

**Utilization of Indigenous and Adapted Cattle by Small-holder Producers in South Africa:
A Socio Economic Perspective**

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ABSTRACT: The objective of this study was to evaluate the practices of small-holder cattle breeders in South Africa and investigate differences among the breeds kept by these producers. Cattle of non-descript genetic provenance had significantly lower calving rates and greater mortality than other breeds ($P<0.05$). Although not different from the Bonsmara, exotic breed types had significantly lower pre-wean mortality rates than the rest of the breeds ($P<0.05$). Women owned exotic as well as non-descript breeds ($P<0.05$). Men own larger herds of cattle, are highly dependent on income from other livestock, and affiliate and hold office in community associations ($P<0.05$). Ownership of indigenous breeds correlated with experience, number of persons attending school, dependence on livestock income, as well as affiliation and office bearing in community associations ($P<0.05$). Results suggest that there is acumen for rearing indigenous cattle and that the demographic attributes should be considered in design of in situ conservation programs.

Key words: small-holder producers; demographic attributes; cattle breeds

Introduction

Despite their adaptability to local conditions, indigenous cattle are largely discriminated against by mainstream feedlot requirements for large-framed animals. This makes the introduction of exotic genotypes an inevitable practice if small-holder producers, who remain the custodians of indigenous genotypes, are to become competitive in the cattle industry. In an effort to meet requirements, the proportion of non-descript and exotic breed types among small-holder herds is growing at the expense of indigenous breeds (Scholtz et al. (2008)). Because small-holder producers own 40% of the national herd (RMRDT (2008)), improved use of indigenous cattle can make a significant impact on the South African economy.

The question whether the efficiency of small-holder producers differs between low input production systems of indigenous cattle and the relatively intensive systems of exotic breeds is yet to be addressed. However, previous efficiency studies showed that demographic characteristics such as age (Tchale (2009)) and education level of household heads (Idiong (2007); Tchale (2009)) do affect farmers' efficiency. With regard to market participation, alternative income as well as food aid also influences off-

take rates among livestock producers (Colvin, (1985); Baldwin et al. (2008); McPeack (2004)). Further insight into these dynamics will enable the development of appropriate interventions for improving productivity of small-holder cattle producers with a view to improving conservation and utilization of indigenous genotypes. The objective of this paper is to determine if the efficiency of South African small-holder cattle producers in managing indigenous as well as exotic cattle breeds differs. The second objective was to establish the relationship between efficiency levels and socio-economic characteristics of producers

Materials and Methods

Study area. This study was conducted in the Dr Ruth Segomotsi Mompoti District Municipality of the North West Province, South Africa. This municipality has the highest concentration of cattle in the country, as well as a wide spectrum of locally-adapted breeds. A questionnaire aimed at capturing cross-sectional data on factors affecting cattle off-take for 2011 breeding season was developed and administered through face-to-face interviews with a sample of 305 randomly selected respondents. In this paper we focus on variables such as cattle breed types as well as those depicting efficiency such as herd size, calving rates, mortality and herd off-take. Demographic variables were also measured to determine household profiles.

Table 1. Distribution of breed types by herd performance (N=305).

Parameter	Breed type				SE
	Afri-kaaner & Nguni	Bonsmara	Exotic Breeds	Non-descript	
Proportion	16.40	9.20	41.30	33.10	...
Average herd size	31.60 ^a	67.04 ^c	43.31 ^b	21.51 ^a	1.94
Calving rate	60.67 ^a	60.96 ^a	57.22 ^a	48.55 ^b	1.64
Prewean mortality	5.00 ^a	3.57 ^{ab}	3.25 ^b	4.79 ^a	0.26
Wean mortality	4.01	2.43	3.69	4.27	0.26
Adult mortality	4.93 ^a	4.70 ^a	4.83 ^a	7.49 ^b	0.32
Herd mortality	7.28 ^a	7.20 ^a	7.26 ^a	10.25 ^b	0.37

Values on same row with different superscript are significantly different ($P<0.05$)

Table 2. The relationship between herd performance and demographic characteristics of producers

	Gender	Education	Income	Years	Breed	Herd size	Wean age	Calving rate	Affiliation
Education	-.092								
Income	-.192**	.124							
Years	-.085	.133*	-.007						
Breed	.159**	-.124*	-.234**	-.153**					
Herd size	-.189**	.113	.070	.155**	-.138*				
Wean age	.033	-.027	-.150*	-.129	.162*	-.100			
Calving rate	-.110	-.048	-.020	.086	-.124*	.002	-.023		
Affiliation	-.181*	.209*	.552**	.115	-.266**	.291**	-.296**	-.043	
Office	-.247**	.078	.497**	.142	-.233**	.378**	-.390**	-.074	.909**

** . Correlation is significant at the 0.01 level (2-tailed).

* . Correlation is significant at the 0.05 level (2-tailed).

Data. Interviews were conducted between May and December 2012. Data were analyzed using IBM SPSS statistics 21. Breed types were initially coded into 20 different nominal classes describing utilization as either purebred or crosses. These data were then transformed into four categories of animals of local provenance i.e., Afrikaaner, Nguni, Bonsmara, and Non-descript, as well as exotic breed types. Non-descript breed types are crosses of an unknown mix of breeds. These categories were used as treatments to enable the analysis of variance. The second transformation was done to create dummy variable distinguishing indigenous breed types from exotic types, crosses and non-descript types

Statistical analyses. Descriptive statistics were computed using frequencies and means to determine patterns between variables. A completely randomized design was used to measure performance variables with differences among means detected using least significant differences (LSD) tests. The Pearson correlation test was used to determine the relationship between demographic attributes of producers and cattle management.

Results and Discussion

Herd performance. Table 1 shows that the exotic breed types constitute the majority (41%) of herds in the study area while the large-framed South African composite breed has the smallest proportion of herds (9%). However, the latter had the largest average herd size (67). The less-common ownership of indigenous breed types of Afrikaner and Nguni (16%) relative to non-descript breeds (33%) is also evident. There seems to be acumen for rearing both indigenous as well as exotic breed types but not for non-descript breeds, which showed significantly poorer calving and mortality rates ($P < 0.05$). Although not different from the Bonsmara, exotic breed types had significantly lower pre wean mortality rates than the rest of the breeds ($P < 0.05$). Previous studies have illustrated that the adoption

of animal health practices could improve efficiency of herds (Muma et al. (2009); Hüttner et al. (2001)). Although we did not observe significant differences in the adoption of practices such as vaccination among herds, owners of both indigenous as well as exotic breed types spent significantly greater amounts of money on cattle ($P < 0.05$) than those of non-descript types. It may be inferred that higher spending on herds led to reduced mortality. This study did not detect any difference in cattle off-take among breeds.

Socio-economic analysis of breed utilization.

Descriptive statistics show that the majority (77%) of respondents were male of ages ranging between 24 and 86 with an average of 56 years. Table 2 shows the correlation between the demographic characteristics of respondents with breed utilization patterns. Male-headed households own larger herds of cattle and are more dependent on income from other livestock ($P < 0.05$) than are households headed by women. Male household heads also tend to be more commonly affiliated with community associations where they hold office ($P < 0.05$). On the other hand, female producers are more inclined to rear exotic and non-descript breed types ($P < 0.05$). The inclination of small-holder producers to select animals for market requirements has been reported in some parts of Africa (Ndumu et al. (2008)). Indigenous cattle tend to be the preference of producers with greater experience in cattle rearing, households with large numbers of persons attending school, households dependent on livestock income, as well as of producers belonging to and holding office in community associations ($P < 0.05$). From the herd management point view, owners of indigenous breeds tend to practice calf weaning while those rearing exotic and non-descript breeds do not wean their calves ($P < 0.05$).

Conclusion

Results suggest that herds consisting of genetically non-descript cattle, which constitute a third of the popula-

tion had poorer performance in terms of calving rates and mortality than other breeds. Female livestock keepers seem to have a preference for exotic breed types, suggesting that these producers may be responding to feedlot market demand for large-framed cattle. However, the correlation between experience of male producers and ownership of indigenous breed types suggests that these producers could be targeted for a conservation programs to reverse the erosion of indigenous genotypes. These producers could also act as opinion leaders in communities for the promotion of the envisaged conservation programs because of their leadership roles.

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