

What are the main limits to smallholder livestock production in the tropics – according to farmers?

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Abstract

Livestock production is central to the livelihoods of a billion poor people. Transforming livestock production would have transformative effects on local economies in Sub-Saharan Africa and South Asia. Development efforts in the livestock sector have tended to be top-down without enough feedback loops to understand farmer realities and aspirations. This, despite the Farmer First movement that began in the 1990s. The Feed Assessment Tool (FEAST) was developed as a reaction to top down livestock feed development approaches. FEAST facilitates a structured conversation with farming communities about their livestock production system and how it connects with the overall farming system. FEAST involves both individual farmer interviews and focus group discussions (FGD's). The final element of each FGD is a conversation with farmers on problems and opportunities for their livestock enterprise. Farmers are asked to name the issues which most limit their livestock enterprise and to rank them using a pair-wise ranking approach. The purpose of this exercise is to make sure that any following development activities consider the issues that really matter to farmers whether they be feed issues or other issues. FEAST has been applied in over a dozen countries and the many published reports provide a global overview of the main issues facing poor livestock keepers who are seeking to enhance their livestock enterprise. In this paper I will provide a global overview of livestock constraints based on over 150 focus group discussions involving over one thousand farmers from various countries in SSA and South Asia.

Introduction

Livestock production is central to the livelihoods of over 1 billion poor livestock keepers in low income countries. The mixed crop livestock production systems account for the largest share of these poor livestock keepers. Households typically keep small numbers of animals to provide food for domestic consumption as well as manure and traction for arable production. There is considerable variation in the extent to which livestock are kept for commercial milk and meat consumption, but the trend is upwards as urban populations grow and incomes increase (Duncan et al., 2013). Satisfying the resulting growth in demand for milk and meat is an opportunity for smallholder farmers but the transition from subsistence to semi-commercial production is challenging. Yields of milk and meat are generally far below the animals biological potential and development efforts to enhance productivity have often been disappointing. Productivity is influenced by a wide range of potential constraints including the classic trio of feeding, genetics and health but also constraints related to knowledge on basic husbandry, access to markets, lack of local infrastructure, access to finance and a range of other factors.

Donors and governments look for promising intervention pathways and want to know where to invest their efforts and resources. This has spurred several initiatives to quantify the benefits of dealing with different sets of constraints to help focus investment. For example, ILRI engaged in a priority setting exercise for livestock research by identifying a list of research themes and then scoring each using a composite index based on e.g. benefit-cost ratios, pro-poor credentials and environmental effects (Randolph et al., 2001). The World Bank commissioned some work to identify investment options for ruminant livestock feeding in developing countries (Thorpe et al., 2012). Similarly, the Bill and Melinda Gates Foundation funded the Livestock Knowledge Development Project (Staal et al., 2009) and more recently the Livegaps project (Mayberry et al., 2017), both aimed at using expert knowledge and modelling approaches to tease out the most efficient routes to improve livestock productivity in low income countries. These efforts are welcome but tend to be data driven without much consideration of the practical realities of smallholder farming practice. Farmers are

excellent integrators of knowledge and because their livelihoods depend on sound decision making, they are often best placed to offer insights into the most promising ways of improving the productivity of their livestock. However, there is a gap between conversations at donor/government level and the realities facing farmers and it is challenging to incorporate farmer perspectives into high-level decision making.

The Feed Assessment Tool (FEAST) was developed partly as a reaction to lack of farmer involvement in design of livestock feed intervention strategies. The tool is designed to guide a structured conversation between researchers/development agents and farmers to improve overall understanding of the local livestock production system and the issues surrounding improved feeding. Although FEAST is designed as a community-led diagnosis of feed constraints leading to action on the ground, a by-product has been the collection of farmer perspectives on livestock feed constraints across many low and middle-income countries. In this paper I present the results of 10 years application of the FEAST tool across 14 countries to gain insights into the farmer perspective on livestock sector constraints.

Methods

The Feed Assessment Tool (FEAST) was originally developed around 2008 and has evolved since then (Duncan et al., 2012). The tool consists of a focus group discussion checklist, a household questionnaire and a data app which generates standard charts summarizing key elements of the livestock production system and the place of feed within that system. The tool is designed to be applied at village/community level as a way of supporting appropriate livestock feed options based on data and farmer perspectives. One important part of FEAST is the constraint ranking exercise. For this, focus groups discuss important local constraints to livestock production and by consensus come up with a list of the top five constraints. These may be related to any aspect of livestock production and not just feed issues. Once the short list of constraints is agreed the farmer group is asked to rank these using a pairwise ranking exercise. This eventually leads to a ranked list of constraints agreed upon by farmers.

For this analysis I used the ranked lists of livestock production constraints as raw data. Around 80 FEAST reports have been published and these report findings from 149 focus groups conducted in 14 different countries in Sub-Saharan Africa and South Asia and involving 2796 farmers (Table 1). Each constraint description was scrutinized and allocated to one of nine constraint categories and within each category to a further series of “issues” within each category. For example, feed, health and genetics were counted as broad constraint categories but within each there were distinct issues. Thus, the feed constraint might be about feed shortage in general or about seasonal feed shortage. The broad categories and sub-issues emerged through the analysis and were subjectively developed by me. Through this process a total of around 700 “mentions” of specific issues were counted. These were weighted by their position in the ranked list to come up with an importance score for each issue. The scores were allocated to ranks as follows: Rank 1 = 5, Rank 2 = 4, Rank 3 = 3, Rank 4 = 2, Rank 5 = 1).

Results

Results show that of the major constraint categories identified in this study, feeding, health and “infrastructure” were the top three constraints (Fig. 1). The rankings were relatively consistent across global regions (data not shown). The infrastructure category was dominated by the issue of water shortage but also included poor livestock housing, lack of machinery and poor road infrastructure. Knowledge constraints also figured strongly in farmer responses and constraints related to breed quality ranked 5th among constraint categories. Input/output markets and constraints related to finance ranked 6th and 7th on the list. Drilling down to the specific issues within these broad categories shows a similar pattern (Fig 2). General shortage of feed was the most-mentioned livestock constraint followed by livestock disease/pests. Knowledge on livestock husbandry and water shortage featured strongly as did breed quality and access to cash/credit. Intermediate importance was placed on issues such as quality and access to veterinary services, access to markets, grazing land issues, seasonal feed shortage, low prices for livestock products and markets for livestock. Concentrate feed issues, lack of forage seeds and housing were also of intermediate importance in the responses of farmers. A range of minor issues were also identified as shown in Fig 2.

Table 1 - Geographic spread of FEAST assessments, number of focus groups involved number farmers participating

Region	Country	Number of focus groups	Total number of farmers
East Africa	Ethiopia	59	973
	Kenya	19	570
	Tanzania	15	251
	Uganda	13	130
West Africa	Nigeria	9	135
	Ghana	6	108
	Mali	6	90
	Burkina Faso	2	40
	Niger	2	40
Southern Africa	Malawi	6	136
	Zimbabwe	2	19
South Asia	India	6	188
	Nepal	2	48
	Bangladesh	2	50
		149	2796

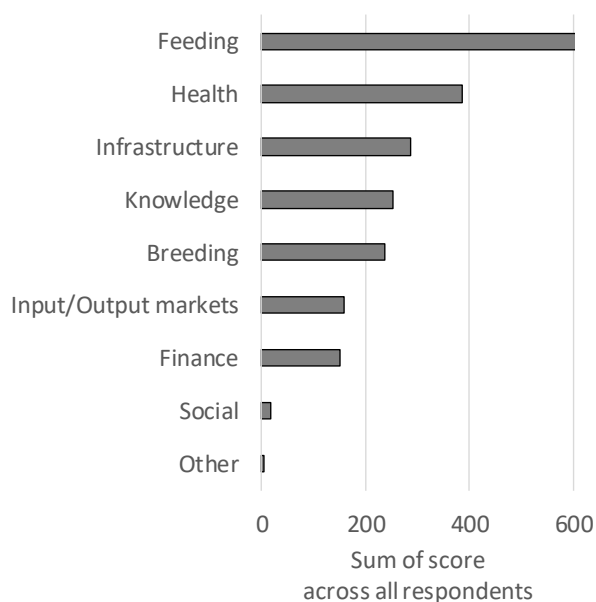


Figure 1. Number of mentions of key constraints to livestock productivity across 149 focus group discussions involving 2796 farmers in 14 countries



Figure 2. Tree map showing the relative importance of a range of livestock constraints according to farmers

Discussion

While the data presented is ad hoc and the coverage reflects the use of the FEAST tool it does provide a reasonably comprehensive overview of livestock development constraints from the farmer perspective across many countries, systems and farmers. Feed shortage is often cited as the main constraint to improved livestock productivity (Ayantunde et al., 2005) without much evidence, but this is borne out by the current data. FEAST is of course focused on livestock feed and this may have skewed the responses somewhat. However, the question posed was general and it was made clear that issues beyond feed should be considered. The “Big 3” constraints of feed, health and genetics all featured in the top five constraints mentioned by farmers as expected. Less expected was the very high importance placed on water shortage as a key constraint to livestock productivity. “Water shortage” covered a range of issues from lack of ready access to drinking water especially for dairy production but also lack of water for optimum growth of forage crops. Gaps in knowledge about basic livestock husbandry were also repeatedly mentioned by farmers and this constraint ranked 4th on the list. This points to the need for renewed focus on basic capacity building on livestock feeding, health and breeding at the farmer level – no small task of course given the unfavourable ratios of farmers to extension workers. The data also highlight the importance of market quality and access to finance for smallholder farmers. These issues have received increasing attention in development efforts in recent years through application of value chain approaches to livestock development, but this analysis suggests that further attention to these issues is needed. The analysis has categorized constraints into a series of bins but this is not to suggest a piecemeal approach to livestock development efforts. If we have learnt anything in the last 10 years it is that dealing with feed, breed, health and market constraints in isolation is futile and that what is needed is to work with bundled intervention packages that address several issues simultaneously.

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References

- Ayantunde, A., Fernandez-Rivera, S., & McCrabb, G. (2005). No Title. In A. Ayantunde, S. Fernandez-Rivera, & G. McCrabb (Eds.), *Coping with feed scarcity in smallholder livestock systems in developing countries*. ILRI.
- Duncan, A. J., Teufel, N., Mekonnen, K., Singh, V. K., Bitew, A., & Gebremedhin, B. (2013). Dairy intensification in developing countries: Effects of market quality on farm-level feeding and breeding practices. *Animal*, 7(12). <https://doi.org/10.1017/S1751731113001602>
- Duncan, A. J., York, L., Lukuyu, B., Samaddar, A., & Stur, W. W. (2012). *FEAST: Feed Assessment Tool*.
- Mayberry, D., Ash, A., Prestwidge, D., Godde, C. M., Henderson, B., Duncan, A., Blummel, M., Ramana Reddy, Y., & Herrero, M. (2017). Yield gap analyses to estimate attainable bovine milk yields and evaluate options to increase production in Ethiopia and India. *Agricultural Systems*, 155. <https://doi.org/10.1016/j.agsy.2017.04.007>
- Randolph, T. F., Kristjanson, P. M., Omamo, S. W., Odero, A. N., Thornton, P. K., Reid, R. S., Robinson, T., & Ryan, J. G. (2001). A framework for priority setting in international livestock research. *Research Evaluation*, 10(3), 142–160. <https://doi.org/10.3152/147154401781777024>
- Staal, S. J., Poole, E. J., Baltenweck, I., Mwacharo, J. M., Notenbaert, A. M. O., Randolph, T. F., Thorpe, W. R., Nzuma, J., & Herrero, M. T. (2009). *Targeting strategic investment in livestock development as a vehicle for rural livelihoods*.
- Thorpe, W. R., Baker, D., & Tarawali, S. A. (2012). *Identifying investment opportunities for ruminant livestock feeding in developing countries*.