

Assessment of cattle owners' perceptions and expectations, and identification of constraints on production in a peri-urban, resource-poor environment

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ABSTRACT

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This questionnaire survey was conducted amongst 200 farmers in the resource-poor, urban and peri-urban environments of Botshabelo and Thaba Nchu towns in the Free State Province of South Africa. The questionnaire was divided into seven sections, namely demography, livestock, cattle, parasites, parasite control, livestock diseases and problems experienced. A total of 87,5% of the livestock owners were not employed (unemployed or pensioner). Cattle constituted more than 50% of the livestock units owned in the area and farmers owned an average of $9,33 \pm 0,812$ head of cattle. A total of 193 (96,5%) of the farmers indicated that milk was the most important product from their cattle. Only 26% of them slaughtered their own cattle for meat consumption. Eighty-eight percent of them indicated that external parasites on their livestock presented a problem, but only 72,9% of farmers implemented any tick control measures. Less than half (45,5%) of the farmers who attempted to control ticks used commercial acaricides. The remainder used various other methods, including the application of used engine oil and household detergents. Amongst the clinical diseases observed in their cattle, dry gallsickness was mentioned most often (20%). This figure, however, is believed to be inaccurate because dry gallsickness may be a clinical manifestation of some of the other diseases mentioned by the farmers, such as anaplasmosis, foreign body obstruction of the gastro-intestinal tract by plastic bags, pneumonia and mastitis. Animal husbandry problems experienced by the farmers included pollution (i.e. ingestion of plastic bags and string by their livestock), availability of water and theft.

Keywords: Cattle owners, peri-urban environment, questionnaire survey, resource-poor environment

INTRODUCTION

For many years agricultural and veterinary research and aid in South Africa focused on the needs of commercial, predominantly white farmers, but since the national elections in April 1994, the new government has realized the need for development aid for small-scale farmers (Saunderson 1995). Before this can be implemented, areas where improvement is needed, must be identified. It is also important that the values and aspirations characteristic of a particular

community's culture be understood, since it is relevant to the identification of constraints that limit productivity (Irskov 1993). The success of any extension service will depend upon the attitudes of the farmers, and the collection of information on the views, beliefs and attitudes of farmers is therefore essential prior to decision-making on the spending of funds.

The aim of this questionnaire study was to assess the views of a group of farmers in the Botshabelo-Thaba Nchu urban communal region, and to collect background information on the existing farming situations and farming management systems.

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MATERIALS AND METHODS

Study area

The study was conducted between August and November 1995 in the two urban areas of Botshabelo and Thaba Nchu in the Free State Province of South Africa, located 55 and 65 km, respectively, east of Bloemfontein. At both locations small-scale cattle farming is practised in urban or peri-urban areas under resource-poor conditions. In 1996 the total population of Thaba Nchu was 68 000 and that of Botshabelo 195 146 (Krige 1996). Twelve villages, also referred to as the informal urban area, and 37 rural villages surround the urban part of Thaba Nchu. Approximately 150 ha grazing surrounds each village (Stöhr, personal communication 1996). In the case of Botshabelo, cattle either grazed within the urban area or on the urban outskirts. The urban commonage (natural veld) around Botshabelo extends over an area of 6 000 ha (Krige 1996).

Results of a livestock census conducted by Agri-Eco in 1994/1995 in Thaba Nchu indicated that the number of cattle in the area was 15 826 (Stöhr, personal communication 1995). An aerial livestock census conducted during 1994 in Botshabelo by the Department of Agriculture and Environmental Affairs, National Government, indicated that there was an estimated number of 2 263 head of cattle. The recommended grazing capacity for veld in the Bloemfontein-Botshabelo-Thaba Nchu environment is 6 ha per large stock unit per annum (De Waal 1990). The estimated, current stocking density in the study area is 2 ha per large stock unit (Stöhr, personal communication 1995).

A veterinary service provided by AGRICOR (Agri-Eco), an agricultural corporation of the Bophuthatswana government, was available in the Thaba Nchu region since 1978. This service consisted of a veterinary clinic manned by one state veterinarian, as well as a herd health program managed by the veterinarian and nine animal health officers. Services provided were either subsidized by the government or free of charge. Most of the services terminated in March 1995 owing to a lack of funds. The veterinarian was also transferred. In contrast to the situation in Thaba Nchu, no veterinary services were historically available in Botshabelo. The nearest supplies of animal health remedies are the small Sentraal-Wes Co-op at Tweespruit (30 km away) and the Sentraal-Wes Co-op at Bloemfontein (65 km away). The nearest private veterinary clinic is also located at Tweespruit.

Survey methodology

The survey questionnaire was divided into seven sections: demography, livestock, cattle, parasites, parasite control, livestock diseases and problems

experienced. These sections involved direct and multiple choice answers, assessments or judgements and personal opinions. Answers supplied by livestock owners on the occurrence of livestock diseases do not necessarily imply that the diagnoses were clinically confirmed. A total of 234 questionnaires were completed by the livestock owners with the help of field workers, but 34 of them were rejected due to ambiguity of answers or answers clearly influenced by the interviewer.

The software program, Epi Info version 6.03 (Pfeiffer 1996), was used for the processing and analysis of the collected data. Most of the data were converted to percentages to simplify the discussion. A significance level of $P \leq 0,05$ was used throughout.

RESULTS AND DISCUSSION

Demography

A total of 87,5 % of the livestock owners were not employed (unemployed or pensioner) and therefore were able to tend to their livestock themselves with the help of their children (Fig. 1). Those having permanent employment hired herd-boys for an average fee of R50,00 per month to herd their livestock.

Livestock

Cattle constituted more than 50 % of the livestock units owned in the area (Fig. 2). An average of $(9,33 \pm 0,812)$ head of cattle per farmer were owned and 85,5 % of them wanted to increase their cattle numbers. Chickens and pigs are not included in the livestock ratios presented in Fig. 2.

Cattle

A total of 193 (96,5 %) of the farmers indicated that milk was the most important product obtained from their cattle (Fig. 3). The milk produced was mainly for own household use but any surplus was sold in

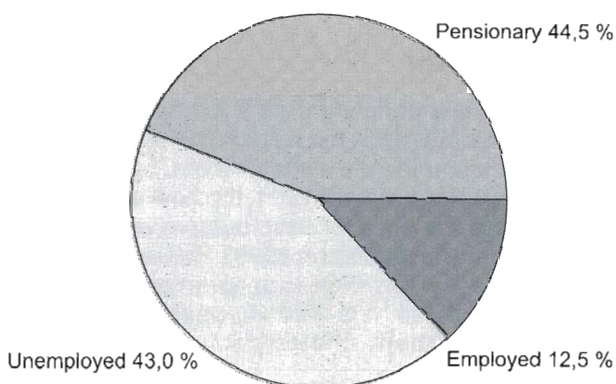


FIG. 1 Statistics on employment of livestock owners ($n = 200$) in Botshabelo and Thaba Nchu

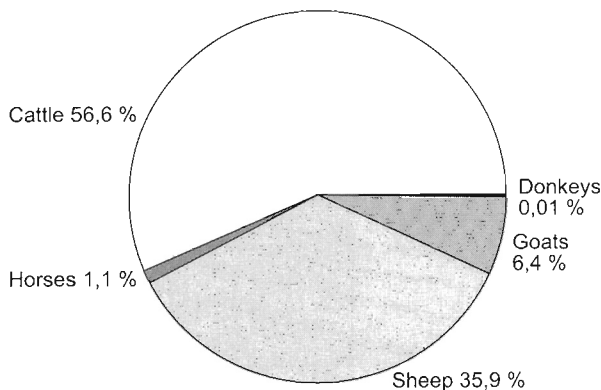


FIG. 2 Composition of livestock of farmers ($n=200$) in the Thaba Nchu-Botshabelo area

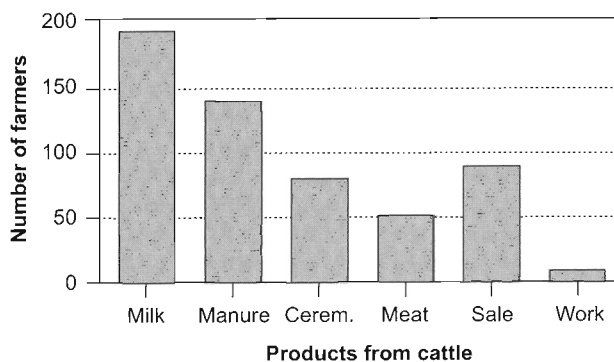


FIG. 3 Different cattle products utilized by farmers ($n=200$) in Thaba Nchu and Botshabelo

Cerem. = ceremonial slaughterings
 Meat = slaughtering for own meat consumption
 Sale = marketing of cattle
 Work = oxen used for ploughing

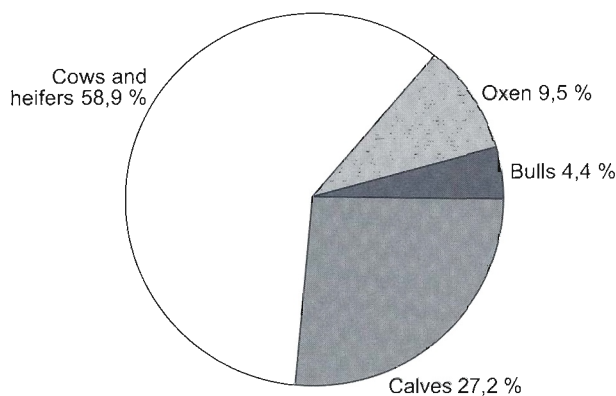


FIG. 4 Composition of cattle owned by 200 farmers in the Botshabelo-Thaba Nchu region

the raw state to neighbours. Dried manure was used as fuel for fires for cooking and heating. It was also used as compost in vegetable gardens, and bags (80 x 62 cm) of it were sold to neighbours for R5,00 each.

Cattle form part of the ceremonial *lobola* or *bogadi* transactions between wedding parties and also play an important role in traditional ceremonies and are slaughtered for weddings, initiations and funerals (Lye & Murray 1980). Only 26% of the farmers stated that they slaughtered cattle for their own day-to-day meat consumption. The herd size of this group was notably larger ($16,77 \pm 2,56$) than the average ($9,33 \pm 0,812$) herd size. Some farmers (45,5%) sold cattle to neighbours and abattoirs when in need of capital. Animals offered for sale were often the oldest and in the poorest condition. Younger, fat animals were seldom sold, since the security value of these animals was greater.

A small percentage (4,5%) of the farmers used their cattle for work, mainly ploughing. There is no private land ownership in the study area, except for the small backyards, and so cultivation of the communal land is a high risk and costly operation. Theft and sabotage were two of the main problems in these urban areas and the only cultivation possible was limited to the backyards. Theft was also the major factor why most of the cattle were kept in the backyards overnight. A total of 95,5% of the farmers ($n=200$) kept their cattle overnight in kraals in their backyards. Another reason for this management system was the twice daily milking of the lactating cows.

Only 46% of the farmers provided supplementary feed to their cattle (Table 1). This mainly consisted of left-over porridge, mainly cooked maize meal, and vegetables such as cabbage and lettuce leaves and potato peels, when available, and was not necessarily fed at times when a supplement was really needed. Lucerne, salt, maize and lick supplements were provided occasionally to the animals but the amounts fed per animal were not adequate.

If one views the cattle owned by the 200 farmers as one herd, its composition would be as shown in Fig. 4. The ratio of bulls to cows is 1:13, as opposed to the generally recognized ratio of 1:25 for cattle maintained under free ranging systems (Bertram *et al.* 1993). When the farmers are assessed individually, a total of 68% did not own a bull, but due to the shared, communal grazing, cows in oestrus were served by any bulls that were available. Nevertheless, most of these farmers still desired to own a bull

TABLE 1 Different supplements (%) fed by farmers ($n=200$) to their cattle

Lucerne	Maize porridge	Maize cobs	Salt	Maize	Vegetables	Licks	No supplement
28%	12,5%	6,0%	5,5%	4,5%	4,0%	3,5%	5,4%

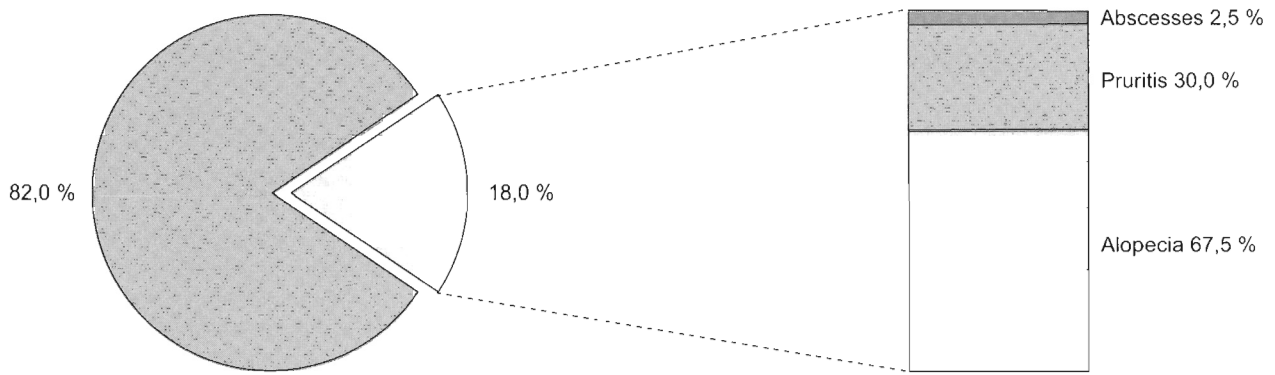


FIG. 5 The proportion (18%) of farmers ($n = 200$) associating ticks with dermatoses and the clinical signs observed (%)

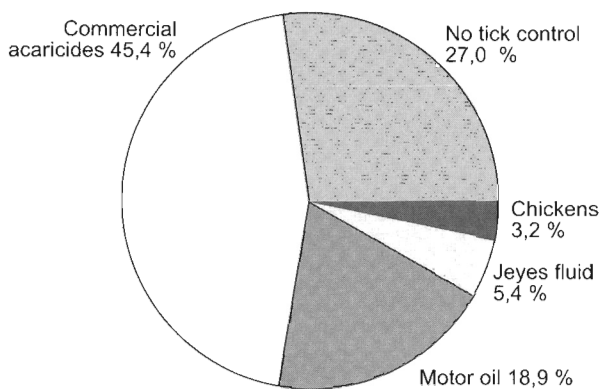


FIG. 6 Different tick control measures employed by farmers ($n = 200$) in the Botshabelo-Thaba Nchu region

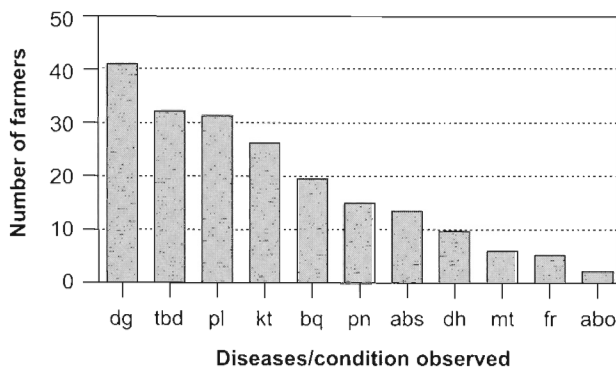


FIG. 7 The proportions of different cattle diseases observed by farmers ($n = 200$) in Thaba Nchu and Botshabelo. Most of these observations were not clinically confirmed by post mortem, except several of the black quarter cases

- dg = dry gallsickness
- tbd = tick borne diseases
- pl = plastic bags
- kt = keratitis
- bq = black quarter
- pn = pneumonia
- abs = abscesses
- dh = diarrhoea
- mt = mastitis
- fr = foot rot
- abo = abortions

possibly, it is surmised, so that they could feel in control of their own breeding programmes. Most of the bulls observed in the region were of mixed breed origin and of low genetic potential. Many of the oxen were full-grown because of an unwillingness of the owners to sell or slaughter them. They were not necessarily sold after weaning but were held back for times of financial need or ceremonial functions. Another custom was the trading of one heifer for two grown oxen when they were needed for a ceremonial function.

Calving rate is defined as the number of cows in a cowherd that calve over a certain time span (Bertram *et al.* 1993). The fact that there was no definitive calving season in the study area complicated an attempt to calculate this rate. The calving percentage of the cows owned by the 200 farmers was 45.5% during the 2-year period 1995/1996. The expected and achievable calving percentage in an organized, well-managed veld-grazing cattle herd is 80% (Bertram *et al.* 1993). Possible reasons for the low calving rate included faulty management, venereal diseases and dietary deficiencies—the latter probably being the most important.

Weaning percentage is defined as the percentage of calves out of the total born that are eventually weaned. A mortality rate of young calves of 6.0% can be expected (Bertram *et al.* 1993). The weaning percentage of the cattle of the 200 farmers was calculated as 88.3%, the mortality rate of the calves thus being relatively low. A comparison of the calving rate with the weaning rate indicated that the conception rate of the cows was a bigger problem than calf mortality.

Livestock parasites

A total of 88.5% of the farmers considered that external parasites on their livestock presented a problem. These observations included different tick species, lice and mange. According to farmers the highest tick numbers occurred from late summer to

mid-winter, which is in accordance with the seasonal occurrence of *Boophilus decoloratus*, the most abundant tick species in the area (Dreyer 1997). Two-thirds of the farmers linked increased tick numbers with seasonal changes such as higher atmospheric temperatures and rainfall. It is a well-known fact that climate has a powerful effect on tick populations (Baker, Ducasse, Sutherst & Maywald 1989).

A small percentage (18 %) of farmers associated ectoparasitism with certain dermatoses (Fig. 5) and almost 30 % of them were of the opinion that pruritus in their cattle was the result of ectoparasitism. Louse infestations in cattle do cause dermal irritation (Devaney, Craig, Rowe, Wade & Miller 1992; Weeks, Nicol, Titchener 1995). Three different louse species were identified during an ectoparasite study conducted on cattle in the area (Dreyer 1997). Severe tick infestations on certain body parts such as the neck, abdomen and inguinal region can also cause localized alopecia. This has been associated in the study area with the high *B. decoloratus* numbers in late summer and early winter (Dreyer 1997).

Some farmers (2,5%) associated skin and subcutaneous abscesses in their livestock with ectoparasitism (Fig. 5). Adult *Hyalomma marginatum rufipes* and *H. truncatum* can cause abscesses at feeding sites (Norval 1994) due to their long mouthparts. Both species occur in the area, and *H. marginatum rufipes* can reach fairly high numbers in the summer (Dreyer 1997). Abscesses in the skin of the perineum, inguinal region and preputium of cattle that were observed during the study were mostly associated with *Hyalomma* bite wounds. Deep penetrating abscesses with involvement of the underlying bone were observed in the mandibular region of several young calves. These were, however, caused by too tight halter-straps. Suckling calves are tethered apart from the herd to prevent them from suckling during the day, and any rope or chain that is available is used to restrain them.

Tick control

Although 88,5 % of the farmers indicated that they do experience high tick infestations and tick-related problems on their livestock, only 72,9 % implemented any tick control measures (Fig. 6). Out of the group of farmers that did attempt to control ticks, 45,5 % used commercial acaricides. Used engine-oil applied to the livestock with a cloth as a form of spot treatment, was used as a tick control method by almost 20 % of the farmers. The oil was either bought or received free of charge from the informal, one-man motor-repair works situated along the roads in Botshabelo and Thaba Nchu. When purchased the engine-oil cost up to R10,00 for 5 l. The average herd sizes of farmers using pour-on acaricides and those using engine-oil were 12,7 and 5,7 head of cattle, re-

spectively, indicating that farmers with relatively larger herds used pour-on acaricides.

A small percentage (5,4 %) of farmers used the household detergent, Jeyes Fluid (a disinfectant and cleanser; carbolic acid coefficient 4–6), as an acaricide. This was either used separately or in a mixture with used engine-oil. When applied alone it was diluted with water as a spot treatment. Dermatological irritations with eczema, crust and scab formations have been observed on cattle treated with the Jeyes Fluid (Dreyer 1997). Only 3,2 % of the farmers used domestic fowls as a biological tick control method. The existing management system of kraaling the cattle from dusk to dawn presents an ideal situation for this form of control (Dreyer, Fourie & Kok 1997).

Cattle diseases and treatment

The diseases observed by the farmers in the study area are presented in Fig. 7. Dry gallsickness, the common name used by South African farmers for ruminal stasis or atony resulting in subacute rumen alkalosis (Mönnig & Veldman 1954), was the condition indicated by most (20,5 %) farmers (Fig. 7) but this figure may be misleading. Theiler (1910) indicated that the term gallsickness as used by the farmers is a collective name for a number of diseases of cattle that are characterized by clinical signs relating to disturbances of the gastro-intestinal tract. The colloquial name for anaplasmosis, caused by the blood parasite *Anaplasma marginale*, is gallsickness and the two conditions with similar common names can be confused with each other. Furthermore, although subacute rumen alkalosis can be a primary disease owing to feeding abnormalities such as poor winter grazing, it can also occur as a secondary manifestation of other diseases (Mönnig & Veldman 1954; Hungerford 1990). Dry gallsickness can therefore be a manifestation of some of the other diseases indicated by the farmers, such as anaplasmosis, foreign body obstruction of the gastro-intestinal tract by plastic bags, pneumonia and mastitis. Only a few farmers gave any or sufficient supplement to their cattle during the harsh winters that are experienced in the study area and it is probable that the poor feeding level could lead to primary subacute ruminal alkalosis.

Some farmers (16 %) stated that they experienced disease and mortality in their cattle due to anaplasmosis (Fig. 7). Large numbers of the tick species that serve as vectors have been observed in the study area and information gained from a serology study of cattle showed that more than 95 % of the cattle ($n = 151$) were seropositive for anaplasmosis (Dreyer 1997).

Many farmers (15,5%) experienced cattle losses due to foreign body obstruction of the rumen (Fig. 7) which was mainly caused by the ingestion of plastic bags.

Environmental pollution in the villages of Thaba Nchu and especially Botshabelo is a major problem, and one form of it is the dumping of household litter on the verges of the roads outside the properties. Empty containers and plastic bags sometimes contain scraps of food, which entice the cattle to consume them.

A total of 13% of the farmers experienced problems with eye diseases in their cattle (Fig. 7) which could be caused by infectious bovine keratoconjunctivitis (Punch & Slater 1984), especially in the summer months, or by vitamin A deficiency during periods of green-feed scarcity which occurs in the winter (Mönnig & Veldman 1954).

The farmers (9,5%) who mentioned blackquarter (Fig. 7) were all from the Thaba Nchu area. This was because the Animal Health Officers of AGRICOR kept these farmers well informed about the disease. Vaccination campaigns against blackquarter were started in 1978 in Thaba Nchu area due to the occurrence of occasional outbreaks (Stöhr, personal communication 1995). It is possible that some farmers participating in the survey attributed any acute death in their cattle to blackquarter. Other diseases observed were pneumonia (7,5%), abscessation (6,5%), diarrhoea (5%), mastitis (3%), foot rot (2,5%) and abortions (1%) (Fig. 7).

More than half (58,5%) of the farmers did not treat diseased cattle (Fig. 8), and 9,5% of them still used traditional remedies. The remainder (32%) sought advice and purchased vaccines and medication such as injectables, drenches and ointments with which to treat their animals.

The diversity of traditional remedies used by farmers for treating their animals was all a type administered as a drench. Equal numbers (31,6%) of farmers either used Coca-Cola or a vinegar and sugar mixture as a drench (Fig. 8). Many farmers treated cattle with the Coca-Cola drench when foreign body obstruction of the rumen was suspected because they believed that it dissolved plastic bags. Another group (15,8%) of farmers used either used engine-oil or cooking oil drench for the same syndrome, because they believed the oil would facilitate movement of the obstruction by lubricating the gastro-intestinal tract. Dry gallsickness was treated by drenching with a mixture of vinegar and sugar. An Epsom salt (magnesium sulphate) drench was used by 21,1% of the farmers for plastic bag obstructions, dry gallsickness, anaplasmosis and other illnesses (Fig. 8).

Problems experienced by farmers

An unexpectedly high number (28%) of livestock owners indicated that they did not experience any problems with farming in the Botshabelo-Thaba Nchu area. It is, however, possible that the manner in which

the question was phrased in the questionnaire intimidated the respondents. The remainder (72%) of the farmers did highlight various problems. These were divided into three main categories for analytical purposes (Fig. 9). Most of the complaints were associated with the urban environment. A total of 51 (25,5%) farmers viewed environmental pollution, particularly that caused by plastic bags and strings, as one of their main problems. Municipal functions such as water supply, sewerage removal, maintenance of roads and pollution are major problems in Botshabelo, since the work is carried out in an inadequate, haphazard and unsustained manner (Moniez & Monson 1994).

Another problem associated with the keeping of livestock in an urban environment is that of theft (Fig. 9). Stock theft is one of the main reasons why livestock is kraaled in backyards at night. In addition, farmers have to guard their cattle during the day on the communal grazing areas. Another reason for herding the cattle during the day was to keep them off the roads, because road accidents due to livestock wandering onto the roads which were not fenced did occur, as indicated by three farmers. The absence of fences along the roads was due to the theft of the wiring and poles, which were then used by urban dwellers to enclose their properties in the villages. These problems associated with the absence of fences were mentioned by 15 farmers.

One of the most important constraints on improvement in animal production is the common ownership of grazing land (Irskov 1993). A large number (47) of the farmers viewed the communal grazing, and therefore, according to them, poor grazing, as a problem (Fig. 9). They would have preferred to have their own small piece of land where they could graze their livestock and even plant supplementary feeding, without their cattle having to compete with those of their neighbours for grazing. This occurred particularly during the winter months when large areas of veld are burned to the ground due to vandalism. Nineteen farmers mentioned veld fires as being a problem.

External parasites and livestock diseases were viewed by 27 and 22 farmers, respectively, as reasons for concern (Fig. 9). External parasites included ticks, lice and mites and the diseases mentioned above. The difficulty in obtaining veterinary drugs and acaricides, as well as the distances which had to be traveled to obtain these, were mentioned by 19 farmers.

A group of 19 farmers mentioned the difficulty in working with their cattle as they did not have crush-pen or head-clamp facilities (Fig. 9). Most of the handling for the purpose of administering drugs, making ear identification marks or castrations was done in the backyards, while the individual animal was restrained by means of ropes. Eleven farmers

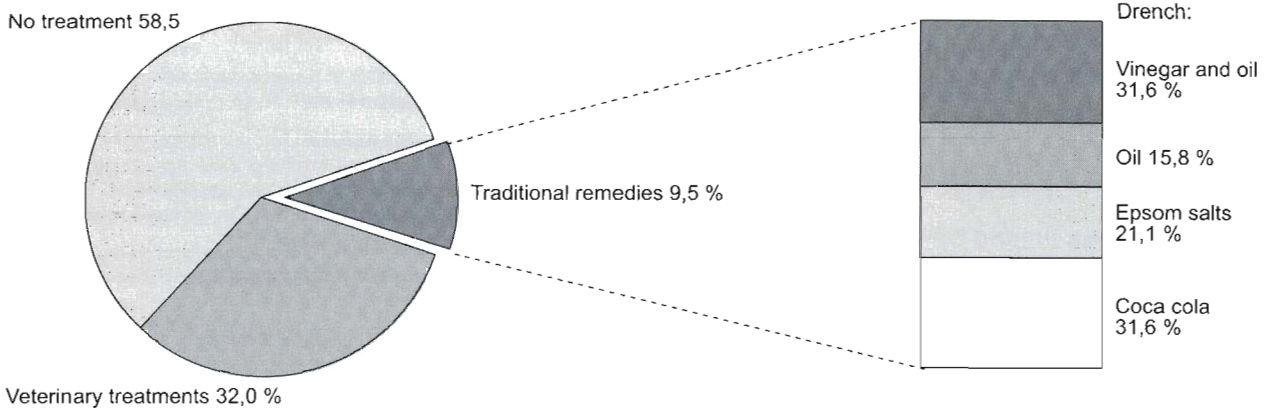


FIG. 8 Percentages of farmers in Botshabelo and Thaba Nchu using either no treatment on diseased cattle, a selection of veterinary products, or traditional remedies

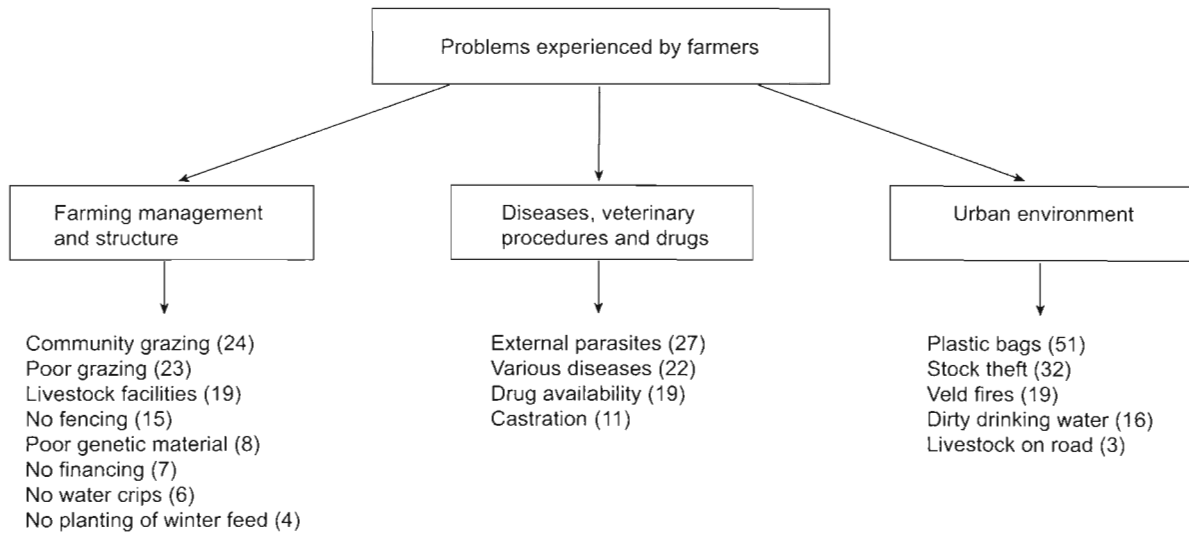


FIG. 9 Different categories of problems experienced by livestock farmers ($n = 200$) in the Botshabelo and Thaba Nchu areas. Numbers in brackets denote numbers of farmers

mentioned that the main problem they encountered when castrating their bull calves was the difficulty in securing them without the calf or helper being injured. They had experienced a poor success rate with the rubberband technique used for this purpose. A consequence of this was that many bull calves that should have been castrated were not and became breeding bulls of low genetic potential. This was reported by eight farmers.

Some farmers (22) complained about the absence of water troughs and the pollution of the Klein Modder River (Fig. 9), from which large numbers of the livestock drank water.

CONCLUSION

Within one communal farming system, many variations in herd size, cattle breed, tick resistance, cat-

tle management and husbandry existed. In the present questionnaire study, a basic understanding of the general farming conditions, attitudes, perceptions and expectations of the farmers was sought. Any success in improving farming conditions and increasing production would depend upon the attitudes of the communal farmers themselves. It is considered that each farmer should accept responsibility for the parasite control and improved husbandry of his own cattle. There is a need for them to group themselves into farmers' unions where problems can be aired and discussed, before being taken further by a committee or spokesman to the local authorities, to negotiate for solutions. The function of a well-funded, properly designed extension service would be to educate and influence farmers positively, to assist with the organization of farmers' unions, and to help retain the self-esteem of the livestock owners. In this way, livestock owners' attitudes

could become more positive, and farming conditions could be improved, which would result in increased production and an improved quality of life for the farmers.

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