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A SYNOPSIS OF CATTLE PERFORMANCE IN ZIMBABWE'S 'INITIAL' RESETTLEMENT AREAS AFTER LAND REFORMS AND REDISTRIBUTION

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UN RESUME DE PERFORMANCE DE BETAIL DANS LES ZONES DE REINSTALLATION "INITIALE" APRES LA REDISTRIBUTION DES TERRES ET LES REFORMES AGRAIRES AU ZIMBABWE

Sommaire

La performance du bétail été suivie pendant une période de deux ans, dans une zone de réinstallation, suite á la réforme agraire post indépendance au Zimbabwe. Un nombre total de 30 agriculteurs, chacun étant propriétaire d'au moins 5 bovins dans 3 villages choisis dans un plan de recasement de 20 villages ont été ciblés pour l'étude. Les pâturages des villages participant étaient évalués tous les mois pour le rendement en biomasse dans différentes classes de couverture physionomique. Le bétail était suivi pendant une période de deux ans pour des informations sur la reproduction (taux de vêlage et fréquence, taux de nouveau vêlage) et les sorties (ventes, abattages, morts, échange et rachat) selon les conditions d'élevage du fermier. L'étude a décelé des taux de vêlage faibles à moyens (25-40%) et des taux faibles de nouveau vêlage (16-26%), avec une nutrition réduite et un faible taux d'exploitation (7,3% à 18,7%) en tant que principales entraves à la performance du bétail. Les poids mensuels des bovins changeaient avec la quantité de biomasse de pâturage disponible et étaient moins importantes pendant la saison sèche (mois de Septembre à Décembre). L'étude a conclu que l'amélioration de la nutrition, l'accroissement du taux d'exploitation et les taureaux éventuellement disponibles dans les zones de réinstallation étaient des actions appropriées pour accroître la performance du bétail dans le court et moyen terme, complètes par des pratiques vétérinaires adéquates.

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Summary

Cattle performance was monitored over a two year period in a resettlement area, a spatial land-use product of Zimbabwe's land reforms post-independence. A total of 30 farmers each owning at least 5 cattle in 3 selected villages of a 20 village resettlement scheme were targeted for the study. Participating village rangelands were assessed monthly for biomass yield in different physiognomic cover classes. Cattle in the study were monitored over a two year period for reproduction (calving rate and frequency, re-calving rates) and exit records (sales, slaughters, deaths, exchange, and buy-in) under farmer management conditions. Cattle weights, exit and reproduction records were analyzed as measures of performance. The study found low to medium calving rates (25-40%) and low re-calving rates (16 -26%), with diminished nutrition and low off-take (7.3% to 18.7%) as major impediments to cattle performance. Monthly cattle weights fluctuated with quantity of available grazing biomass, and were lowest during the dry months (September to December). Cows and heifers were affected more by diminished nutrition than steers. The study concluded that improving nutrition, increasing off-take and possibly availing bulls in resettlement areas were appropriate actions to increase cattle performance in the short to medium term, complimented by adequate veterinary practices.

Introduction

Land-use patterns in Zimbabwe drastically changed following the attainment of national independence in 1980[1]. The need to address imbalances in distribution and ownership of prime agricultural land led to the introduction of land reforms[2]. A land policy was promulgated in 1980 for the purpose of land redistribution and led to the introduction of resettlement schemes[3,4]. The term 'land redistribution' refers to the combined exercise of land acquisition, its transfer to the government for demarcation and final occupancy by black settlers in what is called resettlement[5]. The term 'resettlement' encompasses movement of people, their livestock and belongings to new acquired areas for the purpose of sedentary farming.

Government planners demarcated acquired land parcels and candidates applied for available positions on the land settlement scheme6. Out of the four models of resettlement designed by the government of Zimbabwe for implementation in 1980, the villagised/nucleated settlements model (Model A) took 91% of the 2.7 million hectares acquired for resettlement by 1987[1]. Under this model, a family was allocated 5 hectares of arable land and an equivalent of 30 hectares of rangeland per household, communally owned as a continuous stretch. A rangeland is an area reserved mainly for livestock grazing.

Assessment of productivity and success of initial resettlement schemes in Zimbabwe has been based on crop yields and socio-economic impacts[5,7]. The role of livestock in resettlement areas, and the motivation guiding their ownership, has been given little credence yet livestock is an integral part of smallholder agriculture[8]. Crop-livestock systems, as 'Model A' resettlement, are dependent on animal draft power. Draft power adequacy is a function of animal numbers, sex, age, body condition and frequency of use[9]. These variables require availability of a sustained feed resource base, which is mainly the grazing areas or rangelands. The main objective of this study was to monitor and quantify livestock productivity in a resettlement

scheme. We hypothesized that cattle performance in resettlement areas was not different to that in communal areas.

Materials and methods

Study site

The study was conducted at Mupfurudzi resettlement area, Shamva District, Mashonaland Central Province, Zimbabwe. Mupfurudzi resettlement area is located 60km north of the provincial capital, Bindura, and 35 km from Shamva town. The area receives 650 mm of mean annual rainfall and mean summer and winter temperatures are 29^0C and 18.5^0C, respectively. Mupfurudzi resettlement scheme comprises 20 villages and 3 villages, where a preliminary study was done, were the focus of this study.

Sampling procedure

The 20 villages of the resettlement scheme were categorised into 3 groups; 1: villages bounded by communal areas; 2: tobacco-producing villages and 3: villages bounded by other resettlement villages. One village was selected from each group for the study. It was anticipated that encroaching communal cattle and humans into resettlement rangelands would occur and affect grazing capacity in villages bounded by communal areas. The need to cure tobacco was expected to result in tree cutting, which would affect biomass production in rangelands adjacent to tobacco producing villages. The villages growing crops other than tobacco and wholly bounded by other resettlement villages were expected to have different land-use effects on rangelands, hence on the performance of monitored cattle.

Farmers in a village were grouped into two, those with cattle and those without. Ten farmers in each of the three villages were randomly selected from the group with cattle using sampling without replacement. Only those farmers owning more than five cattle were retained while those with less than five cattle were discarded. Selection continued until a targeted number of 10 farmers in each village was achieved. Secondary data from a previous study had shown that cattle were the dominant livestock species in the study areas hence the emphasis on cattle. Other livestock species were monitored for reproduction and exit only to reduce on costs and management of the study. Employed enumerators and the extension worker in the area assisted with monthly weighing.

Demarcation of rangelands

Rangelands in each village were demarcated into 3 physiognomic cover types namely, VLEI areas, Tree-Bush Savanna and disturbed Bush-Savanna areas, the latter being areas previously cultivated and allowed to revert to grazing areas. Grass biomass was assessed monthly in each cover type using the total clipping method in all villages to determine biomass yield (DM).

Data collection

Cattle of the selected farmers were monitored for the duration of the study for changes in animal weight, reproduction, exit records and reason for exit, draft power provision and general management. The following information was captured during the monitoring study: name of farmer, number of cattle owned, animal identity and sex, reproductive status (pregnant, lactating, dry) and animal weight. Measurements of animal

weights were taken from each sample animal monthly from January 2003 to December 2004, as the heart girth measurement through the use of a weigh band. A weigh band was used since it is simple to use and literature on cattle breeds of similar weight showed a high correlation (r = 0.978) between heart girth and body weight[10].

Statistical analysis

The sample size of monitored cattle with complete information was 128 due to missing data from some of the selected animals. Mukwari village contributed 48 cattle, Tongogara 39 and Takawira villages 41 and these were included in the data set. Data on monthly cattle weights and comparison of weights between months and villages was analyzed using PROC GLM in Statistical Analysis Systems package[11]. An ANOVA was run and LSMEANS computed to compare the differences in monthly cattle weights using a model that accounted for effect of month, sex, village and interaction of these variables. Reproduction (number of cows that calved, never calved, re-calving) and exit records (number of cattle slaughtered, sold, exchanged) as counts were analyzed using Chi-square test in SAS[11].

Results & Discussion

Reproductive Performance and exit records

A summary of cattle reproductive performance in the 3 initial villages monitored over a 24 month period is presented (Table 1). Of the 4 cows reported pregnant in January 2003 for Takawira village, only 3 carried the pregnancy to term while one did not and is suspected to have had stillbirth. There were significant differences between calving rates across the 3 study villages (χ^2-test = 2.79; P < 0.05) Calving rates (cows that calved once divided by the total cows in the village) reported in this study were comparable to those in communal areas9

Table 1. Summary of cattle numbers and reproduction in three initial villages of Mupfurudzi (Jan 2003 to December 2004).

Village	Cows Observed						Calving frequency in 2 years				
	Pregnant	Dry	Lactating	Heifers	Total	None	%	Once	%	Twice	%
Mukwari	8	0	18	4	30	9	30[a]	12	40[b]	5	16.7
Tongogara	3	2	16	3	24	10	41.7[b]	6	25[a]	6	25
Takawira	4	3	14	2	23	7	30.4[a]	7	30.4[a]	6	26.1

[ab]Values with different superscripts within column differ significantly (?2-test, P < 0.05

Table 2. Exit records for cattle in selected villages of Mupfurudzi January 2003 to December 2004

Village	Number of cattle & Exit records over 24 months								
	Present Jan 2003			Sales/Deaths over 24 months				Exchanges over 24 months	
	Steers/Ox	Cows/Heife	Totals	Steers/Ox	% Off-tal	Cows/Heife	% Off-tal	Steers	Cows/heife
Mukwari	18	30	48	5	10.4	4	8.3	0	0
Tongogar	15	24	39	2	5.1	2	5.1	1	2
Takawira	18	23	41	0	0	3	7.3	0	0

(25 and 30% calving rate for Tongogara and Takawira villages respectively), but with potential to surpass it (Mukwari, 40%). Cows generally displayed low calving rates in the two-year intensive monitoring period. This could implicate prolonged diminished nutrition with onset of dry season as this is known to affect exhibition of overt oestrus[18]. The use of cows for draught purposes in the absence of supplementary feeding has been reported to cause low reproductive performance of cows[9]. The shortage of bulls, though not evaluated in the current study, could have resulted in low conception and calving rates[19]. Re-calving rates of 16 – 26% are low but comparable to those in communal areas where cows take 2 -3 years to re-conceive[9]. Between 30% - 42% of potential breeding females never showed discernible pregnancy over the two year period.

Two heifers were bought-into the herds in Takawira and Mukwari village, while one large steer was exchanged for two smaller steers in Tongogara village during the 24 months period. There were no sales of oxen/steers in Takawira, while 5 steers were sold in Mukwari and 2 were slaughtered in Tongogara village (Table 2). Sales reported in the study were made to local beef committees comprising teachers and other civil servants as well as local butchers. Four cows died in Mukwari village and the cause of death could not be established. Two cases of stock theft were reported over the two-year period. The observed low off-take of cattle (0% - 12%, Table 2) is synonymous with smallholder farming communities where multiplicity of cattle roles overrides and masks the need for their disposal18. Farmers with more disposable income as in Takawira (with intensive flue-cured tobacco as a cash crop) invested in cattle ownership and never sold any during the study period.

Cattle weights in initial villages

Cattle weights fluctuated with season within year across all villages (Figure. 1).

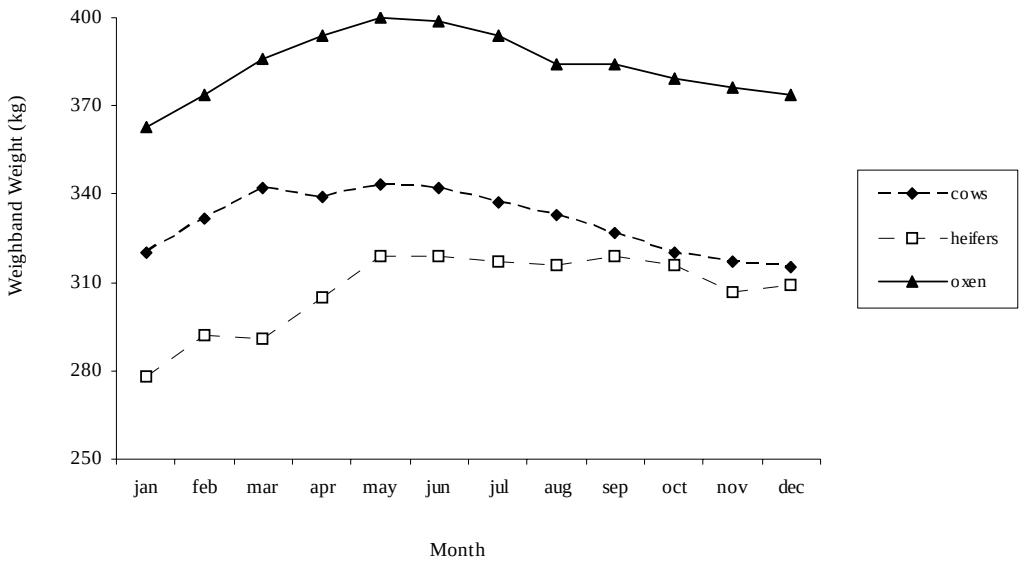

Figure 1. Trend of cattle weights by class of stock in 2003.

Oxen weighed heavier than heifers and cows. Class of stock significantly influenced cattle weights (F-test P < 0.05) throughout months of the year 2003, and similar trends were observed for 2004. Across the villages oxen had similar weights while significant weight differences were noted between heifers and cows. This difference in weight between heifers and cows could indicate confounding effects of breed variations among villages[17] and the averaging effect of mixed pools of sample animals[18]. Monthly weight fluctuation with season is a known phenomenon in arid and semi-arid areas where grass quality and quantity diminishes with coming of the dry season[12]. Cattle production is largely influenced by seasonal fluctuations in both quantity and quality of the veld with summer crude protein (CP) content in Zimbabwe ranging from 120 to 160 grams per kilogram dry matter (DM), but declining to as low as 10 to 20 g/kg DM in winter[13]. Zimbabwe is characterized by a long dry season extending from April to November in average years. Cattle production is also known to be susceptible to the periodic droughts that affect Southern Africa which aggravate and compound the under-nutrition experienced in "normal" years[14].

Grass biomass fluctuations

Grass yield was lowest from August through to December across physiognomic cover types, at which time digestibility and crude protein are often most compromised[13]. There was a positive correlation between fluctuating cattle weights and periods of abundance of grass biomass (Figure 1 & Figure 2). The rate of decline in cattle weight was less severe between May and August. This dampening effect could be due to additional access to crop residues which are often made available after harvest and could last from July through August depending on

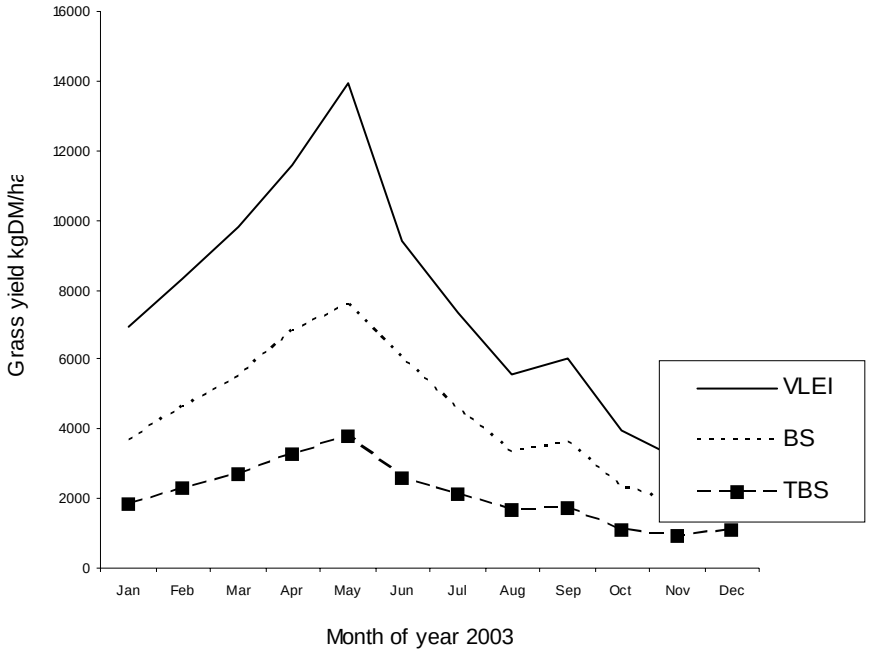

Figure 2. Means of grass biomass yield by physiognomic cover class for villages of Mupfurudzi in 2003.

availability and yield[16]. Even though crop residues were provided as supplementary feeding especially during winter, their utilization could however be limited due to low CP content (30g/kg DM) and high fiber levels in excess of 300g/kg DM[13]. Animal response in terms of live body mass gains from such a feed source is constrained due to insufficiency, low quality, low protein and high fiber diets. These attributes result in low rumen fractional out flow rates and low digestibility, mainly during the dry season, which consequently reduce voluntary feed intake[16].

Conclusion

Low cattle performance (calving rates, re-calving rates) and off-take in resettlement areas are a threat to the need to expand cattle production through future resettlement. That cattle performance in resettlement areas is comparable to that in communal areas calls for drastic measures to be taken to improve it through improving nutrition of homegrown crop residue supplements, use of indigenous female cows as dam lines, provision of bulls and sound selection programmes. Farmers must also be encouraged to pride in owning indigenous beef breeds (Mashona, Nkone) and stick to stocking rates. We encourage farmers to increase off-take between May and August when most cattle are in good body condition as this will help in reducing grazing pressure in their rangelands. Herd improvement through reproduction is slow and farmers are more likely to meet the targeted cattle numbers by buying-in cattle. We accept our hypothesis of similar cattle performance in resettlement areas and communal areas of Zimbabwe.

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