Forage demand and constraints to adoption of forage technologies by livestock keepers in Malawi

MOFFAT KUMWENDA1 AND AUSTIN NGWIRA2
Lunyangwa Agricultural Research Station, Mzuzu, Malawi, Mzuzu Agricultural Development Division, Mzuzu, Malawi, and Lilongwe Agricultural Development Division, Lilongwe, Malawi
1Land O’Lakes Inc., Malawi Dairy Business Development Program, Mzuzu, Malawi
2Land O’Lakes Inc., Malawi Dairy Business Development Program, Lilongwe, Malawi

Abstract

In Malawi, the sustainability of ruminant livestock in the smallholder farming systems setting is based on natural and planted forage. In the past, the government and commercial seed companies have attempted to produce forage seed to satisfy the demand for forage by smallholder livestock keepers. However, over time, commercial seed companies realised that it was financially unviable to produce forage seed and the supply of forage seed subsequently declined. In recent times, due to changes in livestock production systems, livestock have become a vital subsector of the agricultural sector in Malawi. This has stimulated the demand for forage by smallholder livestock keepers.

While forage technologies are available for utilisation of pastures/forages in livestock production systems, there are constraints to adoption of these technologies by livestock keepers in Malawi. These include the scarcity and high cost of forage seed, difficulties associated with forage establishment and maintenance, inaccessibility of forage research results by the end users and lack of appreciation of the value of forage by farmers.

This paper outlines the constraints and proposes possible strategies to redress the situation.

Introduction

Forages are the foundation of the livestock industry across the world; they have minimal value to man unless animals have transformed them into meat, milk, wool, etc. In Malawi, ruminant livestock production systems for small-scale livestock keepers are based on both natural and planted forages and crop residues.

The economy of Malawi is based mainly on agriculture, including crop and livestock subsectors. Nevertheless, the Malawian agricultural sector is constrained by low productivity of both crops and livestock. The low productivity of crops is due to low soil fertility. Moreover, soil fertility is declining rapidly and inorganic fertilisers, which can improve soil fertility, are too expensive for routine use. In contrast, the low productivity of livestock is due to poor nutrition caused by an inadequate quantity and poor quality of fodder. In the past, there have been coordinated efforts by government and non-governmental organisations to improve the nutrition of ruminant livestock through the development of feeding systems based on forage resources as animal feeds.

The livestock industry in Malawi comprises a large traditional sector and a small but important commercial sector. The technology for pasture production to support both sectors of the livestock industry is available in Malawi; however, its adoption is poor, especially by the traditional sector, which includes about 96% of the nation’s cattle. Recent changes in ruminant livestock production systems, especially dairy production systems of smallholder farmers, have created a demand for forage. Nevertheless, there have been problems with adoption of the forage technologies that have been developed.

This paper provides information on the demand for forage and constraints to adoption of
Demand for forage by livestock keepers in Malawi

There are 2 systems of smallholder livestock production in Malawi. The first system is based on zero-grazing; the animals (dairy or beef cattle) are held in pens and fodder/crop residues are taken to them throughout the year. This intensive stall-feeding system (known as ‘cut-and-carry’) is commonly practised by dairy and stall-fattening beef farmers. It has produced increasing amounts of high quality meat and milk from low-cost diets, primarily crop residues. Under the second system, animals are grazed in summer and both stall-fed and grazed in winter. However, under this system, feed resources are so limited during the dry (winter) season that animal liveweight gain and milk production are curtailed. Furthermore, the situation is aggravated by bushfires, which can wipe out all feed resources in the vicinity of farmsteads.

Both livestock production systems have significant impacts on the demand for forage. The intensive stall-feeding system demands large quantities of high-quality forage. In contrast, the extensive system of grazing in summer combined with stall-feeding and grazing in winter is based mainly on natural pastures; accordingly, the demand for high-quality forage is not a major issue.

When high-quality forage is required, especially for dairy cattle, it is necessary to plant high-quality improved pasture/forage. In the past, the government (through the Ministry of Agriculture and Irrigation) and seed companies produced pasture/forage seed for farmers. These efforts are now declining, mainly because it has not been financially viable to produce the seed.

For example, for 15 years, the National Seed Company of Malawi was the nation’s largest pasture seed producer. At peak production, the company was exporting seed, especially of legumes such as Silverleaf desmodium (*Desmodium uncinatum*) (1 tonne/year) and grasses such as rhodes grass (*Chloris gayana*) (100 tonnes/year), to countries including Ethiopia and the United Arab Emirates. Over time, the demand for pasture seed declined, as farmers who had previously purchased seed multiplied it to an extent that buying new seed became unnecessary. Between 1995 and 1996, at a time when pasture seed was produced mainly for non-governmental organisations and the private estate sector, the National Seed Company suspended pasture seed production operations due to low demand. Although the company continued to produce a small amount of leucaena (*Leucaena leucocephala*) seed, specifically for experimental purposes, instead of producing pasture seed, it concentrated on alternative, financially viable activities, e.g. production of hybrid maize and other seed types. There are no immediate plans to resume production of pasture seed (Mkamanga 1999).

Other reasons underlying the low demand for pasture/forage include:

a) For a long time, Malawi’s cattle population has been declining.

Between 1988 and 1998, Malawi’s ruminant population decreased by about 60%. A contributing factor to this decline has been the slaughter of immature and pregnant stock. Slaughter of these animals has resulted from a persistently high local demand for all livestock products in the face of a disproportionately low local supply. Since the demand for forage is directly related to the livestock population, the demand for forages has also decreased. Decreases in demand are particularly pronounced because of the extremely small number of cattle keepers (3%) who use intensive systems of management (Government of Malawi/DANIDA 1998).

b) In the past, the government promoted smallholder (and estate) commercial beef production through the stall-feeding scheme; however, this initiative ceased for a number of reasons including the following:

- Gross margins for beef have been less attractive to producers than in the previously state-controlled economy (see Table 1) because the cost of borrowed capital has been high due to macroeconomic instabilities over the last 2 decades.
- In the past, government farms were the major suppliers of steers. Over time, the farms became unviable and could no longer supply steers to beef producers as planned. Most of the farms, including government dairy farms, were eventually privatised in the late 1990s.
c) To date, livestock extension in Malawi has not clearly stressed the importance of roughages in ruminant rations. In fact, commercial smallholder dairy farmers have previously been indoctrinated into feeding concentrates as the major feed ingredient; this has proved both expensive and unreliable. Recent feeding trials conducted by the Land O’Lakes/Malawi Dairy Business Development Programme have enabled dairy producers to revitalise the role of pastures, management of forage and supplementary feeding. Consequently, the number of farmers adopting improved management practices has been increasing (see Table 2). It is envisaged that increases in the number of dairy producers adopting zero grazing will increase the number of farmers establishing pasture; thus, it is expected that the demand for pasture will increase.

d) One reason underlying decreases in the dairy cattle population was an inadequate and inefficient delivery system for an artificial insemination (AI) service. Accordingly, Land O’Lakes/World Wide Sires began to address this problem through development and expansion of the private AI system. By March 2000, World Wide Sires had supplied Malawi with its first batch of frozen semen from Holstein \( (n = 2000) \) and Jersey \( (n = 1000) \) bulls. A number of farmers \( (n = 32; \text{including 3 women}) \) have been trained as AI technicians and more semen has been ordered since the first batch. Between January 21 and March 31, 2001, a total of 32 calves were produced by AI, and all have survived to date. This is a big achievement considering that the national calf mortality rate is estimated at 30–40%.

It is expected that the cattle population will increase gradually, particularly as the demand for dairy products is extremely high. For instance, in the Lilongwe milkshed area alone, there is an immediate demand for 1000 heifers to be distributed to selected members of the Central Region Milk Producers Association (total membership \( >3000 \)). Malawi does not have this number of heifers. Therefore, the Malawi Dairy Business Development Programme is planning to help meet the short-term demand by supporting selected farmer breeders of commercial dairy stock and by implementing heifer loan schemes. The Department for International Development (DFID, UK) and DANIDA seem interested in supporting these initiatives.

Although the demand for forage seed by livestock farmers remains low, the situation is changing because of the potential growth of dairy farming in milkshed areas. The demand for pasture seed is likely to increase and will need to be supported by increases in capacity for seed production. Recently, the demand for forage has been stimulated significantly by the Land O’Lakes/Malawi Dairy Business Development Programme. The resumption of demand comes at a time when there are no strategies in place for pasture seed production. Currently, the Ministry of Agriculture and Irrigation through its Department of Agricultural Research and Technical Services (DARTS) is multiplying limited amounts of seed, basically for experimental purposes including use on its dairy farms. Some of the seed is being provided free-of-charge to dairy farmers. However, the limited amounts of

Table 1. Estimated rates of return on capital invested in selected livestock enterprises.

<table>
<thead>
<tr>
<th>Type of enterprise</th>
<th>Dairying 2000 litres/year</th>
<th>Dairying 3000 litres/year</th>
<th>Dairying 4000 litres/year</th>
<th>Beef (estate) crossbreds (Brahman/zebu)</th>
<th>Pigs (weaners)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percentage return on capital</td>
<td>30</td>
<td>26</td>
<td>19</td>
<td>25</td>
<td>65</td>
</tr>
</tbody>
</table>


Table 2. Adoption of husbandry practices — at January 2001.

<table>
<thead>
<tr>
<th>Milkshed</th>
<th>Percentage (%) of farmers adopting technology/husbandry practice</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Improved khola</td>
</tr>
<tr>
<td>Lilongwe</td>
<td>71</td>
</tr>
<tr>
<td>Mzuzu</td>
<td>40</td>
</tr>
</tbody>
</table>

Adoption of forage technologies in Malawi

available seed are insufficient to supply the whole country. Table 3 presents data on the quantities of various seeds produced by the Lunyangwa Research Station.

Table 3. Seed quantities produced by Lunyangwa Research Station (of DARTS).

<table>
<thead>
<tr>
<th>Seed type</th>
<th>Quantity of seed produced (kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Silverleaf desmodium</td>
<td>20</td>
</tr>
<tr>
<td>Greenleaf desmodium</td>
<td>10</td>
</tr>
<tr>
<td>Stylo</td>
<td>5</td>
</tr>
<tr>
<td>Rhodes grass</td>
<td>25</td>
</tr>
<tr>
<td>Guinea grass</td>
<td>40</td>
</tr>
<tr>
<td>Glycine</td>
<td>15</td>
</tr>
</tbody>
</table>

Source: Land O’Lakes/Malawi Dairy Business Development Programme baseline survey report log frame analysis and monitoring and evaluation system (Mkamanga 1999).

These data illustrate clearly the inadequacy of current pasture seed production in the context of providing seed for an expanded forage production program around the country. Malawi’s Ministry of Agriculture and Irrigation through DARTS has critical financial problems, and Malawi faces shortages of forage seed; however, technologies for forage production have been developed and are available. Nevertheless, there are constraints to the adoption of forage technologies by livestock keepers in Malawi.

Constraints to adoption of forage technologies by livestock keepers in Malawi

Although the technology for pasture production is available in Malawi, its adoption by the traditional sector is poor. Presently, the technology has been adopted by the commercial sector, which uses rhodes grass (Chloris gayana) in tobacco rotations, and some smallholder dairy producers. Pasture improvement in the traditional sector is difficult because:

- Grazing is a customary right with everybody having free access to grazing areas;
- Improved pastures are expensive to establish, maintenance requires regular applications of fertiliser and fencing may be necessary to control grazing;
- The average land holding in some areas in Malawi is small and does not allow the farmer to establish a significant area of pasture on his own land, unless it can provide him with a greater return than crop production. Dairying might justify pasture establishment in the traditional sector but pasture establishment is not justified by the economics of beef production;
- Prices of seed (when available) and other planting materials are high;
- Pasture research results have not been brought to the point of application, even though considerable research on pastures has been conducted in the country;
- Attitudes of livestock farmers towards forage hinder adoption of forage technologies in Malawi. Farmers consider pasture and forage as weeds rather than crops, and tend to consider weeds and pasture species as one; and
- There is a lack of appreciation of the value of forage. Many livestock farmers do not consider forage as a valuable crop; accordingly, they would rather take care of a maize crop than a pasture crop.

Strategies to enhance the adoption rate of forage technologies by livestock farmers

Forage grasses, legumes and fodder trees are important components of the natural pastures that constitute a major source of livestock feed for rural poor smallholders. Planted forages provide an additional source of feed but could also contribute to soil stabilisation by providing ground cover and wind breaks to prevent soil erosion, and could enhance soil fertility through decomposition of organic matter and microbial nitrogen fixation. At the same time, it is important to understand the needs of poor livestock keepers and to view current levels of forage adoption and impact in relation to these needs; moreover, it is important to understand constraints to wider adoption of forages. Consequently, the following strategies are proposed to enhance the adoption of forage technologies for increased livestock productivity:

- Deliberate introduction of forage legumes into natural pastures for the traditional sector;
- Conducting demonstrations on simple pasture/legume establishment for land-constrained livestock farmers;
- Oversowing or intercropping of pasture/legume forage species with food crops also for the land-constrained farmers;
• Deliberate efforts by both government and non-governmental organisations to organise pasture seed-multiplication programs;
• Funding of pasture seed-multiplication programs by donors just as they fund seed-multiplication programs for food crops;
• Dissemination of pasture research results to the livestock farming community; and
• Deliberate civic education on the value of pasture as a crop for livestock keepers.

Conclusions

Despite the various constraints to adoption of forage technologies by livestock keepers in Malawi, there is now an increasing demand for forage. This is because farmers are now realising that livestock, whose main feed source is forage, play a critical role in both the sustainability and the intensification of agricultural productivity in smallholder farming systems. Livestock make a vital contribution to production of food and essential nutrients, their manure helps maintain soil fertility and they contribute to the overall farming enterprise by providing income and employment.

Recently, forage demand by livestock keepers in Malawi has been stimulated by the Land O’Lakes/Malawi Dairy Business Development Programme. This program focuses mainly on dairy production systems for smallholder farmers. Both government and non-governmental organisations must renew their efforts to revamp the pasture seed-multiplication program, so that livestock keepers can access good quality pasture seed at affordable prices.

Donor agencies need to make a deliberate effort to support the production of pasture seed, just as they support the seed-multiplication program for food crops such as maize, beans and groundnuts.

References
