

Cattle Commercialization in Rural South Africa: Livelihood Drivers and Implications for Livestock Marketing Extension

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KEYWORDS Market Participation. Sustainable Livelihood Framework. Double-Hurdle Model. Agricultural Extension. South Africa

ABSTRACT Commercialization of livestock farming systems remains a challenge in rural South Africa. Recent empirical evidence places agricultural extension at the forefront of policy strategy to address this challenge. This study applies the sustainable livelihood framework (SLF) to quantitatively analyze the factors confounding participation in cattle markets for the purpose of informing agriculture extension programming. Based on a dataset compiled from a household survey of 230 randomly selected smallholder cattle farmers in Okhahlamba Local Municipality (OLM), a Double-Hurdle econometric estimation technique is used to determine factors within the SLF influencing market participation and supply volumes decisions. The results reveal that the low rate of market participation could be explained by the broader aspects of livelihoods of smallholder cattle farmers, including limited access to financial, social and natural capital, as well as the difference in livelihood strategies and motivations. Based on these findings, the study draws the implications for the design of livestock extension programs in OLM, and South Africa in general.

INTRODUCTION

Background of the Study

Market participation is an important ingredient for agricultural and rural development. Commercialization of smallholder farming systems through active participation in cattle markets has the potential to exploit developing regions' comparative advantages and transform rural economies (Boughton et al. 2007; Rios et al. 2009; Mathenge et al. 2010). Commercializing smallholder farming systems leads to increased productivity and improved quality of produce, thereby contributing to improved incomes. Hence, market participation by smallholder cattle farmers has the potential to lead to specialized, market-oriented farming systems (Rios et al. 2009).

In South Africa, the recent growth in livestock markets brought about by high population and income growths, urban migration, globalization, and their associated changes in lifestyles and consumer preferences, has presented new opportunities for smallholder livestock farmers to be integrated into the market economy (Delgado et al. 2001; Coetzee et al. 2005; Uzchezuba et al. 2009). Cattle production contributes between 25% and 30% per annum to

South Africa's national agricultural GDP (Musemwa et al. 2008). In addition to its importance in the national economy, cattle production is a key livelihood strategy of the resource-poor smallholder farmers in South Africa, where around 40% of the total cattle herd size is owned by communal and emerging farmers (National Department of Agriculture 2011). Cattle production by smallholder farmers constitutes a major livelihood strategy particularly for farming households living in marginal areas with degraded lands, and meager economic opportunities, and hence acute poverty, food insecurity and unemployment (Machethe 2004).

The appeal of cattle as a viable agricultural investment option has influenced rural development policies in South Africa. Several strategic intents have been devised to transform the rural livestock sector towards a commercialised industry. The National Livestock Development Strategy proposes to support smallholder and emerging farmers to be competitive and profitable (National Department of Agriculture 2006). The strategy proposes to support smallholder livestock farmers through creation of an enabling policy environment, investment in rural commercial and cooperative infrastructure, market development, training and research, and equitable

participation, and integration into sustainable rural development (National Department of Agriculture 2006). In addition, for the livestock sector, the agricultural marketing strategy has set out to develop commodity groups/associations for ease of smallholder farmers' access to market information and agricultural marketing infrastructure (National Department of Agriculture 2010). These incentives have opened up a variety of market channels for livestock farmers, including auctions, speculations, abattoirs, butcheries, as well as farm-gate sales (Nkosi and Kirsten 1993).

Despite the congruence of incentive structures and processes, the cattle markets in South Africa remain characterized by low participation rates of smallholder farmers. Recent studies found the levels of cattle commercialization to be directly proportional to the holding, with rates of 33% for herd of 10 or less cattle, 52% for 11-20 cattle owners, and 85% for 20 or more cattle keepers (Coetzee et al. 2005; Lehloenyia et al. 2007; Musemwa et al. 2007; Groenewald and Jooste 2012). These studies have documented off-take rates ranging between 5% and 10% among communal lands/smallholder farmers compared to 25% for commercial farmers (Musemwa et al. 2010).

As studies in the agricultural economics literature explain, lower levels of smallholder farmers' participation in agricultural markets can be explained by the incidence of costs or/and non-commercial motives. The transaction costs consist of fixed transaction costs arising from imperfect information, such as the search cost for customers with good terms and conditions, negotiations and bargaining, screening, enforcement, and the costs proportional to the level of activity encompassing per unit costs of market access such as transportation and imperfect information (Key et al. 2000). As Barrett (2008) explains, the extent of these costs largely depends on the household's capability, as defined by its endowment including education, physical infrastructure, social networks and access to public goods such as agricultural extension services, roads, information and communication. Also, there is another body of literature contending that in southern African, cattle are kept for wealth storage rather than income generation (Doran et al. 1979). The asset accumulation and ownership benefits such as security and prestige outweigh market incentives (Jarvis 1980).

Agricultural extension is one aspect that should be strengthened to reduce the transaction costs faced by smallholder farmers in the livestock markets (Bahta and Bauer 2007; Uchezubal et al. 2009). This realization is emerging even as agricultural extension approaches are undergoing paradigm shifts, from a top-down, technology transfer model of extension delivery to multifunctional, farmer-centered, participatory and systems-based approaches to rural development (Duvel 2000; Coetzee et al. 2005; Anandajayasekeram et al. 2008; Swanson and Rajalahiti 2010). The new approaches are supposed to address the real needs of the farmers and encourage their innovativeness.

Research Problem and Objective

Empirical studies in agricultural marketing in South Africa consider agricultural extension only as a discrete ingredient whose access can offset or moderate high transaction costs and other challenges. Such studies do not explore the varying degrees to which agricultural extension can play an integrative role that fosters agricultural market participation. This leaves a vacuum in the understanding of the relevance of different agricultural extension models and methods in addressing the complexity of farmers' issues related to livestock markets participation.

For a more practical approach to analyzing cattle commercialization and addressing the role of extension in livestock market participation, an application of the sustainable livelihood framework (SLF) has two unique advantages. First, the framework gives an explicit consideration of both aspects of challenges and barriers to market participation, that is, transaction cost and farmers' motivations (Department for International Development 1999). Second, it offers an integrative programming framework for poverty alleviation in a sustainable manner (Krantz 2001). In line with appropriate extension models for South Africa (Duvel 2000), the SLF is a responsive and participatory programming framework that builds on people's strengths, and at the same time attempts to overcome their challenges and barriers at multiple levels, thus ensuring that micro-level challenges inform policy development and macro-level environment enables people to build on their strengths (DFID 1999).

Leveraging on this appeal, the objective of the study is to empirically investigate the ef-

fects of factors under different SLF components on market participation decisions among smallholder cattle farmers, for the purpose of recommending appropriate agricultural extension models and methods.

The remainder of this paper is sub-divided into five sections. The subsequent section overviews the key findings of previous empirical studies in the domain of livestock market participation in South Africa. It is followed by a methodological section outlining the empirical strategy adopted by the study, and a section discussing the empirical findings. The last two sections conclude and draw the implications for agricultural extension in South Africa.

Literature Review

Market participation cannot be explained by a single factor (such as price incentives) since it stands out to be both a consequence and a cause of development (Barrett 2008). Farm households' market participation requires access to technology, private and public (institutional and physical) productive assets, which entails various sunk and fixed costs, coordination problems, and liquidity constraints at all decision-making levels (Barrett 2008). The costs associated with market transactions (customer search, negotiation, bargaining, screening, etc.), in particular, determines difference in market relations among smallholder farmers (Key et al. 2000). These transaction costs, which are largely dependent on household-specific factors, can push smallholder farmers' livelihoods into low-level equilibrium traps of semi-subsistence farming systems (Dorward et al. 2003; Barrett 2008). In this line of analysis, a number of empirical studies in the domain of cattle market participation within South Africa have documented various confounding livelihood factors. This section presents an overview of these findings, with a sustainable livelihoods lens.

On the livelihood vulnerability context, cattle mortality and thefts were found to be significant factors explaining positive livestock market participation decisions in Limpopo, Eastern Cape and Northwest Provinces (Montshwe 2006).

With regard to livelihoods assets, empirical studies have documented the significance of human, physical, financial, and natural capital. With regard to human capital, Makhura (2001)

found that female-headed-households are more likely to participate in the Northern Province's livestock market. In the Northern Cape Province, Uchezubal et al. (2009) found that households with few and experienced members have high chances of engaging in livestock markets, whereas shorter distances to market and market infrastructure enhanced participation. The finding that smaller household sizes could explain positive market participation decisions was sharply contrasted by Monthswhe (2006) who revealed that, in Limpopo, Eastern Cape and Northwest Provinces, larger households in terms of the number of members are more likely to participate in livestock market. He further found that trained farmers and those who live within shorter distances to market had more probabilities of participating in livestock markets. These results were vindicated by Bahta and Bauer (2007) in the Free State Province. The significance of access to extension services has been commonly evidenced in the literature, including studies such as Uchezubal et al. (2009) and Bahta and Bauer (2007). Access to market information is also constantly revealed as a key market participation factor (Bahta and Bauer 2007).

The endowment in natural resources, particularly the herd sizes, has also been found to influence market participation rates among smallholder livestock farmers (Makhura 2001; Montshwe 2006; Bahta and Bauer 2007). The significance of the influence of financial assets has also been documented. For instance, indebtedness was found to be a significantly negative factor of market participation among small-scale livestock farmers in the Northern Cape (Uchezubal et al. 2009).

On the structures and processes, however, important processes in the livestock industry have been overlooked by empirical studies. Yet, qualitative studies have pointed out that compliance with livestock management regulations (such as the Livestock Identification Act) figures among livestock marketing constraints faced by small-scale farmers in South Africa (Coetzee et al. 2005; Groenewald and Jooste 2012).

The motivational aspect of livestock marketing has also been investigated. Non-commercial motives in the keeping of livestock include economic functions (for example, wealth storage), agro-economic functions (for example, provision of draft power), agro-ecological functions (for example, provision of manure), nutritional (for

example, provision of milk) as well as socio-cultural functions (for example, dowry) (Nkosi and Kirsten 1999; Lehloeny et al. 2007; Groenewald and Jooste 2012). Makhura (2001) showed that the more unearned incomes (pension) the household receives, the less the probability of its market participation, suggesting the predominance of non-commercial motives. However, these findings were in contrast with the findings of Montshwe (2006) showing that, in the Limpopo, Eastern Cape and Northwest Provinces, household who received unearned incomes had more chances of participating in livestock markets.

Notwithstanding the important insight of these studies, none of them analyse transaction cost and motivational aspect in an integrated manner, which the objective of this study.

METHODOLOGY

Study Area

This study was conducted in Okhahlamba Local Municipality (OLM), a 344,000ha municipality in the UThukela District of the KwaZulu-Natal Province (see Fig. 1). The 2007 population census indicates that the municipality is inhabited by 151,414 people (or 28,508 households), mainly traditional households (56%), illiterate (38%), and communal lands dwellers (OLM 2012). Vast majorities of these people are deprived of public infrastructure (with only 39%, 63%, and 44% having access to electricity, water in their dwellings, and transportation, respectively) (OLM 2012). As reported by the municipality, the harsh economic conditions are such that around 36% of household do not receive any income, whilst 37% earn less than R9,600 (around US\$1,100) per annum (OLM 2011).

In this area, commercial and subsistence farming coexist, although geographically separated (a legacy of the segregationist regime of the apartheid era). Smallholder farmers, mainly engaging in maize, vegetable, and livestock production, occupy the marginal areas, mainly the foothills of the Drakensberg mountain range chain, characterized by low-fertility lands (Elleboudt 2012). Although only 22% of the economically active population engages in crop farming (OLM 2012), 55% of households living on communal land engage in livestock farming, mainly consisting of cattle, goats and sheep (Elleboudt 2012). Mixed livestock-crop farming system is a

special feature of agriculture in the foothills of Drakensberg region, where grazing is scheduled such that cattle are sent to uphill areas during the cropping season in summer, while all the land becomes grazing land off-season in winter (Elleboudt 2012). This creates overstocking tendencies among locals with the associated environmental consequences, and the situation is reinforced by the lack of property rights and enforcement mechanisms such as fencing. The area is also know to experience harsh climatic conditions, characterized by an interchange of droughts conditions in summer and heavy snow in winter, making the palatability of the natural grasslands very seasonal, and farmers have to provide supplementary feeding (Elleboudt 2012).

Empirical Framework

Following the prescriptions of Bellemare and Barrett (2006) and other previous studies such as Winter-Nelson and Temu (2005) and Alene et al. (2008), this study uses a sample selection model to unpack market participation behavior among smallholder farmers. Hence, to estimate the influence of livelihood factors in explaining participation and supply decisions among cattle farmers, this study adopts the Double-Hurdle (DH) econometric technique, as initially proposed by Cragg (1971).

Under this empirical strategy, a cattle farmer has to cross two hurdles to become a participant in a cattle market. First, the farmer becomes a “potential participant” after crossing the first hurdle, i.e. after making a positive decision to participate in the livestock market. A potential participant, capability factors will determine his actual/observed level of participation in the second hurdle. Therefore, the DH model is a two-equation framework (Matshe and Young 2004; Moffatt 2005; Ground and Koch 2008), as depicted in the equation 1.

Considering I_i^* as a binary choice variable, Q_i^{**} as a latent variable which reflects the number of cattle sold (therefore the observed variable, Q_i , being determined as $Q_i = I_i^* \cdot Q_i^{**}$), Z and \hat{a} being the vectors of factor explaining the decision of participation and their influences respectively, and X and \hat{a} being the vector of factors explaining the intensity of participation and their influences respectively; the DH model can be written as follow (Matshe and Young 2004; Moffatt 2005; Ground and Koch 2008):

