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Review

Potential for value-addition of Nguni cattle products in the communal areas of South Africa: a review

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This review focuses on challenges and possible interventions to improve the value of Nguni cattle products in the communal areas of South Africa. There is a general lack of adapted genetic material suited to the needs of the resource-poor cattle producers in South Africa. Nguni cattle are well suited to the management levels of communal farmers who require disease resistant multipurpose animals with low-maintenance feed requirements and relatively high-output. Developmental efforts to reintroduce the Nguni breed initiated in most rural areas of South Africa, especially in the Eastern Cape are reviewed. The possibility of selecting Nguni cattle for specific production traits and develop them into single-purpose herds is evaluated. It is recommended that development and research programmes aimed at reintroducing the Nguni breed in the rural areas should take a holistic and participatory approach in improving the value of Nguni cattle products.

Key words: Draught power, hides, meat, milk, Nguni cattle, value-addition.

INTRODUCTION

There is a general lack of adapted genetic material suited to the needs of the resource-poor cattle producers in South Africa (Scholt, 1988, 2000). A demand for an appropriate solution to address low livestock performance in the rural areas led to the introduction of unsuitable high-maintenance imported breeds into communal areas, but with little success (Bester et al., 2003). Both comercial and communal farmers have the wrong perception that indigenous cattle are inferior because of their small size (Bester et al., 2003). The negative perception towards indigenous breeds were particularly acute in the Eastern Cape and Northern Provinces. Imported breeds, however, lack adaptation traits necessary for survival and production in the rigorous environment of the communal farmer (Collins-Luswet, 2000). These traits include the susceptibility to tick-borne diseases and droughts (Scholtz, 2005).

Recent research shows that Nguni cattle perform well under harsh pedo-climatic and socio-economic conditions prevailing in the rural areas while the imported breeds perform poorly under such conditions (Scholtz, 1988; Osler et al., 1993; Collins-Luswet, 2000; Muchenje, 2007). The recent recognition of its adaptive traits has led to increased efforts to use the Nguni cattle in the comercial sector. In the communal sector, Nguni cattle have multiple functions which include provision of meat, milk, draught power, skins, dung and cash through sales. In addition, Nguni cattle are a source of investment, employment, insurance against disaster and also used for socio-cultural purposes (Schoeman, 1989; Shackleton et al., 1999). Currently, the indigenous cattle herd is a largely untapped resource and has the potential to increase local and export beef and hides supplies (NERPO, 2004). South Africa is a net importer of meat. It imports about 10 000-12 000 tonnes of beef annually, thus close to 10 - 12% of local production (NDA, 2005). This calls for the need to increase outputs and off-take (currently less than 5%) of the cattle products from the rural areas (NERPO, 2004).

Development efforts to reintroduce the Nguni breed have been initiated in most rural areas of South Africa, especially in the Eastern Cape. Despite these efforts there are little or no efforts to add value to the existing

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Nguni cattle products (draught power, milk, meat, hides and dung). This requires a holistic approach. Value-addition refers to the increment added in the process of producing a particular product, which also becomes part of its price (Ramsay et al., 2000). The value of local breeds becomes evident when all products are taken into consideration when developing the breed (Moyo, 1996; Anderson, 2003). This review focuses on challenges and possible interventions to improve the value of Nguni cattle products in the communal areas of South Africa.

Introduction of Nguni cattle in rural areas

Different institutions have been working on reintroducing Nguni cattle in the rural areas of South Africa. Efforts by the Department of Agriculture and the University of Fort Hare, in collaboration with non-governmental organizations, are under way to re-introduce Nguni cattle in the communal grazing areas of the Eastern Cape (EC). The schemes used include the "Bull" scheme and University of Fort Hare model.

"Bull" scheme

The objectives of the "Bull" scheme, implemented by the Department of Agriculture, are to establish and conserve Nguni cattle in communal areas, facilitate the establishment of effective community management institutions and develop livestock production, marketing skills and opportunities for Nguni cattle in rural areas (Bester et al., 2003).

This project initially introduced 35 Nguni bulls into five communities in the northern province and six in the EC. These communities had organized farmer groups that were willing to participate in a development scheme and contribute a minimal amount towards the maintenance of the bulls. A further supply of ten bulls per annum is in place. At the end of three years, the community will return the bull, which will then be placed in another community. Farmers are not encouraged to remove or castrate existing imported breeds in their communities (Bester et al., 2003), but merely to upgrade them to Nguni breeds.

University of Fort Hare model

The University of Fort Hare (UFH) model's long-term goal is to develop a niche market for Nguni meat and skins and to position the communal farmers for the global beef market through organic production and product processing (Raats et al., 2004). The UFH model was initiated about 15 years ago by University of Fort Hare in collaboration with rural development agencies in the Eastern Cape Province of South Africa. The project has benefited about 45 communities to date out of the target of 100 (Raats et al., 2004).

In the UFH model, farmers in selected communities are given two bulls and ten in-calf heifers to allow them to build up a nucleus herd (Fuller, 2006). In addition, the existing bulls are also replaced by registered Nguni bulls. After five years, the community gives back to the project two bulls and ten 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 practiceing rotational resting at specified stocking rates. This has been attempted unsuccessfully for many years, but Nguni project has achieved some success.

Unlike the "Bull" scheme, the UFH project encourages use of Nguni 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 UFH model provides a quick, viable and sustainable mechanism through the establishment of nucleus Nguni herds in the communal areas, which provides the bulk of the breeding bulls and cows needed by the farmers than the conventional "Bull" scheme.

The success of the UFH project depends on the provision of extension services and training in livestock management. This is essential to ensure that purebred Nguni animals retain their genetic value through correct administration of registered animals. Thus, the role of the UFH is to plan, coordinate and train livestock managers and extension officers. The UFH is also responsible for the development and testing of potential models for the efficient and sustainable utilizations of scares resources in the Eastern Cape (Raats et al., 2004). 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 implementtation of the model in communal areas is conducted in close collaboration with the Eastern Cape Department of Agriculture.

Recommendations to improve introduction of Nguni cattle in rural areas

Although the UFH, Department of Agriculture and rural development agencies in South Africa are reintroducing the indigenous Nguni cattle, there is still a need to develop sustainable models for boosting their produc-tivity. To improve productivity in a particular community, there is need to identify prevailing constraints and oppor-tunities, assess the performance of the animals and the value of their products under the existing production sys-tems (Ashley et al., 1999; Shackleton et al., 1999). Since the Nguni is a multi-purpose animal, these projects should take a holistic and participatory approach, and promote development of other products such as milk, draught power and manure. Neglecting other uses of cattle can

reduce household food security and exacer-bate poverty (Ashley et al., 1999; Anderson, 2003; Shac-kleton et al., 1999).

The Nguni cattle improvement programmes are recommended to supply a complete package of back up services such as genetic resources, performance record-ing schemes, genetic evaluation, rangeland management aids and appropriate infrastructural support to the benefiting communities. There is need for effective and continuous monitoring and evaluation of these projects, especially in the implementation phases to detect and rectify unfavourable developments on time.

Nguni cattle products and value-addition

Value-addition is the contribution to final product value by each stage in the production, delivery and marketing process (Anderson, 2003; Köhler-Rollefson, 1997). It also includes transformation processing of products from primary to final state offered to a consumer. Types of value-addition include: imparting desirable taste and improvement in hygienic quality, raising food safety by detoxification, use of additives and flavors, fortification with vitamin, fatty acids and amino acids, use of antioxidants, use of chemical preservatives, nutrient supplementation, reduction of anti-nutritional factors and protective packaging (Köhler-Rollefson, 1997; Ramsay et al., 2000). The long-term stability and survival of any breed of farm animal depends largely on its commercial added value and/or its ability to meet specific needs through sometimes unique traits (Ramsay et al., 2000). This applies particularly to many indigenous breeds, such as Nguni that are often perceived as having no real commercial value.

In recent years, organic farming is becoming an important form of value-addition in several countries worldwide including developing countries, such as South Africa, possibly due to increased demand for consumer's organic products (Anderson, 2003; Köhler-Rollefson, 1997). Concerns about risk of chemical drug residues, transfer of antibiotic resistance from animal to human through animal derived foods, animal welfare associated with conventional farming systems, environmental effects and improved food quality in rangeland based organic livestock farming have, perhaps, led consumers to organic food (Anderson, 2003; Paull, 2006).

The term “organic beef” is difficult to define. Organic beef is produced under legally defined standards which include high levels of welfare, no routine use of chemicals and antibiotics, no use of hormones and genetically modified organisms and no use of pesticides, growth regulators and artificial fertilizers on feed and pasture (Anderson, 2003; Paull, 2006; USDA, 2002). According to Africa's Farms Certified Organic (AFRISCO) (2001) and Acevedo et al. (2006), in cases where animals have been treated with chemically-synthesised medicinal products, antibiotics and prohibited feeds or pastures, they must undergo conversion periods. The conversion period for meat production bovines and their products is at least 9 months (AFRISCO, 2001). With their ability to be raised with little or no chemicals, antibiotics, hormones and inorganic feeds, the potential for organic meat production from Nguni cattle is high.

Meat

Nguni cattle breed was perceived to have little or no value as a source of beef due to its small size (Ramsay et al., 2000). It is therefore important to capitalise on any traits that makes Nguni breed an economically viable alternative to exotic breeds and crossbreds. Nguni cattle developed excellent resistance to ticks and immunity to tick borne diseases (Spickett et al., 1989; Scholtz, 2005; Muchenje 2007). Ndlovu (2007) compared breeds and Nguni had lowest nematode faecal egg counts than Bonsmara and Angus. Thus, Nguni cattle are capable of producing organic beef with little or no use of chemicals (no dipping, no dosing) and stock remedies (largely antibiotics). Organic beef costs US$ 8 -12/kg retail, compared with at least half that amount for conventional ground (natural) beef (ECDC, 2003). Therefore, there is need to create niche markets for this economically and organically produced beef. The revenue generated should be directly channeled back to local Nguni farming communities through input subsides or infrastructural and institutional development. Research on indigenous technical knowledge and ethno-veterinary medicine is required to complement resistance in controlling parasites and diseases in Nguni cattle.

The Nguni cattle have ability to maintain their condition in winter (Osler et al., 1993; Collins-Luswet, 2000; Muchenje, et al., 2007b). It has been noted that the ability to maintain body condition may be a result of adaptation to one or more stress factors; hence validation research is warranted. Nguni cattle have inherent capacity to produce beef of comparably high yield under both feedlot (Swanepoel, 1989; Scholtz et al., 2000; Strydom et al., 2000; 2001) and natural pasture conditions (Muchenje, 2007; Muchenje et al., 2007b) (Table 1). This hardy animal makes an excellent choice in drought prone environments, but excels even more with rangeland improvement and supplementation. Information on communal rangeland management and reinforcement with improved forages and supplementation with locally available organic feed resources is required to design appropriate feeding strategies for economic organic beef production. Breed selection and nutritional management appropriate to a particular environment are the essential keys to improve animal welfare, health and organic beef farming (Anderson, 2003; Köhler-Rollefson, 1997).

Red meat from rangeland-finished cattle are not only an excellent source of protein, energy and minerals, but also have essential fatty acids (e.g. conjugated linoleic acids and omega-3 fatty acids) and vitamins (β-carotene

Table 1. Carcass and meat quality attributes of Nguni cattle reared under feedlot and natural pasture conditions.

Attributes	Feedlot	Natural pasture
Carcass		
Average daily gain (g/day)	800-1200	180-230
Slaughter weight (kg)	240-320	200-240
Warm carcass weight (kg)	160-180	110-120
Dressing percentage	56-58	50-55
Meat quality		
Marbling (%)	05.5-0.75	1.12-1.15
Cholestorel (mg/100g)	-	41-42
Protein (%)	-	21-22
pH	5.5-6.8	5.5-6.7
Colour (L)	-	29-45
WBSF2 (N)	-	11-100
Drip loss	-	1.5-3.5
Water holding capacity	-	0.2-0.5
Sarcomere length (μm)	1.84-1.90	1.0-2.0
Cooking loss 2 (%)	-	15-54
Sources	Swanepoel, 1989; Scholtz et al., 2000; Strydom et al ., 2000; 2001	Muchenje 2007; Muchenje et al ., 2007b

and α-tocopherol) that have benefits (reduce risk of heart disease, diabetes and cancer) in human health (Daley et al., 2005; Descalzo et al., 2005; Baublits et al., 2006; Muchenje, 2007). As the quantity of grass in the diet increases, there is a decrease in saturated fatty acid concentration, an increase in the concentration of omega-3 polyunsaturated fatty acids, desirable omega-3: omega-6 fatty acids ratio and conjugated linoleic acid as well as β-carotene and α-tocopherol vitamins (Daley et al., 2005). This indicates that Nguni cattle, due to their rangeland-based production systems, have a natural advantage in producing lean beef with low saturated fatty acids, and vitamins that are more beneficial to human health than beef produced from concentrate-based systems. It is, therefore, of paramount importance to ascertain the concentration of cholesterol, omega-3 polyunsaturated fatty acids, omega-3: omega-6 ratio and conjugated linoleic acids as well as β-carotene and α-tocopherol vitamins acid in Nguni cattle meat.

In the short-term, value can be added to the fresh Nguni beef by traditional methods of preservation for local markets. These methods include salting, drying and smoking or combinations of these processes. Simple drying is suitable for small-scale production and avoids the high capital, operating and maintenance costs of sophisticated equipment (Wilson et al., 2005). For slightly larger beef quantities, simple solar driers can be constructed and used. Flavour can be added to dry meat as required by the use of salt and various spices. Curing by the use of salt is another traditional way of preserving meat and adding to its value. Concentrations of greater than 4% of salt (sodium chloride) in curing inhibit the growth of spoilage organisms (Wilson et al., 2005). Smoking is less satisfactory as a preservative method as light smoking delays the onset of spoilage by a relatively short period. Heavy smoking is more satisfactory from the preservation point of view but can have severely negative effects on the flavour of the final product. Smoking therefore is often regarded as an emergency measure, with other traditional methods of preservation generally being preferred (Wilson et al., 2005).

In the medium-term, modern methods of meat preservation such as refrigeration for chilling and freezing and canning can be implemented. These modern methods require appropriate infrastructural (abattoirs, housed meat processing equipment, electricity, additives, packaging material, refrigeration facilities and financial and input supply schemes) and institutional support (training, research and extension). Given the above mentioned support Nguni cattle producers are capable of producing value-added beef products such as minced meat, polony, biltong, sausages (hot-dogs), meat balls, meat pies, nuggets, pasta, beef soup, deboned meat and glue for commercial retail markets. Further value can be added by using offals, such as intestines in sausage skins and pancreas, gall bladder and liver in cosmetics or as medical products.This assists farmers to diversify, spread beef marketing risks and promote utilization of some marginal form resources in the rural areas like offals, horns and hooves. Marketing of weaners, yearlings (stockers) and breeding stock are important value-additions. Calves can be slaughtered and sold as veal. Development of niche-

marketing cooperatives and producing contracts can result in payment of premium prices (as much as 30%) for these products.

The value of Nguni cattle products in the medium to long-term can be improved by development of Artificial Insemination (AI) services, particularly in the context of Open Nucleus Breeding Systems (OBNS), integrated with the use of Multiple Ovulation and Embryo Transfer (MOET) and Sexed Semen (SS). Successful implementtation of these technologies by farmers requires laboratories, equipment (castrator, AI Kit, cryocans, refrigerators, hormones, catheters, liquid nitrogen and flow cytometer) and training. Semen from bulls and cryo-preserved ova from cows can be sold locally and exported to countries with similar pedo-climatic conditions for beef production.

Hides

African hides and skins are considered by the trade to be of low quality with many inherent defects such as small size and thin substance, poor grain pattern, plus many pre-mortem defects such as tick bites, those caused by disease (e.g. lumpy skin disease), scratches, inappropriately placed brand marks and horn rakes; and post-mortem effects such as flay cuts, bad trimming, irregular shapes and the effects of putrefaction (Köhler-Rollefson, 1997; Fuller, 2006). The handling, preservation and storage practices and facilities for raw skins and hides in communal areas are inadequate and primitive. Other constraints arise from insufficient collection and preparation for further processing and export, low prices, limited information on differential prices with respect to quality and unfavourable marketing structures (Bester et al., 2003).

A number of leather processing industries have been set up throughout the Eastern Cape and these are currently experiencing shortage of high quality hides (ECDC, 2003). The South Africa Antique Dealers Association (SAADA) (2005) highlighted that the furniture and fashion industries are interested in the aesthetic beauty and quality of the Nguni hides. There is high demand for quality automotive leather in Europe for example Daimler Chrysler in collaboration with Mercedes vehicles in Germany have shown commitment to import over 40 000 Nguni hides annually for car upholstery (ECDC, 2003).

Tick resistance, high quality and colouring characteristics of Nguni skins/hides offer great potential for value addition. Nguni cattle produce high quality thin hides that are pliable, resistant to ticks and have very high amount of hair threads per square centimeter (Bester et al., 2003). A premium is paid for hides with minimal tick damage as these are used for car upholstery. Contracts should be forged with international companies involved in furniture and car upholstery, this can boost national foreign currency reserves and benefit the producing communities. For instance, South Africa has a lucrative contract with a German car manufacturer based largely on hide quality. Nguni cattle hides are currently being sold for between US$200 and US$300 (ECDC, 2003). The effect of tick damage on hide price deserves investigation. Research on the quality of Nguni cattle hides and leather in comparison with other breeds under different utilization systems is essential.

The Nguni are unicoloured or multicoloured (white, black, brown, grey, red, cream and dun). There are about 80 different colour patterns that are uniform, spotted or pied (Bester et al., 2003). These colouring characteristics of Nguni hides offer wide scope for a range of products; from hair, intact hides for floor and wall covering to wallets, handbags, sport bags, footwear, briefcases and fashion garments (jackets) (Köhler-Rollefson, 1997; SAADA, 2005). A holistic marketing strategy is urgently required to market Nguni hides and other products such as meat locally and internationally. The marketing strategy should be tailor-made to fully exploit the favourable marketing opportunity presented by the World Cup scheduled for South Africa in 2010.

Another added advantage of the variety of colour patterns is ecotourism. The Tswaiing project near Onderstepoort has Nguni herd as part of the tourist attraction. Mkhaya in Swaziland is another example of where the Nguni has added value to an ecotourism venture; thereby adding value to the Nguni as well as a potential tourist attraction (Ramsay et al., 2000). This aspect could be put to good use in rural areas with ecotourism potential and can be linked to the local processing and sale of beef, hides and leather products. The potential of ecotourism in communal areas deserve urgent assessment. This would be an added incentive for stockowners in these areas to retain pure Nguni breed.

The Nguni cattle hide also holds a significant place in indigenous culture as a symbol of power and belonging for instance each year, the king from each tribe selects a hide pattern and wears it as his royal robe for the year (ECDC, 2003). Priority intervention should be given to research, extension and training of communal farmers on flaying, handling, preservation, storage, processing and value addition of s kins and hides for domestic and export niche markets.

Milk

Low milk production and high mortality of recognized dairy breeds is a result of lack of adaptation to harsh environments, ticks and tick-borne diseases and low plane of nutrition prevalent in most communal areas of South Africa. On the other hand, in addition to milk required to rear her calf a 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). Lactation period for Nguni cows vary from 120 - 200 days (Moyo, 1996) compared to 250 - 305 days for the recognized dairy breeds. Thus, there is a need to develop a moderate yielding dairy animal that is

adapted to the harsh local environment.

Firstly, there is need to assess the potential performance of Nguni cattle and select for specific milk production traits, such as milk yield, and develop the selected animals into a single-purpose (milk) herd. Record keeping and performance recording by communal farmers are important elements in selecting moderate yielding Nguni dairy cows. Research on yield, composition, eating quality and value addition of milk from Nguni cattle is warranted. The effect of supplementation, milking frequency and restricted suckling on milk production should be investigated.

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.

Crossbreeding with other breeds can be recommended when resources and market demands allow the potential of such stock to be exploited (Cunningham and Syrstad, 1987; Moyo, 1996; Muchenje et al., 2007a). Research on appropriate breeds, levels of upgrading and breeding methods to use for crossbreeding is warranted. Any change in the direction towards crossbreeding from an ongoing pure-breeding strategy requires information on performance, reproduction and health, including adaptive traits (Cunningham and Syrstad, 1987). Performance evaluation of breeds must occur within the local production environment to ensure that the crossbred animals are suited to local conditions, both in terms of meeting their input requirements and their ability to perform in the stressful local environment (Cunningham and Syrstad, 1987; Muchenje et al., 2007 a).

Draught power provision

About 40 - 80% of communal farmers in more remote rural areas of South Africa use draught power for land preparation and/or transport (Starkey et al., 1995).These communal farmers have major problems in preparing fields and transporting their farm produce to the markets, especially in the late dry season (Prasad and Mandebvu, 1990; Chimonyo et al., 1999). There is a general perception among communal farmers and extension workers that the use of animal draught is primitive, thus tractors are seen as the better option and are promoted (O'Neill, 1999). However, tractors are unreliable, expensive and unsuitable in bushy and hilly small pieces of land prevalent in most communal areas of South Africa. Continuous increase in human populations and pressure on cultivable land calls for the need to considerably improve the existing levels of efficiency, use of animal power and crop yields in-order to achieve true sustainability (Starkey et al., 1995; Shackleton et al., 1999). Thus, there is need to provide communal farmers with virtual animal power for cultivation and transport through the use of locally adapted animals.

Resistance to nematodes, ticks and tick borne diseases, maintenance of good condition in winter, good temperament and good walking ability (Scholtz, 2005; Spickett et al., 1989; Muchenje, 2007; Ndlovu, 2007) makes Nguni cattle an ideal breed for draught power. There is need for training to improve Nguni cattle condition prior to the planting season when most of the work power is needed. A training period of 8 - 15 days improves the contents of Na^+, K^+-pumps and so the possible work output of draught cattle (Chimonyo et al., 2000; Veeneklaas et al., 2004). Training resource limited farmers in the use of draught animals' power is essential. Ways and means of increasing the exploitation of Nguni cattle as draught animals are important. There is need to use performance tested Nguni cattle bred specifically for traction rather than for commercial meat production, this can provide oxen capable of cultivating large areas of land per day. Since the use of indigenous cows for draught purposes adversely affects growth, fertility and milk yield (Chimonyo et al., 2000; Veeneklaas et al., 2004), research is required to determine the effect of supplementation on fertility, milk yield and draught power of Nguni cows. Improved implements, harnessing and basic knowledge of animal health and production will further optimize performance.

The use of Nguni cattle as draught animals in farming involves an integration of crop and livestock production, with widespread benefits being realized through the use of organic manure, which is a step towards organic farming and an improvement in animal husbandry (Starkey et al., 1995; Wilson et al., 2003). These benefits can be translated into increases in land area cultivated, greater crop yields per unit area, increases in milk yield and a rise in living standards for the rural population (Starkey et al., 1995).

Dung

Dung is a major by-product of the livestock industry. In communal areas, fresh dung is used as floor polish and for decorating walls whilst the dry form is used as fuel where wood or charcoal for heating and cooking is scarce (Shackleton et al., 1999; Wilson et al., 2005). More importantly, it is used as a fertiliser and for improving the texture and water absorbing capacity of soil. As an example of the value of manure, it has been calculated that manure is worth 12% of the value of livestock output in Zimbabwe communal production systems (Wilson et al., 2003). Value can be added to manure through more rational use and better storage (Wilson et al., 2005). Research on Nguni cattle dung (yield/animal/year, methods and duration of composting, chemical composition, application rates and its agronomical effects) is important for sustainable livestock organic farming. There is need to investigate its potential as a source of energy and feed

for fish in rural areas.

CONCLUSION

The profile of the Nguni shows that it developed under a process of natural selection in a highly challenging environment and that it has the genetic potential to perform better under harsh production environments existing in the communal areas. Development and research programmmes aimed at reintroducing the Nguni breed in the rural areas should take a holistic and participatory approach in agro-processing and value-addition of Nguni cattle products. Increased value-addition can be achieved by provision of appropriate incentives for the establishment of agro-processing industries in the rural areas and promotion of partnerships between communal farmers and agribusiness. Provision of framework for research, training and capacity building for farmers and farmer organizations on aspects of cattle production and management, record keeping, marketing, agro-process-ing, value-addition and entrepreneurship is important. This empower farmers to make informed decisions, increase chances of adoption of Nguni cattle production technologies in rural areas and ensure their viability and sustainability.

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