

*Review*

# Nguni cattle marketing constraints and opportunities in the communal areas of South Africa: Review

L. Musemwa<sup>1</sup>, A. Mushunje<sup>1</sup>, M. Chimonyo<sup>2</sup>, G. Fraser<sup>1</sup>, C. Mapiye<sup>2</sup> and V. Muchenje<sup>2</sup>

<sup>1</sup>Department of Agricultural Economics and Extension, University Of Fort Hare, P. Bag X1314, Alice 5700, South Africa.

<sup>2</sup>Department of Livestock and Pasture, University of Fort Hare, P. Bag X1314, Alice 5700, South Africa.

Accepted 18 November, 2018

Cattle production is the most important livestock sub-sector in South Africa. It contributes about 25 - 30% to the total agricultural output per annum. However, cattle productivity is declining due to diseases and parasites prevalence, lack of feed resources, and poor breeding and marketing management. To increase sustainability and contribution of cattle in eradicating hunger and poverty in communal areas, there is need to make use of locally adapted breeds. In South Africa's communal cattle enterprise, the Nguni breed is becoming a very important socio-economic drive for the resource-poor farmers. Nguni cattle development projects have been initiated in South Africa to improve livelihood of communal farmers. However, these projects are mainly concentrating on solving production constraints and ignoring marketing factors. This paper reviews the neglected marketing constraints and opportunities faced by beneficiaries of the Nguni cattle development program.

**Key words:** Auction, Beef, Diseases, Transactional costs, Sustainability.

## INTRODUCTION

Cattle production is the most important livestock sub-sector in South Africa. It contributes about 25 - 30% to the total agricultural output per annum. Cattle meet the multiple objectives that are desired by resource-poor farmers. These include provision of draught power, manure, cash sales, among other socio-economic functions (Shackleton et al., 1999; Chimonyo et al., 1999; Dovie et al., 2006). Erratic rainfall and high incidence of droughts in most communal areas of South Africa, particularly in the Eastern Cape Province influence the majority of the resource-poor farmers to depend on livestock for their livelihoods. Livestock farming has great potential to alleviate household food insecurity and poverty in communal areas of South Africa (ISRDS, 2004; Coetzee et al., 2004).

Policies and development efforts to improve livestock production in the communal areas have been based on the use of fast growing imported breeds (Collins-Luswet,

2000; Bester et al., 2003; Muchenje et al., 2008). These are perceived to be superior to native breeds because of their large body size (Bester et al., 2003). Contrary to this presumption, exotic breeds are failing to cope with the harsh environmental and socio-economic conditions prevalent in the communal areas where, among other constraints, disease is rampant, feed is scarce and management is poor (Collins-Luswet, 2000; Scholtz, 1988; Schoeman, 1989). Consequently, farmers raising these imported breeds are likely to incur more production costs.

Nguni cattle have ability to grow and reproduce under low input systems (Scholtz, 1988; Schoeman, 1989). Consequently, they produce high beef quality that is comparable to imported breeds (Table 1) (Muchenje et al., 2008). Acknowledgment of these adaptive attributes led to the initiation of development programs to repopulate the Eastern Cape with indigenous Nguni cattle and increase their production and off-take (Mapiye et al., 2007). Despite the efforts, there are few research and development strategies aimed at identifying marketing problems that the communal farmers are currently experiencing and possible niche markets for Nguni cattle products.

\*Corresponding author. E-mail: [lmusemwa@yahoo.co.uk](mailto:lmusemwa@yahoo.co.uk).  
Tel: +2779 262 9943.

**Table 1.** Least square means and standard errors of means (in parenthesis) for productive performance of Nguni, Bonsmara and Angus steers.

Trait	Breed			Significance
	Nguni	Bonsmara	Angus	
Gain 1 (g/day)	98 (13.7) <sup>a</sup>	28 (14.2) <sup>b</sup>	44 (16.9) <sup>b</sup>	*
Gain 2 (g/day)	198 (15.8)	183 (16.4)	198 (19.4)	NS
March Weight (kg)	237 (6.8) <sup>a</sup>	311 (7.0) <sup>b</sup>	288 (8.3) <sup>b</sup>	*
Slaughter Weight (kg)	205 (6.5) <sup>a</sup>	255 (6.8) <sup>b</sup>	240 (8.0) <sup>b</sup>	*
Warm Carcass Weight (kg)	107 (3.5) <sup>a</sup>	145 (3.7) <sup>b</sup>	129 (4.4) <sup>c</sup>	*
Dressing Percentage (%)	52.1 (0.75) <sup>a</sup>	56.9 (0.78) <sup>b</sup>	53.7 (0.92) <sup>a</sup>	*

Means in the same row with different superscripts are significantly different ( $P < 0.05$ ).

Gain 1 = the difference between the slaughter weight and the weaning weight divided by the number of days from weaning to slaughter at the end of April 2006.

Gain 2 = the difference between the March 2006 weight and weaning weight divided by the number of days from weaning to March 2006.

Source: Muchenje et al. (2008).

This paper reviews the neglected marketing constraints and opportunities faced by Nguni cattle farm-ers in the communal areas.

### Overview of the Nguni cattle project

This Nguni cattle development project was initiated in 1998 by the University of Fort Hare in collaboration with rural development agencies in South Africa. In the University of Fort Hare Nguni project, farmers in selected communities are given two bulls and 10 in-calf heifers to allow them to build up a nucleus herd (Fuller, 2006). In addition, the existing bulls in the community are replaced by registered Nguni bulls. After five years, the community gives back to the project two bulls and 10 heifers, which are then passed on to another community (Raats et al., 2004). It works on the 'pay it forward' system. The cycle continues, with each community paying the dividends of its original gift forward to another one (Fuller, 2006). One of the conditions of the project is that communities must have fenced grazing areas, a rangeland management committee and practicing rotational resting at specified stocking rates (Mapiye et al., 2007). The model's long-term goal is to develop a niche market for Nguni beef and skins and to position the communal farmers for the global beef market through organic production and product processing (Raats et al., 2004).

The project has benefited about 45 communities to date out of the target of 100 (Raats et al., 2004). The University of Fort Hare project discourages use of non-descript cows and enforces the removal or castration of the existing exotic bulls in the communal areas and replaces them with pure registered Nguni bulls. The participatory approach of the University of Fort Hare model provides a quick, viable and sustainable mechanism through the establishment of nucleus Nguni herds in the communal areas (Mapiye et al., 2007). The University of Fort Hare is also responsible for planning, coordinating

and training of livestock managers and extension officers. A project development committee made up of interested stakeholders is in charge of the development of infrastructure, training of farmers and the redistribution of animals. The implementation of the model in communal areas is conducted in collaboration with the Department of Agriculture (Raats et al., 2004).

### Contribution of Nguni cattle to communal livelihoods

Communal farmers keep cattle for multiple purposes. Rural households do depend on cattle for the milk, meat, hides, horns and income (Chimonyo et al., 1999; Dovie et al., 2006; Simela et al., 2006). Cattle provide dung for manure, fuel and floor polish/seal, and draught power for cultivation of crops and transport of goods in communal areas (Shackleton et al., 1999; Bayer et al., 2004). Cattle are an inflation-free form of banking for resource-poor people and can be sold to meet family financial needs such as school fees, medical bills, village taxes and household expenses (Dovie et al., 2006; Simela et al., 2006). They are a source of employment, collateral and insurance against natural calamities. Some farmers keep cattle for prestige and pleasure (Shackleton et al., 1999). More importantly, indigenous cattle are valuable reservoirs of genes for adaptive and economic traits, providing diversified genetic pool, which can help in meeting future challenges resulting from changes in production sources and market requirements (FAO, 2007).

Socio-cultural functions of cattle include their use as bride price and to settle disputes (as fine) in communal areas (Chimonyo et al., 1999). They are reserved for special ceremonial gatherings such as marriage feasts, weddings, funerals and circumcision (Bayer et al., 2004). Cattle are given as gifts to visitors and relatives, and as starting capital for youth and newly married man. They are used to strengthen relationships with in-laws and to maintain family contacts by entrusting them to other fa-

mily members (Dovie et al., 2006). Cattle play an important role in installation and exorcism of spirits. They are given as sacrificial offerings to appease avenging spirits (Bayer et al., 2004).

The relative importance of each of the cattle function varies with production system, rangeland type, region and socio-economic factors such as gender, marital status, age, education and religion of the keepers (Chi-monyo et al., 1999; Simela et al., 2006). The differences in farmers' objectives and perspectives to communal cattle production hamper the formulation of effective livestock policies aimed at improving the livelihoods of the resource-poor farmers (Bayer et al., 2004) across all regions or countries. Efforts to improve communal cattle production should, therefore, emphasize the understanding of farmers' objectives, perceptions and experiences. From this knowledge, constraints and opportunities of indigenous cattle by the rural communities can be identified and sustainable developmental strategies formulated (Dovie et al., 2006).

### **Marketing challenges faced by the Nguni project beneficiaries**

Productivity of cattle in communal areas is affected by diseases and parasites, lack of feed resources and poor rangeland management (Chimonyo et al., 2000; Bester et al., 2003; Montshwe, 2006; Musemwa et al., 2007). However, for the Nguni farmers, production related problems are likely to be minimal due to Nguni's resistance to tick-borne diseases and ability to survive under harsh environmental conditions. Therefore, Nguni cattle producers are likely to encounter market-related constraints such as poor infrastructure, high transaction costs and lack of information.

### **Infrastructure**

Lack of marketing facilities imposes a serious constraint on the marketing of livestock (Mahabile et al., 2002). Most of the beneficiaries are located in areas remote from major markets, where there is a serious lack of both physical and institutional infrastructure (NDA, 2005). This partly explains the poor livestock supplies to formal market outlets by small-scale farmers (USAID, 2003). In communities that have marketing facilities, they are either in poor state or non-functional because farmers do not have funds to maintain them (Frisch, 1999). The most important physical infrastructural weaknesses for the communal Nguni cattle producers are related to transport and holding facilities (Bailey et al., 1999).

In South Africa, lack of marketing facilities such as sale pens and loading ramps are some of the numerous factors that impose a serious constraint on small-scale farmers' ability to market their cattle (NERPO, 2004). On the contrary, Fidzani (1993) reported that that poor infrastructure do not influence livestock marketing since

in most cases buyers provide their own loading and transport services. Comparatively, NERPO (2004), states that apart from the distance to formal markets, the poor state of road networks in South African communal areas imposes a serious constraint. It affects farmers' ability to attract many buyers in their areas since bad road network systems are associated with very high transport costs. There is need for the government, community members and stakeholders to collaborate in constructing and maintaining community infrastructures. The involvement of community members can instill some sense of ownership and responsibility and enable them to maintain their infrastructure.

### **High transactional costs**

Transactional costs are barriers to the efficient participation of farmers in different markets. Producers will not use a particular channel when value of using that channel is outweighed by the costs of using it. Remote location of most communal cattle producers coupled with poor road networks, result in high transactional costs (especially transport costs) reducing the price that traders are prepared to pay for the cattle (Musemwa et al., 2007). Makhura (2001), Mahabile et al. (2002) and Nkhori (2004) noted that even if farmers are in areas with good road linkages, the distance from the markets tends to influence transaction costs. The further away the farmers are from markets, the higher the transport costs they incur. In addition, farmers' incur extra transport costs to obtain transporting and selling permits from the police station and veterinary offices, respectively. It is a statutory requirement that when purchasing or selling cattle, they must have a valid identification certificates and transporting permits (NDA, 2005). These restrict farmers' participation in distant markets.

### **Lack of information**

None or poor provision of agricultural information is a key factor that has greatly limited agricultural development in developing countries (Bailey et al., 1999). The farmers' information needs are those that enable them to make rational, relevant decisions and strengthen their negotiating ability during transactions with buyers and consequently prevent possible exploitation by better informed buyers (Coetzee et al., 2004). Information needs for communal farmers range from information on prevailing production techniques and market conditions, type of product demanded, quality, quantity, price and market opportunities (Bailey et al., 1999).

According to Montshwe (2006), lack of time and reliable information is severe, particularly in the communal areas. Although considerable progress has been observed in the provision of communication systems such as telephone and cellular phone network facilities, communal farmers still remain uninformed in terms of new

production techniques, market prices, trends and auction sale dates. Radio and personal communication are still used as main source of information. However, access by smallholder farmers to radios, televisions and internet is still limited. In most cases information is broadcasted and written in Afrikaans and English. This makes the information irrelevant to the majority of communal farmers understand their local languages only (Xhosa, Suthu and Zulu). The poor transfer of knowledge, skills and information is further manifested by limited interaction of the farmers with extension officers due to poor road networks and resources (Coetzee et al., 2004). Training and education will further improve the capacity of the farmers and allow them to make informed decisions.

### **Diseases**

Diseases are a major constraint to the improvement of the livestock industry in the tropics (Devendra et al., 2000). Animal health issues are barriers to trade in livestock and their products, whilst specific diseases decrease production and increase morbidity and mortality (Düvel and Stephanus, 2000; Mwacharo and Drucker, 2005; Chawatama et al., 2005). These diseases include anthrax, foot and mouth, black-leg and contagious abortion. The Mail and Guardian (2007) reported that the South African government has confirmed that until further notice, no veterinary import permits will be issued for cloven-hoofed animals and products derived thereof originating from the United Kingdom due to the current outbreak of the diseases in the United Kingdom. The outbreaks of such diseases in South Africa can be a threat to the communal cattle producers who do not have medicine and proper disease control infrastructure. Furthermore, movement of cattle and their by-products are difficult to monitor in the communal areas. Development of effective and participatory ways and means of enforcing current rules and regulations that control animal movement is, therefore, important.

### **Other marketing challenges**

Communal cattle farmers do fail to attract many buyers in their communities. This is due to a number of reasons, chief of which are lack of marketable livestock numbers and poor condition of livestock. According to Stevens and Jabara (1988), livestock numbers in communal areas are generally low per producer and the average weight of animals are generally low compared to those of the commercial farming sector. The lack of marketable livestock numbers is also as a result of livestock theft. Excellent prices offered for Nguni cattle are likely to increase theft cases from this breed (Van den Bos, 2004; Dzimba and Matoane, 2005). Furthermore, farmers often have inadequate or no insurance coverage on livestock (Smith, 2002). Lack of marketable livestock num-

bers and poor condition of livestock therefore results in buyers not coming to purchase livestock since they will face very high transactional costs (Makhura, 2001).

Poor condition of livestock results in farmers getting low farm gate prices especially during dry spells (Makhura, 2001). More often, it results in farmers refusing to sell their livestock. Livestock auctioneers and speculators often raise concerns that they cannot pay competitive prices for animals that are in poor condition or not ready for the market (Nkhori, 2004). In addition to this, Nkhori (2004) also highlighted that the poor condition of livestock is important, but the age of animals affect prices. The animals are often too old when farmers do sell and this equally contributes to poor prices.

### **Existing market opportunities for Nguni cattle**

A number of cattle market outlets are available to the beneficiaries of the Nguni cattle project; however access to formal markets is limited by a number of factors, chief of which are the distance from the market and inadequate infrastructure. There are many marketing channels that the beneficiaries can use when selling their cattle. These include private sales, auctions, butcheries and abattoirs.

#### **Private sales/ Informal markets**

The shortest, simplest, and the most popular option, especially amongst smallholder livestock owners, is private sales directly to the ultimate consumer (Nkosi and Kirsten, 1993). This method occupies an important position in the livestock marketing arena of the emerging sector. Private sales include individuals buying livestock for different reasons which include slaughter, investment or for socio-cultural functions such as funerals, weddings, customary and religious celebrations (USAID, 2003).

Due to the important functions performed by livestock in African societies, there exists a market amongst individual households (Nkhori, 2004). Private selling is a common practice to communal farmers as they are in a position to determine prices for their animals. In addition, farmers incur low marketing costs. Private sales are therefore the cheapest and most probably the simplest form of market outlet.

Nkhori (2004) revealed that on-farm or direct sales to the consumer offer the greatest profit margin on live animals for the producer because all middlemen and their fees are eliminated. It offers a year-round marketing outlet; however the demand is irregular with high demand during certain times of the year, like festive seasons and Easter. Most of the cattle traded in these informal markets are primarily old oxen destined for service as draught animals and ultimately for slaughter (Swallow and Brokken, 1987).

#### **Auctions**

Livestock auction markets are established places of busi-

ness where livestock are assembled at regular intervals and sold by public bidding to the buyer who offers the highest price per head (Nkosi and Kirsten, 1993). These markets are public markets open to all buyers and sellers. As indicated by the NDA (2005), buyers include individuals buying for household use, butchers, commercial farmers and speculators. Nguni cattle can also be sold at better prices as breeding stock to breeders, commercial farmers and other communal farmers. The number of cattle sold through auctions varies considerably between locations. This influences the number of prospective buyers which in turn may affect the prices paid for cattle at a particular market (Benson et al., 2001). In the case of the Nguni, the Nguni Breeders Association do advertise these auctions, the prices paid in such auctions are very high compared to conventional auctions where all breeds of cattle are sold (Nkhori, 2004).

### **Butcheries**

Another available option to communal farmers is to sell cattle directly to the butchers. Butcheries provide basic marketing services for farmers, particularly communal farmers, who are unable to market their cattle efficiently and profitably through other existing formal channels. Butchers enhance the marketability of livestock by acting as buyers in their own right and by acting as buyers at auctions. Nkhori (2004) found that good prices and farmers having a strong bargaining power in determining the prices of their stock are the main reasons for some farmers' satisfaction with sales to butchers. For Nguni cattle producers, they can sell their cattle to butcheries that do sell natural meat; hence there is need for the beneficiaries to develop some contract with big butcheries like Woolworths. Organic beef costs US\$ 8 - 12/kg retail, compared with at least half that amount for non-organic beef (ECDC, 2003b).

### **Abattoirs**

According to the NDA (2005), the abattoir is the least used marketing channel because of factors which include distance from the producers, slow speed of payments, high risk factor of animals being condemned on the basis of health status, and many charges involved in using this channel. It is not economical to sell one or two animals as transport costs will not be justified. Group marketing can assist farmers to enjoy economies of scale when using this channel. However, group marketing is not always possible since farmers sell their animals at different times.

Abattoirs pay farmers according to age, weight and grade of the animal (Nkhori, 2004). This grading system does not consider the breed and feeding practices. To improve this grading system, there is need for the government to put some tense measures on abattoirs

exploiting farmers by paying them equal amounts of money for naturally and genetically modified beef. Abattoirs tend to sell natural beef at high prices at both local and international markets than genetically modified beef and this result in them getting higher than normal returns at farmers' expense. The ability to sell stock at market-related prices would translate their cattle base into a capital base and improved livelihoods.

### **Potential markets for other Nguni cattle products**

Since the Nguni is a multi-purpose animal, marketing should take a holistic approach, and promote development of other products such as beef, milk, skins and hides, draught power and manure. Neglecting other uses of cattle can reduce household food security and exacerbate poverty (Shackleton et al., 1999).

### **Beef**

Due to the dynamic nature of the world, naturally produced foods are currently in vogue. Beef that contains a high fat content is increasingly frowned upon by consumers. Beef from animals reared with artificial hormones have become unpopular. Natural beef from Nguni cattle is already being 'grown' in the Eastern Cape Province and exportation have already started (ECDC, 2003a). The pesticide and herbicide free natural grasslands in South Africa provide the opportunity to develop high quality beef for both domestic and international natural beef markets (ECDC, 2003b).

Nguni cattle producers have the potential to dominate natural beef market due to the adaptability of the Nguni breed to the local environment. As far as local market is concerned, local supplies are unable to cope with high demand for naturally produced beef; the current biggest market for natural beef in South Africa is Woolworths. Hotel and other butcheries, especially those that are located in low density suburbs have a high potential of being possible markets for naturally produced beef.

### **Milk**

Nguni cow produces 2 - 4 kg of milk per day, on average, compared to established breeds which produce 10 - 20 kg under improved conditions (Moyo, 1996). The low milk quantity is further manifested by few lactating cows that the beneficiaries normally have at the same time. The available markets for Nguni milk are mainly neighbours, street milk vendors and small local dairy shops. However, for the farmers to be able to meet the required supply by these dairy shops and for street vendors, they have to do cooperative marketing and this involves putting their milk together so that they can reduce transactional cost and meet the required volume (ECDC, 2003a). Nguni cattle producers can add value to their milk by processing and

marketing their own products such as farm bottled pasteurised milk, powdered milk, butter, cheese, yoghurt, ice-cream, chocolates and sweets. In the long-term, organic certification and group marketing can result in higher premium prices and profits for the smallholder milk producers (Mapiye et al., 2007). Labeling such products could further enhance value and could even lead to potential lucrative contracts with foreign investors.

### **Skins and hides**

In the past, most of the hides and skins were exported. However, the communal farmers failed to penetrate this market because of lack of information and large volumes required. For the few well informed communal farmers that were able to penetrate this market they encountered little returns due to high transaction costs (many middlemen were involved) As pointed out by Nkhori (2004), higher the transaction costs lowers the profits ,hence reducing the chances farmers participating in a given market. However, nowadays a number of leather Industries have been set up throughout the country and these are currently experiencing shortage of domestic hides, especially of higher quality. These industries forms a local market for hides from Nguni cattle, they provide better-quality hides.

In the Eastern cape, the Eastern Cape Development Co-operation (ECDC) is partnering with Triple Trust, the Eastern Cape Tourism Board and with local farmers and businesses to train small-scale tanners (ECDC, 2003b). The aim of the project is to process skins and hides to produce hand-crafted 'organic' leather products to sell to the tourist market. The project has potential to provide products and a market for the hides that are currently either used locally or sold to brokers without any value being added (ECDC, 2003b). The high demand for quality automotive leather and the need to import finished leather for auto seat manufacture provides an ongoing opportunity for example, the Daimler Chrysler committed itself to the project and will use 40 000 Nguni hides in exported Mercedes vehicles (Raats, 2004). In addition to this, the South Africa Antique Dealers Association (SAADA) (2005) highlighted that the decor and fashion industries have also cottoned on to the aesthetic beauty and quality of the Nguni skin. Top furniture and interior designers are waxing lyrical about the popularity of the Nguni cowhide due to its multi-colours and strength.

### **Draught power**

Nguni cattle are good draught animals; they are used to provide traction power during cultivation or transportation of goods (Bester et al., 2003). Since, some communal farmers do not own cattle, and most of them cannot afford to purchase or hire tractors for tillage (Chimonyo, et al., 1999), Nguni cattle can be a source income to farmers through provision of draught power to neighbors.

This can only be achieved if Nguni cattle farmers can market this service to their neighbours by informing them at community gatherings about the service they can offer, especially those without cattle. If the animals can be well trained, they can be used to pull wagons and this form of transport is preferred by tourists. The Nguni cattle owners can advertise this service in tourist magazines or provide wagons at tourist places near their communities.

### **Manure/dung**

Manure plays a key role in crop production by providing essential crop nutrients (Chimonyo et al., 2000). In addition, the use of fertilizers is now becoming unattractive due to their effect on the environment. This creates a big demand for manure as source of organic nutrients for food and fodder crops. Nguni cattle producers can sell manure to their neighbours. Cattle owners can also combine their manure and sell it to big companies that manufacture organic fertilizers. Cow dung can be a source of income in some communal areas where fire wood and electricity are unavailable.

### **Conclusion**

Since, most communal cattle production constraints can be overcome by use of the locally adapted breeds such as Nguni, addressing the often neglected cattle marketing problems can improve the viability and sustainability of Nguni cattle in the communal areas. Group marketing, decentralization of cattle information centres and the involvement of communal farmers' in the dissemination of information plays a critical role in improving farmers' access to formal markets. The available information and support services and technology should be packaged into accessible and user-friendly forms. Development of local agro-processing industries and training of farmers in cattle products processing deserve attention.

### **REFERENCES**

- Bailey D, Barrett CB, Little PD, Chabari F (1999). Livestock markets and risk management among East African pastoralists: A review and research agenda., Utah University, USA.
- Bayer W, Alcock R, Gilles P (2004). Going backwards? – Moving forward? – Nguni cattle in communal Kwazulu-Natal. "Rural poverty reduction through research for development and transformation". A scientific paper presented at a conference held at Agricultural and Horticultural Faculty, Humboldt-Universität zu, Berlin. p.1-7.
- Benson G, Miller D, Lichtenwalner R (2001). Beef cattle marketing in North Carolina. <http://www2.ncsu.edu/unity/lockers/project/arepublication/AREN032.pdf>.
- Bester J, Matjuda IE, Rust JM, Fourie HJ, (2003). The Nguni: case study. In: FAO Community-based management of animal genetic resources. Rome: UNDP, GTZ, CTA, FAO. pp. 45-68.
- Chawatama S, Mutisi C, Mupawaenda AC (2005). The socio-economic status of smallholder livestock production in Zimbabwe: a diagnostic study. *Livest. Res. Rur. Dev.* 17(12). <http://www.cipav.org.co/lrrd/lrrd17/12/chaw17143.htm>.
- Chimonyo M, Kusina NT, Hamudikuwanda H, Nyoni O (1999). A survey

- on land use and usage of cattle for draught in a smallholder farming area of Zimbabwe. *J. Appl. Sci. Southern Afr.* 5(2): 111-121.
- Chimonyo M, Kusina NT, Hamudikuwanda H, Nyoni O, Ncube I (2000). Effects of dietary supplementation and work stress on ovarian activity in non-lactating Mashona cows in a smallholder farming area of Zimbabwe. *Anim. Sci.* 70 (2): 317-323.
- Coetzee L, Montshwe BD, Jooste A (2004). The Marketing of Livestock on communal lands in the Eastern Cape Province: Constraints, Challenges and Implications for the Extension Services. *S. Afr. J. Agric. Ext.* 34 (1): 81-103.
- Collins-Luswet E (2000). Performance of Nguni, Afrikaner and Bonsmara cattle under drought conditions in North West province of Southern Africa. *S. Afr. J. Anim. Sci.* 30 (1): 33-38.
- Devendra C, Thomas D, Jabbar M, Zerbini E (2000). Improvement of Livestock Production in Crop-Animal Systems in Agro-Ecological Zones of South Asia., ILRI, Nairobi, Kenya.
- Dovie DBK, Shackleton CM, Witkowski ETF (2006). Valuation of communal area livestock benefits, rural livelihoods and related policy issues. *Land Use Policy* 23: 260-271.
- Düvel GH, Stephanus AL (2000). Production constraints and perceived marketing problems of stock farmers in some districts of the Northern communal areas of Namibia. *S. Afr. J. Agric. Ext.* 29: 89 –104.
- Dzimba J, Matooane M (2005). The impact of stock theft on human security: Strategies for combating stock theft in Lesotho. In (ed) Muloongo K., Kibasomba R. & Kariri J. N. *The Many Faces of Human Security: Case Studies of Seven Countries in Southern Africa.* Institute for Security Studies, Pretoria, South Africa.
- Eastern Cape Development Corporation (ECDC) (2003a). ECDC Sector Profile: Dairy Opportunities. <http://www.ecdc.co.za/sectors/sectors.asp?pageid=108>.
- Eastern Cape Development Corporation (ECDC) (2003b). ECDC Sector Profile: Leather and Leather Products. <http://www.ecdc.co.za/sectors/sectors.asp?pageid=115>.
- FAO (2007). Sub-regional report on animal genetic resources: Southern Africa. Annex to the State of the World's Animal Genetic Resources for Food and Agriculture. Rome, Italy. pp. 1-37.
- Fidzani NH (1993). Understanding cattle offtake rates in Botswana. PhD Thesis, Boston University, USA.
- Fraser GCG (1991). Agricultural marketing in less developed countries with special reference to Ciskei. PhD Thesis, University of Stellenbosch, RSA.
- Frisch JE (1999). Towards a permanent solution for controlling cattle ticks. *Intern. J. Parasitol.* 29 (1): 57-71.
- Fuller A (2006). The sacred hide of Nguni; the rise of an ancient breed of cattle is giving South Africa new opportunity. Miracles that are changing the Nation. Industrial Development Corporation (IDC) Newsletter. pp. 3-4.
- Integrated Sustainable Rural Development Strategy (ISRDS) (2004). <http://www.info.gov.za/otherdocs/2000/isrds.pdf>
- Mahabile M, Lyne M, Panin A (2002). Factors affecting the productivity of communal and private livestock farmers in Southern Botswana: A descriptive analysis of sample survey results. *Agrekon* 41(4): 326 – 338.
- Mail and Guardian (2007). SA halts UK meat imports after disease outbreak. 6 August.
- Makhura MT (2001). Overcoming transaction costs barriers to market participation of smallholder farmers in the Northern Province of South Africa. PhD Thesis, University of Pretoria, Pretoria.
- Mapiye C, Chimonyo M, Muchenje V, Dzama K, Marufu MC, Raats JG (2007). Potential for value-addition of Nguni cattle products in the communal areas of South Africa: a review. *Afr. J. Agric. Res.* 2 (10): 488-495.
- Montshwe DB (2006). Factors affecting participation in mainstream cattle markets by small-scale cattle farmers in South Africa. MSc Thesis, University of Free State, RSA.
- Moyo S (1996). The productivity of indigenous by exotic beef breeds and their crosses at Matopos, Zimbabwe. PhD Thesis, Department of Animal and Wildlife sciences, University of Pretoria, South Africa. p. 166.
- Muchenje V, Dzama K, Chimonyo M, Raats JG, Strydom PE (2008). Meat quality of Nguni, Bonsmara and Aberdeen Angus steers raised on natural pasture in the Eastern Cape, South Africa. *Meat Sci.* 79: 20-28.
- Musemwa L, Chagwiza C, Sikuka W, Fraser G, Chimonyo M, Mzileni N (2007). Analysis of Cattle Marketing Channels Used by Small Scale Farmers in the Eastern Cape Province, South Africa. *Livest. Res. Rur. Dev.* 19 (9). <http://www.cipav.org.co/lrrd/lrrd19/9/muse19131.htm>.
- Mwacharo JM, Drucker AG (2005). Production objectives and management strategies of livestock-keepers in Southeast Kenya: implications for a breeding programme. [http://www.ilri.org/html/ZebuBreeding%20Mwacharo\\_Drucker\\_%20Accepted%20TAHP.pdf](http://www.ilri.org/html/ZebuBreeding%20Mwacharo_Drucker_%20Accepted%20TAHP.pdf).
- National Department of Agriculture (NDA) (2005). Red Meat Marketing. <http://www.nda.agric.za/docs/MarketExtension/7Livestock.pdf>.
- National Emergent Red Meat Producers Organisation (NERPO) (2004). Marketing infrastructure development. <http://www.nerpo.org.za>.
- Nkhori PA (2004). The impact of transaction costs on the choice of cattle markets in Mahalapye district, Botswana. MSc Dissertation, University of Pretoria, Pretoria.
- Nkosi SA, Kirsten JF (1993). The marketing of livestock in South Africa's developing areas: A case study of the role of speculators, auctioneers, butchers and private buyers in Lebowa. *Agrekon*, 32 (4): 230-237.
- Raats JG, Magadla AM, Fraser GCG, Hugo A (2004). Re-introducing Nguni nucleus herds in 100 communal villages of the Eastern Cape province. A proposed co-operative project between the University of Fort Hare, Agricultural and Development Research Institute (ARDRI) and the East Cape Department of Agriculture and the Kellogg Foundation.
- Schoeman SJ (1989). Review: Recent research into the production potential of indigenous cattle with specific reference to Sanga. *S. Afr. J. Anim. Sci.* 19: 55-61.
- Scholtz MM (1988). Selection possibilities of hardy beef breeds in Africa: The Nguni example. *Proceedings of the 3rd World Congress on sheep and beef cattle breeds*, Paris, France 2: 303-304.
- Shackleton CM, Shackleton SE, Netshiluvhi TR, Mathabela FR, Phiri C, (1999). The direct use value of goods and services attributed to cattle and goats in the Sand River Catchment, Bushbuckridge, CSIR-Environmentek Report No. ENV-P-C 99003, CSIR, Pretoria.
- Simela L, Montshwe BD, Mahanjana AM Tshuwa MP (2006). The livestock production environment in the South African smallholder sector. New challenges for the animal science industries. SASAS 41<sup>st</sup> Congress Abstracts. p.66.
- Smith D (2002). Crime in rural areas on increase. [http://deltafarmpress.com/mag/farming\\_crime\\_rural\\_areas/](http://deltafarmpress.com/mag/farming_crime_rural_areas/)
- South Africa Antique Dealers Association (SAADA) (2005). Beauty is Nguni skin deep. <http://www.streetwires.co.za/pressroom1.htm>.
- Stevens RD, Jabara CL (1988). *Agricultural Development Principles: Economic Theory and Empirical Evidence.* Baltimore and London: The John Hopkins University Press.
- Swallow BM, Brokken RP (1987). Cattle marketing policy in Lesotho. <http://www.fao.org/Wairdocs/ILRI/x5508E/x5508e00.htm#Contents>.
- United States Agency for International Development (USAID) (2003). Agri-link II Project 2003, Monthly progress report #22, South Africa.
- Van den Bos G (2004). Stock Theft: We are Winning, Slowly but Surely. *S. Afr. Police Service J.* [http://www.saps.gov.za/docs\\_pubs/publications/journal/septoct04/ind ex.htm](http://www.saps.gov.za/docs_pubs/publications/journal/septoct04/ind ex.htm).