

COMMUNITY-BASED GOAT PRODUCTIVITY IMPROVEMENT IN CENTRAL AND SOUTH MERU DISTRICTS OF KENYA: CHARACTERISATION OF FARM RESOURCES AND CAPACITIES FOR KEEPING LOCAL GOATS OR DIFFERENT GRADES OF CROSSBRED GOATS

C. O. AHUYA¹, F. M. MATIRI² and A. M. OKEYO³ AND F. M. MURITHI²

¹Farm Africa-Dairy Goat and Animal Healthcare Project, PO Box 2980, Meru, Kenya,

²Kenya Agricultural Research Institute, Headquarters, Kaptagat Rd., PO Box 57811 City Square 00200, Nairobi, Kenya.

³University of Nairobi, Dept. of Animal Production, PO Box 29053, City Square 00200 Nairobi, Kenya.

Abstract

A survey was conducted in Central and South Meru Districts in the Eastern Highlands of Kenya. The objective of the survey was to identify the biophysical and socio-economic characteristics of farmers that might influence the adoption of different types or grades of crossbred goats. A questionnaire was administered to a total of 129 individuals and eight farmer groups. Of the respondents, 64% were women and 36% men, indicating a high level of female participation. Eighty per cent of the respondents have land holdings of less than 2 ha, and more than 75% of this is allocated to crop production. Goat rearing is becoming popular with most households as a source of milk, fast growing goats for sale and as a coping strategy for farms too small to sustain a cow. Farmers keep small flocks of goats, ranging from one to four goats per household. The majority of farmers feel that they can manage cross-bred goats despite their meagre resources.

Introduction

Increasing human population, dwindling farm sizes and less productive local animals in the eastern highlands of Kenya has led to intensification of farming in the mixed crop-livestock production systems in the region. Resource poor farmers in the Eastern highlands are finding it difficult to maintain traditional livestock holdings of local goats and cattle of low productivity. Keeping livestock, and goats in particular, for resource poor farmers, can make important contributions to the farming systems, livelihoods and the welfare of smallholder farmers. Small land sizes suggest keeping fewer, but improved, livestock genotypes. Introducing an improved genotype through cross-breeding for smallholder farmers has been carried out by both NGOs and Government, Cartwright (1984), Bradford, (1981); Davendra, (1988), Shelton, (1978). Crossbreeding programmes with goats, particularly in developing countries, have usually increased productivity by increasing milk production, lactation and fat yields and lactation length while decreasing fat percentage, Shelton, (1978).

However the degree of improvement is dependent upon the genetic potential of the indigenous breed and the level of management available. Crossbreeding has also been shown to be a strategy for quicker benefits than those obtainable through selection, Cartwright, (1984), but if not properly planned, it can lead to disappointing results.

Sands and McDowell (1978) have also pointed out that management, particularly with regard to nutrition, limits the amount of improvement realised through cross-breeding. They noted that the increase in lactation yields is only 54% of that expected when averaging the production of the exotic parental, line in its temperate habitat, with that of the indigenous tropical parent and adding on a 73% increase due to heterosis. They further noted that cross-bred animals were fed only about 1.8 times their maintenance needs and are unable to produce at their maximum genetic potential and smallholders generally feed their livestock only about 1.1 to 1.2 times their maintenance requirements. At this rate of feeding they concluded that cross-breds would perform no better than indigenous livestock. The approach should, therefore, be to introduce cross-bred goats and improved management as a comprehensive technology package to small-scale resource poor farmers.

Goat rearing has become popular among the resource poor smallholder farmers in mixed crop livestock production systems in the Eastern Highlands of Kenya. Their popularity is due to the fact that they are a source of cash incomes, household milk and manure.

FARM-Africa, an NGO working with smallholder goat keepers, has introduced a community-based goat improvement initiative with the main objective of improving family income and nutrition, thereby improving the livelihood of smallholder farmers. The strategy to achieve this has been the importation of the British Toggenburg goat, an established dairy breed for upgrading of the local less productive goats.

A survey was carried out between October 2000 and April 2001 among farmers in the project area to characterise the farmers.

Objectives of the study

The objectives of the survey were to identify the biophysical and socio-economic characteristics of the farmers that might influence the adoption of different types or grades of crossbred goats. Furthermore, the aim of the survey was to categorise these farmers in three distinct groups, based on their resource endowment, of Low, Medium and High management systems, for the long term monitoring of goat productivity.

Material and methods

A survey was conducted in Meru Central and South Districts, between October 2001 and April 2001, through a questionnaire administered to both individual and group respondents. Both were randomly selected but ensuring that the main ecological zones in the study area were represented. A total of 129 individuals and eight groups were interviewed. The types of resources considered in the questionnaire were:

- (a) Land and the enterprises on it
- (b) Farm labour, skilled, unskilled, children and women
- (c) Capital Income level, capital base
- (d) Entrepreneurship skills and experiences
- (e) Physical location of the farm

(f) Level of goat technical know-how.

In group interviews the objective was to get a general overview of the groups, membership and their understanding of goat production. Nearly all members of the groups (94%) attended these interviews. Four groups were picked at random from each district, giving a total number of members in group interviews of 144. A total of 128 individual members of various groups were also interviewed.

Results and discussion

Farm Characteristics

Out of the 128 respondents, 64.1% were women, 33.6% were men while 2.3% were the sons of farmers. This correlates well with the gender participation during group interviews, where more women than men participated, an indication that dairy goats are mainly managed by women. From the survey, it was also clear that the groups are composed of mainly married families (95.3%), an indication of cultural stability that can contribute to reducing management conflicts among the members. This high level of female participation indicates that introduction of dairy and, or, dual-purpose goats may be an appropriate strategy to empower women and hence improve household food security.

In terms of the size of land owned, the study shows that most of the farmers have small holdings with most of them having less than 5 acres (75%). The study also shows that the main ways of attaining land are inheritance (over 70%), renting (2%), land purchase (5%), allocation by the government, clan land and some farmers being given land by friends. It was also noted that most farmers have only one parcel that was inherited from parents. Of the respondents, 53.9% own only one parcel of land while around 39.8% own two parcels. It was noted that most of the second parcels were rented (18.0%), 15.6% inherited and only 10.9% purchased. Also, most of the respondents (65%) indicated that land for agricultural production is inadequate. It is evident that land is one of the most limiting factors of agricultural production and the farmers are resource poor and, therefore, unable to purchase more. The high level of land inheritance with little land purchase implies that there is a need to appropriately conserve and manage appropriately the available smallholdings for sustainable agricultural production.

Most farmers may be unable to keep dairy cows and hence dairy and, or, dual-purpose goats may be the best option for them. With some clan land and land given by friends there is also a strong indication that some strong socio-cultural networks still exist in the community. These can be exploited during extension of appropriate interventions for improved goat productivity.

The study also indicates that most of the land is allocated to crop production. Over 80% of the land is allocated to crops and only 5% to livestock production. This, therefore, implies that the land allocated to livestock production is not adequate to supply enough forage for goat production. Hence, their potential productivity will not be realised, calling for an intervention that can boost high yielding and quality fodder production. This constraint of an inadequate amount of high quality fodder was also identified in all the group interviews. Farmers recommended introduction of forages such as *lucaena*, *calliandra*, *sesbania* sp. etc., that are high yielding and contain relatively large amounts of protein.

Livestock production is usually carried out close to the homestead, even for those who own more than one parcel of land. However, the criteria that farmers apply in selecting where to keep their livestock was not clear. Though most of the land is allocated to crop production, it was clear from the group interviews that the returns from dairy goat production is far higher than from any of the crop enterprises. The study was conducted in the main marginal coffee zone and, therefore, most of the land was allocated to coffee when the market prices were high and farmers are yet to find an alternative enterprise.

Capital

Household infrastructure includes farm buildings, animal structures, water systems and fences. Most of the farm structures are predominantly semi-permanent. With buildings and animal structures 62% and 69%, respectively, are semi-permanent (timber walled houses with iron-sheet roofs and animal sheds made of non-durable posts and other local materials), compared to 20% and 5% respectively of permanent buildings and animal structures (block walled houses with iron sheets and animal structures made of durable posts). On the other hand, most of the respondents have non-permanent or traditional fences, made of indigenous natural shrubs (48%), 31% semi-permanent (poor quality posts) and 15% permanent (durable posts with barbed wire). This high proportion of the households having semi-permanent and non-permanent (traditional) buildings, animal structures and fences is a further indication of their poor resource base (low to medium wealth groups). There may also be a need to train farmers on how to construct less capital-intensive goat structures that depend on locally available resources.

The survey also showed that very few households have access to piped water (39%). Almost half of the respondents (48%) depend on rivers located at a distance from the households, with 31% depending on seasonal canals. The remainder of the households depends on other sources of water, such as springs. It was noted during the group interviews that lack of adequate water near the homestead is a limiting factor to dairy goat production due to their high water requirement. This places a heavy burden on women, leaving little time for other activities related to goat production. The problem of lack access to water directly and indirectly affects dairy goat productivity and should not be treated in isolation of other constraints within the system.

The study also revealed that most households depend mainly on farm income (83%) with very few depending on off-farm income (16%). A negligible proportion (1%) have both farm and off-farm incomes. This high dependence on farm income implies that very few of the family members have off-farm employment and hence there are few remittances from outside the farm. This places a high risk on the livelihoods of these households because they cannot be cushioned from the shocks of vagaries of the weather (e.g. drought) and this highly affects the productivity of all the farm enterprises.

Labour

Most (over 85%) of the farm labour comes from the family and hired labour. Family labour alone accounts for 40%, while labour exchange accounted for a meagre 5%. Women provide most (>85%) of the family labour on-farm on a permanent basis while men and children mainly provide family labour on a discontinuous basis, while not hired out or not in school, respectively. Hired labour is mainly casual (up to 80%), especially during peak periods of labour demand. Peak labour periods include planting, weeding, harvesting and, to a lesser extent, seedbed preparation. Such periods occur in October to April, which includes the long rains. This is the period when family labour is usually deficient, hence the need for hiring labour from outside. Besides, hiring out, other ways of coping with labour deficiencies include: staggering farm activities, especially those that are not tightly linked to periods of rainfall; exchanging labour, whereby two families or more come together to work on each others' farm; and also getting help from relatives. Labour surplus is experienced during the third quarter of the year (July to September) during which families can hire out their services, pay less or lay off their casual workers, or engage in non-farm activities as a way of rationally utilising the excess labour.

Family labour is allocated to food crops (30%) and livestock (25%). Overall the dairy goat is allocated less than 10% of the family labour and non-farm activities take most (45%). While allocating family labour, most (50%) farmers tend not to consider labour intensiveness or time sensitivity of the enterprise. Forty-five percent of the hired labour is used in specialised and general farm activities such as building construction, digging trenches for water and bush clearing. On the other hand, less than 10% of the hired labour is used on dairy goats, mainly to fetch feed.

Daily wages range from fifty to one hundred Kenya shillings (\$1.28) per person irrespective of gender. However, gender influences family labour allocation, in that women tend to concentrate on farm-based and domestic chores, while men opt for non-farm activities where the financial returns are higher. The domestic chores include fetching of firewood and water, and preparing meals for the family.

Given that, dairy goat enterprises are currently profitable and that family and hired labour are usually available, it can be concluded that labour may not be a major constraint to dairy goat production in the study area.

Farm enterprises

The enterprises include crops (food and cash) and livestock. Mixed crop-livestock enterprises were the majority (50%). Livestock were mainly allocated to the land near the homesteads. Up to 25% of the farmers did not have cattle and of those who had cattle, 50% had one or two, while 19% had three or four, with the remaining 6% having five or more. Most of the cattle were dairy types kept mainly (70%) for milk, for home consumption and sale. Those who did not have any dairy cattle gave the reasons as: lack of money (70%); unfavourable climate (19%); inability to manage or lack of technical knowledge (4%); and no land (<4%). This indicates that despite the small land sizes, the majority of the farmers who currently do not keep dairy cattle feel that, with adequate funds, they could. Of the farmers who keep dairy cattle, 36% were getting <1 litres /cow/day, while the majority (57%) of the cows gave between 2 and 9 litres/cow/day. This indicates that on average the productivity of the dairy herd in the study area was low.

Dairy goats

Numbers of goats

Sixty-five per cent of smallholders own between one and four dairy goats. Dairy goats became available in 1996; a lot of farmers acquiring them in 1997, and the numbers are still increasing. This indicates a strong interest in the dairy goat project in the study area. The majority (60%) of the dairy goats were purchased, while 40% were from the project.

Reasons for keeping goats

The reasons given for keeping the dairy goats were, milk production for home consumption (65%), milk for sale (30%) and for meat and milk (<5%). This confirms why the majority (95%) of such goats are kept within the farms. According to the farmers interviewed, 55% felt that the numbers of dairy goats are increasing in the area, while 27% feel their population has remained constant and the rest (18%) felt they are decreasing in number. Goats are disposed of through sales (52%) and deaths (15%).

Goat milk utilisation and prices

Of the farmers interviewed, 50% have started milking goats, getting an average of 1.5 litres per day per goat, which is used within the household. About 5% sell the milk, and the remaining 45% have not yet started to milk. For the goat milk sold, over 80% of the respondents indicated that its price compares favourably with that of cows, while about 10% indicated that goat milk fetched higher prices than cows' milk. Goat milk is sold at Kshs 20 per litre compared to Kshs 17 per litre of cows' milk. This is further confirmed by all respondents thinking that the demand for goats' milk was increasing.

The goats owned by the respondents were cross-bred (40%), local Meru goats (30%), local Galla goats (20%) and Toggenburg (<10%), indicating that the local goats were being upgraded. The herd size ranged from one to four goats, with the majority (>55%) having one

goat, while 6% and 10%, had three and two goats, respectively. The farmers (80%) emphasised that their greatest need is for a productive goat. Given a choice, they would go for a cross-bred that produces the greatest amount of milk and is also adapted to the local conditions. The cross-breds currently available mainly first crosses (F1s). Less than 10% of farmers indicated that they would select a pure-breed goat, such as the Toggenburg.

Sale of dairy goats

About 40% of farmers have started selling goats, mainly cross-bred, fetching up to 4200/= Kenya shillings (US\$55) for a ten month old male goat. The respondents indicated that local goats fetch a quarter of that price at the same age. The decision to sell a dairy goat is mostly (80%) made by both wife and husband. Only in 15% of the respondents did the wife make that decision alone, while the husband alone was (5%). This is, however, different from the sale of milk, where the decision whether or not to sell is usually made by the wife. Decisions on the use of income from the sale of dairy goats are taken jointly in 80% of cases, either taking the decision alone accounting for the remainder.

Feeding of dairy goats

Most farmers interviewed (70%) feed their goats on local forages and they are aware of, and using, fodder conservation techniques such as haymaking. However, conservation of fodder is constrained by shortages (70%), lack of storage space, no time for baling, goats not being productive and no goat to feed. Thirty per cent of farmers are not aware of any conservation methods. Other conservation methods used include storing stovers and beans haulms on platforms and baling. The majority of farmers indicated that they would like to be trained in fodder conservation methods, because they also recognise that nutrition is a major factor in goat productivity. Although these farmers have cross-bred dairy goats, they feel that further improvement is possible.

Most feed deficiencies occur during the months of July, August and September, while feed surplus occurs during the months of April, May and June, and again in October, November and December, the second and fourth quarter respectively. Farmers have methods of coping with both deficiencies and surpluses. About 35% of the respondents purchase feeds while 15% use stored feed. The remainder borrow feed, tether their goats or collect fodder from riverbanks etc. During times of surplus 40% of respondents indicated that they practised conservation, while another 40% did not know what to do with the surplus and the remaining 20% either gave it away or sold it. This implies that if farmers can intensify their forage conservation efforts, then a continuous supply of feed is possible. The study indicates that a lot of feeds are wasted during periods of surplus.

Source of feeds

Up to 60% of feed for goats is produced on the farm and only 25% is purchased. The balance (15%) comes from neighbours' plots and river banks etc.

Management of dairy goats

From the interviews, the respondents ((50%), indicated that the management of dairy goats is the responsibility of the women, while 40% take joint decisions. However, the decision on the utilisation of the milk is left to the woman, even where the management is shared. This implies that promotion of dairy goat technology is a sure way of empowering women to take a bigger role in family affairs.

Household income and nutrition

Of the 128 respondents interviewed, 45% indicated that they milk their goats and this has greatly improved the nutritional status of their household. About 52% have not yet started

milking and 3% said that they have not experienced any improvement. However, all the respondents indicated that they perceive benefits from the goats. These include income from the sales, milk for home consumption, manure, faster growth rates of crossbred kids and a rapid increase in goat numbers.

Constraints to dairy goat production

Constraints to dairy goat production were listed as follows: diseases; 35%, fodder shortages, 25%; lack of funds to buy dairy goats 10%; and drought, less than 5%. Sixty per cent of the respondents had knowledge of veterinary procedures, fodder storage, zero grazing and intensification of feeding. The remainder claim not to have experienced any serious constraint.

Sources of information

Up to 75% of the respondents indicated that their only sources of information on dairy goats were extension staff and FARM-AFRICA. Currently extension provides 80% and FARM-AFRICA less than 20% of the information on dairy goats. This confirms that the implementation of the project has been a joint effort between FARM-AFRICA and the Ministry's Extension Department. Only about 5% of respondents obtained information from group members. This implies that despite the several training and study tours that have taken place, farmers have not, contrary to expectations, passed on any information or new ideas to fellow members.

Dairy goat improvement.

Most respondents felt that management of dairy goats could be improved by more farmer-training (40%) and improved feeding (35%). Other ways of improving dairy goats were mentioned, including provision of credit services to enable more farmers to buy goats.

Conclusions

From the survey it appears that the main objectives and benefits of keeping dairy goats are:

- Provision of milk to the household
- Provision of fast growing goats for sale
- Coping strategies for small farms
- Dairy goats are highly prolific, giving farmers increased numbers for sale
- Dairy goats compare very well with local cattle, 1.5 litres of milk per day from goats versus 2 litres from local cows
- Goats able to withstand some underfeeding
- Cross-bred goats command better prices than local goats and cattle
- Labour is not a major constraint to goat production in the study area

References

BRADFORD, G.E. (1981) Potential of Dairy Goats as a source of milk on smallholder farms in Kenya. *Symposium of the Animal Production Society of Kenya at ILRAD, Kabete, 1981.*

CARTWRIGHT, T. C. (1984) A strategy for breeding dual purpose goats for Kenya. *Proceedings III SR-CRSP Kenya Workshop, Kabete, Kenya.*

DEVENDRA, C. (1988) Goat Production in small farm systems. *Proceedings of a Workshop on Small Ruminant Research and Development in the Near East. 2-4 Nov. 1988. Cairo, Egypt. pp. 20.*

SANDS, M. and McDOWELL, R. E. (1978). The potential of the goat for milk production in the tropics. Cornell International Agriculture Mimeograph # 70 Ithaca, New York, USA.