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Characterization of African Goat Production and Productivites: The Case of Ethiopia: A Review

By Getachew Bekele Fereja
Gambella University

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Characterization of African Goat Production and Productivites: The Case of Ethiopia: A Review

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Abstract- African goats could be grouped in to three main families: the Dwarf goats of West and Central Africa, the Savannah goats of Sub-Saharan Africa and the Nubian type goats of North Africa. The parents of the Nubian goats came from Asia. It is assumed that the first wave of goats entered Ethiopia from the north between 2000 and 3000 B.C. In sub-Saharan Africa, indigenous breeds of sheep and goats are very important, in fact more important than cattle for the small-scale farmers since they are easier to acquire and to maintain. Goat breeds found in Ethiopia have been identified and classified based on their differences in physical characteristics and genetic make-up. The physical characteristics include body color, size and shape of body parts, and presence or absence of body parts. Few physical features can be used to identify major groups of breeds. Identification and classification of breeds based on physical characteristics can be supported by advanced tools. The majority of Ethiopian goat population is found in large flocks in the arid and semi-arid lowlands where pastoralists in the South, East, and West keep them for milk and meat production and for sale. Goats in the highlands are widely distributed in the crop-livestock production systems with very small flock sizes as a means of cash earnings and meat. Phenotypic characterization refers to the morphological descriptions of farm An GR only. It is an essential, initial step in breed identification. The classical description of breeds using the phenotype is based upon morphological characters such as coat color, horn, tails, body measurements and other specific visible traits. Phenotypic relationships, based upon the comparison of morphological characters, are used to estimate variations within breeds and distances between breeds, and are used to describe them in terms of the frequency of the most typical characteristics.

Keywords: breed, characterization, goat, morpholical, production.

I. Introduction

The livestock sector employs 1.3 billion people and creates livelihoods for one billion of the world's poor people. Local communities in smallholder and pastoral systems have benefited from the multipurpose and highly adaptable indigenous farm animal genetic resources that developed over millennia (LPPS and Koehler, 2005). Livestock production is an important enterprise in Eastern Africa where about 56% of Africa's livestock wealth is maintained.

Thousands of years of adaptation, human initiated migration, and geographic isolation has led to a high degree of phenotypic variation of the indigenous goat populations. In contrast, there has been minimal artificial selection for production parameters including growth, milk yield, or reproductive traits with the exception of the Boer breed (2 % of African goat population) in South Africa. Cross-breeding of high-producing milk goats with indigenous goats has shown minimal success as exotic breeds do not possess the hardiness for survival in the African ecotypes. The result of these factors has created indigenous goat populations uniquely adapted for resiliency and sustainability in diverse African ecosystems with untapped potential for production improvement.

African goats could be grouped in to three main families: the Dwarf goats of West and Central Africa, the Savannah goats of Sub-Saharan Africa and the Nubian type goats of North Africa (Wilson, 1991). The parents of the Nubian goats came from Asia. It is assumed that the first wave of goats entered Ethiopia from the north between 2000 and 3000 B.C. The ancestors of Ethiopian goats are closely associated with goat type which migrated from the Middle East and North Africa (Kassahun and Solomon, 2008).

The domestic goat (*Capraaegagrus hircus), is* believed to be the first ruminant domesticated. Goats are believed to be the second animal domesticated following the dog. It is also believed that the first goats reached Egypt around 5000 B.C. and then spread south and west throughout Africa. Evidence suggests that this took place before 7000 BC in south-west Asia, on the borders of present-day Iran and Iraq, where agriculture was already advanced (Mason, 1984).

In sub-Saharan Africa, indigenous breeds of sheep and goats are very important, in fact more important than cattle for the small-scale farmers since they are easier to acquire and to maintain. These serve as a secure form of investment, a means of income, source of manure and for various religious and ceremonial functions (Chenyambuga, 2002). It is believed that domestic goat is a subspecies of goat domesticated from the wild goat of southwest Asia and Eastern Europe; whose horn shape closely resembles the horns of the domestic goats we know today (FARM-Africa, 1996).

These animals often provide the only practical means of utilizing vast areas of natural grasslands in the areas where crop production is uneconomical (Rege *et al*., 2002). Adapted to the local environment, the African sheep and goat represent a unique genetic resource for

Author: Department of Animal Science, College of Agriculture and Natural Resource, Gambella University, PO Box 126, Gambella.
e-mail: gechobek@gmail.com

the farmer. However, the need for increased economic gains has led to crossbreeding these indigenous breeds with imported exotic breeds or directly replacing the indigenous genotypes (Wollny, 2003). To compound the problem, indigenous breeds have not been characterised in many African countries and it would be tragic to lose these unique genetic resources that are the result of centuries of human and natural selection (Leak *et al*., 2002). Therefore the objective of this paper was to review the characterizing goat production and productivities across Africa and generating data to develop crucial information.

II. African Goat Population

The goat population in 2012, of Africa held approximately 35% of the world's goat population, being the most abundant production livestock species on the continent (FAO 2014). In addition to providing nutritional value as sources of milk and meat, goats are part of African culture and provide financial stability to the small-holder farmer. Goats are disseminated all over the world because of their great adaptability to varying environmental conditions and the different nutritional regimes under which they are evolved and subsequently maintained. They have proved useful to man throughout the ages due to their productivity, small size and non-competiveness with man for food (Mohamed Abdel Aziz, 2010).

Indigenous breeds constitute well over 95 percent of small ruminant populations in Africa (Rege, 1992). Around 90 'breeds' of African goats have been recognized using criteria as geographic distributions, ecotypes or communities-tribe ownership (Rege, 1992). They presumably derive from goats that spread south from Egypt at an early date. Generally, goats of sub-Saharan Africa are divided into three major types following their morphology; the long lop-eared type in north east and southern Africa, the small short-eared type dominant in eastern Africa and the dwarf short-eared type of West Africa. The population of goats in sub- Saharan Africa is estimated to be 163 million (Rege *et al.*, 2002). Migration to a new habitat and consequently the effect of natural and artificial selection have led to the evolution of breeds and types of goat, which differ in appearance and performance.

III. Origin and Domestication of Goat

The domestic goat (*Capraaegagrus hircus), is* believed to be the first ruminant domesticated. The goat is a member of the Bovidae family and is closely related to the sheep as both are in the goat-antelope subfamily Caprine. There are over three hundred distinct breeds of goat (Hirst and Kris, 2008). Evidence suggests that this took place before 7000 BC in south-west Asia, on the borders of present-day Iran and Iraq, where agriculture was already advanced (Mason, 1984). It is believed that domestic goat is a subspecies of goat domesticated from the wild goat of southwest Asia and Eastern Europe; whose horn shape closely resembles the horns of the domestic goats we know today (FARM-Africa, 1996).

a) Goat Genetic Resource in Ethiopia

Migration to a new habitat and consequently the effect of natural and artificial selection have led to the evolution of breeds and types of goat, which differ in appearance and performance. They presumably derive from goats that spread south from Egypt at an early date. Generally, goats of sub-Saharan Africa are divided into three major types following their morphology; the long lop-eared type in north east and southern Africa, the small short-eared type dominant in eastern Africa and the dwarf short-eared type of West Africa. Intermediates morphological types are numerous. The two broad approaches through which farm animal genetic resources (FAnGR) can be conserved are the *ex situ* and *in situ* conservation systems. *In-situ* conservation is primarily the active breeding of animal populations for food and agriculture, such that diversity is best utilized in the short term and maintained for the longer term (Hammond, 1993). Ex-situ conservation on the other hand refers to either conservation of animals as samples of a breed outside their native production environment or frozen storage of rare breeds in the form of living semen, ova, embryos or tissues (cryopreservation) (Grum Geberyesus, 2010).

Information compiled on physical description and management system revealed that there are 14 goat types in Ethiopia and Eritrea (Farm-Africa, 1996). Out of these eleven are found in today Ethiopia. However, goats in Africa have traditionally been divided into three main families – the Dwarf goats of West and Central Africa, the Savannah goats of sub-Saharan Africa and the Nubian type goat of Northern Africa (Epstein, 1971; Wilson, 1991). Using a set of morphological characters and multivariate statistical analysis the goat of Ethiopia and Eritrea have been classified into four major families: - the Somali family (Short-eared Somali, Long-eared Somali, and Hararghe Highland), the Nubian family (Nubian and Barka), the small Rift valley family (Abergalle, Worre, Afar, Arsi-Bale, and Woyto-Guji) and finally the more heterogeneous Small East African family (Western Highland, Keffa, Central Highland and West Lowland). The names given to the goat types of Ethiopia reflect mainly their geographical locations and to some extent also their ethnic affiliation.

b) Distribution and Classification of Goat Breeds of Ethiopia

Goat breeds found in Ethiopia have been identified and classified based on their differences in physical characteristics and genetic make-up. The physical characteristics include body color, size and

shape of body parts, and presence or absence of body parts. Few physical features can be used to identify major groups of breeds. Many physical features have to be collected and analyzed to identify specific breeds within major groups. Identification and classification of breeds based on physical characteristics can be supported by advanced tools. Advanced classification is based on differences between breeds in their genetic make-up. For this purpose, analysis of the genetic material called DNA is required. Such classification results in identification of genetically distinct breeds (Solomon Gizaw, 2009).

Based on differences in physical characteristics and genetic differences at the DNA level, four families and 12 breeds of goats have been identified in Ethiopia (FARM-Africa, 1996; Solomon Gizaw, 2009). A family is a group of breeds that are genetically more related and physically more similar than breeds outside the group. The families and breeds are named after their geographical location, the ethnic communities maintaining them, or based on some identifying physical features (Solomon Gizaw, 2009). However, a recent genetic characterization of Ethiopian goats by Tesfaye (2004) was inconsistent with the classification of Farm Africa. Following the analysis of 15 micro satellite loci, the results indicate eight separate genetic entities: the Arsi-Bale, Gumez, Keffa, Woyto-Guji, Abergalle, Afar, Highland goats (previously separated as Central and North West Highland) and the goats from the previously known Hararghe, South eastern Bale and Southern Sidamo provinces (Hararghe Highland, Short-eared Somali and Long-eared Somali goats) (Tesfaye, 2004).

c) The Goat Population of Ethiopia

The majority of Ethiopian goat population is found in large flocks in the arid and semi-arid lowlands where pastoralists in the South, East, and West keep them for milk and meat production and for sale. Goats in the highlands are widely distributed in the crop-livestock production systems with very small flock sizes as a means of cash earnings and meat. Despite the huge resource potential, production and export opportunities, goat production in Ethiopia is relatively undeveloped. Although there are severe environmental constraints to increase goat productivity, there is considerable potential for goat production in the country, where goat milk, meat, and skin are valued commodities. Goats are of great importance as major sources of livelihood (Kosgey, 2004) and contribute to the sustenance of landless, smallholder and marginal farmers especially to the poor in the rural areas throughout the developing countries.

Agriculture in Ethiopia is the backbone of the country's economy and livestock is an integral part of agriculture. Ethiopia have large livestock population; comprising out of total livestock 24.06 million goats, (CSA, 2013) and endowed with diverse and abundance livestock species (FAO, 2011). The Somali Regional State has 8.547 million heads of goat which is about 35.5% of the national goat population (ESRS LCRDB, 2013). It is eminent that livestock products and by-products in the form of meat, milk, honey, eggs, cheese, and butter supply provide the needed animal protein that contributes to the improvement of the nutritional status of the people. Livestock also plays an important role in providing export commodities, such as live animals, hides and skins to earn foreign exchanges to the country (CSA, 2013).

IV. Characterization of Goat Breed, Production and Productivities in Ethiopia

Phenotypic characterization refers to the morphological descriptions of farm AnGR only (IBC, 2004). It is an essential, initial step in breed identification (Mekasha, 2007). The classical description of breeds using the phenotype is based upon morphological characters such as coat color, horn, tails, body measurements and other specific visible traits. Phenotypic relationships, based upon the comparison of morphological characters, are used to estimate variations within breeds and distances between breeds, and are used to describe them in terms of the frequency of the most typical characteristics. Morphological or phenotypic characterization has been suggested and used to describe and classify breeds of farm animal species (FARM-Africa, 1996; Lanari *et al*., 2003; Traore *et al*., 2008). Morphological data are cheap and easy to obtain, in comparison to molecular data. The advantages of morphological data are that it is relatively easily obtained; requiring relatively inexpensive instrumentation in comparison to molecular instruments (Desalle and Grimaldi, 1991). Furthermore, the generation of morphological data through the comparison of individuals is greatly facilitated by easily identifiable homologous structures based on variation in shape, number, relative position, size and structure.

Goats have a short reproductive cycle and hence high multiplication rate as compared to large ruminants, which is ideal for poverty alleviation. Indigenous goat populations generally dominate the goat flocks in Ethiopia and have developed certain valuable genetic traits such as ability to perform better under low input condition and climatic stress, tolerance to infectious diseases and parasites as well as heat stresses (Philipsson et al., 2006; Kosgey and Okeyo, 2007). These traits enable them to cope with the stressful nature of the vast marginal lands of the region. They are also hardy animals and are important reservoirs of useful genes. Their morphological differences have important socio-cultural and economic values to the Ethiopian communities; as a result, most

farmers have specific consideration and choices for goat coat colors followed by body sizes.

Knowledge of the adapted goat genetic resources is a pre-requisite for designing appropriate breeding and utilization programs. Characterization of livestock breeds based on their morphological traits variations (Delgado et al., 2001) are the first step towards the use of the available AnGRs (Lanari et al., 2003). Morphometric measurements have been used to evaluate the characteristics of various breeds of animals, and could provide first hand information on the suitability of animals for selection (Nesamvuni et al., 2000; Mwacharo et al., 2006; Martins et al., 2009; Yakubu, 2010a) and for further characterization studies using modern molecular methods.

a) Indigenous goat breeds of Ethiopia with their family, distribution, common name, production system and main use

Family	Breed/Type	Distribution/Location	Common names/Local names	Production System	Main use
Nubian	Nubian	North-west Ethiopia (Wegera)	*Shukria, Langae, Hassen*	Pastoral	Milk, meat and skin
Rift valley	Afar	Afar Region	*Adal, Danakil*	Pastoral	Milk, meat and skin
	Abergelle	Along the Tekeze river,Notherrn Wollo,Gondar	-	Mixed farming, agro-pastoral	Milk, meat and skin
	Arsi-Bale	Highlands of Arsi, Bale and South Shewa	*Gishe, Sidama*	Mixed farming to agro-pastoral	Milk, meat, skin and manure
	Woyto-Guji	North and South Omo,Gamu-Gofa and Eastern Sidamo (Guji)	*Woyto, Guji, Konso.*	Pastoral to mixed farming	Milk, meat and skin
Somali	Hararghe Highland	Highlands of Eastern and Western Hararghe	*Kotu-Oromo*	Mixed farming	Milk, meat, skin and manure
	Short-eared Somali	Northern and Eastern parts of Ogaden and around Dire Dawa	*Issa-Somali, Ogaden, Modugh, Mudugh, Dighier, Deghiyer, Dighi Yer, Denghier, Agal, Ogaden, Habab, Bimal*	Pastoral	Milk, meat and skin
	Long-eared Somali	Throughout the Ogaden, lowlands of Bale, Borana and Southern Sidamo	*Large-White Somali, Digodi,Degheir, Melebo, Boran Somali, Benadir, Gigwain,Ogaden*	Pastoral	Milk, meat and skin
Small east African	Central Highland	Northern Ethiopia (North Gondar,Wollo,Tigray)	*Brown Goat*	Mixed farming	Meat, skin and manure
	Western Highland	Highlands of Western Ethiopia (South Gondar,Gojam,Wellega, and Western Shoa)	*Agew*	Mixed farming	Meat and skin
	Western Lowland	Lowlands of Western Ethiopia (Metekel, Asossa andGambela)	*Gumez*	Agro-pastoral	Milk and meat
	Keffa	Keffa, part of South Shewa, Kembata and Hadiya	-	Mixed farming	Meat, milk, and skin

Source: FARM-Africa, 1996; DAGRIS, 2006 and Solomon Gizaw, 2009

b) Goat Production Systems in Ethiopia

Goat production in Ethiopia is described under low input production system and is operated by smallholder farmers. This production system accommodates almost all of the goat population of the country (IBC, 2004). The main features of the low input goat production system are its full dependence on natural resources and the limited demand for inputs. This system is constrained by land scarcity, severe resources degradation and recurrent drought (IBC, 2004). Production systems are identified on the basis of contribution of the livestock sub sector to the total household revenue. Almost all the goat production systems in Ethiopia have been designated as "traditional" (Workneh, 1992). These traditional production systems include pastoral, agro-pastoral, agricultural and urban.

Goats are distributed in all agro-ecological zones of the country although the majority of the sheep population is concentrated in the highlands. The majority of the goat population is found in large flocks in lowlands in pastoral and agro–pastoral production systems, in arid and semi-arid agro–ecological zones, where goats are kept by nearly all pastoralists, often in

mixed flocks with sheep, freely grazing or browsing in the rangelands (Mekasha, 2007).

i. *Mixed crop-livestock farming system*

Mixed farming system is predominantly found in highland agro-ecological zones where the climatic factors are conducive for farming of crops and raising livestock. In this system, livestock and crops are maintained as complementary enterprises (IBC, 2004). In a mixed crop–livestock production system, which is prevalent in humid, sub-humid and highland agro–ecological zones, goats are kept by smallholders and graze together with sheep and/or other livestock such as cattle. In these mixed-species grazing systems, goats complement cattle and sheep rather than compete with them for feed, because of their inherent ability to eat a wider variety of plant species (Mekasha, 2007).

ii. *Pastoral and agro- pastoral production system*

In pastoral and agro–pastoral production systems, which are found in arid and semi-arid agro–ecological zones, goats are kept by nearly all pastoralists, often in mixed flocks with sheep, freely grazing or browsing in the rangelands. This production system is associated with the purely livestock based nomadic and transhumance pastoral production systems based largely on range, primarily using natural vegetation. In the lowlands of Ethiopia, livestock is comprised of large flocks and herds of sheep and goats, cattle and camels mainly transhumant's, where only surplus are sold at local markets or trekked to major consumption centers. Extensive livestock keeping is the backbone of the economies of the lowlands (EARO, 2000).

c) *Productivities and Reproductive Performance of Goat*

Reproductive parameters heavily influence genetic improvement through their impact on selection intensity. As a consequence, adequate knowledge on reproductive performances of the indigenous breeds is crucial for planning a feasible breeding scheme. However, information on the reproductive traits of indigenous goat breeds is scarce (Mekasha, 2007).

i. *Age at first kidding*

Age at first kidding (AFK) can be defined as the age at which does give birth for the first time. It is a function of puberty, age at first breeding and conception and successful completeness of pregnancy. These reproductive characteristics including age at first kidding (AFK) are influenced by many factors such as genetic make-up of an individual, physical environment, nutrition and time of birth (Alexander *et al.*, 1999; Awemu *et al.*, 1999). Puberty is generally considered to be related more to growth than age in tropical goats (Devendra and Burns, 1983), with first estrus occurring with the attainment of 60-70% of adult weight. The age at first kidding is between 15 and 26 months which, when allowance is made for a gestation period of 5 months, suggest 10-20 months as the age at first service. This considerable variation in age is not the best parameter for initiating mating. In general, goats have good nutritional management the age of first service is usually around 12 months resulting in occurrence of AFK around 17 months. Age at first kidding in Ethiopian breeds is well known trait at farm level and it ranges from 12-24 months (Girma, 2008).

ii. *Kidding interval*

Kidding interval (KI) is defined as the number of days between successive parturitions. This is a useful comparison of fertility and productivity between breeds. Thus, a shorter KI is desirable if the fertility (regular production of viable offspring) and productivity of the flock is to be maintained. It accounts only for those does that kid regularly and are persistent milkers but, sterile and barren does are not included and their presence in the flock is ignored (Devendra and McLeroy, 1982). It comprises the service period (the period between kidding and conception) and gestation period. The gestation period in several breeds of goats in the tropics averages 146 days with a range of 144 to 153 days.

KI ranges from 240 to 350 days for different breeds of goats reviewed. Long KI is associated with controlled mating and confinement (Wilson *et al.*, 1989). The prolonged KI is responsible for a decrease in reproduction and productivity of goats (Awemu *et al.*, 1999). Moreover, poor nutrition and prolonged suckling resulted in longer interval between parturition. Generally, KI decreases as parity increase, but the trend of the effect of type of birth and year of birth on KI is not clear in some studies (Odubote, 1996). Effect of parity is probably due to the reproductive physiology function being more active in mature does compared to in younger and older does.

iii. *Litter size*

Litter size is defined as the number of total kids born per kidding per doe (Alexander *et al.*, 1999) and this definition was implemented for the current study. Prolificacy in sheep and goats is largely determined by the eggs librated by the ovary at the heat period, and by the amount of embryonic mortality. If only one egg is released and fertilized, a single lamb/kid will result unless this egg divides so that twin is produced. Mostly, twins and triplets are produced due to the shedding of more number of eggs which are fertilized and complete their development (Ensminger, 2002). From an evolutionary point of view, the size of the litter could be considered as an indicator of fitness or adaptability capacity of the animals to their environmental conditions. However, the benefit of the incidence of triplets and quadruplets should be evaluated in terms of survival of the kids, dystocia in the does, effect on kidding interval and body weight of the kid at birth (Odubote, 1996). Litter size is also affected by genotype

of goats (Amoah *et al.*, 1996; Mourad, 1996; Rojero *et al.*, 2005). Nutrition significantly affects the prolificacy rate and is a handling factor which is not uniform in the different goat breeding system (Rojero *et al.*, 2005).

iv. *Litter weight*

Both total litter weight at birth and at weaning are considered as composite dam traits and used as measures of dam productivity. Total litter weight at birth is a composite dam trait with its component traits such as number of kids born and litter mean weight at birth. It measures the capacity of dam to produce kid weight at birth. Observations of the traits are continuous and can be considered approximately normally distributed although skewed to the right (Rosati *et al.*, 2002). The total litter weight at weaning per doe kidding reflects the combined effect of reproduction (litter size, pre-weaning survival) and pre-weaning growth rates of kids, but failed to include conception rates. Ideally dam productivity is measured as the total weights of litter weaned per dam exposed as it includes fertility (conception rate), litter size at birth, pre-weaning survival (litter size at weaning), lactation and pre-weaning growth (Vanimisetti *et al.*, 2007; Snowder, 2008).

V. Phenotypic Characterization Goat of Ethiopian

Breed/Type	facial profile	Horns type	coat colour	Ear type	height
Nubian	straight to concave	directing backwards	black or brown or grey	long ears	70-74 cm
Afar	Concave, narrow face	long thin upward-pointing.	patchy coat	prick-eared	62-72cm
Abergelle	Straight narrow	directing backwards	reddish brown	Long eared	65- 71 cm
Arsi-Bale	Straight wide	backwards or upwards.	white, black and brown	long ears	66 to 75 cm
Woyto-Guji	straight to concave	straight or curved	brown, black or red in patchy	Long eared	66 to 73 cm
Hararghe Highland	straight or concave	Mostly polled	mixed coat white,brown,black	Medium to Long eared	63-72 cm
Short-eared Somali	straight facial	upward pointing	white in colour	long eared	61 to 66cm
Long-eared Somali	straight facial	curved and backward pointing	white.	long ears.	69 to 76 cm.
Central Highland	wide face	thick horns	reddish brown	Small ears	65-74 cm
Western Highland	concave facial	straightpointing backward.	white	Long eared	62-75 cm
Western Lowland	straight facial	Straight pointing backwards	black and grey	Long eared	64-67 cm
Keffa	straight facial	pointing backwards	red or black	Small ears.	67 to 76 cm

Source: FAO 2011, Tesfaye Alemu. 2004. Genetic characterization of indigenous goat populations of Ethiopia using microsatellite DNA markers, PHD thesis, National Dairy Institute, Haryana, India. 188p.

The pictures which shows the different types of goat in Ethiopia

Afar female goat

Abergalle male goat

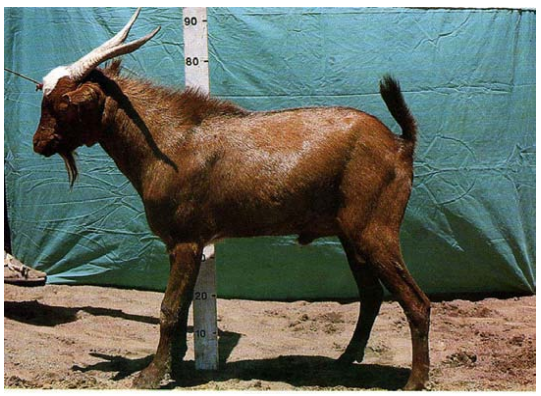
Arsi-bale goat

Woyto-Guji goat

Hararghe Highland female got

Short-eared Somali goat

Long-eared Somali female goat



Central Highland goat

Western Highland goat

Western Lowland goat

Keffa male goat

Source: Tesfaye Alemu. 2004. Genetic characterization of indigenous goat populations of Ethiopia using microsatellite DNA markers, PHD thesis, National Dairy Institute, Haryana, India. 188p

VI. Conclussion

The present Review was carried out to review the characterized goat production and productivities in case of Ethiopia. Goats in the review were characterized as having dominantly plain coat color pattern, white coat color type, straight profile and long ears. The most frequently reviewed horn orientation was backward. However phenotypic characterization of individual animals of particular breeds has been a routine process. One of the basic tool for improving goat production and productivity is to improve the genetic makeup of the animal and its environment.

One of the main conclusions to be drawn from this review is that the goat plays a significant role for pastoralist as home consumption and income generation throughout the years. But, goat production in particular was more of extensive production system which constrained by disease occurrence, feed shortage, water problems, poor of veterinary service and less focus on breed and breeding system to improve productivity of goats.

Therefore, this review was a baseline for understanding the production and productivities of goats for better management and further characterization.

References Références Referencias

1. Alexander, G., G. Aumont, J.C. Mainaud, J. Fleury, M. Naves. 1999. Productive performances of Guadeloupean Creole goats during the suckling period. Small Rumin. Res.34:155-160.
2. Awemu, E.M., L.N. Nwakalor, B.Y. Abubakar 1999. Environmental influence on per weaning mortality and reproductive performance on Red Sokoto does. Small Rumin. Res. 34: 155-160.
3. Chenyambuga, S. (2002). Genetic characterisation of indigenous goat populations of sub-Saharan Africa using microsatelite DNA markers. PhD thesis, Department of Animal Science and Production, Sokoine University of Agriculture, Sokoine, Tanzania.
4. CSA (Central Statistics Agency). 2013. Federal Demographic Republic of Ethiopia. Central Statistical Agency. Population projection of Ethiopia for all regions at Wereda level from 2014 – 2017. August 2013, Addis Ababa, Ethiopia.

5. Delgado JV, Barba C, Camacho ME, Sereno FTPS, Martinez A, Vega- Pla JL (2001). Livestock characterization in Spain. AGRI. 29:7–18.
6. Desalle, R. and D.A. Grimaldi. 1991. Morphological and molecular systematics of the Drosophilidae. *Journal of Annual Review of Ecology and Systematics*. 22: 447-475.
7. Devendra, C and G.B. McLeroy. 1982. Goat and sheep production in the tropics. In: Intermediate Tropical Agricultural Series. Longman, London/New York, 271p.
8. Devendra, C., Burns M. 1983. Goat production in the tropic. Common wealth Agricultural Bureaux, 183p.
9. EARO (Ethiopian Agricultural Research Organization). 2000. National Small Ruminants Research Strategy Document. EARO, Addis Ababa, Ethiopia.
10. Ensminger, M.E. 2002. Sheep and goat science (Animal Agriculture Series) (6th ed.). Intersatate Publishers, Inc. Danville, Illinos. 693p
11. Epstein, H. (1971). The origion of the domestic animals of Africa. Vol. II. African publishing corporation. New York, London, Munich. pp 719.
12. Ethiopian Somali Regional State Livestock Crop and Rural Development Bureau (ESRS LCRDB). 2013. Livestock Population in the Region 2005 E.C Estimation. Jijiga, Ethiopia.
13. FAO, 2011. Draft Guidelines on Phenotypic Characterization of Animal Genetic Resources. Commission on Genetic Resources for Food and Agriculture. Thirteenth, Regular session, Rome, 18-22 July 2011.
14. FAO, F. A. O. (2014). "FAOSTAT." Retrieved Feb 2014, 2014, from http://faostat.fao.org/.
15. 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 pp.
16. Girma Abebe. 2008. Reproduction in sheep and goats. pp 57-77. In: Alemu Yami and R.C. Merkel (eds.). Sheep and goat production handbook for Ethiopia. Ethiopian sheep and goat productivity improvement program, USAID.
17. Grum Geberyesus, 2010. Community-based participatory characterization of the short eared Somali goat population around Dire Dawa. An MSc Thesis submitted to the school of graduate studies. Haramaya University, Haramaya.
18. Hammond K. 1993. Why conserve animal genetic resources? *J. Giversity* 9(3): 30-35.
19. Hirst, K. Kris. 2008. "The History of the Domestication of Goats".*About.com*. Accessed August 18, 2008.
20. IBC (Institute of Biodiversity Conservation). 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, May 2004. Addis Ababa, Ethiopia.
21. Kassahun Awgichew and Solomon Abegaz. 2008. Breeds of sheep and goats. pp 5-26. In: Alemu Yami and R.C. Merkel (eds.). Sheep and goat production handbook for Ethiopia. Ethiopian sheep and goat productivity improvement program, USAID.
22. Kosgey IS, Okeyo AM (2007). Genetic improvement of small ruminants in low-input smallholder production systems: Technical and infrastructural issues. Small Rumin. Res. 70(1):76-88.
23. Kosgey, I.S. 2004. Breeding objectives and breeding strategies for small ruminant in the tropics. Ph.D. Thesis, Animal Breeding and Genetics Group. Wageningen University, the Netherlands.
24. Lanari MR, Taddeo H, Domingo E, Centeno MP, Gallo L (2003). Phenotypic differentiation of exterior traits in local Criollo goat population in Patagonia (Argentina). Archiv Tierzucht Dummerstorf. 46:347–356.
25. Leak, S., Faye, D., and Geerts, S. (2002). Genetic resistance to vectors and vector borne diseases in indigenous West African livestock. In: Integrated Control of Pathogenic Trypanosomes and their Vectors (ICPTV) newsletter, 6: 36-38
26. LPPS and Koehler Rollefson I. 2005. Indigenous breeds, local communities. Documenting animal breeds and breeding from a community perspective. Lokhit Pashu-Palak Sansthan, Sadri, India. 80p
27. Malmfors and A.M. Okeyo (eds.). AGTR - version 2, International Livestock Research Institute, Nairobi and Swedish University of Agricultural Sciences, Uppsala, Sweden.
28. Martins CEN, Quadros SAF, Trindade JPP, Quadros FLF, Costa JHC, Raduenz G (2009). Shape and function in Braford cows: The body shape as an indicative of performance and temperament. Archivos de Zootecnia 58:425–433.
29. Mason, I. L. 1984. Goat. In: Mason I.L. (Ed), Evolution of domestic animals. Longman, Essex, England. pp 85-99.
30. Mekasha, Y. 2007. Reproductive traits in Ethiopian male goats, with special reference to breed and nutrition. PhD dissertation. Department of Clinical Sciences, Faculty of Veterinary Medicine and Animal Sciences, Swedish University of Agricultural Science (SLU), Uppsala, Sweden. 56p.
31. Mohamed Abdel Aziz. 2010. Present status of the world goat populations and their productivity King Faisel University, Al-ansa, Saudi Arabia. 45(2) pp 42.

32. Mourad, M. 1996. Estimation of repeatability of litter of Common African goats and crosses with Alpine in Rwanda. Small Rumin. Res. 19:263-266.
33. Mwacharo JM, Okeyo AM, Kamande GK, Rege JEO (2006). The small east African shorthorn zebu cows in Kenya:I- Linear body measurements. Trop. Anim. Health Prod. J. 38:65–76.
34. Nesamvuni AE, Mulaudzi J, Ramanyimi ND, Taylor GJ (2000). Estimation of body weight in Nguni-type cattle under communal management conditions. South Afr. Anim. Sci. J. 30(Supplement 1):97–98.
35. Odubote, I.K. 1996. Genetic parameters for litter size at birth and kidding interval in the West African Dwarf goats. Small Rumin. Res. 20: 261-265.
36. Philipsson J, Rege JEO, Okeyo AM (2006). Sustainable breeding programmes for tropical farming systems. In: J. M. Ojango, B.
37. Rege, J. E. O. (1992). Indigenous African small ruminants: a case for characterization and improvement. In: proceedings of the second Biennial conference of the African small ruminant research Network, 7 - December, 1992, AICC, Arusha, Tanzania. pp 205-211.
38. Rege, J. E. O., Muigai, A. W. T., Chenyambuga, S., Kierstein, G., and Hanotte, O. (2002).Assesment of genetic diversity in African small ruminants: present status and future prospects. In: 53rd Annual meeting of the European association of animal production, Cairo, Egypt, September 1-4, 2002.
39. Rojero, R.D.M., A.A.M. Lagunas, L.R. Santamaria and J.V. Mendez. 2005. Reproductive performance in three goat breeds under dry tropical conditions in Guerrero, Mexico. Vet. Mex. 36(2): 147-157.
40. Rosati, A., E. Mousa, L.D. Van-Vleck, L.D. Young. 2002. Genetic parameters of reproductive traits in sheep. Small Rumin. Res. 43:65-74.
41. Snowder, G.D. 2008. Genetic improvement of overall reproductive success in sheep: A review. Arch.Latinoam.Prod.Anim. 16(1): 32-40.
42. Solomon Gizaw. 2009. Goat Breeds of Ethiopia: A guide for Identification and Utilization. (eds) Alemu Yami, Kassahun Awgichew, T.A. Gipson and R.C. Merkel. Technical buleting no.27. Ethiopian sheep and goat production improvement program (ESGPIP).
43. Tesfaye Alemu. 2004. Genetic characterization of indigenous goat populations of Ethiopia using microsatellite DNA markers, PHD thesis, National Dairy Institute, Haryana, India. 188p.
44. Traore, A., H.H. Tamboura, A. Kabore, L.J. Royo, I. Fernandez, I. Alvarez, M. Sangare, D. Bouchel, I.P. Poiveye, D. Francois, A. Toguyeni, L. Sawadogo and F. Goyache. 2008. Multivariate analyses on morphological traits of goats in Burkina Faso. Arch. Tierz., Dummerstorf, 51 (6): 588-600.
45. Vanimisetti, H. B., D. R.Notter and L. A. Kuehn. 2007. Genetic (co)variance components for ewe productivity traits in Katahdin sheep. J. Anim. Sci. 85:60-68.
46. Wilson R T. 1991. Small Ruminant Production and Small Ruminant Genetic Resources in Tropical Africa. FAO. *J. Animal Production and Health.*No.88. FAO, Rome.
47. Wilson, R.T., T. Murayi and A.Rocha. 1989. Indigenous African small ruminant strains with potentially high reproductive performance. Small Rumin.Res. 2: 107-117.
48. Wollny, C. B. A. (2003). The need to conserve farm animal genetic resources in Africa: should policy makers be concerned? *Ecological Economics* 45: 341-351.
49. Workneh Ayalew. 1992. Preliminary survey of indigenous goat types and goat husbandry practices in Southern Ethiopia. M.Sc. Thesis, Alemaya University of Agriculture. Alemaya, Ethiopia. 156p.
50. Yakubu A (2010a). Path coefficient and path analysis of body weight and biometric traits in Yankasa lambs. Slovak J. Anim. Sci. 43:17–25.