The Identification of Constraints and Opportunities in the Livestock Sector: Methods and Data Issues

The Livestock Data Innovation in Africa Project (LDIP) aims to support livestock-related data collection and analysis in three pilot sub-Saharan African countries - Uganda, Tanzania and Niger - with the ultimate objective to draw lessons on how best provide decision makers with information to identify market and investment opportunities that benefit the livestock-dependent poor.

The Project will produce two major outputs: a sourcebook on ‘Livestock Data in Africa: Collection and Analysis for Decision Making’, and an advocacy document on ‘Livestock for Development: The Opportunities and Challenges’.

As part of its activities, the Project has been reviewing and refining methods to identify livestock sector developmental constraints. From a policy perspective, binding constraints represent priority areas for investments for efficient and equitable growth of the sector.

What is a constraint?

In the context of smallholder livestock production systems, a constraint is ‘any barrier that prevents livestock keepers from achieving their goal to improve their livelihoods’. This working definition is adapted from the theory of constraints (TOC) that states ‘a chain is no stronger than its weakest link’ (http://en.wikipedia.org/wiki/Theory_of_constrai
nts). The TOC states that producers in any system are limited in achieving their goals by a few constraints that can be identified and removed. However, the TOC approach to constraint analysis is narrowly focused on contexts of modern business management, which is different from the nature of constraints in small holder farming systems in Sub-Saharan African. Therefore, we have adapted the TOC approach more broadly to address constraint analysis in the context of this study.

Constraints occur in many different forms, but theory and evidence both suggest that binding constraints in most systems are often very few in number. They can be classified in different ways, but they range from bio-physical, resource and technical constraints to those associated with socio-cultural factors, infrastructure and policy. An important attribute of constraints is that they are not easily observed, and as a result are often confused with their symptoms (such as “low productivity”). The following steps are central to any robust analysis that seeks to reveal constraints and evaluate their impacts: a) establish a relevant performance measure against a benchmark b) identify and evaluate the factors associated with underperformance. Those factors are proxies for the underlying constraints.

Identification of constraints: methods

There are diverse methods in applied constraint analysis in the context of rural development.

- At larger spatial scales, constraint analyses have mostly been conducted by applying descriptive methods to collated information through desk reviews of the literature (Salami et al. 2010).
- A widely adopted method to identify constraints is participatory rural appraisal, which involves active participation of farmers to identify constraints and plan
appropriate solutions (Meganathan et al. 2010; Devendra 2007).

- When detailed farm-level data are available, linear programming has often been applied to identify binding constraints (Siegel and Alwang 2005; Jansen and Wilton 1984). This approach requires that potential constraint factors are accurately included into the programming.
- Econometric methods to estimate agricultural supply responses, using both household and country level data, have also been used to identify productivity enhancing or hindering factors, i.e. opportunities or constraints (Heltberg and Tarp 2002).
- Finally, constraints have been identified by using data envelopment analysis (DEA) that combines farm efficiency analysis with statistical identification of the factors associated with low performance. This mirrors the two step approach above (Gelan and Muriithi 2012; Stokes et al. 2007).

Identification of constraints: data issues

Different approaches can be thus used to identify livestock developmental constraints when farm-household data are available. However, much depends on the specific data that are available.

Data from the Tanzania 2008 National Panel Survey (NPS), for example, show that consumption of milk and other dairy products is anticipated to increase in the coming years, providing a major business opportunity for smallholders. At the same time, a preliminary analysis of NPS farm-level data has revealed that, although dairy outputs are distinguished and valued in the database, farm inputs are not divided and allocated to different farm activities (e.g. livestock, cropping, etc). This makes it unfeasible to estimate the overall efficiency of milk producers, such as with the DEA, and then to identify constraints among the less than efficient. But the data can be used to undertake a partial productivity analysis of dairy production, which involves computing milk yield per cow per day, and then seeking explanations for differences among farms in productivity using multivariate analysis.

The latter approach will be used by the Livestock Data Project to identify and evaluate constraints, and reveal opportunities for investments in small dairy production systems in Tanzania. Some field work and participatory workshops will validate the major findings.

Improved data for constraint analysis

The Livestock Data Project has been contributing - in collaboration with the Living Standards Measurement Study-Integrated Surveys on Agriculture (LSMS-ISA) Project of the World Bank. Data from both surveys will be available in 2013, which will allow conducting detailed analysis of livestock development constraints, thereby facilitating the identification of investment opportunities that promote an equitable and efficient growth of the livestock sector.

References


For further information please visit: www.africalivestockdata.org

Or contact:
Ayele Gelan and Derek Baker, ILRI a.gelan@cgiar.org; d.baker@cgiar.org

Ugo Pica-Ciamarra, FAO ugo.picaciamarra@fao.org