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 the activities aimed to produce both the sourcebook and the advocacy document, 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 an 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_constraints). The analytical approach with TOC comes from the contention that producers in any system are limited in achieving their goals by a few constraints. The TOC process seeks to identify and remove these constraints.

Constraints can take many different forms but a core principle in TOC is that binding constraints in most systems are often very few in numbers. They can be classified into bio-physical or policy constraints, and are either internal or external to the production system. Their existence is often indicated by the ability of the system to produce less or more than what the market can bear.

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 of collating information through desk reviews of the literature (Salami et al. 2010; Osterloh et al. 2003).
- 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 to smallholder production systems in Africa (Siegel and Alwang 2005; Jansen and Wilton 1984). A pre-condition for this approach is that the number and types constraints must already been known to researchers, who actually write them into the mathematical programming.
- Econometric methods to estimate agricultural supply responses, using both household and country level data, have been also used to identify productivity enhancing
or hindering factors, i.e. opportunities or constraints (Heltberg and Tarp 2002).

- Finally, constraints have been identified by using a data envelopment analysis (DEA) to measure technical efficiency of farms together with econometric methods aimed at explaining the efficiency scores difference among the farms in terms of differences in the constraints or opportunities they face (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 or household-level data are available. However, much depends on the specific data items 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 constraints, and 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 - to improve the livestock section of the Niger Enquête Nationale sur Les Conditions de Vie des Ménages 2011/12 and the Uganda National Panel Survey 2011/12.

Data from both surveys will be available in 2013, which will allow conducting detailed analysis of livestock development constrains, thereby facilitating the identification of investment opportunities that promote an equitable and efficient growth of the livestock sector.

References


