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The Productivity of Tethered Goats in Tanzania*

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*Study on the Impact and Control of Diseases Affecting the Productivity of Tethered Goats, as Compared to Other Methods of Goat Keeping in Morogoro Region, Tanzania

Tanzania has over 8 million goats

Executive Message

- This project provides much needed information on the nature and the extent of health problems of tethered, stall-fed or grazed goats in different eco-climate zones of the Morogoro area of Tanzania.
- Major disease problems of goats kept by small-scale farmers and pastoralists were helminthosis (internal worms), coccidiosis (intestinal parasites), diarrhoea and ectoparasites (ticks, lice & fleas).
- It also identified the need to improve the body condition of goats by feeding crop byproducts during periods of restricted grazing or poor feed supply, such as during the rainy season. This was found to help animals resist disease challenges from helminths which are greater during the rainy season. Better housing management, with improved hygiene, also reduced disease stress.
- A small scale trial showed improved growth rates for goats treated with antelmintics.
- A booklet 'Diseases of Goats and Sheep in Sub-Saharan' and extension leaflets on recommendations to improve management systems and control of diseases were produced for use by veterinary and extension staff and goat keepers.

These findings should help the many small farmers keeping goats in similar eco-climatic zones in Africa improve their livelihoods.

Background

Tanzania has an estimated 8.5 million goats. They are kept primarily by small-scale farmers and pastoralists under traditional systems of management. These goats are very important to the livelihoods of their owners, particularly women. Goats are a source of meat, milk, skins and cash as well as having important religious and social functions. There have been few studies on the impact of diseases on goat production in rural areas and consequently there is a complete lack of information on the nature and the extent of health problems of goats in local areas. This information is needed to help design control strategies tailored to an area's needs. The work parallels a sister DFID livestock production project at Morogoro, that focuses on the nutrition of tethered goats.

Objectives

The Morogoro area of Tanzania has diverse eco-climate zones ranging from intensively cultivated hills, which have a high rainfall to more mixed arable/livestock systems with outlying less fertile 'drier' lands where extensive grazing by pastoralists is the dominant livestock system. This field study has been designed to cover a range of zones. The production and health problems of goats were monitored at three sites:

- Mgeta in the hills (1,800m) where most of the goats are tethered throughout the year
- Mlali in the foot-hills (800m) where a mixture of tethering (rains) and herding (dry-season) of the goats is practised.

- Melela in less fertile low-land zone where the goats are herded throughout the year by their pastoralist herders.

The specific objectives included :

- Studying and characterising the various systems of goat keeping practised by small-holder farmers and pastoralists in the Morogoro area.
- Defining levels of goat productivity and identifying the most important health problems
- Determing the impact of gastrointestinal parasites as a constraint to the productivity of goats
- Undertaking a small-scale anthelmintic trial to assess the production and economic benefits of controlling internal parasites.
- Producing a set of goat health management guidelines, based on project findings, that can be used in extension programmes.

Highlights

A field study was conducted in Mgeta and Mlali Divisions of Morogoro District, Tanzania between September 1993 and December 1994, which monitored the traditional systems of goat management and investigated the health problems affecting goats under different management systems in these divisions.
In Mgeta, tethering is the main goat management system, while stall-feeding is practised by a few farmers keeping dairy goats. In Mlali, most goats kept by small-holders are tethering during the rainy season and free ranged during the dry season. Flocks normally consist of more than 20 goats. Tethering is popular with small-holders because of a shortage of grazing land in this predominantly cropping area. This system also reduces labour inputs. This is important because labour shortages are common, especially during the rainy season, when most people are engaged in other farming activities. Conversely, larger scale farmers in Melela herd their animals because labour is available and tethering larger numbers of goats is impractical.
Housing systems for goats varied considerably in Morogoro. In Mgeta farmers use brick-walled, earth floored and grass thatched structures whilst in Mlali small-holders use part of the family house. The larger more extensive systems of Melela use either open bomas, or walled enclosures with tin or asbestos roofs.

Project staff found that the body condition scores and weights of goats declined during the rainy season and improved during the dry season irrespective of the management system used. Restriction of feeding, either due to tethering or reduced grazing times of herded goats, was considered to be responsible for this weight loss, although helminthosis and coccidiosis were considered to be contributing factors. Free-range goats did better during the dry season.

The major health problems encountered in goats, both in Mgeta and Mlali, were helminthosis (internal worms), coccidiosis (intestinal parasites), diarrhoea and ectoparasites (ticks, lice & fleas). Subclinical helminthosis and coccidiosis were common, whereas clinical cases were rare. Helminth egg burdens were significantly higher during the rainy season than during the dry season in tethered goats belonging to small-holders in Mlali. This was also true for herded goats. No significant difference was observed in helminth infection in different seasons for either tethered or stall-fed goats in small-holder herds in Mgeta. Crossbred goats in small-holder herds in Mgeta suffered more than indigenous goats. Tethered goats in Mlali had significantly higher helminth egg burdens than free range goats.

Coccidial oocyst burdens were significantly higher during the rains in pastoral goat systems in Mgeta but they were higher during the dry season in small-holder herds. Stall-fed goats in Mgeta had significantly higher coccidia oocyst burdens than tethered ones.

The most prevalent helminths were *Haemonchus contortus, Trichostrongylus colubriformis* and *Oesophagostomum columbianum. Bunostomum trigonocephalum, Strongyloides papillosus, Trichuris ovis* and *Moniezia expansa* were less prevalent. *Eimeria* was the only genus of coccidia encountered. *Eimeria arloingi, E.alijevi, E.ninakohlyakimovae* were the most prevalent species but *E.christenseni, E.hirci, E.jolchijevi* and *E.caprovina* were also found.

The project undertook a small trial to monitor the effects that treating goats with anthelmintics had on worm burdens. They found that burdens were significantly lowered in adults and that treated kids from tethered small-holder herds in Mgeta grew much quicker than untreated ones.
Other disease problems were also encountered including respiratory infections, footrot, diarrhoea and ectoparasites, which were common with the larger herds of pastoralist systems where goats, when housed, were kept under crowded and unhygienic conditions. Diarrhoea and footrot were more prevalent during the rainy season than

during the dry season. Fleas, ticks and lice were the major ectoparasites.

Impact

The management systems used by farmers in Mgeta and Mlali, like most traditional systems, are infact very rational, given the available land resource. However, improvements in the housing systems such as better hygiene and more space, would reduce stress on stock and the incidence of disease. Feeding crop by-products has been shown by other research findings to greatly improve the goat's body conditions at times when grazing is poor. This helps goats resist disease challenge. In this area supplementary feeding during the rainy season would mprove body conditions. Direct control and treatment of diseases is likely to result in significant improvements in goat productivity if supported with appropriate extension advice. All of these changes will help boost income for farmers and so improve their livelihoods.

- A handbook on 'Diseases of Goats and Sheep in Sub-Saharan' has been written by project staff. Extension leaflets with recommendations to improve management systems and the control of diseases have also been produced. These are written in Kiswahili and have been designed for use by vets, extension staff and goat keepers.

This project has thus made a first useful step in identifying and to a limited extent quantifying the main disease problem of goats kept by poorer farmers. They have also demonstrated that treating animals with suitable drugs can boost productivity and incomes for farmers. This information now needs to be taken up by extension staff and vets in Tanzania as part of a campaign to persuade livestock owners of the benefits of modifying their management practices, including housing, animals health and feeding systems. Farmers may need help to purchase any drugs or additional feeding to be able to benefit from suggested changes.

The information gained from the surveys of management systems, performance of small ruminants and the epidemiological survey of gastrointestinal parasites in Mgeta , Mlali and Melela will also be of great help to researchers investigating similar problems in other African countries.
In Tanzania this information will be used to plan extension programmes relevant to the area. Assuming that the recommendations given are adhered to, there is a great potential for increased productivity of goats in Mgeta, Mlali and Melela as well as similar farming systems in other parts of Tanzania.

The trials carried out on this project provided the first knowledge regarding the effects of sub-clinical helminthoses and coccidiosis on the productive performance of goats. Further work is now needed to quantify the synergistic pathogenic effects on animals of mixed worm nematode and coccidia infections.

Dissemination

The booklet and extension leaflets produced by this project demonstrate that DFID funds have been well used in disseminating the knowledge gained by the researchers involved directly to farmers who need to use it and extension staff who can support them. A number of academic papers were also produced, ensuring that other scientists working in the same field would be able to in corporate the findings into their research.

Selected paper publications

Kusiluka, L.J.M., Kambarage, D.M., Harrison, L.J.S., Matthewman, R.W. and Daborn, C.J. (1995) Gastrointestinal helminths of goats and sheep in Tanzania. *Tanzanian Veterinary Bulletin,* **15,** 3**.**

Kusiluka, L.J.M., Kambarage, D.M., Matthewman, R.W., Daborn, C.J. and Harrison, L.J.S. (1995) Prevalence of ectoparasites of goats in Tanzania. *Journal of Applied Animal Research,* **7**:69-74**.**

Kusiluka, L.J.M., Kambarage, D.M., Matthewman, R.W., Daborn, C.J. and Harrison, L.J.S. (1995) Causes of condemnation of carcasses and organs in goats in Tanzania. *Journal of Applied Animal Research,* **7,** 69-74.

Booklet and extension leaflets

Kusiluka, L.J.M. and **Kambarage, D.M.** (1996) Diseases of small ruminants in Sub Saharan Africa: A Handbook. VetAid, ISBN 09522299 5
Extension leaflets on recommendations to improve management systems and control of diseases.
(in Kiswahili).