of local breeds, as well as associated contexts of their development and utilization, is the first step in making well informed decisions pertaining to genetic/breed improvement interventions. Attempts were so far made to document indigenous Goat breeds in Ethiopia and elsewhere in the tropics following the conventional methodological approaches of phenotypic characterization (FARM Africa, 1996; Workneh *et al.,* 2004) using global list of descriptors published by FAO (FAO, 1986a; FAO, 1986b; FAO, 1986c). Despite empirical data on description of the so called "economically important" traits of the breeds, conventional approaches have so far felt short of capturing holistic picture of breeding in the context of traditional systems.

A "people-centred" breed characterization method has recently emerged with a more participatory approach to identify and understand the indigenous animal genetic resources. It recognizes indigenous animal genetic resources as results of both deliberate and non-deliberate manipulation of the gene pool by local communities for ecologically and socio-culturally determined preferences (Koehler, 2005).

Documentations of important productive, reproductive and adaptation traits pertaining to the *Woyto-Guji* goat (locally known as *Halla*) goat breed are scanty. Essential inputs for designing breeding strategy in the context of community-based management, such as, local trait preferences, traditional systems in managing the gene pool, socio-cultural portfolio of the breeding community, remain untapped. The basic objective of this study was to characterize the *Woyto-Guji* goat based on the knowledge, concepts and priorities of the Loma community breeding it and its production environment.

MATERIALS AND METHODS

The Study Area

The study was conducted in Loma district (around Northern Omo), located at 6.59˚-7.34˚N latitude and 36.68˚-37.52˚ E longitudes with at altitudinal range between 501-3300 meters above sea level in Southern Nations, Nationalities and Peoples Region (SNNPR) (Mathewos, 2008). The District was, selected based on its potential for goat production, diversified agro ecological zone which encompasses lowland, midland and highland and its varied production system. The total surface area of the district is 116,280ha; with the mean annual rainfall of 900-1800mm, with bimodal and erratic distribution and temperature ranges from 14˚C to 30˚C (SNNPRS-BoFED, 2004; CSA, 2007).

According to housing and population census of Ethiopia in 2007 (CSA, 2007) the total population of Loma district was about 109,192 (male 55,214 and female 53,978) and total land area of study site was 116, 280 ha. The land use pattern followed is 40701 ha cultivated, 36172.17 ha covered by bush shrubs, 26202 ha under settlement, 12060 ha for grazing, 782.33 ha covered under forests and the remaining 362.50 ha is for others. The livestock resources of the District (LAR, 2013) were 91.54 thousand cattle, 28.02 thousand sheep's, 47.08 thousand goats, 19.08 thousand equines and 61.87 thousand poultry. The Loma district comprised of 3 urban Kebeles and 36 rural kebels. The selection of District is based on its potential for goat production and its holistic agro ecological zone from very low agro-ecology to highland areas and wide range of area coverage with different production system such as Agro pastoralist, in the low land and mixed farming in mid and highland areas.

Site Selection and Sampling Techniques

Multi-stage stratified sampling technique was employed in the present study. In the first stage, district was stratified into three agro ecologies namely lowland with altitude of <1500masl, midland with altitude of 1500-2300masl and highland with > 2300masl (MOA, 2000). In the second stage, two kebeles were randomly selected from each agro-ecology. In the third stage, a total of 230 households (90, 70, 70 from lowland, midland and highland respectively) having goat stocks were interviewed at randomly in all direction after every eight to twelve households based on the number of household per each Kebels. On average 3, 4 and 4 goats per households were measured from lowland, midland and highland, respectively.

Data Collection

Range of PRA tools and an open-ended questionnaire were employed to collect the data. The PRA tools include discussions with a focal-group established at each kebele whose members included individuals communally

known to have high quality breeding animals, people believed to be knowledgeable about past and present social and economic status of the area, community elders and story tellers. Own-flock ranking experiment was used to define the breeding objective and trait preferences. Open-ended questionnaires were administered to a total of 230 respondents on socio-economic characteristics, routine husbandry practices, production constraints and breeding management.

Data Analysis

Indexes were calculated for all ranking data according to a formula: Index = sum of (3 for rank 1 + 2 for rank 2 + 1 for rank 3) given for an individual reason (attribute) divided by the sum of (3 for rank 1 + 2 for rank 2 + 1 for rank 3) for overall reasons. Statistical Procedure for Social Sciences (SPSS for window, release 20.0, 2013) was used to analyse the qualitative data from the questionnaire and physical description of the sample goats. F test was carried out as appropriate, following analysis of variance (ANOVA), to assess statistical significances.

RESULTS AND DISCUSSION

Production system

Agro pastoralist in lowland and Crop-livestock mixed production system in midland and highland are prevalent in the study area. The study area has been endowed with two kinds of grazing lands, viz: communal grazing land and private owned grazing land. The proportion of farmers (respondents) using both communal and private grazing land were 68.3%, 67.4% and 61.6% in lowland, midland and highland, respectively whereas proportions of farmers using only communal grazing land was 31.7%, 32.6% and 38.4% for corresponding agro ecologies. According to the views of the goat owners, the Woyto-Guji goat withstands the harsh environmental conditions marked with shortage of feed and water and contributes significantly to their livelihood.

Livestock Holding and Flock Structure

The major livestock species in the study area were goats, cattle, sheep, chicken, donkeys, mules and horses. Besides the respondents maintained bee hives in all three agro ecologies. An overall minimum number of 5 and maximum of 73 goats were reported per household in present study. The overall livestock holding per house hold was 15.47±14.40, 5.50±3.99, 2.15±3.13, 4.22±4.57, 0.64±0.83, 4.22±4.57, 2.33±3.6, 0.35±0.79 and 0.1±0.33 for goat, cattle, sheep, donkey, chicken, bee hive, mule and horse respectively. The goat were more numerous per household (28.44±15.53, 8.36 ±3.06 and 5.89±1.9) for lowland, midland and highland, respectively followed by cattle 7.7±4.55, 4.4±2.9 and 3.79±2.66 in lowland, midland and highland, respectively. However, sheep was more numerous (5.51±3.58) than cattle per household in highland area. The number of goats, cattle, sheep and donkey per household showed a significant variation ($p<0.01$) among agro ecologies (table 1).

Table1: Livestock holdings per household in the study area

Descriptor	Lowland	Midland	Highland	Overall
	Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD
Goat	28.44±15.53[a]	8.36±3.06[b]	5.89±1.9[c]	15.47+14.40
Cattle	7.7±4.55[a]	4.4±2.9[b]	3.79±2.66[b]	5.50±3.99
Sheep	0.16±0.62[a]	1.34±1.38[b]	5.51±3.58[c]	2.15±3.13
Donkey	0.39±0.53[a]	0.59±0.87[a]	1.01±1.00[b]	0.64±0.82
Chicken	3.97±3.49	5.31±5.62	3.44±4.49	4.22±4.57
Bee hive	2.56±3.82	2.41±3.59	1.94±3.34	2.33±3.60
Mule	0.09±0.28[a]	0.3±0.57[b]	0.7±1.18[c]	0.35±0.79
Horse	0.00±0.00	0.06±0.23	0.26±0.53	0.1±0.336

[a, b, c] means on the same row with different superscripts are significant different ($p<0.01$), SD = standard deviation

The agewise and sexwise goat floack structure of the study area is presented in table 2. The results showed that female goat aged greater than one year constituted 28.7, 29.3 and 29.6% of total floack strength in all three agro ecologies (Lowland, Midland and Highland, respectively) and these proportion were highest among all age and sex class. These proportions were significantly different between lowland –midland and lowland – highland whereas difference between midland – highland were not significant. Flock structure trend in the three agro ecologies were not the same though female goat aged greater than one year were at top of hierarchy in all the three areas.

Table 2: Livestock holdings per household in the study area

Flock class		Agro ecologies												Overall			
		Lowland				Midland				highland							
Sex	Age	Range	sum	Mean± SD	%	Range	sum	Mean±SD	%	Range	sum	Mean±SD	%	Range	sum	Mean±SD	%
Male	< 6 months	0-8	235	2.6±1.76	7.4	0-3	105	1.5± 1.07	5.6	0-3	143	2.04± 1.10	8.7	0-8	483	2.1± 1.44	7.2
	6 month to 1 year	0-13	324	3.6± 2.7[a]	10.2	0-4	232	3.31± 0.93[b]	12.32	0-6	141	2.01± 1.40[c]	8.6	0-13	697	3.03± 2.15	10.4
	> 1 year	0-12	403	4.48± 3.2[a]	12.7	0-7	183	2.61± 1.66[b]	9.7	0-7	178	2.54± 1.72[b]	10.86	0-12	764	3.32± 2.85	11.41
Subtotal Male			962		30.3		520		27.6		462		28.17		1944		29.04
Female	< 6 months	0-15	464	5.15± 3.2[a]	14.6	0-5	305	4.35± 1.63[b]	16.2	0-6	270	3.86± 1.70[b]	16.46	0-15	1039	4.51± 2.77	15.5
	6 month to 1 year	0-16	663	7.36± 4.4[a]	20.9	0-6	438	6.26± 1.74[b]	23.3	0-6	385	5.50± 1.68[b]	23.47	0-16	1486	6.46± 3.85	22.2
	> 1 year	0-24	911	10.12±5.44[a]	28.7	0-6	551	7.88± 1.70[b]	29.3	0-5	486	6.94± 1.32[b]	29.63	0-24	1948	8.50± 4.71	29.1
Subtotal Female			2038		64.2		1294		68.7		1141		69.6		4473		66.8
Castrated		0-16	172	1.91± 2.44[a]	5.4	0-5	68	1.0± 1.27[b]	3.6	0-4	37	0.53± 1.07[c]	2.3	0-16	277	1.20± 1.87	4.14
Pooled Total			3172		100		1882		100		1640		100		6694		100

[a,b,c] means on the same row with different superscripts are significantly different (P<0.05), SD = standard deviation, livestock composition (%)

Table 5: Household ranking on major production constraints in the area

Constraints	Agro ecologies															
	Lowland				Midland				Highland				Overall			
	R1	R2	R3	I	R1	R2	R3	I	R1	R2	R3	I	R1	R2	R3	I
Disease	48.8	31.4	3.2	0.35	32.3	18.7	14.1	0.25	46.3	26.7	8.6	0.34	42.7	25.6	8.6	0.31
Feed shortage	8.4	22.6	18.7	0.15	18.4	23.8	28.7	0.22	5.4	4.2	6.4	0.05	10.7	16.8	17.9	0.14
Water shortage	1.4	2.0	1.2	0.02	1.6	2	0	0.02	1.4	-	1.3	0.01	1.47	1.3	0.8	0.01
Predator	26.7	17.4	32.2	0.25	12.3	1.2	0	0.07	0	1.7	2.7	0.01	13	6.7	11.6	0.11
Genotype	0	0	0	0	0	0	0	0	0	1.5	2.3	0.01	-	0.5	0.76	0.003
Market	9.3	6	24	0.11	2.4	1.4	0	0.02	2.2	4.3	26	0.07	4.6	3.9	16.6	0.06
Draught	1.4	1.0	2.2	0.01	1	0	0	0.01	0	1.0	-	0.003	0.8	0.6	0.7	0.007
Land	0	0	0	0	3.4	16.7	23.6	0.11	34.5	28.3	24.3	0.31	12.6	15	16.0	0.14
Labor	4	19.6	18.5	0.12	28.6	36.2	33.5	0.32	10.2	32.3	28.4	0.21	14.3	29.3	26.8	0.21

R1, R2 and R3 = rank 1, 2 and 3 respectively. I= index: Index = sum of (3 for rank 1 + 2 for rank 2 + 1 for rank 3) given for an individual reason (attribute) divided by the sum of (3 for rank 1 + 2 for rank 2 + 1 for rank 3) for overall reasons

Table 6: Preference ranking of goat production objectives by household (%)

Purpose of goat keeping	Lowland				Midland				Highland				Overall			
	R_1	R_2	R_3	I	R_1	R_2	R_3	I	R_1	R_2	R_3	I	R_1	R_2	R_3	I
Meat	42.2	32.2	16.7	0.35	40.0	21.4	17.1	0.30	44.3	40	44.3	0.43	42.17	31.2	26	0.36
Milk	4.4	12.2	17.8	0.09	2.9	11.4	27.1	0.10	0	6.1	6.1	0.03	2.4	9.9	17	0.07
Sale of live animals	45.6	39	22.1	0.40	52.9	54.3	20.0	0.48	48.6	41.1	38.6	0.44	49.03	44.8	26.9	0.44
Skin	0	1.1	15.6	0.03	0	0	7.1	0.01	0	0	1.4	0.002	0	0.37	8	0.02
Social gift	5.6	11.1	17.8	0.10	4.3	8.6	22.9	0.09	7.1	7.1	5.7	0.07	5.6	8.9	15.5	0.08
Tradition	2.2	4.4	10	0.04	0	4.3	5.7	0.02	0	5.7	3.9	0.03	0.7	4.8	6.5	0.04

R_1, R_2 and R_3 = rank 1, 2 and 3 respectively. I= index: Index = sum of (3 for rank 1 + 2 for rank 2 + 1 for rank 3) given for an individual reason (attribute) divided by the sum of (3 for rank 1 + 2 for rank 2 + 1 for rank 3) for overall reasons

The highest proportion of female greater than one year may be ascribed to the role of female in the multiplication of flock facilitating annual replacement and sale of supplies animal thereby generating income to the farmer. The proportion of male aged 6 month to one year showed significant difference among all pairs of comparesion whereas pairwise comparisons among other proportions were either significant or non-significant.

The overall proportions of female and male goat in the study area were 66.8% and 33.2%, respectively. These findings are comparable with the proportion of 60.8% and 39.2% female and male goats of Hararghe (Dereje, 2011) and 69.84% and 30.16% female and male goats, respectively in Ethiopia (CSA, 2008). However, present finding not in agreement of 75.6% female and 24.4% male goats reported in Alaba (Deribe, 2009). The proportion of castrated goat were 5.4, 3.6 and 2.3 % in lowland, midland and highland area, respectively with overall proportion of 4.14%. The present finding was comparable with the 3.35% castrated per house hold reported (Tesfaye, 2009) and 3.5% and 4.4% in Arsi-Bale and Keffa goats' (FARM Africa, 1996), respectively. The comparable proportion of castrated, recorded in the current study, may be due to extensive fattening practices of Loma farmers as flock structure is a function of production objectives of the producers.

Feeding Practice and Response to Feed Shortage

The proportion of farmers (respondents) using both communal and private grazing land were 68.3%, 67.4% and 61.6% in lowland, midland and highland, respectively whereas proportions of farmers using only communal grazing land was 31.7%, 32.6% and 38.4% for corresponding agro ecologies, respectively. The results (Table 3) showed that that supplementation was practiced by 87.7, 85.7 and 88.6 % of respondents in lowland, midland and highland areas. The supplementation was practiced in dry seasons of the year by majority of goat respondents (85.5, 82.9 and 88.6 % in lowland, midland and highland areas, respectively). This may be due to the shortage of forages in grazing land due to harsh climate affecting growth of vegetation and other shrubs / plants.

Table 31: Summary of Feeding Practices by respondents (%)

	Lowland		Midland		Highland	
	N	%	N	%	N	%
(I) Type of grazing land:						
Communal grazing land alone	28	31.1	23	32.9	27	38.6
Private grazing land alone	-	-	-	-	-	-
Both types	62	68.8	47	67.1	43	61.4
(II) Grazing methods in different season:						
(A) Dry seasons:						
Herded grazing	65	72.2	48	68.6	33	47.1
Tethered	0	0	1	1.4	4	5.7
Herded, paddock, tethered	20	22.2	18	25.7	24	34.3
Herded and tethered	5	5.6	3	4.3	9	12.9
(B) Wet season:						
Herded grazing	78	86.7	4	5.7	1	1.4
Tethered	0	0	6	8.6	2	2.9
Herded, paddock, tethered	8	8.9	39	55.7	36	51.4
Herded and tethered	4	4.4	21	30	31	44.3
(III) Practice of supplementation:						
Supplementation practiced	79	87.7	60	85.7	62	88.6
Supplementation not practiced	11	12.2	10	14.3	8	11.4
(IV) Season of supplementation						
Dry season	77	85.5	58	82.9	62	88.6
Wet season	9	10.0	4	5.7	6	8.5
Both seasons	4	4.4	8	11.4	2	2.9

Watering Resource and Utilization

Perusal of table 4 showed that river was the major source of water for goats in both wet and dry season. The proportion of goat watered by river water were 61.1 %, 47.8 % (wet and dry seasons, respectively) in lowlands, 47.0, 68.6 % (wet and dry seasons, respectively) in midlands and 34.3, 43.0 % (wet and dry seasons, respectively) in highlands. The majority of the respondent provides water to goats once a day during both wet (55.6, 61.4 and 65.7 % in wet seasons) and

dry seasons (73.3, 75.7 and 77.0 % in dry season) in all three agro ecologies (Lowland, Midland and highland, respectively). The study showed that during dry season a good proportion of respondents provided water once in two days (20.0, 18.6 and 13.0 in lowland, midland and highland, respectively).

Table 4: Water sources and utilization during dry and wet seasons

Water source in seasons	Lowland		Midland		Highland		Overall	
	N	%	N	%	N	%	N	%
(A) Water source in Wet seasons:								
River	55	61.1	33	47.0	24	34.3	112	48.6
Spring water	4	4.4	9	13.0	15	21.4	28	12.1
Bore hole/water well	0	0	2	3.0	14	20.0	16	7.0
River and spring	0	0	26	37.0	17	24.3	43	18.7
Bore hole and pond	31	34.4	0	0	0	0	31	13.5
(B) Water source in dry seasons:								
River	43	47.8	48	68.6	30	43.0	121	52.6
Spring water	0	0	3	4.3	19	27.1	22	9.6
Bore hole/water well	0	0	0	0	0	0	0	0
pond	18	20.0	0	0	8	11.4	26	11.3
Bore hole and pond	14	15.5	11	15.7	8	11.4	33	14.3
River, pond and bore hole	15	16.6	8	11.4	5	7.1	28	12.1
Frequency of watering	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**
(A) Wet seasons:								
Freely availably	40	44.4	27	38.6	21	30.0	88	38.3
Once a day	50	55.6	43	61.4	46	65.7	139	60.4
Once in two day	0	0	0	0	3	4.3	3	1.3
B) Dry seasons:								
Freely availably	6	6.7	4	5.7	7	10.0	17	7.4
Once a day	66	73.3	53	75.7	54	77	173	75.2
Once in two day	18	20	13	18.6	9	13	40	17.4

N= Number of observation , % =percentage

Production Constraints

Disease, predator, feed shortage and labor were ranked the 1st, 2nd, 3rd and 4th in goat production in lowland with index of 0.35, 0.25, 0.15 and 0.12, respectively. Goat owners in midland area ranked labor, disease, feed shortage and land as the 1st, 2nd, 3rd and 4th challenges with an index of 0.32, 0.25, 0.22 and 0.11 respectively. However, in highland disease was ranked first with an index of 0.34, land ranked second (0.31), labor ranked third (0.21) and market ranked fourth (0.07) (Table 5).

Purposes of Keeping Goats

Perusal of these results showed that rearing of goats was expected to provide multifaceted benefits to farmers. The sale of live goat and meat were ranked first and second preferred production objectives with index of 0.40, 0.48 and 0.44 (sale of live animals) and 0.35, 0.30 and 0.43 (meat) in lowland, midland and highland, respectively. FGD further revealed that pooled income from sale of live animals, meat, milk and skin were most tangible benefits whereas tradition, social status, saving, social payments, ritual and manure were among the intangible benefits to the farmer.

Local concepts about key characteristics of the Woyto-Guji goat population

The local "key characteristics" employed by the local community to distinguish their goat type among other breeds within their migratory reach concept included physical features like Back profile, Coat color type and pattern, Horn orientation, Horn spacing. Nevertheless, the locals' concept of key characteristics also extends to perceptions about special attributes of the population. According to the focal group discussion members and individual interviewees, ability to stances, drought and heat stress tolerance were mentioned as special attributes of the Woyto-Guji goats.

Breeding Management

Majority of the respondents (84.63%) reported to practice selection of buck for breeding whether from own flock or other sources. Meanwhile, 13.37% of respondents also reported selection of breeding females. Stages of selection for breeding males were early; (birth-6months old), (2.0%), young; (6

months-1year old) (76.6%), adult; (more than year old) (21.4%). Selection criteria reported were mother (ancestral) history, own performance (appraisal) and some other traditional systems.

The *Loma* community has a culture of mentally memorizing personal ancestral genealogy as well as genealogy of their animals. Focal group discussion members also reported that owners can recall up to more than 7 lines of maternal lineages tracing back to superior individuals. Genealogy memorization is used to select breeding animals born to a superior maternal lineage. According to respondents, means to control mating were castration (53.0%), culling (25.2%) either through sale or slaughter of unselected animal and combination of these (21.8%). Mean age at castration of unselected males was reported to be 2.1 years. Main sources of breeding buck, according to respondents, were own-flock, relatives, neighbours and community members (regardless of spatial location).

Socio-Cultural Context of Goat Breeding In the Loma Community

The Woyto-Guji goatis locally known as the *halla dysha* goat after the communal name of the farmers that keeps it around Omo Rivers. The Loma community is a predominantly mixed crop-livestock community with strong clan system as the main social fabrics. This strong and closed clan based social identity goes beyond present day political boundaries unifying and networking members' of southern and south eastern pastoralist and agro pastoralist area. The Loma community maintains a perception of special association towards the Woyto-Guji (locally known as *halla dysha*) goat breed, claiming a historic role in its development and adaptation. Such cultural links between individual ethnic or social groups and specific breeds have been reflected in many breeds being named after ethnic groups (Rege, 2001; Koehler, 2003; FAO, 2009).

The FGD showed that the prevalent local myth about origin of Loma goat stated that it came from southern part of Omo river valley as the gift of God that the ancestors of Loma populace received from valley around Omo River. Thus domestication of feral goat started around Omo river area. Furthermore FGD revealed that goat breeds existing around southern and south eastern range land spread from the Valley of Omo River. There are several social circumstances that depend on ownership of goats for use as medium of social exchange and social payments. These include groom wealth gift, dowry payments, compensation payments and help to poorer relatives or clan members. In all the social exchange circumstances breeding buck constitute higher proportion of the gift stock.

Participatory Description of Physical Features of the Goat Type

The participatory descriptions of qualitative characters for both female and male goats are presented in table 6, 7. The result showed that both female and male goat exhibited white, brown, black, grey and cream white coat color type but in varying proportion in either same sex or across two sexes. In all white, brown, black, grey and creamy white coat color type were observed in the sampled goats. The overall (pooled) results showed that proportion of brown, black, white, cream white and grey coat colour were in descending order in the sampled goats. The highest proportion of brown coat colour indicated that farmers prefer this coat colour and have selected these animals favourably. Three coat colour patterns, viz: plain, patchy and spotted, were found in sampled goats. The plain coat colour pattern was dominant with 91.2 % (overall / pooled) occurrence in the sampled goats. The other two coat colour patterns (patch and spotted) were less common. The head profile observed were straight, slightly convex and concave among the sampled goats in the present study. The straight head profile is dominant (overall average = 80.6 %) followed by slightly convex (overall average = 15.2 %) and concave (overall average = 4.2 %). The ear formation showed that long ear were highly predominant (overall average = 97.0 %) in population of goats studied. Similar finding were reported by FARM Africa (FARM-Africa 1996).

Participatory definition of local trait preferences

Female goat traits in own-flock ranking experiments

The results of preferred female traits by farmers from own flock ranking experiments are presented in table 8. The results pooled overall three agro ecologies showed that body conformation, adaptation, twining ability, coat color, lamb survival, mothering character, short kidding interval and age at first maturity/longevity were ranked as first, second, third, fourth, fifth, sixth and seventh

traits with index value of 0.22, 0.18, 0.16, 0.15, 0.12, 0.06, 0.05 and 0.02/0.02, respectively, by farmers for selection of females. The ranking of trait preference in order of descent was body conformation (0.25), coat color (0.20), twining ability (0.18), adaptation (0.16), mothering character / lamb survival / short kidding interval (0.06), age at first maturity (0.02) and longevity (0.01) in lowland agro ecology. Similarly the sampled respondents in midlands ranked traits in descending order as twining ability (0.21), body conformation (0.19), lamb survival (0.18), adaptation (0.16), coat colour (0.14), mothering character / short kidding interval (0.04), longevity (0.02) and age at first maturity (0.01). In highlands body conformation / adaptation (0.22), coat colour / lamb survival (0.12), mother character (0.10), twinning ability (0.08), short kidding interval (0.06) and age at first maturity / longevity (0.04) were ranked as I, II, III, IV and V preferred trait in selection.

Table 2:Summary of the qualitative traits in the female and male sample goats

Characters	Factors level	Female		Male		Total	
		N	%	N	%	N	%
Coat color type	White	125	21.2	36	16.4	161	19.9
	Brown	259	43.9	111	50.5	370	45.7
	Black	124	21.0	39	17.4	163	20.1
	Grey	39	6.6	14	6.4	53	6.5
	Cream white	43	7.3	20	9.1	63	7.8
Coat color pattern	Plain	541	91.7	198	90.0	739	91.2
	Patchy	40	6.8	11	5.0	51	6.3
	Spotted	9	1.5	11	5.0	20	2.5
Head profile	Straight	473	80.2	180	81.8	653	80.6
	Slightly convex	93	15.8	30	13.6	123	15.2
	Concave	24	4.1	10	4.5	34	4.2
Ear formation	Rudimentary	2	0.3	1	0.5	3	0.4
	Short ear	8	1.4	11	5.0	19	2.3
	Long ear	578	98.0	208	94.5	786	97.0
Ear type	Semi pendulous	411	69.7	154	70.0	565	69.8
	Horizontal	179	30.3	66	30	245	30.3
Horn orientation	Rudimentary	58	9.8	13	5.9	71	8.8
	Front	57	9.7	21	9.5	78	9.6
	Backward	428	72.5	159	72.3	587	72.5
	Lateral	47	8.0	27	12.3	74	9.1
Horn shape	Straight	403	68.3	175	79.5	578	71.4
	Polled	64	10.8	16	7.3	80	9.9
	Spiral	123	20.8	29	13.2	152	18.8
Beard	Present	521	88.3	215	97.7	736	90.9
	Absent	69	11.7	5	2.3	74	9.1
Wattl e	Present	51	8.6	52	23.6	103	12.7
	Absent	539	91.4	168	76.4	707	87.3
Ruff	Present	531	90.0	201	91.4	732	90.3
	Absent	59	10.0	19	8.6	78	9.6

The plausible reasons as perceived by the respondent for body conformation were that bodily strong female goat survived the stress of climate, pregnancy, parturition, mothering, shortage of feed and water in a better way than week conformed goats. The farmer's preference for adaptation trait indicated that survivability and performance during harsh climates was uppermost in their minds. The interaction with respondent and FGD revealed that brown and/or reddish coat colors were preferred over black and/or white coat color by the producers. The possible reasons, as perceived by respondents, for this were (a) lower market demand and lower sale price, (b) better camaflouge from predator attack (especially when flocks remain unattended during grazing), (c) less parasitic infestation and (d) better heat tolerance by brown and/or reddish coat colors. Similarly the preference of respondents for twinning ability, mothering character and lamb survival as trait of choice, though followed by first set of three traits in order of preference, reflects their concern for ensuring availability of both replacement and surplus stock.

Male Traits in Own-Flock Ranking Experiments

The results pooeld over all agro ecologies showed that body conformation, adaptation, coat color, early maturity / multiple birth and pedigree were ranked as I, II, II, IV and V preferred traits with index of 0.28, 0.24, 0.20,

Table 8: Own flock ranking for preferred female goats within different agro ecologies (%)

Factors	Lowland						Midland						Highland						Overall
	R1	R2	R3	R4	R5	I	R1	R2	R3	R4	R5	I	R1	R2	R3	R4	R5	I	I
Body Conformation	37.7	31.1	15.6	4.4	3.3	0.25	31.4	14.3	5.7	24.3	5.7	0.19	28.6	24.3	11.4	20	11.4	0.22	0.22
Coat color	22.2	23.3	17.7	21.1	5.5	0.20	20.0	11.4	8.5	12.8	15.6	0.14	12.8	10.0	8.5	24.3	8.5	0.12	0.15
Mothering character	-	-	13.3	23.3	8.9	0.06	-	-	12.8	11.4	-	0.04	8.5	17.1	8.5	2.8	11.4	0.10	0.06
Lamb survival	-	-	15.5	15.6	8.1	0.06	12.8	22.8	24.3	20	-	0.18	15.7	5.7	17.1	5.7	18.8	0.12	0.12
Twining ability	24.4	13.3	9.0	23.3	24.4	0.18	22.8	14.3	30.0	24.3	8.7	0.21	12.8	14.3	-	-	-	0.08	0.16
Short kidding interval	1.3	15.6	4.4	3.3	8.9	0.06	1.4	5.7	8.5	-	11.4	0.04	1.4	7.1	14.3	5.7		0.06	0.05
Age at 1st maturity	-	-	4.4	3.3	12.2	0.02	-	-	-	-	14.3	0.01	-	-	8.5	8.5	14.3	0.04	0.02
Adaptation	14.4	16.6	23.3	5.5	12.2	0.16	11.4	28.5	10.0	7.2	20	0.16	20.0	21.4	25.7	24.3	20	0.22	0.18
Longevity	-	-	-	-	16.6	0.01	-	2.8	-	-	24.3	0.02	-	-	5.7	11.4	15.6	0.04	0.02

R1, R2, R3, R4, R5 = rank 1, 2,3,4 and 5 respectively. I= index **:** Index = sum of (5for rank1+ 4for rank2+3 for rank 3 + 2 for rank 4 + 1 for rank5) given for an individual reason (attribute) divided by the sum of (3 for rank 1 + 2 for rank 2 + 1 for rank 3) for overall reasons

Table 9: Own flock ranking for preferred male goats within different agro ecologies (%)

Factors	Lowland						Midland						Highland						Overall
	R1	R2	R3	R4	R5	I	R1	R2	R3	R4	R5	I	R1	R2	R3	R4	R5	I	I
Adaptation	34.4	26.6	17.7	23.3	13.3	0.26	32.8	28.6	14.3	17.1	5.7	0.24	25.7	31.4	17.1	15.7	11.4	0.23	0.24
Body conformation	40.0	31.1	13.3	16.6	12.2	0.27	44.3	32.8	25.7	11.4	14.3	0.31	37.1	28.6	11.4	28.6	17.1	0.27	0.28
Coat color	20.0	24.4	27.7	23.3	5.6	0.22	12.8	17.1	10.0	28.6	11.4	0.15	31.4	22.8	20.0	14.3	11.4	0.23	0.20
Early maturity	-	5.5	12.2	13.3	26.6	0.07	-	4.3	18.6	22.8	28.6	0.10	-	-	22.8	18.6	29	0.09	0.10
Pedigree	3.3	7.7	23.3	5.8	18.8	0.10	10.0	11.4	10.0	5.7	7.2	0.10	5.7	5.7	17.1	-	-	0.07	0.08
Multiple birth	2.2	4.4	5.5	17.7	23.3	0.07	-	5.7	17.1	14.3	32.8	0.10	-	11.4	11.4	22.8	31.4	0.10	0.10

R1, R2, R3, R4, R5 = rank 1, 2,3,4 and 5 respectively. I= index **:** Index = sum of (5for rank1+ 4for rank2+3 for rank 3 + 2 for rank 4 + 1 for rank5) given for an individual reason (attribute) divided by the sum of (3 for rank 1 + 2 for rank 2 + 1 for rank 3) for overall reaso

0.10 / 0.10 and 0.08, respectively, by the respondents for selection

. The possible reasons, as perceived by respondent, for body conformation, ranked as I in all areas, were that heavier body bucks showed superior breeding performance, sire heavily kids and fetch good market price, if sold. However, interaction with respondent revealed that castrated male fetch high market price than intact male bucks. The respondents stated that buck body conformation is a function of body length, body condition, height at withers and pelvic width and the sale and / or purchase price was determined by body conformation of the animal and coat color in central and local villages markets (Table 9).

CONCLUSIONS AND RECOMMENDATIONS

The *Loma* community maintains a perception of special association towards the Woyto-Guji goat type, claiming a historic role in its development and adaptation. Local myths persistent in the community associate the origin of the Woyto-Guji goat breed with the communal ethno-history. Physical description of the goat population was made based on the "key characteristics" concept used by the community to distinguish their goat type among other breeds. The Woyto-Guji (halla dysha) goat is managed under agro pastoralist and crop mixed production system and kept for multifaceted purposes. The production system is characterized with limitation of inputs and production constraints like disease, predator, feed and water shortage. Therefore, the community based genetic improvement strategy, based on ranking of goat breeding objectives and selection criteria by farmers, production constraints, should be given consideration while planning schemes for conservation, genetic improvement and sustainable utilization of Woyto-Guji goats.

REFERENCES

Adane, H., and Girma, A. (2008). Economic significance of sheep and goats, pp: 1-4. In: Alemu Yami and R.C.Merkel (eds.). *Sheep and goat production handbook for Ethiopia. Ethiopian sheep and goat productivity improvement program*. Addis Ababa, Ethiopia.

Alemayehu, R. (1993). Characterisation (Phenotypic) of Indigenous Goats and Goat Husbandry Practices in East and South-Eastern Ethiopia. *MSc thesis*, Alemaya University of Agriculture, Ethiopia. 135 pp.

Central Statistics Authority (CSA). (2008). Central Statistical Agency of Ethiopia (CSA): *the National Statistics*. Addis Ababa, Ethiopia.

Central Statistics Authority (CSA). 2011. Agricultural sample survey volume II: Report on Livestock and Livestock characteristics in Ethiopia. *Statistical Bulletin 505*, February 2011, Addis Ababa, Ethiopia.

CSA. (2007). Summary and Statistical Report of the 2007 Population and Housing Census Result, Addis Ababa, Ethiopia.

Dereje T. (2011). Community based characterization of Hararghe high land goats in Darolabu district Western Hararghe, *An MSc thesis*. Jimma, Ethiopia.

Deribe G. (2009). On-farm performance evaluation of indigenous sheep and goats in Alaba, Southern Ethiopia. *An MSc Thesis Presented to the School of Graduate Studies of Hawasa University college of Agriculture*, Hawasa. pp: 38-93.

FAO (Food and Agricultural Organization). (1986b). Animal Genetic Resource Data Banks. 2. Descriptor Lists for Cattle, Buffalo, Pigs, Sheep and Goats. *Animal Production and Health.* FAO, Rome. 59(2): 22-41.

FAO (Food and Agricultural Organization). (1986c). Animal Genetic Resource Data Banks. 3. Descriptor Lists Poultry. *Animal Production and Health.* FAO, Rome. 59(3): 17-27.

FAO (Food and Agricultural Organization). (2009). Contributions of smallholder farmers and pastoralists to the development, use and conservation of animal genetic resources; *proceedings of the intergovernmental technical working group on animal genetic resources for food and agriculture*, 5th session. 28-30 January 2009, Rome.

FAO (Food and Agricultural Organization). 1986a. Animal Genetic Resource Data Banks. 1. Computer Systems study for Regional data banks. *Animal Production and Health.* FAO, Rome. 59(1): 27-39.

FARM-Africa. (1996). Goat Types of Ethiopia and Eritrea. Physical description and management systems. Published jointly by FARM-Africa, London, UK, and ILRI (International Livestock Research Institute), Nairobi, Kenya. 76 p.

Institute of Biodiversity Conservation (IBC). (2004). The State of Ethiopia's Farm Animal Genetic Resources: Country Report. A Contribution to the First Report on the State of the World's Animal Genetic Resources. IBC. Addis Ababa, Ethiopia.

Koehler Rollefson, I. (2003). Community-Based Management of Animal Genetic Resources with Special Reference to Pastoralists. Proceedings of symposium on Community-based management of animal genetic

resources. Mbanbane, Swaziland. May 7, 2003, FAO. pp: 14-26.

Koehler Rollefson, I. (2005). Indigenous breeds, local communities. Documenting animal breeds and breeding from a community perspective. Lokhit Pashu-Palak Sansthan, Sadri, India. 80p.

LAR. (2013). Loma Woreda Annual report. Agricultural office annual report. 24p. Gessa.

Mathewos, A. (2008). Ethnobotany of Spices, Condiments and Medicinal Plants in Loma and Gena Bosa Woredas of Dawro Zone, Southern Ethiopia. *A Thesis Submitted to the School of Graduate Studies in Addis Ababa University in Partial Fulfilment of the Degree of Masters in Biology* (Dryland Biodiversity), 120p.

MOA (Ministry of Agriculture). (2000). Agro ecological Zonation of Ethiopia. Addis Ababa, Ethiopia.

Rege J. (2001). Defining livestock breeds in the context of community based management of animal genetic resources. In Proceedings of the workshop on community based management of animal genetic resources, May 2001 Mbabane, Swaziland. SADC/UNDP/FAO and GTZ.

SNNPRS-BoFED. (2004). Regional atlas. Southern Nation, Nationalities and Peoples Regional State, Bureau of Finance and Economic Development, Bureau of Statis-tics and Population, Awassa, Ethiopia.

SPSS (Statistical Package for Social Science). 2013. SPSS user's guides. Version 20.0., SPSS Inc.

Tesfaye, K., 2010. Assessment of on-farm breeding practices and estimation of genetic and phenotypic parameters for reproductive and survival traits in indigenous Arsi-Bale goats, (unpublished MSc thesis, Haramaya University).

Tesfaye, T. (2009). Characterization of Goat production systems and on- farm evaluation of the growth performance of Grazing goats supplemented with different protein sources in Metema woreda, Amhara region, Ethiopia. *An M.Sc Thesis Presented to the School of Graduate Studies of Haramaya University*, pp: 41-74.

Workneh, A., Van Dorland, A., and Rowlands, J. (2004). Design, execution and analysis of the livestock breed survey in Oromiya Regional State, Ethiopia. *OADB (Oromiya Agricultural Development Bureau), Addis Ababa, Ethiopia, and ILRI (International Livestock Research Institute),* Nairobi, Kenya, 260 p.