Tropentag, September 17-19, 2014, Prague, Czech Republic

"Bridging the gap between increasing knowledge and decreasing resources"

Technical Efficiency in Beef Cattle Production in Botswana: A Stochastic Metafrontier Approach

Sirak Bahta

International Livestock Research Institute (ILRI), Botswana

Abstract

As a consequence of harsh climate and relatively poor soils, Botswana's agriculture is dominated by livestock production, which accounts for over 80 per cent of the agricultural sector's output. The harsh climatic conditions manifested by low and unreliable rainfall and poor soils render crop production both risky and unprofitable. Within the livestock sector the dominant sub-sector is beef, which is one of the country's major foreign exchange earner and contributes about 57 per cent of agricultural value added. In addition, the beef sector is a sector in which many indigenous Batswana have participated in, hence important for wealth creation and poverty eradication especially in the rural areas where poverty is more pronounced. However, reduction of EU beef support prices and the high cost of sanitary and phyto-sanitary (SPS) and a series of livestock diseases outbreaks such as foot and mouth disease (FMD) have led to low beef supply to foreign markets.

The study used survey data of about 600 farm households from three districts of Botswana to estimate technical efficiency (TE), hence to fill the gap on analytical evidence on efficiency levels of farmers in various production systems. The stochastic metafrontier model was applied to estimate TE and technology gaps across farms. Subsequently, possible determinants of TE were assessed using a Tobit model.

Results show that there is significant inefficiency in both the small and medium livestock farm systems, but less in large scale livestock farms. Further, in contrast with the other two farm sizes, large scale farms are found to have higher meta-technology ratios (MTRs). The average pooled TE with respect to the metafrontier is estimated to be 0.62, which suggests that there is considerable scope to improve beef production in Botswana. The main factors that are found to have a positive influence on TE include: income from crop activities, age of household head, use of controlled cattle breeding method, access to market information, access to credit, off-farm income and larger herd size.

Keywords: Beef production, Botswana, stochastic metafrontier, technical efficiency

Contact Address: Sirak Bahta, International Livestock Research Institute (ILRI), Private Bag 0033, Gaborone, Botswana, e-mail: s.bahta@cgiar.org