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**TECHNICAL BULLETIN No.28**  
***Sheep breeds of Ethiopia:***  
***A guide for identification and utilization***



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## FORWARD

This technical bulletin titled “*Sheep breeds of Ethiopia: A guide for identification and utilization*” is the 28<sup>th</sup> in a series produced by the Ethiopia Sheep and Goat Productivity Improvement Program (ESGPIP). The ESGPIP is a USAID funded Project with the objective of improving the productivity of sheep and goats in Ethiopia.

Many different breeds of sheep and goat are found in different parts of Ethiopia. These breeds are characterized by varying physical, productive and reproductive features. Attempts have been made by different institutions and individuals to characterize sheep and goat breeds of Ethiopia. This technical bulletin attempts to assemble information on the sheep breeds of Ethiopia and their characteristics. It provides guidelines for identification and utilization of these breeds.

The information contained in this bulletin is believed to be useful for development agents to train farmers/pastoralists and above all serve as a reference to the sheep breeds and their specific characteristics as a basis for making decisions on their utilization.

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# Sheep breeds of Ethiopia: A guide for identification and utilization

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## 1. Introduction

Knowledge of the characteristics of a farm animal genetic resource (e.g., sheep, goat, cattle) is essential in managing the resource for optimum benefit. Farm animal resources are organized into 'breeds' that describe productive and adaptive characteristics of identified groups of animals.

Ethiopia has a diverse indigenous sheep population numbering 23.6 million. Sheep contribute significantly to farm livelihoods, particularly where crop production is unreliable and where livestock is the mainstay of livelihoods (i.e., pastoral areas). In this bulletin, practical guidelines are provided for the identification of sheep breeds of Ethiopia at the village level and for their sustainable utilization. Finally, what Kebele Development Agents (KDA) can do to promote sustainable utilization of the sheep resources is outlined.

## 2. The concept of breed

### 2.1 What is a breed?

A breed is a unit for the management of a farm animal genetic resource. It is a group of similar animals within a species. There are two definitions of a breed as currently applied in the context of developed and developing countries.

✚ In the context of developed countries, a population should meet the following conditions to be designated as a breed:

- The population should be closed in which mating pairs are drawn only from within the population
- All members have a recorded pedigree tracing their ancestry
- The members also share certain recognizable phenotypic characteristics, such as color, horn shape, and body type that designate their breed identity.

✚ In the context of developing regions, the term breed has been defined as:

- Any recognizable interbreeding populations, groups or regional stocks
- It is a group for which geographical and/or cultural separation from phenotypically similar groups has led to acceptance of its separate identity.

### 2.2 Tools to identify and classify breeds

#### 2.2.1 Physical characteristics

Breeds of farm animal species can be identified and classified based on physical characteristics. 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.

### 2.2.2 Differences at the DNA level

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.

## 3. Sheep breeds of Ethiopia

There are about 14 traditionally recognized sheep populations in Ethiopia. These populations are called sheep *types* in some literatures. They are also designated as breeds according to some definitions of ‘breed’ (see section 2.1). The sheep types are named after their geographic location and/or the ethnic communities keeping them.

The sheep types in Ethiopia are classified into four major groups based on their physical characteristics: short fat-tailed, long fat-tailed, thin-tailed and fat-rumped sheep. Based on DNA differences (see section 2.2), Ethiopian sheep types have been classified into nine genetically distinct breeds (Table 1; Solomon Gizaw, 2008).

Table 1. Major groups, breeds and sheep types<sup>1</sup> of sheep in Ethiopia

Major group	Breed <sup>2</sup>	Sheep types <sup>3</sup>	Tail type/shape	Fiber type
Short-fat-tailed	Simien	Simien	Fatty and short	Wool/fleece
	Short fat-tailed	Sekota, Farta, Tikur, Wollo, Menz	Fatty and short	Wool/fleece
	Washera	Washera	Fatty and short	Short hair
Long-fat-tailed	Horro	Horro	Fatty and long	Short hair
	Arsi-Bale	Arsi-Bale, Adilo	Fatty and long	Short hair
	Bonga	Bonga	Fatty and long	Short hair
Fat-rumped sheep	Afar	Afar	Fat rump with fat tail	Short hair
	Black head Somali	Black head Somali	Fat rump/tiny tail	Short hair
Thin-tailed sheep	Gumz	Gumz	Thin and long	Short hair

<sup>1</sup> It should be noted that some breeds in neighboring countries could be found in border areas in small numbers. These breeds are not included here. Example, Nuer sheep (found in the Gambella region and maintained by the Nuer community), Barka or Begayit in the Tigray region. <sup>2</sup> Based upon DNA analysis. <sup>3</sup> Based upon tradition.

For the sake of clarity in presentation, the traditionally recognized sheep types rather than the breeds are described in this bulletin. The sheep types are also referred to as breeds in the bulletin. However, it should be noted that populations traditionally recognized as distinct types with different local names could be genetically similar. For example, the short fat-tailed breed combines the sheep types Sekota, Farta, Tikur, Wollo, and Menz which are all genetically similar.

## 4. Geographical distribution

Geographical distribution of sheep breeds of Ethiopia is shown in Figure 1. This location map of the breeds can also be used to identify the breed of a population of sheep in Ethiopia. Rutana breed (from Sudan) is increasingly dominating in the area delineated as Gumz sheep breeding tract.

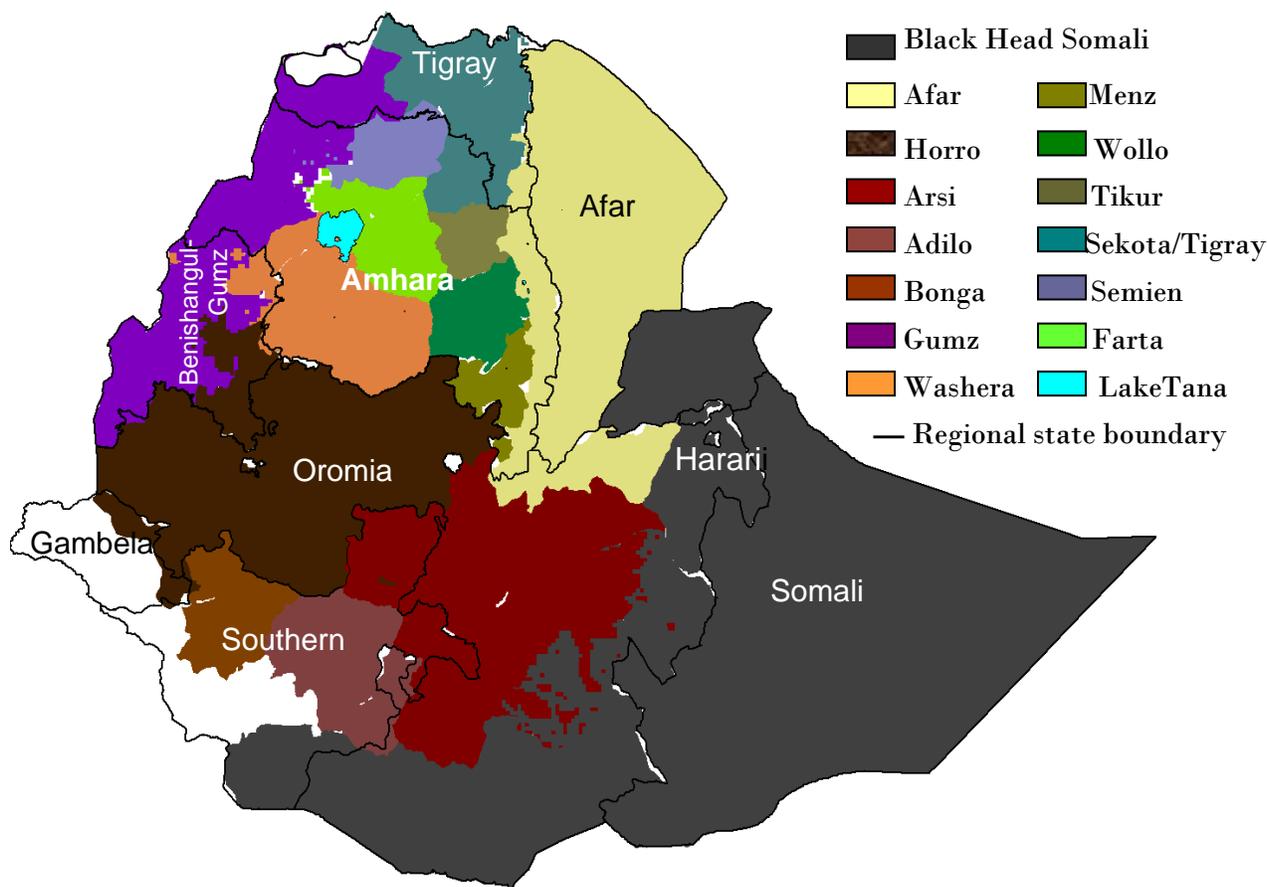


Figure 1. Geographic distribution of sheep breeds in Ethiopia. (Note: Lake Tana is not a breed)  
 Source: Solomon Gizaw (2008)

## 5. How to identify sheep breeds of Ethiopia in the field

Whereas sheep breeds of Ethiopia have been identified and classified, practical guidelines to identify breeds at the field level are required. People involved in sheep production and development such as KDA can identify the sheep breed in their locality by observing the physical characteristics of the flock and by consulting Table 1.

### 5.1 Key physical characteristics

There are key physical characteristics that distinguish breed groups and breeds of sheep in Ethiopia. It is important to note that observation should be made on adult full-mouth animals which express the true characteristics of the breed. This is particularly important for those characteristics that require measurements such as size of body parts.

### 5.1.1 Tail type

A primary characteristic used in identifying a sheep breed is the tail type. Tail type is a significant distinguishing feature among sheep breeds in Africa in general. This is because the founder populations of current African sheep breeds were thought to be introduced from Asia in three waves of migration of *fat-tailed sheep*, *thin-tailed sheep*, and *fat-rumped sheep*. Thus, a sheep stock in Ethiopia could be assigned to one of these three major groups based on its tail type.

### 5.1.2 Tail shape

Ethiopian sheep have uniquely different tail shapes. Within the fat-tailed group, some populations have short tails while others have long tails. This characteristic can be used to designate a population either into short fat-tail or long fat-tail groups. Sheep breeds in Ethiopian can be categorized into four breed groups based on a combination of their tail type and tail shape: *short fat-tailed*, *long fat-tailed*, *thin-tailed* and *fat-rumped* (see Table 1). This approach of classification has been shown to correspond to genetically distinct groups.

### 5.1.3 Fiber type

Fiber type is another major distinguishing feature of sheep breeds in Ethiopia. There are two breed groups: coarse-wool sheep and short-hair sheep. These breeds have developed this characteristic as an adaptation to their ecological distribution. Coarse-wool sheep are found in cold, sub-alpine environments and short-hair sheep in warmer areas.

## 5.2 Other physical characteristics

In order to identify the breed of a population within the major groups that are discussed in sections 5.1.1 to 5.1.3, further observation or measurement regarding physical characteristics is required. Among the characteristics, an important objective measure is size. Size includes body size and sizes of other body dimensions. Size characteristics of sheep breeds of Ethiopia are given in Table 2. A detailed list of physical characteristics of sheep breeds in Ethiopia is presented in Table 3 with accompanying pictures in Figure 2.

Table 2. Body size characteristics (withers height, body length, heart girth, sub-sternal height) and other body dimensions measured on adult full-mouth ewes

Sheep type	Withers height	Body length	Heart girth	Sub-sternal height	Ear length	Tail Length	Tail Width	Hair length
Adilo	65.5	62.1	71.8	35.8	11.7	28.1	6.7	4.4
ArsiBale	64.1	62.3	73.3	35.3	11.0	28.4	6.2	4.2
Bonga	66.7	69.4	73.5	36.4	9.8	25.9	8.1	2.9
Farta	67.9	65.7	72.0	37.3	9.9	22.9	9.6	7.5
Gumz	62.9	65.8	72.1	32.9	11.2	31.6	7.2	3.6
Horro	70.0	71.6	76.9	38.1	10.8	35.6	9.9	2.6
Menz	57.5	58.5	65.7	30.9	6.8	17.0	7.9	7.9
Sekota	62.3	62.2	69.9	33.5	4.4	19.9	9.5	6.5
Semien	66.6	64.7	73.2	35.9	8.3	12.8	9.6	8.2
Afar	63.6	58.3	70.6	35.6	3.8	19.1	16	3.2
Tikur	64.1	63.6	69.7	35.9	6.8	17.3	8.9	7.4
Washera	69.4	66.7	74.1	38.6	10.6	-	-	6.3
BHS	63.3	59.9	71.5	35.1	9.6	14.7	14	4.0
Wollo	62.7	61.2	67.6	34.3	8.7	20.4	7.2	7.9

All measurements are in centimeters. Sub-sternal height is the height from the ground to the underside of the front body. It shows the legginess (long-limbed) of the animal.

Table 3. Important distinguishing physical characteristics of sheep types in Ethiopia

Name	Other local names	Distinguishing physical characteristics	
<b>Menz</b>	Legegora, Shoa, Abyssinian, Ethiopian Highland sheep	Short, fat tail turned-up at end; long fleece with coarse wool; small body size; short-legged; commonly black with white patches, white, brown, white with brown patches; straight-faced; horned males; short semi-pendulous ears with 12% rudimentary ears in the population.	
<b>Sekota</b>	Tigray Highland, Abergelle	Short, fat tail turned-up at end and fused with main part; hair coat (white animals have fine hair or wooly under-coat); medium-sized; predominantly plain brown or white coat, few blacks with brown belly; semi-pendulous or rudimentary ears in Wag Himra and Tigray, predominantly rudimentary in Tekeze valley. Reared by Agew, Tigray and Amhara communities.	
<b>Semien</b>		Short, fat tail; well developed wooly undercoat; largest of the highland woolled sheep; plain brown, plain white, brown/white with white/brown patches, plain black and black with brown belly; unique long laterally spiral horn in males and short horns in most females; Reared by Amhara communities.	
<b>Tikur</b>		Short fat tail; wooly undercoat; small body size; predominantly (60%) black coat; majority short semipendulous ears, 24% rudimentary ears. Reared by Amhara communities	
<b>Wollo</b>		Short, fat tail with short twisted/coiled end, occasionally turned up at end; well developed wooly undercoat; small size; predominantly black, white or brown, either plain or with patches of white, black or brown; long hair with wooly undercoat; horned males. Reared by Amhara communities	

Name	Other local names	Distinguishing physical characteristics	
<b>Farta</b>		Short, fat tail; woolly under coat; medium size; commonly white (37.5%), brown (27.5%) and black with brown belly (15%), white/brown with brown/white patches; males are horned. Reared by Amhara communities	
<b>Washera</b>	Agew, Dangilla	Short, fat tail; short-haired; large body size; predominantly brown; both males and females are polled. Reared by Amhara and Agew communities	
<b>Adilo</b>	Wolaita	Long, fat tail reaching the hocks, broad at the base and upper third with long tapering end; short-haired; large size; males are short-horned and 18.4% of ewes are horned; predominantly brown (43%), brown with white patches (32%), black (16%), and black with brown patch (9%). Reared by southern communities	
<b>Arsi-Bale</b>		Long, fat tail with twisted end in some; hairy fiber, especially in adult ewes, males have minor wool growth in some parts of body; medium size; males and most females (52%) are horned; large size; brown coat (35.1%), brown with white patches (24.3%), black, white, and combinations of above colors. Reared by Oromo communities	
<b>Horro</b>		Long, fat tail extending below hock, either straight (51.4%) or coiled/twisted (48.6%) at the tapering end; prominent fat tail in males; short-haired; large size and leggy; dominant colors are brown and fawn, belly is lighter especially in adult ewes, less frequent are black, white, brown with white patches; both sexes are polled. Reared by Oromo, Benishangul and Gambella communities	

... Table 3 continued

Name	Other names	Important physical characteristics	
<b>Bonga</b>	Gesha, Menit	Long, fat tail with straight tapering end (98.4%); hair sheep; large size; predominantly plain brown (57.9%) or with black (.9%) or white (5.3%) shade, plain white (10.5%) or with brown patches (10.5%), and black (2.6%); both sexes are polled. Reared by Keffa, Sheka and Bench communities	
<b>Afar</b>	Adal, Danakil	Rump, wide, fat tail, with some large fat tails reaching below the hock; hair fiber; medium size; characteristically uniform creamy white/ beige coat; rudimentary ear; polled; dewlap. Reared by Afar, Amhara, Tigray people	
<b>BHS</b>	Wanke, Ogaden, Berbera black	Short, fat rump with a stumpy appendage; short-haired; medium size; uniform white body and black head and neck; polled; convex face, especially in males; short, outward forward drooping ear; well developed dewlap. Reared by Somali and Oromo, Konso and south Omo communities	
<b>Gumz</b>		Long, thin tail reaching below the hocks; hair coat' somewhat dwarf; convex face profile; long pendulous ear; commonly plain brown or with patch (39.4%), white with brown or black patch (21%), black (15.8%), white, black with white patch, brown with black patch; polled. Reared by Gumz and Amhara communities.	

Figure 2. Sheep breeds of Ethiopia.

## 6. Utilization of sheep breeds of Ethiopia

### 6.1 Production and adaptation characteristics

To best utilize these sheep resources, the first step is to characterize the:

- production environment (climate, feed availability, disease prevalence);
- production system (farmers sheep production practice, their preferences, socio-economic circumstances and level of input use); and
- productive and adaptive characteristics of the sheep breeds. These characteristics are presented in detail in Table 4. The following is the summary.

Short fat-tailed sheep (see Table 1 for the breeds in the groups)

- highly adapted to the local environment.
- only sheep in Ethiopia producing coarse fleece.
- lowest in productive and reproductive performance.

Long fat-tailed sheep

- best meat producing breeds in Ethiopia.
- adapted to produce in good environments of wet highlands

Fat-rumped and thin tailed sheep

- highly adapted to their environment.
- good producers of mutton.

Table 4. Productive and adaptive characteristics of sheep breeds of Ethiopia

Sheep type	Adaptive characteristics/special merits	Body Weight (kg)	Litter size	Lamb survival percentage
Menz	Adapted to cold, surviving and producing in marginal areas; tasty meat; best wool producers	20.1	1.00	98
Farta	Adapted to feed shortage; produce wool	28.3	1.09	90
Sekota	Adapted to feed shortage	26.6	1.00	83
Semien	Adapted to cold, high altitude, feed shortage; produce wool	26.9		80
Tikur	Adapted to feed shortage; produce wool	25.4	1.08	95
Wollo	Adapted to feed shortage; produce wool	21.7	1.00	91
Adilo	Adapted to produce in good environment; good mutton producers	28.1	1.53	45
Arsi-Bale	Adapted to cold, to produce in good environment	28.6	1.37	81
Horro	Adapted to produce in good environment; good mutton producers	35.4	1.43	82
Bonga	Adapted to produce in good environment; good mutton producers	34.2	1.31	49
Gumz	Adapted to heat; unique genetic make-up	31.0	1.31	88
Afar	Adapted to heat, feed and water shortage, long trekking; good meat yield; fatty meat	31.0		
Washera	Adapted to produce in good environment; good meat producer	32.8		
BHS	Adapted to heat, feed and water shortage, long trekking; good meat yield; fatty meat	27.9	1.00	100

## 6.2 Guidelines for sustainable utilization

*What does sustainable utilization mean?* It is using our resources to fulfill our current requirements while maintaining them for future use. This means conservation. The following guidelines can be followed.

- ✚ Conserve the adapted indigenous breeds as they have special adaptive and productive merits.
  - Conserve breeds through utilization. The rationale is that we need to use the breeds to improve our livelihoods.
  - Improve competitiveness of local breeds! Increase their value to the communities. In Ethiopia, there is a tendency to replace the local breeds with improved exotic breeds. This is because the locals are perceived to be inferior in productivity. Competitiveness of local breeds could be increased by improving their productivity.
  
- ✚ Productivity can be improved in two ways: *Improving the production environment* (feed, disease control/prevention) and *improving genetic merit*.
  - Genetic improvements should maintain adaptive merits of breeds (see Table 4).
  - Genetic improvement options should consider environment of the breeds. For example, crossbreeding should not be an option in low potential areas.
  - Improve the breed for what it lacks! The productive merits and demerits (see Table 4) need to be considered.
  
- ✚ Genetic improvement options are selective breeding and crossbreeding (see Technical Bulletin no. 14).
  - *Selective breeding* is a sustainable option to improve genetic merits.
  - Crossbreeding can also be utilized sustainably
  - There are exotic breeds with good productive merits in the country:
    - Awassi (Figure 3) good for meat and coarse wool for carpet weaving (Figure 4)
    - Corriedale (Figure 5) good for fine wool production used for weaving *gabi* (Figure 6).
    - Dorper (Figure 7) for meat production
    - Rutana (Figure 8) for meat production; adapted to arid pastoral system. The Rutana is introduced from The Sudan and is found in the western lowlands (Metema area) of Ethiopia.
  - Indiscriminate crossbreeding should be avoided! Breeding must be controlled.
  - Terminal crossbreeding is an option for a controlled crossbreeding.
  - Terminal crossbreeding can increase farmers' income from the sale of crossbred lambs while conserving local flocks.
  - Terminal crossbreeding involves selling all crossbred lambs except the ram maintained for subsequent breeding.



Figure 3. Awassi sheep (Source: Debre Berhan Agricultural Research Center)



Figure 4. Carpet made from coarse wool produced by Awassi and local sheep at Gimba, South Wollo



Figure 5. Corriedale sheep at Gimba, South Wollo (Source: Debre Berhan Agricultural Research Center)



Figure 6. *Gabi* made partly using fine wool produced by Corriedale sheep at Gimba, South Wollo (Source: Debre Berhan Agricultural Research Center)



Figure 7. Dorper sheep



Fig. 8. Rutana sheep in western lowlands

### **6.3 What can the KDA do to promote sustainable utilization**

- Create awareness among farmers about the adaptive merits of their breed. Information provided in section 6.1 of this bulletin could be used for this purpose.
- Monitor the population dynamics and flock structure, particularly the relative numbers of breeding females and males in a breeding flock. For instance, few breeding males may indicate that there is a risk of losing diversity due to inbreeding.
- Teach farmers options for sustainable utilization of their breeds. Guidelines outlined in section 6.2 of this bulletin can be utilized.
- Train farmers on techniques of feed production/health care and genetic improvement to increase productivity of their breed.
- Organize village sheep breeding groups to collaborate in community-based selective breeding schemes, provision of inputs and marketing of their sheep. (The reader is referred to USAID Technical Bulletin No. 14 for a guideline on organizing a community-based selection scheme)
- If crossbreeding is opted for by the farmers to improve genetic merits of their sheep:
  - Create awareness among farmers on the long-term risk of indiscriminate crossbreeding;
  - Teach farmers the benefits of terminal crossing; and
  - Train them on the method of terminal crossbreeding.

## **7. References**

Solomon Gzaw (2008). Sheep resources of Ethiopia: Genetic diversity and breeding strategy. PhD thesis, Wageningen University, The Netherlands.