Tropentag, October 5-7, 2011, Bonn
"Development on the margin"

Goat production system and opportunities for market orientation in Southern Ethiopia

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Introduction

Goats account for about 30% of Africa's ruminant livestock and contribute to about 17 and 12% of the total meat and milk production, respectively. Sub-Saharan Africa (SSA) accounts for over 60% of the total goat population in Africa, with estimated 147 million goats representing about 80 indigenous breeds or strains distributed across all agro-ecological zones and production systems (LEBBIE, 2004). Ethiopia has about 22 million goats (CSA, 2009/10) and 2/3 are found in arid and semi arid lowlands and a third in the crop livestock mixed system in the highlands. In Southern Nations Nationalities and Peoples Regional State (SNNPR), about 2.7 million goats are reared in a wider range of agro ecological zones. Goats are highly adapted to a broad range of climatic and geographic conditions and are more widely distributed than any other mammalian livestock. The unique features of goats, which include selective feeding behavior, enable them to select the most nutritious parts of plants. They have fast reproduction, consume a diversity of plant species and require low capital investment making them very important especially for poor farmers in densely populated mixed farming areas and pastoralists. In recent years, the demand for goat meat is continuously rising presumably due to increased local consumption and the growing export market. However, despite the huge number of goats that are reared by smallholders and agro pastoralists in the district, productivity of the goat and their system of production has received little attention in research and development endeavors. Proper description of the production and marketing systems and identification of the actual production constraints as well as potential productivity of goats is fundamental to any development intervention. The objectives of this study are to identify and describe goat production and marketing systems, to identify opportunities and challenges of goat production, and to determine production potential for development of market-oriented production system.

Materials and Methods

The study was conducted in Wonsho, Dale, and Loka Abaya Woredas (districts) of Sidama Zone in Southern Nations, Nationalities and Peoples Regional (SNNPR) State, Ethiopia. Wonsho Woreda represents Moist Dega agro-ecology having altitude ranging from 2300 to 3200 masl, Dale represents Moist Weyina Dega agro-ecology with altitude range from 1500 to 2300 masl and Loka Abaya represents the Moist Kola agro-ecology with altitude from 1170 up to 1500

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masl. These Woredas have a total land area of 1,411 km^2 and are located about 320 km south of Addis Ababa (IPMS, 2005). The Sidama Zone has 183,462 goats which is 6.7% of the Regional goat population. The study Woredas have 17,248 goats, contributing to 17.1% of the total Zonal goat population (CSA, 2009/10). Both formal and informal methods were employed in the study. In the first stage, Kebele (village) administrations (KAs), the lowest administrative units, involved in the study were selected using stratified sampling technique. In the second stage, random proportional sampling techniques was used in order to determine the number of Kebeles from each stratum. As a result, a total of eight, i.e., one Kebele from Wonsho, six from Dale and one Kebele from Loka Abaya were selected. Finally, households were selected using simple random selection method after identifying goat owners using purposive sampling method. Three primary market namely: Bokasso, Naramo Dela and Hantate were selected from the Moist Dega, Weyina Dega and Moist Kola agro-ecologies. Data were analyzed using SPSS version 12 Software. Descriptive statistics and analysis of variance were used.

Results and Discussion

Out of the 120 respondents, 94.2% were male and the overall mean age and family size were 39.3±2.82 years and 7.5±0.25, respectively. On average, households in the Moist Dega possess larger ($P<0.001$) land (2.18 ha) than those in the Weyina Dega (1.27 ha) and Kola (1.77 ha) agro-ecologies. The average livestock holdings in TLU per household in Moist Dega, Weyina Dega and Moist Kola is 3.47 (9.4 animals), 4.44 (11.9 animals), and 10.82 (24.4 animals) TLU, respectively (Table 1). Livestock to land ratio per household for Dega (4.64 animals/ha) is significantly lower than the other two agro-ecologies. Farmers in Dega move their flock to the lowlands around Lake Abaya during the dry season in search of grazing, and this may have also contributed to the low livestock density in the Dega ecology.

Table 1. Mean livestock holdings per household in the three agro-ecologies

Species	Moist Dega (N=15)	Moist Weyina Dega (N=90)	Moist Kola (N=15)
Cattle	4.13	5.13	10.93
Goat	2.57	5.76	12.47
Sheep	2.21	0.70	0.48
Equine	0.57	0.31	0.49
Total number	9.48	11.9	24.37
TLU	3.47^{a}	4.44^{a}	10.82^{b}

TLU = Tropical Livestock Unit.

Goats in the Moist Dega phenotypically resemble the Arsi-Bale goat type and possess hairy coat. Their coat color varies from black to grey with some red. The Sidama goat type is found in Moist Kola and are fairly similar to those found in the Moist Weyina Dega area, but differ markedly from the highland Dega goats ((Workneh, 1992). The Sidama goat type is bigger in size than the Arsi-Bale goats whereas goats in the Moist Weyina Dega are of intermediate size and their coat is fawn, grey and white. The Loka Abaya goats are predominantly white in color, with some fawn and black. Flock holders indicated that large sized, white colored goats with thick and straight horns have better market demand and value than the other colored goats. The overall mean flock size per household for all the study sites was 5.98±0.55, of which 53.5% were does, 13.4% castrates, 13.8% bucks, 10.6% doe kids and 8.8% buck kids of less than six months of

age. On average, the highest flock size (12.5±2.2) was observed in the Moist Kola and was significantly higher (P<0.05) than in Moist Dega (2.7±0.36) and Moist Weyina Dega (5.5±0.55) areas. The breeding stock consisted of 63.4% female. Data on reproductive performance of goats in the three agro-ecologies are presented in Table 2.

Table 2. Reproductive performance of goats in three agro-ecologies

Agro-ecology	Age at first mating (Months)	Age at first kidding (Months)	Kidding interval (Months)	Litter size
Moist Dega	10.33±0.73[a]	16.13±0.61[a]	10.0±0.35[a]	1.33±0.13[a]
Moist Weyina Dega	9.83±0.27[a]	14.86±0.29[ab]	8.56±0.18[b]	1.59±0.16[a]
Moist Kola	8.73±0.76[a]	13.73±0.70[b]	7.27±0.28[c]	2.07±0.07[b]
Overall	9.76±0.24	14.88±0.25	8.57±0.17	1.62±0.13

Within columns, means followed by different superscripts differ significantly (P<0.05)

Two hundred forty goats belonging to 50 households were monitored from September 2006 to March 2007. The average body weight of adult does (≥ 2 years) in the Moist Kola, Moist Weyina Dega and Moist Dega was 24.9±0.97, 24.3±0.89 and 22.7±0.66 kg, respectively. Out of the total birth observed 53.6% were single, 41.5% were twins and 4.9% were triplets. Mean kid birth weight was 2.9 kg in the Moist Kola, 2.5 kg in the Moist Weyina Dega and 2.2 kg in the Moist Dega. The mean 120-days adjusted weaning weight was highest (P<0.05) in the Moist Kola (11.5±0.53 kg) than in the Moist Weyina Dega (9.2±0.26 kg) and Moist Dega (8.25±0.35 kg). The major exit routes from the flock were sales (20%) and death (13.3%).

Respondents (86.7%) in the Moist Kola feed goats on tree leaves, like Acacia species and *Olea Africana*. Crop residues of maize, haricot bean, banana (*Musa paradisiaca*) and enset (*Enset ventricosum*) leaves and stem parts are used during the dry season. In the Moist Dega and Moist Kola, 46.7% and 86.7% of the respondents, respectively indicated that shrubs, bushes and tree branches are the major feed resources for goats. On the other hand, the majority (66%) of the respondents in the Moist Weyina Dega use crop byproducts from enset, banana, chat (*Khata edulis)* leftover, locally known as '*garaba'*, sweet potato vine, haricot bean (leaves and broken seed), weeds and tinnings from annual crops for goats. In Loka Abaya, palatable trees like *Balanite aegiptica*, *Maytenus ovatus*, *Rhamus prinoides* and Tragia spp. are important feed resources and are being replaced by less palatable bushes. Heart water and internal parasites in all agro-ecologies and trypanosomosis and goat pox in the Moist Kola area are the major diseases of small ruminants. In general, lack of veterinary clinic, shortage of veterinarians, shortage and high price of drugs were identified as major animal health problems.

The first primary market is Bokasso located in the Moist Dega agro-ecology. It is the smallest market compared to the other two markets (Naramo Deala and Hantate). The number of animals marketed per week is estimated to be about 400 per week. The second market is Naramo Deala in the Moist Weyina Dega, situated 7 km west of Yirgalem town. The number of animals that enter this secondary markets ranges from 500 to 1000 heads per week. Hantate market located in the Moist Kola area is the third and the biggest primary market. Market participants are producers, retailers and small-scale traders. During the transaction, middlemen "*Delalas"* play a significant role in bring the two to a deal. Commonly used animal characteristics that affect price are body weight, sex, age, body condition, presence of horns and coat color. Body weight is

estimated by *'eye ball'* for all animals. Prices peak around religious festivals like Easter, New Year, Mawlid, Eid Al Adha, Epiphany and Christmas and reach the lowest during the cropping season.

Conclusions and Outlook

Considerable differences were identified in goat population, production and marketing systems among the Moist Kola, Moist Weyina Dega and Moist Dega agro-ecologies. The Moist Kola agro-ecology (Loka Abaya) has a great potential for goat production, but lacks access to markets, and diseases hamper full exploitation of the resource. The emerging small-scale fattening in the Moist Weyina Dega is an opportunity to integrate with the Moist Kola extensive production system. Farmers in the Moist Weyina Dega could buy young goats from the Moist Kola for fattening and marketing. Integration of forages into crop production systems especially under sowing legumes like cowpea with *chat* (*Khata edulis)* and desmodium under *enset* and coffee crops is important. Therefore, development strategies and interventions should focus on the challenges and opportunities of a specific location rather than attempting to implement a blanket approach in the development of goat production and marketing.

Trypanosomosis and sheep/goat pox are the major diseases in the Moist Kola agro-ecology, while heart water and internal parasites are important in the Moist Weyina Dega and Dega agro-ecologies. Goat pox can easily be prevented through one time mass vaccination every two years. On other hand, trypanosomosis is economically important disease and the seasonal mobility of the herders to protect their flock from tsetse-infested areas to the relatively cooler highlands is an appreciable strategy. However, community-based and integrated trypanosomosis control program is key to sustainable goat production in the area. In accessibility of some areas (Loka Abaya) to markets and urban centers is a crucial problem in marketing goats. Facilitating market opportunities by connecting with big market players and establishing livestock market in Loka Abaya will encourage goat owners to improve their goat flocks and be more market-oriented.

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