

The impact of fodder flow systems practiced by small scale dairy farmers on milk production and economic viability in Marirangwe smallholder dairy scheme of Zimbabwe

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Abstract

An analysis was made for the cattle feed quality used by the small-scale and large-scale producers in Marirangwe, Zimbabwe. This was done to try and explain the huge disparity between milk production by the two dairy sectors. Feed-staff from the 2 dairy production systems were analysed for nutritional quality. There was no significant nutritional differences between the feed from the two production sytems. Disparities in milk production could therefore be attributed to the consistency of provision and quality of feed given to animals. There is therefore need to promote cultivation of crops that can provide feed to animals without competing with humans to bridge the gap of fed supply inconsistency among small scale dairy producers.

Key words: Dairy nutrition, feed quality, feed supply, proximate analysis

Résumé

Une analyse a été faite pour la qualité des aliments du bétail utilisés par les producteurs à petite échelle et à grande échelle dans Marirangwe, Zimbabwe. Cela a été fait pour tenter d'expliquer l'énorme disparité entre la production de lait par les deux secteurs des produits laitiers. Le programme de « nourrir le personnel » à partir de 2 systèmes de production laitière a été analysé pour la qualité nutritionnelle. Il n'y avait pas de différences significatives entre les aliments nutritionnels des deux systèmes de production. Les disparités dans la production de lait pourraient donc être attribuées à la cohérence de l'offre et la qualité des aliments donnés aux animaux. Il ya donc nécessité de promouvoir la culture de plantes qui peuvent fournir l'alimentation des animaux sans entrer en concurrence avec les humains pour combler le fossé de l'incompatibilité d'approvisionnement nourris au sein des producteurs laitiers à petite échelle.

Mots clés: Alimentation des vaches laitières, la qualité des aliments, l'approvisionnement en aliments pour animaux, l'analyse immédiate

Background

In Zimbabwe, milk supply by the large scale formal sector has steadily been on the decline due to a number of factors including farm disruptions and political instability. Milk supply by the small scale informal sector has been low and has not changed significantly probably because the sector is less sensitive to political instability. National milk production levels from the commercial sector dropped from 180 million litres in 1998 to less than 80 million litres in 2006 (Dairieboard, 2007). This highlights the importance of the small scale dairy sector (SSDS) in the provision of milk and milk products. If the milk production of the SSDS could be improved while maintaining minimum costs of production, the sector could emerge as most critical source of milk for the country.

Smallholder dairy production is characterised by poor quality and pasture grazing feeding on crop residues and by-products and home-grown feed materials. However, for most of these feed sources, their quality is not known, and is most likely substandard, one of the reasons milk production by this sector is low.

This study was therefore carried out: i) to determine the chemical composition of the predominant feedstuffs, crop residues, veld grasses and browse species fed to small scale dairy cows, ii) to establish the fodder flow of the feeding systems practiced in Marirangwe SSDS in comparison to the neighbouring large scale commercial dairy farm ‘Red Dane Dairies’, and iii) assess the economic viability of the SSDS in comparison with the large scale dairy system.

Literature Summary

The small holder dairy sector in Zimbabwe consists of three sub-sectors: communal, small scale commercial and resettlement. The common features among these are that: (a) they are mainly family run and employ limited additional labour, (b) they generally cultivate small areas (<5.0 ha), (c) they grow food crops with surplus for sale, (d) crops grown include maize as the staple food, groundnuts, sunflower, sorghum, millet and beans, (e) livestock farming is generally integrated with crop activities, (f) use crop by-products as cattle feed and apply manure to crops, and (g) most of the milk is sold locally with a surplus sold to other milk product outlets.

In Zimbabwe, milk production was mainly developed among large scale commercial producers. These dairy enterprises compared favorably with those in Europe, North America, New

Zealand and Australia. The predominant dairy breeds are the black and white Holstein-Friesian, although a number of other breeds such as the Jersey, Ayrshire, Guernsey and the Red Dane are also represented (Smit 1989; Ball et al 1990; Henson 1992). In addition to these large-scale milk producers, there are smallholder dairy schemes set up through the Dairy Development Programme (DDP) based on communal, small scale or resettlement farmers. Communal farmers are individual families who cultivate their own subsistence plots but have no title to own the land (Ball et al., 1990); small-scale farmers have the title to own land (Ball et al., 1990); while resettlement farmers are allocated land on former large-scale commercial farms, they too have no title to the land (Ball et al., 1990; Mupunga and Dube, 1993). Traditionally, these farmers keep cattle as a source of draught power, manure, wealth and status (Ball et al., 1990), but with suitable infrastructure and better management, this sector has the potential of producing about 250 million litres of milk per year (Borland, 1990).

High yielding dairy cows have characteristically been feed on maize grain which creates competition with human beings (Chinogaramombe, 2008). This should be discouraged with more emphasis put on legume-reinforced dry land or irrigated artificial pasture forage, or legume reinforced natural pasture grazing (Pascoe, 1975; Robinson and Clatworthy, 1980). Forage or browse legume-reinforced-cereal maize mixed silage or hays of high protein content are also likely to be ideal quality forages for dairy cows (Titterton and Maasdorp, 1977; Ngongoni, Mwale, Mapiye and Moyo, 2007b). The guiding principle is that for low to medium yielding crossbred dairy cows, maximum rates of rumen digestion and microbial protein production may meet total protein and energy requirements for both maintenance and production (Orskov, 1970; 1988).

It is desirable to make the maximum use of the forages which can be effectively grown and obtained locally. Generally, supplemental feed is needed for lactating cows and calves. When formulating the additional feed, a reasonable knowledge of the nutrients provided by the forages is essential (Crowley, 1976). Most of the smallholder dairy farmers have limited capital available to regularly purchase commercial dairy concentrates and to economically feed their dairy cattle. Selective feeding of concentrates due to limited availability and high purchase price are widespread among the small holder dairy farmers. The

most economic and sustainable option appears to be that which relies more on feeding locally available feeds (Cowan, 1968).

Study Description

Marirangwe is located 35km south of Harare, off the Beatrice road. It is in natural region 2B, with an average annual rainfall of about 700mm. The Marirangwe dairy community consists of up to 35 small scale producers at any one time. During the dry season, however, producers can drop to as low as 20 active suppliers, but increase with the rainy season.

A pre-tested questionnaire was used to capture all the demographic, production and input data. Samples of the various feed stuffs used by the small scale dairy cattle in the area were picked both in the dry and rainy seasons. In addition to supplementary feed that was given to the dairy cattle ranged from various crop residues to commercially formulated feeds were also sampled and chemically analysed.

From the large scale commercial farms, samples of the various feeds provided to the dairy cows were also taken and analysed. Analysis was carried out for crude protein, crude fibre, NDF, ADF, fat, calcium, phosphorus, ash and metabolisable energy.

In the rainy season, the focus of analysis was on the natural veldt pastures which accounts for 95% of feed used by the small scale dairy farmers. Ten farms were selected on the basis of their location so as to attain a representation of the whole Marirangwe grazing area. Transect sampling was done by pacing forty steps between each farm. A one by one metre steel quadrant was thrown behind the samplers back. All the grass species that fell within the quadrant was cut about 5cm from ground level and identified as palatable and non palatable species. These different categories were weighed. Composite samples of the samples from each quadrant were then analysed using the proximate analysis method (AOAC, 1997).

Research Application

The fodder flow nutrient composition between the small scale farmers and the commercial farmer was not significantly different ($P>0.005$). Therefore, the major factor responsible for the huge disparities in milk production between the two farming systems could be consistency and quantities of the various locally produced feedstuffs fed to animals.

Recommendation

There is need to promote the growth of crops that can be easily grown by the small scale farmers do not compete directly with

humans but can provide feed to animals. Many farmers are already growing some of these crops but the challenge is to disseminate the nutritional relevance of these crops for increasing milk production.

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