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Community based small scale commercial cattle breeding programme in Mangwe district of Zimbabwe

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ABSTRACT

The objective of the study was to assess the impact of the introduction of improved indigenous beef cattle bulls on productivity, herd population dynamics and socioeconomic factors in small scale commercial livestock production areas of Mangwe district in Zimbabwe. A semi-structured questionnaire was administered to all 20 participating farmers in the breeding scheme. The data collected included household demographics, herd structure, breeding practices, management, marketing, socio-economic impacts, challenges and impacts of withdrawal of funds on the breeding project by donors. Data analysis was perfomed using statistical package for social science (SSPS), version 16 for descriptive statistics. The herd sizes increased by 77%, 96%, 71%, and 60% for the White Brahman, Black Brahman, Tuli and Nguni, respectively. The highest number of offspring was sired by the White Brahman (4 per year per farmer).The Tuli and Nguni bulls contributed the least number of offspringof 2 per year per farmer. The mean age at first calving from the progeny of the White Brahman, Black Brahman, Tuli and Nguni were 36 ± 0 , 34,5 ± 2.12 , 33.75± 2.26, 35 ± 1.73 months, respectively. The main challenges affecting the programme were lack of adequate feed, uncontrolled mating and lack of

functional fences. The withdrawal of support funds on the breeding programme resulted in collapse of the restocking program and lack of improvement of water points. It was concluded that improved indigenous cattle genetic resources can survive, reproduce under low input communal systems. Therefore, community based breeding schemes are a viable and sustainable option in improving beef production in the country.

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1. Introduction

The livestock sector offers significant opportunities for economic growth and poverty reduction due to the predicted increase in livestock and livestock products consumption in most developing countries (Delgado et al., 1999; Jabbar, et al., 2010), , especially among the rural farmers. In Zimbabwe cattle play an important role in the livelihood of resource poor communal farmers mainly practicing crop-livestock integrated farming system (Chikura,1992). It has been estimated that 70% of the national herd and 95% of the indigenous cattle breeds are owned by smallholder farmers (Sibanda 1999). The communal cattle herd sizes are small and are estimated at less than 10 head per household (IFAD, 1996). The majority of the national cattle population (3.5 million) is found in the smallholder areas, however, off-take (currently 3-5 %) from this sector is low (Assan,2012) The reproduction rate of cattle under communal systems reported in the literature is particularly poor compared with reproduction percentages reported in commercial systems (De Leeuw and Thorpe, 1996). The major cause of concern is that the communal cattle herd has such a small contribution to the formal beef market despite harbouring the largest portion of the national herd. This has been exacerbated by the fast track land reform programme which resulted in the collapse of the stud cattle breeding industry that produced breeding animals and slaughter cattle to support commercial beef farming and reduction of farm sizes which supported large stud herds for breeding.The gap created by the repossession of beef production farms resulting in decrease in cattle sales from the commercial beef sector provides an opportunity for the communal farming sector beef herd to participate in mainstream cattle breeding programmes as a result increasing off take to the formal beef market. In the past the positive impact of cattle breeding and improvement has unfortunately been more limited to the commercial beef sector. As a result, the communal beef production sector which constitute the majority of the beef cattle population lagged behind in this regard.Therefore to address the emerging beef shortages posed by the decline in contribution from the commercial beef sector, there is need to promote small scale commercial beef production. Different strategies can be employed to improve beef production in small scale commercial areas in order to respond to the decline in beef production in the country. The elements that determine the success of community based cattle breeding programs and the prerequisites for ensuring this are discussed in the context of the bewildering diversity of cattle genetic resources, small scale low input system, multifunctionality of livestock and opportunities for responding to challenges to efficient productivity in small scale livestock production farming sector. The objective of the study was to assess the impact of introduction of improved indigenous beef cattle bulls on productivity, herd population dynamics and socioeconomic factors in communal areas of Mangwe district in Zimbabwe.

1.1. Statement of the problem

The contribution of the small scale commercial cattle herd to the formal meat market is insignificant despite harbouring the largest portion of the national herd.

1.2. Justification

The gap created by the repossession of beef commercial farms resulting in decrease in meat sales from the commercial beef sector provides an opportunity for the small scale commercial farming sector beef herd to

participate in mainstream cattle breeding programmes through increasing cattle offtake to the formal beef market. This is on the background that fast track land reform programme resulted in the collapse of the stud cattle breeding industry that produced breeding animals and slaughter cattle to support commercial beef farming and reduction of farm sizes which supported large stud herds for breeding.

1.3. Objective

The objective of the study was to assess the impact of introduction of improved indigenous beef cattle bulls on productivity, herd population dynamics and socioeconomic factors in small scale commercial areas of Mangwedistrict in Zimbabwe.

1.4. Research questions

1. Is small scale commercial based beef cattle breeding programmeseconomically viable and sustainable?
2. What socioeconomic and institutional challenges are faced to realize benefits in thesmall scale commercial breeding programmes?
3. What is the impact of the introduction of improved indigenous beef bull on productivity, herd dynamics and socioeconomic welfare of communal farmers?

2. Methodology

2.1. Study site

The study was carried out in Zimnyama small scale commercial farming area in Mangwe district of Zimbabwe. The area comprises of 43 farms within four villages of Makwela, Matole, Mpondo and Thomba. It has a carrying capacity of 990 livestock units which is equivalent to 1125 mature cattle. The area is transversed by the Mbakwe River and had the perennial Matole and Wasi dams. The area is situated in the agroecological natural region of V and IV in the semi arid areas of Zimbabwe. These regions are characterised by erratic rainfall of less than 650 mm/year. The summer temperatures are high reaching up to 40oC and experiences low winter temperature of 13oC.

2.2. Sampling

A total of 20 respondents who constitute all the participating farmers were interviewed. The population comprised of 12 farmers who were keeping the Tuli cattle breed, 4 farmers managing the Nguni cattle breed, 2 farmers for the Black Brahman and 2 farmers for White Brahman breed

2.3. Data collection and analysis

The primary data was collected from 21st of August 2013 tothe 28th of August 2013 using a semi structured questionnaire. The information capture included household demographics, livestock dynamics, breeding practices (breeding objectives; reasons for the choice of breed; number of working bulls; number of breeding females). Information on age at first calving, calving interval, preferential breeding traits and desirability of offspring was recorded. The farmers had to also give information on feeding strategies, disease management, marketing, socioeconomic impacts of the breeding scheme on household welfare. General comments on the breeding scheme include information of challenges faced on the breeding scheme, social issues associated with the breeding scheme, impact of withdrawal of funds on the breeding programme and also on the possible interventions of the farmer on how to best improve the breeding programme was recorded.Data was analysed using Statistical Package for Social Sciences(SPSS) version 16.0. Frequencies and cross tabulations were computed.

3. Results and discussion

3.1. Household demographics and educational level

Most households were male headed (80 %) while the remaining (20%) were female headed. The high number of male headed households is in agreement with what other studies have found in communal areas of Zimbabwe (Ndebele et al. 2007, Mashoko et al 2007, Musemwa, 2008). This has an implication for decision making where most of the cases decisions are made by men, despite women beign the custodian of most of the agricultural activities. The highest level of education obtained by majority of the farmers (70%) was primary school education, 20% attended secondary education (20%), while the farmers who did not attend formal education were (5%). This implies that formal education offers a platform for adoption of extension services. Education enhances the farmer's ability to obtain, analyse and interpret information (Nkhori 2004). Education of the household head has an influence on the likelihood of participation in cattle markets. This suggests the importance of education in increasing the ability of households to utilize market information and thereby utilizing market opportunities. Evidence presented in this paper raises several critical issues that need to be considered in addressing the challenges of community based cattle breeding programmes in Zimbabwe. Key public investments are required that may serve to increase participation in cattle markets include investments in rural education, and building institutional and infrastructural capacities that allow smallholder farmers to successfully compete and integrate within the formal beef industry. Provision of an enabling environment through public sector investment to allow smallholder cattle producers to increase production through improved efficiency and productivity is another area that needs attention. However, given the limited government resources as well as uneven distribution of cattle development interventions such as improved disease control or reproductive management, infrastructural development such as construction of abattoirs could be prioritized in these communities. There has been much government smallholder crop assisted input schemes without considering livestock production sector, a combined smallholder crop and livestock input scheme which include livestock veterinary inputs to allow livestock farmers to access subsidized medicines may improve livestock production. This is a good idea as long as the subsidy is linked to encouraging smallholder livestock farmers to think of livestock production as a business.

The age differences of participating farmers varied from 50 to 90 years of age. The majority of the farmers were within the age group of 50 to 59, with less of below 40 years of age. This shows that young participants were discriminated against in this project which might affect the continuity of the breeding project. The young and educated participants may be receptive to new technologies in animal breeding such as artificial insemination which might be used to improve productivity in cattle production.

3.2. Herd dynamics and productivity

The avarage herd sizes when the project started in 2009 were 6, 2, 8 10 for Black Brahman, White Brahman, Nguni and Tuli, respectively. The herd size avarages increasedin 2013 to 27, 49, 24 and 28 for the Black Brahman, White Brahman, Nguni and Tuli respectively. This translated to herd sizes increase of 77%, 96%, 71%, and 60% for theWhite Brahman, Black Brahman, Tuli and Nguni, respectively. This trend seems to confirm that community based cattle breeding can be a viable option to improve cattle production in small scale commercial areas. The mean average number of offspring from different bull types per farmer per year were recorded.TheWhite Brahman had the highest number of offspring of 4 per year per farmer, followed by the Black Brahman, which had an average of 3 offspring per year per farmer. The higher avaerage of young ones produced by the Brahman might have improved the farmers herd sizes. In communal areas herd size ranged between 3 and 30 beasts per household (Mutibvu et al., 2012) which was in agreement with Scoones and Wolmer (2000) who made similar observations for Chikombedzi in Zimbabwe. This mean deviates from the 3.6 observed for Masvingo and Sanyati (Ndlovu et al 2004), while Ndebele et al (2007) recorded a mean herd size of 10 for Gwayi, Zimbabwe. The Tuli and Ngunibulls contributed the least number of offsprings of 2 per year per farmer have could have not promoted large herd sizes in this breed.

The ways of ascertaining productivity of a bull include assessing calving rate and progeny testing (Cattle Producers Association 1998). The calving rate is an indicator ofbull fertility and the high performance of the White Brahman breed is in agreement with Tawonezvi et al (1988a; 1988b), who reported that the Brahman was highly productive compared to the Nguni and Tuli breed. The highest mean number of offspring's per farmer per year produced by the White Brahman bull could be attributed to the fact that farmers had enough cow to bull ratios, while the Tuli and Ngunifarmers did not have enough cows for mating. A group of farmers had to share a single

bull hence compromising its performance. It is suffice to suggest that the high performance of the Brahman bulls compared to the Tuli and Nguni bulls, may be a result of response to good management practises.

Cattle offtakein smallholder livestock sector is generally low (less than 7%) (Rukuni,1994). Farmers tend to target old (9-10 years) and unproductive animals for sale.The low offtakehas been attributed to cattle being kept for multiple purposes. Furthermore, farmers in smallholder farming sector have small herds of an average of 4-5 head per household. This makes it difficult to constantly sell animal to the formal meat market hence the low cattle offtake. It also has been reported that about 40% of households in the smallholder sector have no cattle and depend on cattle owners for draught power. These farmers may focus on purchasing and building herds leading to reduced offtake.

Brahman cattle were provided with supplementary feeding in the dry season (Figure 3), while in the Tuli and Nguni clusters relied solely on rangeland. Beef cattle are fed supplements because of seasonal changes in the feeding value of grazing: this involves the use of protein supplements during the dry season, phosphorus in the wet season and occasionally energy supplements in spring and early summer (Sibanda, 1998). The quantity and quality of herbage varies spatially and temporally (Weinman, 1948; Elliot and Folkertsen, 1961). Rainfall is a major determinant of grass production (Dye and Spear, 1982). There is a linear relation between grass production and annual rainfall in areas receiving less than 900 mm in semi arid areas, where the present study was carried out. It is difficult for producers to match animal numbers with available herbage. Farmers therefore use conservative stocking rates in order to prevent overgrazing. This strategy, however, results in under-utilisation of herbage in years of above-average rainfall. There is need for farmers to reinforce rangeland with legumes in order to improve the quality of grazing where several herbaceous and browse legumes are used. This is only possible where grazing is not communal and infrastructure in place. The mean age at first calving from the progeny of the white Brahman, Black Brahman, Tuli and Nguni were 36 ± 0 , 34,5 ± 2.12 , 33.75± 2.26, 35 ± 1.73 months, respectively. The differences in the working bulls, and bull to cow ratio may also affect conception in cattle herds. The lower age at first calving is in agreement with a report by Rewe et al (2004) inBoran Cattle in East Africa. He observed that unimproved Borancows had longer calving interval and calved down at a later stage compared to the improved Borancows. The lowest age at calving exhibited by the Tuli is in agreement with a report citing that Tuli was the most fertile breed reaching sexual maturity at an earlier age compared to the Nguni and the Brahman breed(Hamudikuwanda, 1999). The comparable high productivity of improved bulls could be attributed to the exploitation of heterosis which results in a mean increase in the mean performance of the offspring compared to the parent. Mhlanga (2000) reported that hybrid vigour alone increase reproductive efficiency maternal ability, gainability, longevity and hardiness under stress. However, genetic improvement is not a product of genes, nutrition is of vital importance in genetic improvement programmes as environmental effects on animal production are greater than genetic effects (Nowers et al., 2013). Genetic improvement can improve production only up to the limits imposed by management and nutrition. Therefore, the element of nutrition through supplementary feeding in the form of commercial feed, purchased hay and silage in Brahman production enabled the bulls to perform well in the project. Nqeno (2002) reported that poor nutrition resulted in longer calving intervals, longer anoestrus periods, poor conception rates and pregnancy rates. Supplementary feeding during the dry season reduced average age at first calving from 45.0 to 37.5 months in Nellore, Gir and Indu cattle in Brazil (Weitze, 1984). This implies that the time taken by an animal to attain puberty and sexual maturity depends on quantity and quality of feed available. Good nutrition playsa crucial role in cattle productivity.There is a consesus that numerous factors affect livestock production and productivity, however nutrition is of paramount importance. During the rainy season pastures are available in higher quantities and show good nutritional quality whereas dry season pastures have poor nutritional quality with high fiber and low protein contents (Butterworth 1984). Lack of feed supplementation during the dry season is frequent in traditional management systems. This situation leads loss of body condition at the onset of the dry season hence affecting the both the productive and reproductive performances. To minimize the effect of dry season nutritional deficiencies in smallholder livestock farming sector to maintain productivity, is essential to design appropriate community based cattle breeding programmes in Zimbabwe.

Progeny from black Brahman showed desirable traits of improved larger body size with a combination of high growth rate, drought tolerance(Figure 1).The White Brahman domminatedhigh growth rate. The Tuli also showed high growth rate, docility and disease tolerance. Other farmers reported good body size and confirmation while other farmers reported a combination of high growth rate and disease tolerant for the Tuli breed. On the Ngunibreed farmers reported that the desirable traits of the improved bull were that the offspring were drought

tolerant and had a good body condition and confirmation. The Tuli and Nguni breed farmers used natural pasture for feeding during the wet season (Figure 2). The Braham used natural pasture as well as crop residues and commercial feed for feeding their cattle during the wet season.All farmers provided supplementary feeding for their livestock during the dry season.

Dipping was done on a weekly basis at the dip tank during summer and fortnightly during winter. All the famers reported that they practiced vaccination. The majority of the farmers (60%) reported parasite control, while 40% of the farmers did not control parasites.Most of the respondents acknowledged that they were aware that diseases posed the worst threat to herd growth. This appears to be a common observation among communal livestock producers with findings by other researchers generally making similar revelations (Masimba et al., 2011), adding that disease challenges are a major constraint to the improvement of the livestock industry in the tropics (Devendra et al., 2000). This was attributed to the effect of diseases reducing production and increasing morbidity and mortality (Mwacharo and Drucker 2005).Diseases and parasites are among the most severe factors that impact livestockproduction and productivity. From the point of view of smallholder livestock producers, livestock diseases are essentially an economic problem. Diseases that reduce production, productivity, and profitability are associated with the cost of their treatment. Livestock diseases can cause direct losses (deaths, stunting, reduced fertility, and changes in herd structure) and indirect losses (additional costs for drugs and vaccines, added labor costs and profit losses due to denied access to better markets and use of suboptimal production technology) in revenue (Rushton 2009). However, indigenous cattle are less affected by disease and parasites challenges than imported ones.

The majority of farmers in the breeding scheme sold their cattle through informal markets (Figure 4).The Brahman farmers had the previlege of using the farm gate price and a combination of auction sales.The challenges associated with marketing of animals included lack of organized markets, low prices (45 %), high transport costs(5%), delayed payment by butcheries(5%) and shortage of buyers(Figure5). A few farmers cited language barrier as another challenge in marketing their animals.Majority of sales involved the black Brahman and Tulibreeds, and the least number of sales being recorded from the Nguni. Changes in income brought by the breeding programme to those who sold the offspringBrahman breed farmers observed that after the commencement of the breeding programme their income increased due to increasedprogeny sale. Half of the Black Brahman farmersacknowledged that their income had increased as a result of higher prices due to animalsgood body condition and increased offtake. The income from Tulifarmers did not change because of lack of organised markets.Improved road networks and marketing infrastructure such as holding facilities may encourage farmers' participation in livestock markets (Ouma, et al., 2003), though the effects in some country studies are not significant (Ehui, et al., 2003).

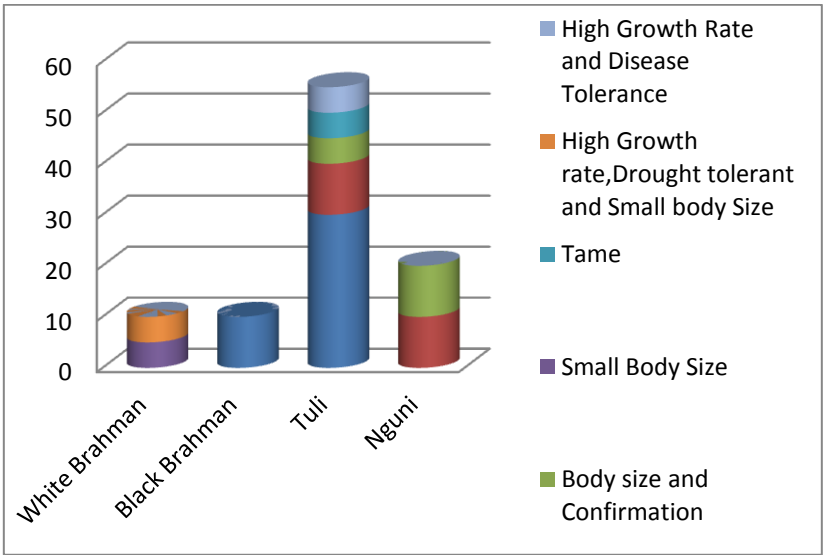

Fig. 1. Desirable traits of Improved bull Offspring.

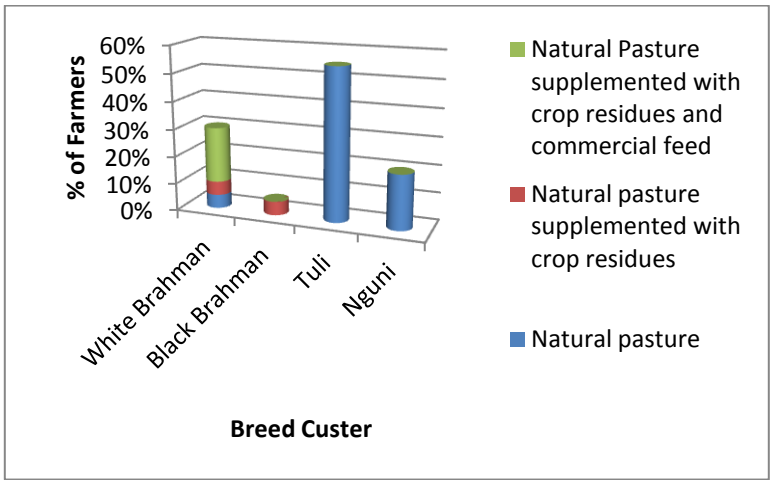

Fig. 2. Feeding Strategies during the Wet Season.

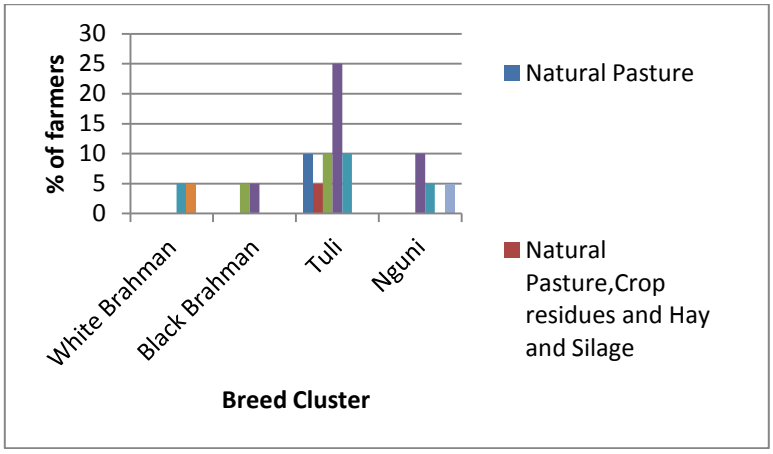

Fig. 3. Feeding Strategies during the Dry Season.

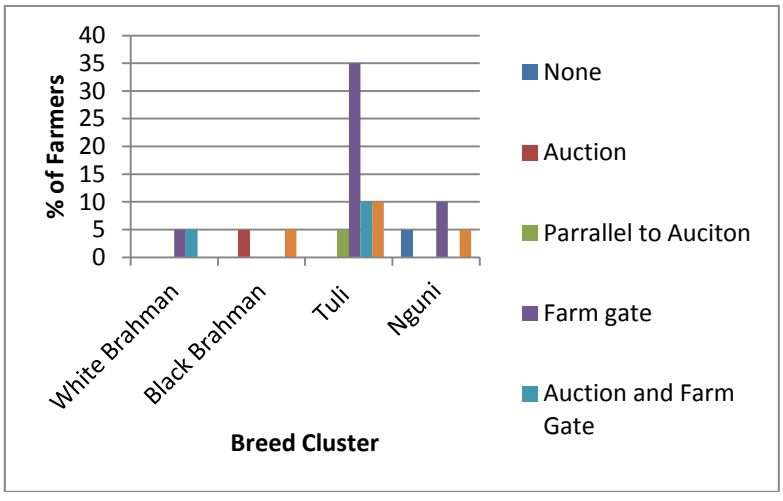

Fig. 4. Marketing Channels

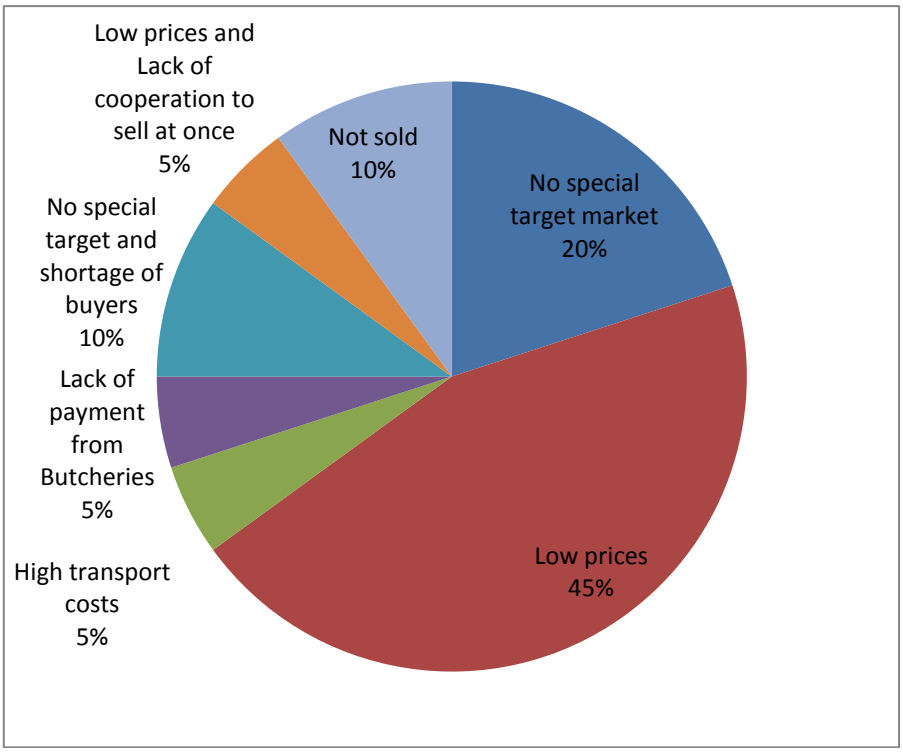

Fig. 5. Marketing Challenges.

Physical constraints on marketing include low population densities in rural areas (Nkonde 2008), remoteness of livestock producers from the main urban market centers, and poor road infrastructure that result in high transport costs (Gabre-Madhin 2009).Due to the restriction of cattle movements and lack of organised markets, farmers opt to sell to local butcheries and to fellow farmers in their communities at reduced prices.

3.3. Constraints and opportunities for improving cattle production

Majority of cattle farmers reported that lack of adequate water, lack of adequate feed, unwanted matings, lack of medicine, low bull to cow ratio, shortage of bulls, cattle getting stuck in the mud of the rivers during the dry season, small herd sizes and damage to infrastructure by elephants were the major challenges in the cattle breeding scheme (Figure 5 and Table 1). Peeling and Holden (2004) points to the failure of government services to provide veterinary health servicesin community based livestock breeding programmes. Poor housing, low soil fertility for forage production and weak market chains for livestock and livestock products have been cited as the major constraints for improving livestock production in rural communities. Livestock production in communal areas in sub-Saharan Africa is constrained by a variety of factors where feed shortages during the dry season constitute the greatest challenge in terms of quantity and quality. The main constraint to increasing livestock productivity and output is the lack of adequate supplies of good quality livestock feed in the dry season produced at a competitive cost and without jeopardizing household food security (Kassam et al., 2009). Together with high incidences of diseases and mortality rates, feed shortages lead to low livestock productivity. According to Masikati (2010), the major constraint for cattle production in the smallholder farming systems is the high animal mortality through diseases. In a study carried out by Amenu et al (2011), farmers indicated shortage of feed, shortage of water and livestock diseases as the top ranked constraints for livestock production in Lume district in Ethiopia. Elsewhere, in south-east Asia, the farmers in the studied sites rated the lack of feed and disease as the most important constraints to cattle production (Pen et al 2009). Farmers in this study were not always able to identify common disease problems affecting their livestock herds.Masikati (2010) reported that water constraints were

prevalent during the dry season, where animals had to walk distances of up to 14 km per day to access water. Water points are sometimes limited and large numbers of animals use the same points leading to high chances of spreading diseases and land degradation. The Brahman farmers cited uncontrolled mating and low bull to cow ratioand shortage of mating bulls as their problem. The farmers complained of intruders cutting fences, difference of superiority of breeds which influenced breed preferences and lack of appropriate policy on running the breeding project. There was gender inequality in participation in the cattle breeding scheme where men dominated in the project decision making process. The Brahman farmers apart from the cutting of fences also experienced killing of animals by snares and ward shifting.The cutting of fences was influenced by neighbouringcommunal farmers who wanted to use the bulls from the cattle breeding project and for grazing purposes. No proper pedigree records were kept by most farmers relying on traditional systems of genealogy memorization without appropriate animal identification. The withdrawal of funding had several implications for the running of the cattle breeding project which included the discontinued restocking programme and increased animal mortality due to lack of veterinary services. According to Mwacharo and Drucker (2005), diseases are a major constraint to the improvement of the livestock industry in the tropics as they decrease production and increase morbidity and mortality. It emerged from this study that the use of conventional drugs was sporadic as farmers lacked capacity to identify disease problems in their herds. In the commercialisation model during the foundation stage there existed high levels of mortalitycaused by poor husbandry practices (Khombe, 2007). Farmers failed to match improved cattle stock with improved management, farmers had not adjusted their management level. Ndebele et al (2007) revealed that calves were the most vulnerable group, especially during the dry season and beginning of the rainy season. In Namibia, a high incidence of mortalities was reported in communal livestock which was attributed to disease challenges (Petrus et al., 2011). When the funds were available for running the project farmers were trained to become paravets to perform practices such as vaccination, dosing and treatment of diseases. The development of watering points could not be done. The running of the project became difficult because of disagreement with the farmers themselves. However, in other segments of the project all operations remained normal. Practices such as dipping and vaccination are done by the government hence show very high adoption rates. Veterinary services were compromised due to financial constraints which lead to increased infestation of internal parasites led to poor condition of the cowsthus low conception rates. Ticks transmit diseases resulting in reduced reproductive performance and reduction in herd size due to mortalities. Those farmers who improved their management entered the growth stage where there was an exponential increase in productivity. However, it has been suggested that small scale famers cannot grow their herds beyond foundation stage and the growth stage i.e. breeding cows greater than 20 due to the low number of breeding females (Khombe et al .,2008). The low number of breeding females in relation to bulls, made it difficult to manage the bull or to keep the bulls confined. This resulted in considerable indiscriminate crossbreeding especially in dry season when there was inadequate water and feed supplies points.There was an increase of mating of related animals due to small herd size.

Sourcing of loans for farmers who had no cattle and creating partnership with value chain markets or setting up of organised markets was also necessary. Involving other stakeholders is very important for the diffusion of information and can add value to cattle research and development in small scale livestock production areas. This enhances well formulated cattle breeding projects with clear priority setting and participatory approach to ensure success and the realization of efficient cattle production. Small scale farmers must be included in the core team all the way from cattle breeding programme definition, formulation, implementation to the realization of impacts. Such an involvement is the essence of participatory effort in which livestock farmers will be the ultimate beneficiaries of the totality of livestock development efforts. For community based cattle breeding programmes growth to be pro-poor and succeed, it is suggested that the following attributes are important: A reproductive technology package that can be profitably adopted by small scale livestock farmers and an efficient input, credit, and product markets so that small scale livestock farms have access to needed modern livestock and receive similar prices for their products. There has been a tendency of previous policies to discriminate small scale livestock farmers this need to be addressed. Reviews of livestock policy have highlighted a reality that the impacts of many livestock policies either by-pass the poor or, not uncommonly, further constrain their ability to make a living (LID, 1999). Poor livestock-keepers are rarely engaged in policy formulation processes; and the apparent assumption that what is beneficial for wealthier, larger-scale livestock producers will also assist poor livestock-keepers, is now being questioned (McSherry and Brass, 2007). Massive investments and appropriate policy is required for community-based programmes to address and enhance the plight of small scale livestock farmers from the throes of the key descriptors of *deprivation, subsistence, illiteracy, survival*and*vulnerability*, whose lives

are a non-endingsyndrome of a*poverty* (Devendrá, 2011). The prices of heifers could be standardized so that they can be affordable to help build individual herds. Drilling of boreholes was also suggested in an attempt to capacitate farmers to run the programme on their own. However, the repairing of broken fences and provision of extension services to farmers on proper breeding practices had to be addressed. Government financial support and constant supply of animal feed at asubsided cost could promote production. The finances could also be channeled to demarcation of paddocks to keep the bulls inside the plots for easy bull management. Wollny (2003) found out that developing countries lack the adequate infrastructure required for functional breeding progrmmes. It was also impractical to practice controlled grazing or mating in areas without fences. The indigenous cattle population in the smallholder sector is a potential animal genetic resource which demands greatly for their improvement for increased productivity. The wide use of these animals can be expected to increase overall meat productivity and consequently national off take. The inability of governmental institutions to deliver effective support services to community based cattle breeding was identified as a factor limiting the development of such projects. However, piloted successful community based cattle breeding models, which enhance outreach capacity of livestock development projects through non-governmentalorganizations support based on participatory and self-help principles. This model when adopted can support the expansion of the community based cattle breeding sector and to strengthen local institutions. The community based cattle breeding programmes may take advantage of the rapidly growing population, and urbanization which has been associated with the social and economic changes. Partnering with other stakeholders in community based cattle breeding programmes will assist in addressing the technical, financial, infrastructural and managerial constraints which have been used as the major obstacles imperviousprogrammes on the continent. The current trends and drivers of change the ability to fulfil the demand for livestock products lies on the capacity by the community based cattle breeding programmes to increase efficiency and productivity. Addressing the infrastructural need to utilize the reproductive technologies such as artificial insemination will assist in promoting production. Artificial insemination offers the opportunity to obtain accurate estimates of breeding values of young bulls and results in a genetic progress that is much higher than natural mating.

4. Implications

The high reproductive performance of improved indigenous beef bulls has led to the subsequent increase in herd size of the cattle herds in communal areas.This implies that an opportunity exists for community based small scale cattle breeding programmes in Zimbabwe to contribute substantially to the formal meat market. It is however important to note that the small herd size limits the potential in which genetic improvement can be achieved through reduction in selection intensity and increased inbreeding. The communal areas can operate indigenous cattle breeding programmessuccessfully. However, sustainable community based genetic improvement programmesshould be supported with appropriately designed technical services.The issues on major challenges affecting the sustainability of the community breeding schemes such as inadequate infrastructure (fences), lack of adequate water and lack of adequate feed need to be addressed.Sustainable community based beef breeding schemes are hindered by lack of understanding of the basic principles of animal breeding. Knowledge on basic breeding objectives is crucial for the success of these projects, however challenges will be faced in an attempt to generate increased productivity while maintaining the adaptive traits of the local animal genetic resources which are important in the context of climate change and variability. It is also important to mention that when community based cattle breeding projects are introduced, it is paramount to setup organized marketing channels for participating farmers to maximize benefits. Breeding project are a long term issue hence there is need for proper planning to avoid unintended results such as inbreeding. Profitable cattle breeding projects incentivize farmers to participate in the programme. Organizing farmers in groups for the purpose of selling their product may be one of the strategies to reduce the transaction costs. It is recommended that quantification of the magnitude of environment x genotype which exists between cattle under extensive and intensive systems of cattle breeding.Government and Donors should put long term investments into developing the livestock sector especially in agroecologicalnatural region V and IV in Zimbabwe. Infrastructure development (paddocking) is a prerequisite in the cattle breeding programme. Chief community based cattle breeding strategies and opportunities are enormous, and include *inter alia* defining a policy framework, resolution of priority constraints using smallholder livestock systems perspectives and community-based participatory activities, application of yield-enhancing

technologies, intensification, scaling up, and impacts. The conclusion from a consideration of the interrelated facts on the present community based cattle breeding, is that community based cattle breeding programmes merit more investments and development attention in the future, particularly in the context of poverty alleviation, food security and environmental integrity. Community cattle breeding programmes can be one of the strategies to empower rural communities, however cattle marketing and infrastructural development issues need to be addressed. It is also a prerequisite that members of the same cattle breeding group embrace the same breeding objectives so as to ensure sustainability in community breeding schemes. Due to the fact that the majority of cattle lie in the communal sector there is need to improve production and off-take of the cattle in the small holder sector in order to improve the beef industry in Zimbabwe.

References

Assan, N., 2012. Genetic Improvement and Utilization of Indigenous Cattle Breeds for Beef Production in Zimbabwe: Past, Present and Future Prospects. A Review. Sci. J. Agric., 1(1), 1-7.

Butterworth, M.H., 1984. Beef cattle nutrition and tropical pastures. Longman, London (England).

Chikura, S., 1992. Improving the Management of Feed Resources for Draft Animals in Mangwende, Zimbabwe. In P. Starkey, E. Mwenya and J. Stares (editor). Proceedings of the First Workshop of the Animal Traction Network for Eastern and Southern Africa (ATNESA) held 18-23 January 1992, Lusaka, Zambia., pp. 162-163.

De Leeuw, P.N., Thorpe, W., 1996. Low-input cattle production systems in tropical Africa: an analysis of actual and potential cow-calf productivity. All Africa Conference on Animal Agric., 1-4 April. Pretoria.

Devendra, C. 2011. Integrated tree crops-ruminants systems in South East Asia: Advances in productivity enhancement and environmental sustainability. Asian-Aust. J. Anim. Sci. 24:587–602.

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.

Dye, P.J., Spear, P.T., 1982. The effect of bush clearing and rainfall variability on grass yield and composition in south-west Zimbabwe. Zimbabwe J. Agric. Res., 20, 103-117.

Ehui, S., Benin, S., Paulos, Z., 2003. Policy Options for Improving Market Participation and Sales of Smallholder Livestock Producers: A Case Study of Ethiopia. Paper Contributed to the 2nd Inter. Confer. Contemp. Dev. Issues. Addis Ababa, 11-13 July, 2003.

Elliot, R.C., Folkertsen, K., 1961. Seasonal changes in composition and yields of veld grass. Rhodesia Agric. J., 58, 186-187.

Gabre-Madhin, E.Z. 2009. A Market for All Farmers: Market Institutions and Smallholder Participation. http://escholarship.org/uc/item/3k49r747 (accessed December 12, 2009).

Hamudikuwanda, H., 1999. The influence of nutrition on fertility in dairy cattle. Harare. Zimbabwe Soc. Anim. Product. J., 25 (3), 20-27.

International Fund for Agricultural Development (IFAD)., 1996. Review of research findings applicable to the dry communal areas of Zimbabwe. Report No. 0657-ZI rev.1 of South Eastern Dry Areas Project and Smallholder Dry Areas Resource Management Project, Africa II Division. Programme Management Department. Rome.

Jahnke, H.E., Tacher, G., Keil, P., Rojat, D., 1988. Livestock production in tropical Africa, with special reference to the tsetse-affected zone. In Livestock production in tsetse-affected areas of Africa, pp. 3 - 21. Proceedings of a meeting of the African Trypanotolerant Livestock Network, Nairobi, 23 - 27 November 1987. Nairobi. Inter. Livest. Centre Africa Inter. Laboratory for Res. Anim. Dis.

Kassam, A., Kueneman, E., Kebe, B., Ouedraogo, S., Youdeowei, A., 2009. Enhancing Crop-Livestock Systems in Conservation Agriculture for Sustainable Production Intensification: A Farmer Discovery Process Going to Scale in Burkina Faso. Integrated Crop. Manag. Volume. 7.

Khombe C.T., Ndlovu, L.R., 2008. The Livestock Sector After the Fast Track Reforms in Zimbabwe, ISBN 987-0-7974-3698-5.

LID (Livestock in Development)., 1999. Livestock in Poverty-Focused Development, LID Crewkerne.

Masikati, P. 2010. Improving the water productivity of integrated crop-livestock systems in the semi-arid tropics of Zimbabwe: an ex-ante analysis using simulation modeling. Retrieved January., 17, 2012,

Masimba, E.S., Mbiriri, D.T., Kashangura, M.T., Mutibvu, T., 2011. Indigenous practices for the control and treatment of ailments in Zimbabwe's village poultry. Livest. Res. Rur. Dev., Volume. 23,

McSherry, B., Brass, J.N., 2007. The political economy of pro-poor livestock policy reform in Kenya, IGAD LPI Working Paper., No. 04-08.

Mutibvu, T., Maburutse, B.E., Mbiriri, D.T., Kashangura, M.T., 2012. Constraints and opportunities for increased livestock production in communal areas: A case study of Simbe, Zimbabwe. Livest. Res. Rur. Dev., 24 (9).

Mwacharo, J.M., Drucker, A.G., 2005. Production objectives and management strategies of livestock-keepers in Southeast Kenya: implications for a breeding programme. Trop. Anim. Health Product., 37(8), 635-52.

Ndebele, J.J., Muchenje, V., Mapiye, C., Chimonyo, M., Musemwa, L., Ndlovu, T., 2007. Cattle breeding management practices in the Gwayi smallholder farming area of South-Western Zimbabwe. Livest. Res. Rur. Dev., Volume 19,

Ndlovu, R.L., Bwakura, T., Topps, J.H., 2004. In: Starkey P and Fielding D (eds), Donkeys, people and development. A resource book of the Animal Traction Network for Eastern and Southern Africa (ATNESA). ACP-EU Techn. Centre Agric. Rur. Cooperat., (CTA), Wageningen, the Netherlands. 244p.

Nkhori, A.P., 2004. Impact of Transaction Cost on the Choice of Cattle Markets in Mahalapye District in Botswana. Master's thesis. Univ. Pretoria.

Nkonde, C., 2008. Determinants of Market Participation and Animal Health Management of Smallholder Livestock Producers in Zambia. Master's thesis, Purdue University.

Ouma, E.A., Obare, G.A., Staal, S.J., 2003. Cattle as Assets: Assessment of Non-Market Benefits of Cattle in Smallholder Kenyan Crop-Livestock Systems. Proc. 25th Inter. Conference of Agric. Econom., 16-22 August. Durban.

Peeling, D., Holden, S., 2004. The effectiveness of community-based animal health workers, for the poor, for communities and for public safety. Rev. Sci. Tech. Off. int. Epiz., 2004, 23 (1), 253-276.

Petrus, N.P., Mpofu, I., Schneider, M.B., Nepembe, M., 2011 The constraints and potentials of pig production among communal farmers in Etayi Constituency of Namibia. Livest. Res. Rur. Dev., Volume 23.

Rukuni, M., 1994. Report of the Commission of Inquiry into Appropriate Agricultural Land Tenure Systems. Volume II: Technical Reports. Government Printers, Harare.

Rushton, J., 2009. The economics of animal health and production. CAB International, Oxford.

Scoones, I., Wolmer, W., 2000. Pathways of Change: Crops, Livestock and Livelihoods in Africa, lessons from Ethiopia, Mali and Zimbabwe. Inst. Dev. Stud., University of Sussex. Retrieved March 29, 2012.

Sibanda, S., 1986. The use of crop residues in livestock production systems in the communal areas of Zimbabwe, pp. 140-144. In: Preston, T. R. and Nuwanyakp, M. Y. (editors). Towards optimal feeding of agricultural by-products to livestock in Africa. Proceedings of a workshop held at the University of Alexandria, Egypt. ILCA, Addis Ababa, Ethiopia

Sibanda, S., 1998. Supplementary feeding of beef cattle. In: Beef Production Manual, Commercial Farmers Union, Harare. 15 pages.

Weinman, H., 1948. Seasonal growth changes in chemical composition of herbage on Marondellas sand veld. Rhodesia Agric. J., 45, 119-131.

Wollny, C., 2003. Some aspects on current and future livestock breeding strategies in livestock in Southern Africa.