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Husbandry Management System and Its Effect on Improvement of Sudanese Indigenous Livestock Types in the Peri-Urban Region of Khartoum North Province (KNP)

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Abstract: A total of 90 small and large commercial producers were randomly selected and interviewed using structured questionnaire. The present work aimed to study the effect of husbandry and management practices on livestock production. Results revealed that all respondents were supplementing their cattle with concentrates. 95% of the investigated householders fed agro-industrial by-products with or without commercial concentrates and minerals. Crop residues and other forms of feeds like wild grass were also fed. Natural mating was practiced by (91.1%) householders while (5.6%) used artificial insemination (AI). The poor breeding practices are exemplified by dairy cows and heifers run together with both local and exotic bulls resulting in uncontrolled breeding and/ or progeny of inferior quality. It was noted that infectious diseases e.g. foot and mouth disease and contagious bovine pleura -pneumonia had frequently occurred in milk-oriented small and large scale livestock keepers (60%). Tick and tick- borne diseases were indicated by 43.3% as the second most frequently occurring disease. High cost of concentrates (74.4%), veterinary drugs (41.1%) and treatment (12.2%) or veterinary drugs + treatment (26.7%) were among the constraints faced livestock production in the study area. It was concluded that the current husbandry management practices did not result in the required improvement in performance of indigenous livestock.

Key words: Feeding · Husbandry · Indigenous livestock · Management practice

INTRODUCTION

The local Sudanese cattle breeders belong to *Boss indicus* species referred to as Zebu type or indigenous cattle which estimated as 40 million heads [1]. Kenana and Butana cattle are milk producing, while western Baggara is the major beef-producing cattle breeds in Sudan. Different sources of feeds varying from natural range, green fodder production to agro-industrial by products. Urban and prei-urban areas, where diaries exist, are famous of fodder production [2]. Almost all of the feed concentrates is produced locally. Agro-industrial by-products are widely used in as supplements to dairy cattle, small ruminants and fattening operations in urban and peri-urban areas. The major feeding systems in Sudan are free grazing feeding system, the cut-and-carry feeding system and stall feeding system [3].

According to El-sammani *et al.* [4] veterinary services declined and almost collapsed from the mid-eighties. The disease situation in Sudan is complicated by vast county area and the fact that nine countries share borders with it. This pose hazards to the national herd due to nomadic grazing animals that cross the boundaries in dry seasons. Musa *et al.* [5] reported that contagious bovine pleura pneumonia, trypanosomiasis, theileriosis and foot and mouth disease are the major diseases of herds in the study area.

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MacDowell [6] noted that crosses between the indigenous and exotic breeds have shown to be superior to local types of cattle in terms of production and reproduction. However, improved management, feeding and breeding have led to increased production of local breeds such as Kenana breed in Sudan [7]. The plans for genetic improvement of the indigenous cattle breeds in many tropical countries are more or less similar. Matthewman [8] reported that in the tropics, exotic breeds do not perform better than local breeds; hence increased production can easily be achieved by crossbreeding. Although crossbreeding widely spread, the success rate of AI in Africa and other third world countries is low. Azage *et al.* [9] owed this to constraints such as technical, system related, financial and managerial. The objectives of the present work were: to describe the peri-urban livestock production system (PLP) systems in Khartoum north province and to study the effect of husbandry and management practices on livestock production as well as its improvement of Sudanese indigenous livestock types.

MATERIALS AND METHODS

The study was carried out in two administrative units of Khartoum North Province (KNP) in Sudan. From these two units, three divisions were chosen: Halfaya, Kadaro and Silate. The distribution of large and small commercial householders between the three divisions was as follows: 58 householders in Silate, 23 in Kadaro and 19 in Halfaya. The geographical characteristics of the study area were described by Elniema [10]. For the purpose of this study, two questionnaires were produced. General questionnaire used to conduct a baseline survey at household level for both small and large commercial householders, while the second one covered the relative profitability and income contribution of the small commercial householders (case studies) as suggested by Creswell [11]. The general questionnaire was pre-tested in the three divisions. The single-visit, multiple- subject approach to data gathering as described by Gilbert *et al.* [12] were used in this study e.g. taking notes (questionnaires), as well as taking photographs and the help of some key informants in the area complemented by secondary data. The collected survey data were coded and analyzed using Statistical Packaging for Social Sciences [13]. Frequency and descriptive statistics were used in preliminary analysis to characterize farm households involved in livestock and poultry production in different study areas and where ratio measurements had been obtained, T-tests were employed.

RESULTS AND DISCUSSION

Feeding Practices: It was observed in this study that all respondents were supplementing their cattle with concentrates. Ninety five percent of investigated householders fed agro-industrial by–products with or without commercial concentrates or minerals. Household and restaurants leftover was used by 17.8% of the householders to reduce feed cost (Table 1).

Table 1: Feeding practices in the different management systems

	Feeding practices	Grazing	Partial grazing	Stall feeding	Partial grazing + stall feeding	Production	Poultry Total
1	Concentrates	0	0	0	0	2	2
2	Green fodder + Wild grass	1	0	1	0	0	2
3	Green fodder + Wild grass + mineral lick blocks	0	1	1	0	0	2
4	Green fodder + Agro-industrial by-products + Concentrates	0	0	2	0	0	2
5	Green fodder + Concentrates + mineral lick blocks	0	0	2	0	0	2
6	Green fodder + Agro-industrial by-products + mineral blocks	0	1	0	0	0	1
7	Green fodder + Agro-industrial by-products + Concentrate+ mineral lick blocks	0	2	48	1	0	51
8	Green fodder + Household waste+ Agro-industrial by-product s+ concentrates	0	0	1	0	0	1
9	Wild grass + Household waste + Concentrates + mineral block	0	1	0	0	0	1
10	Green fodder + Wild grass + Agro-industrial by-products +concentrates	0	0	1	0	1	2
11	Green fodder + Wild grass + Concent. + mineral blocks	0	1	0	0	0	1
12	Green fodder + Wild grass + Agro-industrial by-products + mineral lick blocks	0	1	8	0	0	9
13	Green fodder + Household waste + Agro-industrial by-products +concentrates+ mineral lick blocks	0	2	3	0	0	5
14	Green fodder + Wild grass + Household waste + Agro-industrial by-products + concentrates+ mineral blocks	0	1	7	1	0	9
Total		1	10	74	2	3	90

Table 2: Patterns of mating in the study area

Patterns of mating	Frequency	Percent
Natural mating	82	91.1
Artificial	05	05.6
No animals raised	03	03.3
Total	90	100.0

Table 3: No. of householders using different patterns of mating by region

	Patterns of mating %		
Area	Natural	Artificial	No animals raised
Silate (N=53)	98.1	1.9	0.0
Kadaro (N=20)	95.0	0.0	5.0
Halfaya (n=17)	64.7	23.5	11.8

In this study the concentrate mixture is prepared and fed on daily basis to lactating cows and breeding bulls. This practice was also reported by Hanyani-Malambo *et al.* [14] in some east African countries. However, transportation costs of agricultural by-products remain the main constraint for their utilization. Another alternative to reduce feed cost was to send pregnant cows and young animals to rural areas. In this study observation from the field visits during the survey revealed that householders in the study area were not applying specific feeding plans. Concentrates was given to dairy herds irrespective of the physiological status of the animal. It is also shown in this study that 74.4% of the respondents mentioned that high concentrates prices constraint livestock production. This agreed with the findings of Leslie *et al.* [15] who reported that animal feed is a major constraint for zero-grazed dairy cattle.

Breeding Practice: Upgrading indigenous cattle breed with exotic blood was dominant in the study area. Natural mating was the pattern of matting that most householders (91.1%) were using, while the remaining proportion (8.9%) used artificial insemination (AI) (Table 2). It was noted that that in Halfaya farm (near city centre) 23.5% of the respondents used AI against 0 and 1.9% in Kadaro and Silate farms, respectively (Table 3). This may be attributed to the fact that AI services are only available near city centre. In this study the poor breeding practices are exemplified by dairy cows and heifers run together with both local and exotic bulls resulting in uncontrolled breeding and/ or progeny of inferior quality. Patterns of matting were highly significantly and positively correlated with distance from city centre (r= 0.39) and herd management system (r= 0.55) ($P<0.001$). It appeared that there were no practical and feasible breeding programs in the study area.

Table 4: Frequencies of diseases occurrences in the three regions

Diseases	No. of HHs (N=90)	% HHs
Infectious diseases (FMD, CBPP)*	54	60.0
Brucellosis	6	06.7
Pulmonary infestations	12	13.3
Internal parasites	12	13.3
Tick and tick-borne diseases	39	43.3
Mastitis	32	35.6
Milk fever	2	02.2
Heart water	4	04.4
Pox	20	22.2
Diarrheas and bloats	22	24.4
ND	4	04.4
Poultry salmonella	3	03.3
Other diseases	9	10.0

HHs= householders, FMD=Foot and Mouth Disease, CBPP=Contagious Bovine Pleura- pneumonia

Veterinary and Animal Health Practices: Veterinary services though available but livestock keepers, irrespective of the location in the three regions, had listed a wide range of diseases. Table 4 shows that infectious diseases e.g. foot and mouth disease and contagious bovine pleura-pneumonia had frequently occurred in the herd milk-oriented small and large scale livestock keepers (60%). Tick and tick-borne diseases were indicated by 34.3% as the second most frequently occurring disease. These findings are partly complying with those reported by Musa *et al.* [5] who found the incidence of infectious diseases in cows in Butana cattle area were as high as 24% for Foot and mouth disease and 40% for contagious bovine pleura-pneumonia. High cost of veterinary drugs (41.1%), treatment (12.2%) and veterinary drugs + treatment (26.7%) were among the constraints faced livestock keepers in the study area. The high incidence of infectious diseases may have direct effects on live stock productivity that include reduced feed intake, changes in digestion and metabolism, increased mortality and decreases rates of reproduction, weight gain and milk production.

Mature Management Practices: Inadequate animal waste disposal system can cause health and environmental problems, even in small-scale enterprises. The majority of the householders (87.8%) directly disposed manure on daily basis by selling it. By this farmers mean to sell manure as an income to cover some of the daily household expenditure.

Local ordinances set by health authorities necessitated sound manure treatment. Only 40% of the households sprayed manure with insecticides. This explains why a large proportion of householders (49%) think that pressures from government health authorities constrained their production.

Table 5: Availability of extension services and visits during the last 12 mo (2007)

	Extension services (% of HHs)				
Area	N.A.	Available with no visit done at all	At request	Twice a year	Other
Silate (N=53)	86.8	5.7	1.9	3.8	1.9
Kadaro (N=20)	100.0	0.0	0.0	0.0	0.0
Halfaya (n=17)	82.0	17.6	0.0	0.0	0.0

N.A. = Not Available

Table 6: Sources of information on livestock management

Sources of information	No. of HH	%
Government extension	5	05.6
Research centers	2	02.2
Private veterinarians	15	16.7
Radio and T.V.	6	06.7
Books	6	06.7
Parents	20	22.2
Relatives and friends	13	14.4
veterinarians + parents	13	14.4
veterinarians + relatives and friends	9	10.0
parents + relatives and friends	18	20.0

Extension Services and Sources of Information on Livestock Management: Whereas 88% of the householders indicated unavailability of extension services from the government extension authorities, 6.7% said that the service was available but they did not receive it. While 1.1% said they ordered the service at request, 2.2% requested the service twice a year and 1.1% requested the service with frequency rate other than that indicated by different householders (Table 5). The poor extension coverage was indicated by the poor hygienic practices. The reason behind poor government extension coverage could be due to the negligence of government authorities to this important sub-sector. Parents alone seemed to be the first step in acquiring livestock management practices for 22.2% of the householders in small and large commercial enterprises. Private veterinarians played a great role in educating livestock keepers about herd management practices. More than 40% of the householders got their information from veterinarians alone and/or with parents and friends (Table 6). Similar findings are reported by DFID [16] in Kampala (Uganda).

It can be concluded that though relatively modern means of animal production were used in the study area, means of livestock husbandry are relatively traditional and the current husbandry management practices did not result in the required improvement in the performance of indigenous livestock types. Information on the performance potential of indigenous breeds is very vital for the development of national breeding policies and for improving productivity.

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