INCREASING FOOD SECURITY THROUGH IMPROVED GOAT PRODUCTION: A PROGRESS REPORT OF A UNCF-FUNDED INTERNATIONAL DEVELOPMENT PARTNERSHIP BETWEEN LANGSTON UNIVERSITY AND ALEMAYA UNIVERSITY

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1. Introduction

In Ethiopia, agriculture in general and livestock in particular play pivotal roles in the nation's economy. The majority of the population depends upon agriculture for their livelihoods. Livestock are an integral component of the farming systems present in Ethiopia; cattle, horses, donkeys, sheep and goats serve various functions from supplying draught power to meat and milk production to serving as a source of savings. Despite its importance to the country, the livestock sector has traditionally been neglected in terms of formulating appropriate development strategies and a suitable marketing infrastructure for livestock and livestock products (Tilahun, 1994). This has led to livestock contributing less to Ethiopia's economy than its importance and size would suggest.

The Harar highlands are densely populated with some areas recording a population density of over 300 persons/km^2 (Wagayehu and Habtemariam, 1994). Crop-based livestock farming systems are the dominant agricultural system of the region. Although many species of livestock are raised in this area, recent trends suggest that goat raising is on the increase. In this region, as well as in Ethiopia at large, goats can play a role in combating two challenges faced by the rural population of suboptimal food security and self-sufficiency and low income generation. Goats have the ability of producing milk and meat under harsh environmental conditions that might limit productivity of sheep and cattle. Goats also require a lower initial investment than cattle and have lower housing and feed requirements per animal. As a result of these characteristics, many farmers are turning away from larger ruminants and finding goats an attractive investment.

There are an estimated 18 million goats in Ethiopia (FAO, 1988) that are kept in a wide variety of production systems, reflecting the diversity of the Ethiopian environment. Approximately two-thirds of the goat population is believed to be kept on rangeland and associated lowland areas while the remaining one-third is found in small flocks on mixed highland farms. Goats serve many important purposes for their owners. They are a valuable source of milk, meat, and immediate cash income and their role as savings and investment assets cannot be overlooked. In addition to their direct roles on-farm, goats contribute to Ethiopia's foreign income earnings through skins supplied to the tanning industry and in the form of live animal export. Often, goats are the only milk source to children of the poorest families. The demand for this milk is so high that in some areas milk is diluted with water to distribute and nourish a greater number of children.

Despite their value and importance, the productivity of goats in Ethiopia and in the highlands of Harar in particular is constrained by various complex factors involving biological and environmental aspects as well as socioeconomic factors. These include:

❖ Inadequate knowledge of the on-farm feed resource base, its utilization and seasonal variability. This has hampered efforts on formulating appropriate feeding and nutrition strategies to overcome the decreased animal productivity due to seasonal feed shortages.

❖ Poor description of Ethiopian goat genotypes. Some research has been conducted to identify the different goat phenotypes of the country and to characterize their major habitats (FARM Africa, 1996). However, the genetic potential of Ethiopian goats for meat and milk production and for factors such as resistance to disease or parasites has not yet been quantified.

❖ Inadequate formulation of strategies designed to combat the diverse array of animal diseases present in the country and the lack of effective health delivery services. Little emphasis has been paid to goats in this area.

❖ The absence of good extension services that address the production of livestock in general and goat owners in particular.

❖ Lack of well-structured marketing facilities and a lack of processing facilities for production of goat products.

❖ Goats have been wrongly associated with environmental degradation. As a result, little attention has been paid to goats by policy-makers, development administrators, and researchers.

Attempts have been made by non-governmental and governmental organizations to exploit goats for the benefit of the rural poor in the Harar highlands by improving their productivity through research and extension. The British non-governmental organization FARM Africa initiated a Dairy Goat Development Project (DGDP) in 1988 in collaboration with governmental and non-governmental organizations found in Ethiopia. The project's aim was to increase income and raise the nutritional status of the rural poor, especially women and children living in the densely populated Harar highlands. It was only after DGDP intervention that research and development interests in goats have intensified.

The DGDP of FARM Africa began improving goat productivity through crossbreeding the indigenous stock (Somali breed) with the exotic Anglo-Nubian breed. The resulting crosses were distributed to farmers along with improved feed and health packages. Project results showed that milk and meat outputs were increased, leading to an average increase in gross per capita income of 19% for the beneficiaries (Wagayehu and Habtemariam, 1994). However, the long-term success of a goat improvement strategy based on crossbreeding with exotic breeds remains unproven (Wagayehu and Habtemariam, 1994).

Whereas crossbreeding with exotic breeds has been shown to increase productivity, the potential to improve local goat breeds through selection and breeding is unknown. Additionally, data on the on-farm productivity of local goats is lacking. Recently, in a collaborative project conducted with Langston University (LU), Langston, OK, USA Alemaya University (AU) distributed local goats to nearby rural poor women's groups with the intention of helping them improve their livelihood and collecting information on the on-farm productivity of local Somali goats. Another project goal is the establishment of a nucleus herd of the Somali breed to provide breeding stock and for assessment of their on-station performance.

2. The Collaborative Project between Alemaya University and Langston University

The collaborative project between LU and AU is an Institutional Development Partnership Activity (IDP) funded by the United Negro College Fund with monies designated for this purpose by the United States Agency for International Development (USAID). The IDP program is designed to: strengthen the ability of institutions in developing countries to meet national economic and social development needs; assist in the achievement of USAID goals and strategic objectives of country USAID Missions; and to further the international involvement of the Historically Black Colleges and Universities of the United States. With these criteria as a backdrop, LU and AU formulated an IDP project with the following partnership aims:

- Increase the ability of AU staff in meeting the development needs of the surrounding region.

- Strengthen the capacity of both AU and LU in achieving their educational missions.

- Enhance food security in the AU region.

The above partnership objectives were set in accordance with the Special Objective of the USAID Mission in Ethiopia of enhancing food security through increased household income and improved family health status. Project objectives also support a Strategic Objective of the Greater Horn of Africa Initiative of strengthening African capacity to enhance regional food security.

The goals of the collaborative project were planned to be accomplished through the following activities.

- Establishing collaborative research at LU and AU

- Training AU staff at LU

- Establishment of developmental groups that target women in development through the provision of goats and training to women groups

Regarding the first two goals, collaborative research at both institutions is already underway. Another important aspect of the project is the training of AU staff in goat research methodology and extension at LU. This was designed to assist AU staff in building their capability to conduct research and to better help the region surrounding AU in achieving regional food security. From May to November, 1999, one AU staff member, Mr. Getachew Animut participated in a six-month training at LU. In August 2000, a second staff member, Mr. Mengistu Urge, traveled to LU to participate in a similar training program. The remainder of this report will focus on the development project carried out at AU.

3. Activities Accomplished in the Establishment of Women's Groups

A main objective of this project was to enhance food self-sufficiency among the rural poor households around AU. This was to be accomplished through the establishment of a project that targeted women in development through provision of goats and training to women's groups. In the conduct of this objective, the following activities have been accomplished.

3.1 Site Selection

Two extension sites near AU were selected. The two sites were selected to represent an area either dominated by a crop called chat (*Catha edulis*) or by maize and sorghum. In each extension site three villages were identified resulting in six villages involved in the project (Table 1). The sites and villages were selected in consultation with extension agents working in the area. More than one village in each site was selected to prevent placing all of the distributed goats in one village. This was done so that:

❖ A wider area would be covered by the project. This would result in selection of more appropriate target groups (women) and in broadening project impact.

❖ The probability of overstocking leading to overgrazing and feed shortages would be minimized.

Table 1. Selected sites, villages and number of selected households for the project.

Chat dominated area			Maize and sorghum dominated area		
Village name	No. of farmer households	No. of households selected	Village name	No. of farmer households	No. of households selected
Abdi	26	17	Gerero	30	16
Meiy	50	16	Ebronamude	67	17
Kola	20	17	Yobe	53	17

3.2 Women's Group Selection

A format was prepared to register all the households of the selected villages. Family size, livestock holdings and major crop types cultivated were recorded as indicators of poverty to help in the process of selecting the collaborative women's groups for the project. Before selection of target groups, all women in the selected villages were called to a meeting where the project was discussed. Goat production was explained as well as the terms of participation, i.e., what they could expect from the project and what was expected from participants. Two leaders from women's groups in each village were selected to assist in collecting appropriate information about the households in the village and to organize the selected farmers for smooth conduct of the project.

The following step was the selection of participant women. The main criteria for the selection of women to receive goats were:

❖ Interest in participating in the goat production project. Selected women were expected to voluntarily participate in every aspect of the project and to receive goats with the understanding that a number of young breeding female goats equal to the number received would be returned to the project.

❖ Family size and livestock ownership. Large families owning few livestock had a better chance of being selected to receive goats. This was done to better achieve the objective of enhancing household food security of resource poor households.

❖ Priority was given to women-headed households, provided the women had time to care for the goats and that goats would not be an additional burden to them.

Using the aforementioned criteria, fifty women households from each site or sixteen to seventeen per village were selected. This resulted in a total of one hundred women participants.

3.3 Training

Training materials were prepared in Amharic (the local language) for ease of understanding by extension agents and villagers. The importance of goats, and aspects of feeding and forage development, health care and related management issues of goat raising were explained in the training material.

Training was also provided to the women's groups in their villages prior to distribution of goats. Training was also conducted at the AU goat farm, where women were given an opportunity to see the campus goat farm housing facilities, management, feeding and feed base. The women groups also had the chance to see the different animal farms of the university as well.

3.4 Goat Purchase

Another activity accomplished was the purchase of local goats to be given to women's groups on credit. This was done after the woman showed interest and commitment to the project. Before purchasing the goats, aspects regarding the physical characteristics that needed to be considered were established. In order to improve the long-term prospects for the project, only young healthy females were purchased. Females with one pair of permanent incisors (15 – 18 months old) or with milk teeth but which had obviously been weaned for sometime (12 – 15 months old) were purchased. Older females are usually sold for a reason, such as infertility or poor mothering ability and, thus, older animals were avoided. Body conformation was also considered when purchasing the breeding stock. A good milking goat should have as much depth as possible in front of the hind legs giving her a triangular look deep in the hindquarters and narrowing towards the front goats. For males, goats with one pair of permanent incisors were purchased. The teeth of goats were checked not only for age but also for wear and any irregularities. The udder, which is of primary importance, was observed for any signs of abnormalities such as supernumerary teats (small teats attached to the side of the main teat). A physical inspection for externally observable abnormalities or wounds was also made. The eye (infections), nose (discharge), feet (foot rot), swelling under the jaw (internal parasites), skin (mange mite infestation), coat (is it dull or shiny and healthy?) and general appearance (dull/restless or full of energy) were all considered.

The goat purchase was made following the normal purchasing procedure of AU. Somali breed goats required for distribution to the participant women under this project were purchased in two batches from Harshin about 250 km and Hartishek about 190 km east of the AU campus. In the first purchase, 139 goats, were bought in Harshin. This purchase took place on June 2 and the goats arrived at the AU campus on June 6, 2000. The second batch of goats, 154 in number, was purchased from Hartishek on June 24 and the goats arrived at Alemaya on June 29, 2000. A total of 80 male and 213 female goats were purchased.

Upon arrival at AU, the goats were placed in quarantine for about two weeks. A day after arrival, a fecal sample was collected from each goat and a fecal egg count conducted to determine the degree of parasite infestation. Fecal egg counts indicated that of all goats 3, 41, and 56% were shown to have a high, medium and low parasitic loads, respectively. Of the 80 male goats purchased 4, 56 and 40% were observed to have a high, medium and low infestation rate whereas for females 3, 36, and 61% had high, medium and low infestation rates, respectively. Ectoparasites and external abnormalities were not observed in any animals acquired.

During the quarantine period goats were vaccinated against anthrax (Anthrax vaccine, National Veterinary Institute, Debre-Zeit, Ethiopia), drenched for internal parasites (Pamizole, Pharmaceutical Veterinary Industry, Ozzano Emilia (Bologna) –Italy) and dipped for ectoparasites (Steladone, Novartis Inc., Basle, Switzerland). Nonetheless, out of the purchased goats six male and one female goat died during the quarantine period before being distributed, mainly due to pneumonia. The higher parasitic load in males compared with females might have played a role in the death of more male goats during this quarantine period.

3.5 Goat Distribution

Goats were distributed to the participant women with the understanding that an equal number of goats given shall be returned to the project. The conditions of credit were clearly explained to the collaborative farmers. Distribution of goats to women farmers was started on June 22 and was completed on July 17, 2000. One hundred selected women farmers, fifty from each site, were given two does each with a buck provided for a group of three to four female farmers. All in all, 200 female goats and 30 male goats were distributed to the farmers.

4. Management tips

In addition to helping the rural poor in improving their livelihood by providing goats, the other objective of goat distribution was to collect information on the on-farm productivity of local Somali goats, and the management practices employed in goat raising. To this end data collection has been started. A preliminary survey was conducted in August, 2000 to collect information on the common crops grown, management practices employed in goat raising, and future plans of product use in the project sites. Half of the women collaborators were randomly interviewed.

4.1 Common Crops Grown

The common types of crops cultivated in the project areas are sorghum, maize, chat, sweet potato, potato, beans, wheat and barley in their order of abundance. In the chat dominated site, chat was the second most common crop following sorghum. These two crops were followed in abundance by maize, sweet potato, potato and beans. Byproducts of these crops are major feed sources for goats.

4.2 Grazing or Browsing

Except one respondent that practices zero grazing due to the lack of enough grazing land and a person to look after animals during grazing, all other participants allowed their goats to graze/browse on limited land. Half of the respondents had access to communal grazing, though small in size, where as others did not. Some farmers, however, were reluctant to allow goats to use communal grazing areas for fear of diseases that prevail in the area. About 85% of the respondents use small, privately owned fallow grazing areas, border farms, hill areas or allow goats to browse on the natural browse fences. Browse plants are important feed sources for goats in the project sites and those commonly eaten by goats are shown in Table 2. Goats on average spend 7 hours grazing or browsing with the range of survey responses being from 5 to 10 hours grazing time. Owners in some villages tended to have their goats return from grazing early in the day in fear of predators, especially hyena.

Table 2. Grown browse plants around project sites that are commonly eaten by goats

(based on farmer responses)

Local Name		Scientific Name
Oromigna language	Amharic language	
Agamsa	Agam	*Carissa edulis*
Gora	Qega	*Rosa abyssinica*
Kore-buse	Kosheshila, or	*Xanthium spinosum*
	Torserawit, or	
	Yeset-milas	
Katekate	Yewof-qolo	*Lantana camera*
Garbi	Gerbi or Girar	*Acacia albida*
Ejersa	Woyera	*Olea africana*
Wadessa	Wanza	*Cordia africana*
Kuana	Nslal	*Ferula communis*
Sariiti or Endesariiti	Qestancha	*Asparagus africanus*

4.3 Feeding

Goats were given feed in the house upon returning from grazing or browsing. Various types of feeds were given but the most common were thinnings of maize and sorghum plants, byproducts of chat called geraba, weeds collected from the farm, sweet potato vines, harvested grass, kitchen byproducts and leftover food, and grain byproducts produced when preparing grains for flour production. Some women also purchased wheat bran and peanut cake for supplementation. Almost all owners provided goats with table salt either mixed with water or mixed with leftover food.

4.4 Watering and Water Sources

Goats were offered water at home from the water used for human consumption. The most common source of water was hand pumped or shallow well water. Spring water was also used in few villages. Half of the respondents watered their goats once per day at midday whereas the other half watered goats twice per day at midday and in the evening. Water was provided to goats ad libitum. Owners seemed worried that their goats were not drinking enough water and most of them mixed water with salt to increase the water intake. One respondent said that her goats did not drink water for more than a month. This may have been due to the fact that the goats were getting enough water from consumed feed as it was the wet season.

4.5 Housing

Goats mainly share the same house with their owners. Few owners have separate housing for their animals. Generally, goats are housed together with other animals present.

4.6 Mating

Since several women were given a male goat for group use, the women needed to be able to detect estrus. Respondents indicated they could detect estrus and were able to tell signs of estrus. Bleating, wagging the tail, discharge of mucus from the vagina, riding and following other goats,

and a decrease in appetite were indicated by respondents as signs of estrus. A problem some women mentioned in connection with this is the failure of male goats provided to respond when females came into heat.

4.7 Tending

Tending goats was mainly the job of children. In the absence of a capable child to look after the goat or when children were in school, the housewife took care of the goats. Two-thirds of the respondents said that goats were tended with child labor, while one-third indicated that women looked after the goats. The householder was the least involved in the management of goats.

4.8 Product use

Respondents were asked to prioritize the importance of goat products, such as meat, milk, skin and manure. Milk was deemed the most important followed by meat, manure and skin. Of all the respondents, 30% ranked goat meat over milk in importance whereas the rest selected milk as the most important goat product. Goat manure was a highly valued product, even ranking above than the skin. Manure was valued as a fertilizer, with the majority used on the cash crop, chat. In addition, respondents indicated that inclusion of goat manure around the chat farmstead prevented wild animals, specifically the grey duiker or midaqoa in Amharic (*Syivicapra grimmia*), from eating the chat. The smell of goat manure is not liked by such animals and acts as a deterrent. The skin of the goat was processed and mainly used as a praying mat, locally called a salat, which is common among religious Muslims. Goat skin is preferred for salats to the skins of sheep and cattle as sheep skin is very hairy and cattle skin is not too flexible.

All respondents indicated that they will milk goats upon kidding. Milk will be used for home consumption, either for children or to prepare a common traditional drink called hoja (boiled coffee pulp mixed with milk). More than 85% of respondents indicated that milk will be given in priority to children followed with use for hoja, while the rest (15%) gave priority for the making of hoja. Women gave priority for hoja out of the belief that if hoja is consumed by the mother, there will be enough breast milk for the child. Milk will not be sold as respondents think there will not be excess production.

Except for three respondents who preferred cows, all others surveyed preferred goats to other farm animals. The reasoning by the three respondents who preferred cows was that cows will give more milk than goats. Respondents provided various reasons for preferring goat to other farm animals. These included: the diverse feeding habit of goats; small size which makes them easy to manage; small feed requirements; fast reproduction rate which results in immediate cash income and milk production; and the belief that meat and milk from goats, as compared with products from other animals, is felt to have a curative or medicinal value and as a result goats are slaughtered and fed when a child gets sick. Most respondents felt that goats were not difficult to raise but others indicated that goats were prone to flee and run to the chat fields and other farms to eat crops.

4.9 Expense

Goat owners did not report major expenditures in the raising of goats. Very few had purchased medicine. The main expense for goats indicated by most respondents was salt, which is not that expensive. Some farmers, especially those having large ruminants, bought supplemental feeds such as wheat bran and peanut cake and their goats were also provided with a share.

Goats generally share the same house with their owners, who considered this as a major constraint in raising animals. Most respondents realized the potential consequences of living with animals in the same house but said they needed the animals there to maintain a close watch on them. Most mentioned the lack of finances as a constraint to construct separate animal housing. However, lack of awareness of potential problems is also a reason why animals are not housed separately. In this regard, efforts need to be made to educate farmers on the importance of constructing separate animal houses and, if possible, to construct a model animal house in the farmer's area to change their attitude about housing animals with them.

Since this survey was conducted in the wet season, a shortage of green feed was not a major concern to goat owners. However, during the dry season grazing land may become scarce and feed shortages may become a production constraint. Most respondents did not support this view and except for very few, feed shortage was not considered as a constraint.

The lack of efficient veterinary service for animals was another constraint observed. When animals became sick farmers tended to buy tablets and treated animals themselves. The lack of timely treatment of sick animals may have been one a factor in the death of seven female goats out of those distributed to the women's groups.

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