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ABSTRACT

South African communal farmers possess indigenous breeds and resources required for organic beef production. However, the market off-take rate from communal farms is 5-10%, compared to 25% on commercial farms, despite the fact that 40% of cattle are found on communal lands. The objective of the study was to investigate the possibility of organic beef production on South African communal farms, using Focus Group Discussions (FGDs) conducted with communal cattle farmers in UMgungundlovu, KwaZulu-Natal. The findings revealed that socio-cultural factors are the primary reasons for keeping cattle, with cash generation being a secondary importance. Despite the lack of external support, communal farmers value their communal production systems and produce which are labelled 'organic' by default. These farmers perceive this system as wholesome; results in mature and tasty meat with several domestic and medicinal benefits compared to conventional cattle production systems, hence, its products should be sold at a premium. Socio-behavioural factors, such as isolation, inferiority and lack of institutional support, market access and market information pertaining to the marketing of organic beef are the reasons why communal farmers are not actively participating in the South African formal beef market. It can be concluded that facilitating product differentiation and the involvement of communal farmers as stakeholders in the South African formal beef market through civic engagement has the potential to increase off-take rates from communal farms, rather than the bottom-up and top-down management strategies.

Keywords: Civic engagement, Communal farmers, Extension, Formal beef markets, Organic beef, Off-take rates, Socio-behavioural factor.

1. INTRODUCTION

During the mid-to-late 20th century subsistence agriculture with its relatively low yields was discouraged in most African countries (Bryceson, 2000). This promoted the top-down management strategy which brought about the introduction of large and superior exotic breeds in both the communal and commercial cattle farming sectors in countries such as South Africa. However, these breeds have failed to survive the harsh conditions such as disease and parasite prevalence, insufficient feed resources, poor breeding and marketing management characteristic of communal farms (Musemwa, Mushunje, Chimonyo, Fraser, Mapiye & Muchenje, 2008).

Over 70% of the resource-poor farmers in South Africa are situated in the harsh agro-ecological zones where cropping is unsuitable, and thus, rely on livestock for their

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livelihoods (Mapiye, Strydom, Dzama & Chimonyo, 2009). As a result, the Integrated Sustainable Rural Development Strategy (ISRDS) identifies livestock farming as the agricultural enterprise with the most likely chance of improving household food security, alleviating poverty, and improving livelihoods in communal farming areas of South Africa (ISRDS, 2004).

Bryceson (2000) stated that African rural dwellers value the pursuit of farming in which the subsistence production of food is a major component of livelihoods in sub-Saharan Africa. The rural dwellers are largely made up of communal farmers who are in possession of adaptable, indigenous breeds which have an ability to cope with the local bio-physical and climatic conditions. Moreover, 75% of indigenous breeds are found on communal lands (Tada, Muchenje & Dzama, 2013).

According to Montshwe (2006) and Mapiye *et al.*, (2009), the motive for keeping cattle on communal farms is to use them for generating income, however, the off-take rate on communal lands is low (5-10%) compared to 25% in the commercial sector. This is despite the fact that cattle thrive well on marginalised environments, and that 40% of cattle in South Africa are kept under communal production systems (Musemwa, Mushunje, Chimonyo & Mapiye, 2010). Increasing the off-take rate on communal farms could be one method of mitigating the negative effects of high temperatures as brought about by climate change in South Africa.

Mapiye *et al.* (2009) reported that market unavailability is one of the reasons for the low off take rates on communal farms in South Africa. Montshwe (2006) reported that the lack of market information hinders communal farmers from actively participating in the South African formal beef market. As a result, addressing the often-neglected cattle marketing problems can improve the viability and sustainability of Nguni cattle in the communal areas. Musemwa *et al.* (2010) stated that communal cattle have multiple functions resulting in the low cattle market off-take rates and lack of market sustainability. The indigenous breed commonly reared on South African communal farms is the Nguni which is also used for several cultural ceremonies such as paying dowry and appeasing ancestors. The studies above and several others have been conducted on the reasons for rearing cattle on communal lands; however, none of these have investigated the possibility of organic beef production on South African communal farms. Hence, the objective of this study was to determine the possibility of organic beef production on South African communal farms.

2. JUSTIFICATION OF THE STUDY

Conventional farming which was encouraged by the ‘Green Revolution’ is characterised by high input costs which most communal farming households cannot afford (Bryceson, 2000). As a result, small scale farming including organic beef farming is still practiced among communal farming households all over South Africa. However, communal farmers’ participation in the South African formal beef market is low. Thus, strengthening the indigenous and low-input technologies, such as organic beef farming, is necessary for increasing participation of communal cattle farmers in the formal beef markets.

Organic farming is often promoted as an opportunity for communal farmers in Africa, at subsistence and commercial levels (Walaga, 2002), including environmental sustainability, cultural factors, similarities in production, enhancing indigenous knowledge systems and profit opportunities. Although organic plant production has made significant inroads in South Africa, organic beef production is still at inception stage. This is despite the fact that

communal farmers have access to land that has not been exposed to intensive chemical agriculture; hence they could gain certification faster than the three-year conversion period recommended by the European Union Biodynamic & Organic Certification Authority (BDOCA, 2006).

These farmers are in possession of adaptable indigenous breeds which are suitable for organic beef production. Therefore, communal farmers have an opportunity to produce premium-priced products in organic markets and obtain higher revenue than that typically gained from conventional agricultural markets. According to O'Donovan & McCarthy (2002), organic foods are sold with a premium. In support, (Oberholzer, Dimitri & Greene, 2005), certified organic products are sold with a premium in the market place, therefore, organically produced beef will realise higher revenue compared to conventional beef.

Regardless of these benefits in favour of communal farmers, output from communal farms in the South African formal beef markets is very minimal as evident in the thin organic beef niche market. Therefore, there is a need to investigate why communal farmers are not actively participating in the formal beef market, especially in lieu of the increase in demand for organic products as witnessed recently (Sofos, 2008). The investigation of market barriers hindering the participation of communal farmers in the South African formal beef markets is important in order to determine the possibility of organic beef production, enhance off-take rates from communal farms and ensure efficient utilization of agricultural resources.

3. RESEARCH METHODOLOGY

3.1. Study sites and sampling technique

A series of four FGDs were conducted in two communal farming communities in the peri-urban UMgungundlovu district, KwaZulu-Natal. The two communities which participated in the study were in Willowfontein and Mpendle. These study sites were selected based on the premise that peri-urban farmers tend to sell a higher proportion of their outputs compared to those in rural areas (Omiti, Otieno, Nyanamba & Mccullough, 2009). Communal farmers who owned indigenous cattle breeds in these sites were randomly selected from a list that was provided by the KwaZulu-Natal Department of Agriculture (DOA), UMgungundlovu district.

3.2. Data collection

According to Ter Morsa, Terwela, Daamena, Reinerb, Schumannc, Angheld, Bouloutae, Cismaruf, Constanting, de Jagera, Dudud, Eskenh, Falupg, Firthb, Gemenii, Hendriksj, Ivanf, Koukouzasi, Markosk, Næssl, Pietznerh, Samoilag, Savad, Stephensonm, Tomescug, Torvatnn & Tvedto, 2013), FGDs are used to produce high quality opinions through exploring a subject phenomenon. During this study, moderator guidelines were developed prior to the FGD sessions based on literature and technical expertise. Although the composition of the FGDs participants was dominated by males, efforts were made to encourage participation from all participants. All participants were cattle farmers, hence were regarded as key informants in communal cattle production systems.

The FGD participants were members of local communal farmers' groups in the two communities which are supported by DOA. Nine communal farmers participated in each of the four FGDs which comprised of participants over the age of 21 years. The nine participants were requested to participate in the study through the DOA preceding the FGDs

in order to maximize a variety of inputs from the communal farmers. There were two sets of FGDS from each study site. The FGDS were conducted by an expert facilitator in isiZulu which is the native language of the communal farmers. The discussions included ranking of key issues, and strengths, weaknesses, opportunities and threats (SWOT) analysis which resulted in the development of the civic engagement model. Proceedings were recorded on flip chart papers and using a tape recorder. The FGDS interview guide comprised of questions regarding differentiation between organic and conventional beef, importance of keeping cattle on communal farms, perceived entrepreneurial opportunities and challenges, and factors hindering communal farmers from actively participating in the South African formal beef market.

3.3. Data analysis

Data was analysed using content or thematic analysis which is a method for identifying, analysing, and reporting patterns (themes) within data (Braun & Clarke, 2006). Themes were identified; data coded per theme and analysed to portray an accurate reflection of the content of the entire data set.

The questions that guided the thematic analysis are as follows:

- What are the reasons for keeping cattle?
- What is the difference between organic and conventional beef?
- Why are communal cattle farmers not actively participating in the formal South African beef market?

During data analysis, the results were coded and themed into three categories namely: importance of cattle, differentiation between organic and conventional beef and reasons for lack of participation in the South African formal beef markets by communal farmers. Verbatim quotes were used to show the views of the communal farmers participated in this study.

4. RESULTS

The results of the FGDS are presented in accordance with the three identified themes pertaining to the possibility of organic beef production on South African communal farms.

4.1. Theme 1: Importance of cattle

Communal farmers were requested to list the significance of cattle and to rank the identified factors into two sub-themes which are presented in Table 1.

Table 1: Importance of cattle

Sub-theme 1: Primary importance of cattle		
Factor	Description	Quote
Social value (self-worthiness)	Communal farmers have pride and dignity emanating from owning locally adaptable cattle	<i>“We take pride in growing our own food”</i>
Cultural value	Meat from cattle reared by communal farmers is used for paying dowry, appeasing ancestors and in traditional ceremonies and events.	<i>“As long as there are sufficient indigenous and custom related steps from production to slaughter, meat raised on communal farms can be used to appease ancestors”</i>
Sub-theme 2: Secondary importance of cattle		
Food security	Communal farmers rear cattle for food in the form of milk and meat, and for cash as secondary importance	<i>“We sell cattle when there is a domestic need.”</i>
Agricultural activities	Cattle on communal lands are used for draught purposes.	<i>“Cattle enable timely planting and maintenance of field crops.”</i>
Domestic purposes	Manure from communal cattle is used for cleaning traditional houses’ floors	<i>“The chemical free manure from the local cattle is used to floor houses.”</i>

Communal farmers were requested to list the significance of cattle and to rank the identified factors into two sub-themes namely; primary and secondary importance of cattle on communal lands. Sixty five percent of the participants were males who are cattle owners. Socio-cultural values were ranked as primary reasons for keeping cattle by communal farmers. Unexpectedly, rearing cattle for cash was classified under food security which was ranked as a secondary reason for keeping cattle. Contrary to Mapiye *et al.* (2009) who stated that cattle on communal lands is mainly reared for cash, the FGDs participating farmers ranked cash as a secondary reason for keeping cattle.

4.2. Theme 2: Differences between conventional and organic beef

There was a consensus amongst the communal farmers that organic beef is different from conventional beef. The differences between conventional and organic beef were captured in five sub-themes as presented in Table 2.

Table 2: Differences between conventional and organic beef

Sub-theme 1: Production	
Conventional beef	Organic beef
<ul style="list-style-type: none"> - Conventional beef is produced using synthetic chemicals and artificial hormones - Conventional beef production is highly resourced with external support from government and private companies 	<ul style="list-style-type: none"> - Organic beef is produced using natural production systems - Lack of external support for production - Organic beef production promotes the use of production methods which farmers are proud of - Efficient and effective production through mixed farming - Source of livelihood (food and income) for communal farmers
Sub-theme 2: Maturity of meat	
<ul style="list-style-type: none"> - Immature meat and products - May contain traces of chemicals 	<ul style="list-style-type: none"> - Superbly matured meat - No traces of chemicals in products
Sub-theme 3: Taste	
<ul style="list-style-type: none"> - <i>“Conventional beef is tasteless”</i> 	<ul style="list-style-type: none"> - Organic beef is of better taste compared to conventional beef
Sub-theme 4: Contribution towards domestic purposes	
<ul style="list-style-type: none"> - Manure cannot be used for flooring because of its chemical composition 	<ul style="list-style-type: none"> - Manure is used for flooring and regulating ambient temperature
Sub-theme 5: Medicinal purposes	
<ul style="list-style-type: none"> - Unknown medicinal benefit from manure 	<ul style="list-style-type: none"> - Fresh manure from indigenous breeds can be used to cure stomach ailments

The differences between conventional and organic beef were divided into five sub-themes namely production, maturity of meat, taste, contribution towards domestic and medicinal purposes. The results indicated that communal farmers have a clear distinction between conventional and organic beef, whereby organic beef is described as chemical free, superbly matured, of better taste and contributes to domestic and medicinal purposes than conventional beef.

4.3. Theme 3: Reasons why communal farmers are not participating in the South African formal beef market

The third theme on reasons why communal farmers are not participating in the South African formal beef market is shown in Table 3.

Table 3: Reasons why communal farmers are not participating in the South African formal beef market

Sub-theme 1: Socio-behavioural factors	
Factors	Quotes
Exploitation by commercial markets	<i>“Communal farmers are currently price takers in the markets.”</i>
Lack of appreciation for communal cattle farming systems by government and markets through support, policies and regulations	<i>“The government is promoting first world standards in a third world country.”</i>
Underestimated by government and consumers	<i>“Organic beef is said to be unclean and uninspected.”</i> <i>“Local consumers board buses to buy beef from butcheries in town, leaving local markets.”</i>
Communal farmers feel powerless	<i>“We are perceived to be inferior, lazy and lacking skills, hence are excluded from policy development.”</i>
Sub-theme 2: Production factors	
Communal farmers value products from their indigenous cattle which are chemical free and distinguished	<i>“Our products are of high value; hence we deserve high returns from the markets.”</i>

The reasons why communal farmers are not participating in the South African formal beef market are summarised in two sub-themes; socio-behavioural factors and production factors. The results indicated that communal farmers feel isolated, inferior and expressed a lack of institutional support by other stakeholders in the South African beef industry and hence the decision not to participate in markets. These communal farmers are particularly aware that their products, derived from rearing indigenous cattle breeds under natural production systems, are of significant economic value.

4.4. Organic beef market participation pathway as perceived by smallholder farmers

A SWOT analysis was performed with the communal farmer respondents in which the following opportunities and challenges were identified in Table 4 below.

Table 4: SWOT analysis for organic beef production and marketing by communal farmer respondents

<p>Strengths</p> <ul style="list-style-type: none"> - Communal cattle farming systems adopts the organic livestock management practices because their cattle are still exposed to the natural setting to free range - Communal farmers are in possession of an average of 15 cattle which they could use for both socio-cultural and socio-economic purposes - Communal farming systems have a potential for the marketing of highly valued organic beef and distinguished hides 	<p>Opportunities</p> <ul style="list-style-type: none"> - Organic beef production could result in the establishment of product differentiation in the South African formal beef market - Organic beef production on communal farms, through improved extension systems could contribute to biodiversity and conservation
<p>Weaknesses</p> <ul style="list-style-type: none"> - Lack of access to formal markets (market unavailability) - Limited market information - Insufficient external support to meet organic beef marketing standards and certification 	<p>Threats</p> <ul style="list-style-type: none"> - Isolation and exclusion - Limited extension services - Limited skills in maintaining organic cattle management and practices - Lack of recognition of smallholder indigenous farming systems

The SWOT analysis revealed that communal farmers identified isolation, exclusion and the lack of extension services as threats hindering them from participating in the South African formal beef market. In line with Montshwe (2006) and Mapiye *et al.* (2009), communal farmers identified market unavailability and lack of market information as the main factors for the low off-take rates and subsequently, lack of participation in the South African formal beef market.

5. DISCUSSION

Importance of cattle

The results indicated that cattle farming is an integral part of the South African communal farmers' livelihoods. This support the finding by Bryceson (2000) who reported that farming pursuit is inherent in communal lands. However, the results show a status quo in favour of socio-cultural values, rather than economic. The results indicated that the primary reasons for keeping cattle are social (pride and dignity) and cultural values.

These results revealed that communal farmers are not willing to be treated as inferior by other formal beef stakeholders in the South African formal beef markets when they are in possession of valuable products in the form of organic beef. Communal farmers take pride in producing their own indigenous food using unconventional systems. These farmers regard the rearing of indigenous breeds using Indigenous Knowledge Systems (IKS) from production to slaughter in a manner that was used by their ancestors as important in conserving cultural values and IKS from generation to generation.

Food is of secondary importance to the communal farmers rearing cattle on communal lands. Significantly, cash is of secondary importance in cattle rearing by these communal farmers. This could be attributed to the fact that these farmers value their all-round and distinguished products; hence they are not willing to take low sale prices. As thus, they would rather derive satisfaction by keeping their most priced cattle, and only sell when there is an urgent and dire need.

Communal farmers use cattle for draught purposes in order to timeously grow crops and maintain the field crops thereby ensuring continuous food production. One of the FGD participants was quoted: “*cattle are a source of renewable energy for draught purposes and for fertilizing crops and vegetable.*” These farmers consider organic beef as a highly acceptable source of protein with a great potential for the sale of by-products such as the valuable hides from the indigenous Nguni breed which is commonly reared on communal farms. In support, Sibanda (2013) reported that the Nguni breed of cattle has signatory and distinguished hides of high economic value. Rearing indigenous cattle breeds on communal lands contributes to various domestic uses such as provision of flooring materials and for various medicinal purposes.

Differentiation between organic and conventional beef

Communal farmers value their production systems which they consider to yield matured meat that is chemical and additives free. Since organic beef production eliminates the use of chemicals, it is considered healthier than conventional beef. The participating communal farmers gave an example that manure from naturally reared cattle can be mixed with water and taken orally in order to heal stomach ailments. Communal farmers perceived organic beef to be superbly matured than its conventional counterpart: ‘*i-Ncasa*’ meaning that organic beef is tastier than conventional beef.

Reasons why communal farmers are not participating in the South African formal beef market

The findings revealed that socio-behavioural factors are the main reasons why communal farmers are not actively participating in the formal beef market. This results from communal farmers feeling exploited by commercial markets, with a limited voice because of low literacy levels and lack of market information. This is in line with Monshwe *et al.* (2006) who reported that one of the factors hindering the participation of communal farmers in the South African formal beef market is the lack of market information.

Communal farmers are price takers in the South African formal beef markets, even though their produce is of high value. According to Levin & Milgrom (2004), producers are motivated by profit which can be directly measured in order to actively participate in the market. This enables producers to derive utility, defined as experienced satisfaction, and may not directly refer to usefulness (Levin & Milgrom, 2004). The study confirmed that as long as communal farmers feel isolated, inferior and are price takers without market information, they would rather derive satisfaction by keeping their cattle and not participating in the South African formal beef market.

According to the communal farmers, the lack of trust in the communal farming system is evident when the consumers leave the local informal markets on communal farms to purchase cheaper beef from major retailers in surrounding towns. This indicates that consumers trust

the renowned formal markets to provide safe and quality meat. The communal farmers reported that some local consumers perceive “*organic beef as unclean and uninspected, and thus has germs.*”

In spite of the lack of external support, such as regular inspection, produce from communal farming systems are unique, hence should not be marketed similarly to conventional counterparts. The results indicated that despite the challenges on communal farming systems and lack of trust and support, communal farmers are willing to sell their products in a differentiated market which would take into consideration the product value and low-output nature of organic beef production systems. The absence of an organic beef niche market in South Africa, considering that communal farmers have been producing, for centuries, the valuable beef which could be regarded as organic, indicates that on their own, communal farmers have failed to promote their differentiated produce in the market. These results challenge the bottom-up management approach and infer that it is not relevant in South African communal cattle farming systems.

Likewise, the top-down management strategy has failed to develop the marketing of communal cattle produce; hence the focus group participants have cited the lack of external support as a weakness hindering the marketing of organic beef in South Africa. The conventional production methods which have been promoted during the Green Revolution have failed to increase off-take rates on communal farms. As a result, there is a need for civic engagement amongst all beef stakeholders in order to improve trust and confidence in the industry thereby facilitating the establishment of an organic beef niche market.

Civic engagement model

The model shown in Figure 1 indicates that communal farmers desire to be involved in matters affecting the South African beef industry in which they could actively participate in the production and marketing issues as partners. The concepts used to design the model were drawn from interpreting various statements from farmers who participated in the FGDs. The following model is proposed for consideration during the introduction of organic beef as an alternative in the South African formal beef market:

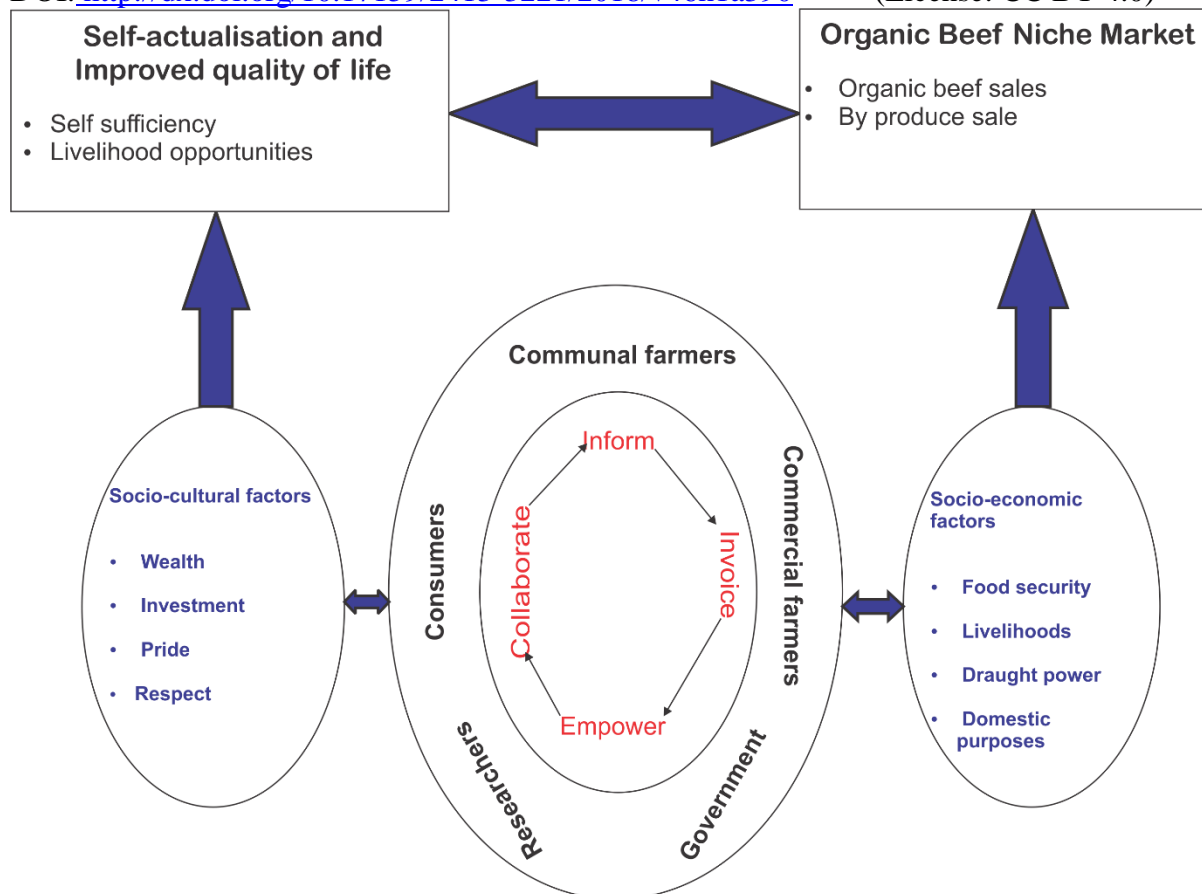


Figure 1: Civic engagement model

The model illustrates that cattle are an integral part of the South African communal farming systems in which they could play a significant role in sustaining livelihoods and in ensuring food security through the establishment of an organic beef niche market in which communal farmers could sell their highly valued organic beef at the right price. The model indicates that while communal farmers ranked food security as of secondary importance in communal cattle production, there is a potential for organic beef production since they are willing to sell their differentiated products to the right market and at the right price.

Communal farmers identified the need for product differentiation at the market place in order to enable them to sell their valuable products at a premium and allow consumers to differentiate between organic and conventional beef and ultimately, make informed choices. This is particularly important because organic beef production, despite being of low-output, produces valuable, wholesome products that should fetch high prices in the market place. In support, O’Donovan & McCarthy (2002) reported that organic products are sold with premium prices.

6. CONCLUSION

In line with the food sovereignty principle, communal farmers are willing to enhance cattle rearing for the provision of food and for sale. This could be achieved through the establishment of an organic beef niche market in which communal farmers could sell their differentiated organic beef as an alternative to conventional beef. It can be concluded that

there is a potential for communal farmers to participate in the South African formal beef market. Communal farmers were willing to participate in the South African formal beef market whereby trust and involvement of all stakeholders in the production and sharing of market information were identified as essential for maintaining transparency and inclusiveness of communal farmers in the development of an organic beef niche market in the South African formal beef market. Hence, there is a need for the rebuilding of trust between all stakeholders in the beef industry including communal and commercial beef farmers, consumers, government and the private sector through civic engagement amongst all stakeholders. This could contribute to the maintenance of the organic beef niche market in the South African formal meat market where the distinguished communal products such as organic beef could be sold.

The importance of civic engagement in this regard cannot be overemphasized since it is critical in sustaining the organic beef niche market in South Africa. This organic beef production could fetch premium prices which could contribute to the sustainable development of communal farms in South Africa. The maintenance of organic beef production could lead to sustainable development through the conservation of animal genetic resources.

7. RECOMMENDATIONS

From the conclusions, it can be recommended that extension could play a pivotal role in enabling civic engagement of all stakeholders in the beef industry. This study questions the authenticity of the Training and Visit extension model as the main mode to extension, especially in Southern Africa where the extension to farmer ratio is low. In particular, the extension to farmer ratio in the South African non-governmental sector is 1:1034, against 1:171 for government extensionists (Koch & Terblanché, 2013). Therefore, there is a need for more integrative approaches, such as the Farmer Field Schools and Group approaches including the Training of Trainees programmes which encourages active involvement from all stakeholders in order to reduce the pressure from extensionists which could be built from the civic engagement model proposed in this study. The civic engagement of all stakeholders in agricultural extension should take into consideration the socio-economic conditions of communal farmers in South Africa and strive for the delivery of scientific production methods in par with the farmers' good farming practices and contexts, culture and gender.

REFERENCES

- BIODYNAMIC & ORGANIC CERTIFICATION AUTHORITY (BDOCA). 2006. Organic Certification Standards. Biodynamics and Organic Certification. Biodynamic and Organic Certification Authority. Bryanston, Johannesburg, South Africa.
- BRAUN, V., & CLARKE, V. 2006. Using thematic analysis in psychology. *Qual. Res. Psychol.*, 3:77–101.
- BRYCESON. D. 2000. African rural labour, income diversification and livelihood approaches: a long-term development perspective. *Rev. Afr. Political Econ.*, 26(80):171–189.
- INTEGRATED SUSTAINABLE RURAL DEVELOPMENT STRATEGY (ISRDS). 2004. <http://www.info.gov.za/otherdocs/2000/isrds.pdf>.
- KOCH, B. H. & TERBLANCHÉ, S. E. 2013. An overview of agricultural extension in South Africa. *SASAE.*, 41(1).

- S. Afr. J. Agric. Ext.
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DOI: <http://dx.doi.org/10.17159/2413-3221/2018/v46n1a390>
- Kunene-Ngubane,
Chimonyo & Kolanisi
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- LEVIN, J. & MILGROM, D. 2004. Consumer theory. Downloaded from: web.stanford.edu/~jtlevin/Econ%20202/choice%20Theory.
- MAPIYE, C., STRYDOM, P. E., DZAMA, K. & CHIMONYO, M. 2009. Cattle Production on Communal Rangelands of South Africa and the Potential of Acacia Karoo in Improving Nguni Cattle Production. Fort Hare. University of Fort Hare Publishers.
- MONTSHWE, B. D. 2006. Factors affecting participation in mainstream cattle markets by small-scale cattle farmers in South Africa. MSc thesis submitted in partial fulfilment of Agricultural Economics. University of Free State, Bloemfontein.
- MUSEMWA, L., MUSHUNJE, A., CHIMONYO, M., FRASER, G., MAPIYE, C. & MUCHENJE, V. 2008. Nguni cattle marketing constraints and opportunities in the communal areas of South Africa: review. *Afr. J. Agric. Res.*, 3:239–245.
- MUSEMWA, L., MUSHUNJE, A., CHIMONYO, M. & MAPIYE, C. 2010. Low Cattle Market Off-Take Rates In Communal Production Systems of South Africa: Causes and Mitigation Strategies. *JSDA.*, 12(5):209-226.
- OBERHOLZER, L., DIMITRI, C. & GREENE, C. 2005. Price premiums hold on as US organic produce market expands. Economic Research Service Outlook Report No. VGS30801 (Washington DC: USDA).
- O'DONOVAN, P. & MCCARTHY, M. 2002. Irish Consumer Preference for Organic Meat. *British Food Journal.*, 104(3/4/5):353-370.
- OMITI, J. M., OTIENO, D. J., NYANAMBA, T. O. & MCCULLOUGH, E. 2009. Factors Influencing the Intensity of Market Participation by Smallholder Farmers: A Case Study of Rural and Peri-urban areas of Kenya. *AfJAR.*, 3(1):57-82
- SIBANDA, S. 2013. The Nguni Co Skin Has Got Special Qualities. Downloaded from www.chronicle.co.zw/nguni-cow-skin-has-special-qualities, in June 2013.
- SOFOS, J. N. 2008. Challenges to Meat Safety in the 21st Century. *Meat Sci. J.*, 78(1-2):3–13.
- TADA, O., MUCHENJE, V. & DZAMA, K. 2013. Effective Population Size and Inbreeding Rate of Indigenous Nguni Cattle under In Situ Conservation in the Low-Input Communal Production System. Short Communication. *S. Afr. J. Anim. Sci.*, 43(2):137-142.
- TER MORSA, E., TERWELA, B. W., DAAMENA, D. L., REINERB, D. M., SCHUMANN, D., ANGHELD, S., BOULOUTAE, I., CISMARUF, D. M., CONSTANTING, C., DE JAGER, C.H., DUDUD, A., ESKENH, A., FALUPG, O. C., FIRTHB, R. M., GEMENII, V., HENDRIKSJ, C., IVANF, L., KOUKOUZASI, N., MARKOSK, A., NÆSSL, R., PIETZNERH, K., SAMOILAG, I. R., SAVAD, C. S., STEPHENSONM, M. H., TOMESCUG, C. E., TORVATNN, H. Y. & TVEDTO, S. D. 2013. A comparison of techniques used to collect informed public opinions about CCS: Opinion quality after focus group discussions versus information-choice questionnaires. *Int. J. Greenhouse Gas Control.*, 18:256–263.
- WALAGA, C. 2002. Organic agriculture in the continents. In Yussefi, M. and Willer, H. (Eds). *The World of Organic Agriculture: Statistics and Future Prospects*, IFOAM. Tholey, Germany.