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SHORT NOTE [NOTA CORTA]

LIVESTOCK MANAGEMENT AND PRODUCTION SYSTEM OF AGROPASTORALISTS IN THE DERIVED SAVANNA OF SOUTH-WEST NIGERIA

[PRÁCTICAS DE MANEJO Y SISTEMAS DE PRODUCCIÓN AGROPASTORALES EN LA SABANA DEL SUR OESTE DE NIGERIA]

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SUMMARY

A survey was conducted by the administration of structured questionnaires to agropastoralists in fifty settlements in the derived savannah of South-west Nigeria in order to highlight the management practices and some of the factors influencing production in the area. The production system is traditional with animals being maintained on free range grazing, browsing and offer of crop-residues. Rangelands were, however, the major source of feed for the cattle. Farmers rarely supplemented their stock with concentrate diet while the most commonly purchased feed supplement was salt. Cattle constituted the major ruminant in the stock (65%) while sheep and goats accounted for 23% and 11%, respectively. The most favoured and dominant breed of cattle in the agropastoral herd is the Bunaji (White Fulani) (72.1%) followed by N'Dama (18.2%) and Keteku (9.3%). Female cattle were more in the herd than the male for all the breeds. Labour allocation among the agropastoralists is based on sex with more male tasks than female. All the agropastoralists (100%) inherited there stock while few (24%) engaged in care-taking of animals for others. Soil-eating and diarrhoea were the prevalent diseases among the animals. Majority (84%) of the agropastoralists depended on the use of local herbs and self medication for treating their animals as against a few (6%) engaging the services of the veterinarian. The system under study vividly typifies a traditional smallholder dairy production system characterized by little or not input. Improved feeding, housing and health management will enhance the productivity of the animals.

Key words: Herd structure and composition; ownership system; feed resources and feeding practices; labour allocation; health management

RESUMEN

Se realizó una encuesta estructurada en cincuenta asentamientos agropastorales de la sabana del sur oeste nigeriano, con el objetivo de identificar las prácticas de manejo y factores que influyen en los sistemas de producción de la región. El sistema de producción es tradicional con animales mantenidos en pastoreo libre, ramoneo y oferta de residuos agrícolas. No obstante, las praderas representan la mayor fuente de alimento para el ganado. Los granjeros raramente utilizan alimento concentrado para suplementar y el principal insumo adquirido como suplemento es la sal. Los bovinos constituyen el principal componente del hato (65%), mientras que los ovinos y cabras representaron el 23% y 11% respectivamente. La raza predilecta y dominante en los sistemas agropastorales fue la Bunaji (Fulani blanca) (72.1%), seguida de la N'Dama (18.2%) y la Keteku (9.3%). Las hembras constituyen la mayor proporción del hato. La distribución del trabajo es realizada de acuerdo al género, siendo los varones los que realizan las principales tareas. Todos (100%) los productores agropastorales heredaron su hato de animales y únicamente una pequeña proporción (24%) estaba involucrado en el cuidado de animales ajenos. Los principales problemas de salud fueron la diarrea y el consumo de suelo. La mayoría de los granjeros (84%) depende del uso de remedios herbales locales y la automedicación para medicar a sus animales y solamente el 6% recurrió a servicios veterinarios. El sistema estudiado tipifica la producción lechera a pequeña escala con bajo o nulo empleo de insumos externos. Mejoras en la alimentación, alojamiento y manejo sanitario repercutirán positivamente en la productividad de los animales.

Palabras clave: estructura y composición del hato; sistema de propiedad; alimentos y alimentación; distribución del trabajo manejo sanitario.

INTRODUCTION

Domestic livestock husbandry either at subsistence or commercial level is widespread in the Nigerian economy. Cattle, and to a lesser extent, sheep and goat production are generally associated with pastoral Fulani who are reputed to own approximately 90% of the national herd (Suleiman, 1988). Agropastoralism, an age long traditional system in the northern savanna that has just evolved in the derived savanna of Nigeria, emanates from transhumant pastoralists who are sedentary and combine crop cultivation with livestock production. These sedentary cattle pastoralists had been displaced out of their traditional territories by a variety of agro-ecological and socio-economic factors and thus their influx into the favourable zones of the derived savanna. A sizeable population of agropastoralists in the hinterlands of the urban centres in the derived savanna of Oyo states of Nigeria were originally normadic cattle pastoralists (Mohammed, 1990). Its land use management is characterized by transhumant system due to vegetation variations, agricultural practices and tsetse fly infestation (Iyayi *et al*., 2003).

The derived savanna of the South-western zone of Nigeria is recently experiencing pressure on land and such pressure is as a result of increase in population, land development and expansion of cropping land (Olafadehan, 2007). With this new development, a new system of livestock production has been observed to be evolving in the zone since the 1990s. The herd size is not only declining in number but the pastoralists are also settling down and taking up crop production in conjunction with cattle husbandry. As a result of these changes, new opportunities for growth are opening up and also new challenges are being faced. It is against this background that this study was conducted to provide information on the livestock management and production pattern in the study area.

MATERIALS AND METHODS

The study area

The study was conducted in the derived savanna vegetation zone of Oyo state, South-western Nigeria, which has been reputed to have the highest concentration of agropastoral farmers in Southwestern Nigeria (Okoruwa, 1994). It lies roughly between longitude 3^{o} 4/ West, 6° 4/ East of Greenwich and latitude 6° 10/ and 9° 10/ North of the equator. The study area is bounded in the north by the southern guinea savanna zone and in the south by the interface between the lowland rain forest and southern parts of the derived savanna. Annual rainfall is between 1,500 and 2,000 mm and follows a bimodal distribution. The temperature ranges from 22–33°C while the wet season lasts for 8.0–8.5 months starting from mid-March to mid-November.

Selection of farmers

Due to the on-going sedentarization of agropastoralists, only few of them are now in the study area which was formerly reported unsuitable for ruminant stock production as a result of the problem of trypanosomosis. Because of this peculiar problem, only 50 agropastoralists out 60 previously identified by International livestock Research Institute (ILRI, 1995), with at least five years of sedentarization, were selected for the survey.

Data collection and analysis

The instruments of data collection, which spanned a period of six months from February to July 2003, were observations and a combination of informal and formal surveys with the household heads. The preparation and administration of formal survey or questionnaire was preceded by an exploratory informal phase and a pre-testing phase. Primary data were collected by administration of both open and close ended structured questionnaires to the sampled agropastoralists in the study area. The questionnaire administered on the farmers centred on four main issues mainly: herd inventory and structure, feed resources and feeding practices, management practices and production pattern and animal health and health management. Each topic consisted of a number of multiple choice and open ended questions. The interviews, which were conducted in the morning, were held near the cattle kraal and or farm where it was easy to count the animal and observed various activities done by the farmer. Descriptive statistics were computed using the Statistical Package for Social Scientists (SPSS) 11.0 for Windows (2001).

RESULTS AND DISCUSSION

The average number of cattle, sheep goat and poultry in agropastoral stock were 28, 10, 5 and 28 representing 39.4, 14.1, 6.9 and 39.7% of herd sizes, respectively (Table 1). Of the ruminant animals, cattle constituted the major ruminant in stock (65%) compared to sheep (23%) and goats (11%). The herd structure was fairly similar to that reported elsewhere in Kenya (Lanyasunya *et al*., 2006); they indicated that ruminant livestock population comprised of 61.7% cattle, 35.1% sheep and 3.2% goats. The average herd size of cattle is similar to the average herd sizes of 26 and 25 reported by Okoruwa *et al*. (1999) and lyayi *et al*., (2003), respectively. The preponderance of cattle over sheep and goat in the agropastoral stock confirms previous reports (Suleiman, 1988; Mohammed, 1990; Lanyasunya *et al*., 2006). Sheep were higher in stock than goats because of their ease of management and

herding along with cattle unlike goats which are hardier to handle and practise more of browsing than grazing. Keeping of poultry by the pastoralists is a sharp contrast to the livestock composition of nomadic pastoralists obviously because poultry cannot be herded along with cattle. The sedentarization of the pastoralists is probably responsible for their keeping of poultry in addition to the ruminants. This, however, does not translate into much increase in meat production as their tropical livestock units (TLU) are still very low.

Breed composition of cattle in the agropastoralists stock (Table 1) showed that the favoured breed of cattle in the stock is the Bunaji followed by N'Dama and Keteku, which is the breed least kept by the farmers. The composition of the cattle breed is similar to that reported by the Iyayi *et al*. (2003) but was slightly different from that reported by Olanite *et al*. (2003) for the same study area. The predominance of Bunaji breed could be due to the assertion made by Waters-Bayer (1988) who noted that agropastoralists have preference for Bunaji cattle because of their reputation for higher milk production, faster growth rate, large body size and good temperament. The preponderance of Bunaji, a trypanosusceptible cattle in the derived savanna of South-west Nigeria, which is known to host tsetse fly (the vector of trypanosomosis), seems to suggest that the area is no longer an area of high trypanosomosis challenge. Adu (1993) reported that the trypanosusceptible cattle in the derived savanna have developed some degree of tolerance to this disease.

Table1. Livestock holdings and breed composition of cattle population of the agropastoralists

Item	Mean	% of animals	TLU
Species			
Cattle	27.88 ± 10.12	39.4	19.52
Sheep	9.96 ± 1.50	14.1	0.99
Goat	4.90 ± 1.23	6.9	0.49
Poultry	28.10 ± 4.26	39.7	0.28
Cattle breeds			
Bunaji	20.10 ± 6.46	72.10	
N'Dama	5.20 ± 1.60	18.20	
Keteku	2.58 ± 0.90	9.30	

TLU: Tropical Livestock Unit (equivalent)

As shown in Table 2, herd composition of the agropastoralists indicated that there were more female cattle than the male. The proportions of male to female were about 1:12 for adult cattle and 1:2 for calves. The observed herd structure remarkably typified a smallholder dairy production system. Smallholder dairy farming has become popular in most developing countries (Mwenya, 1992; Banda *et al*., 2000; Ngongoni *et al*., 2006, 2007). The higher number of female cattle more than the male in the agropastoral herd is believed to correlate with the major reason for keeping cattle, which is the milk production; the milk is sold to augment household income. The result agrees with that of Lanyasunya *et al*. (2006). Dairying in the smallholder areas is practised to produce milk for feeding the family and for sale, to produce manure, support crop production and provide dairy animals for insurance and financing emergency cash needs and for social status (Ogungbe and Adu, 1998; Banda *et al*., 2000; Bebe *et al*., 2003; Iyayi *et al*., 2003). As a result of the sedentarization of the pastoralists, a new system of agricultural production resulting in crop-livestock interaction has emerged in the study area. This new development has opened up various challenges such as provision of marketing chains for the dairy products, education and social amenities like good roads, health care services, pipe borne water for the farmers. The proportions of breeding bulls were low suggesting a higher offtake of male at relatively young age. Most agropastoralists kept only one breeding bull, mostly Bunaji for serving the females in order to upgrade the milk production potential of other less dominant breeds of cattle in their herds, and those without breeding bull hired from their neighbouring household to serve their female stock. Parallel results were reported by Mohammed (1990) and Okoruwa *et al*. (1999). About 90% of the farmers practised uncontrolled breeding. The fact that few farmers owned a bull implies that these bulls may be used to mate close relatives, potentially increasing the inbreeding levels in the population. Furthermore, most of the bulls would be of unknown pedigree, although generally of known genotype, implying that systematic selective breeding is lacking. Increased inbreeding and the use of unproven bulls and lack of artificial insemination (AI) services may have unfavourable long-term effects on productivity through the degradation of the herd genotype. The organisation by farmers' co-operatives of village bull schemes using bulls of proven genetic merit may be an attractive alternative to expensive AI and reduce inbreeding.

Presented in Table 4 are the feeding methods, seasons of supplementation and classes of animals supplemented. Availability of feed is the most important factor in livestock production. Without optimum feeding, the animals do not produce up to their production potential and are vulnerable to various diseases. In the area surveyed, rangelands were the major source of feed for the dairy cattle and other ruminant stock. This is consistent with the report of another survey on smallholder livestock production elsewhere in Africa (Chinogaramombe *et al*. 2008) and Asia (Khan and Usmani, 2005). While majority of agropastoralists (66%) depended on grazing plus browsing and crop residues for feeding their animals, very few (4%) reported using concentrate as supplement to grazing and browsing. All the

agropastoralists supplemented their animals with browse and salt as against very few using cassava peel and concentrates. A vast majority of the agropastoralists depended on natural feed resources for feeding their animals because the production system under consideration is a smallholder dairy production system characterized by low or no inputs. The result concurs with the previous reports (Francis *et al*., 1987; Khan and Usmani, 2005; Olafadehan and Adewumi, 2009) who noted that pastoralists rarely supplemented their animals with concentrate diets. According to ILCA (1994) sedentary pastoralists graze their cattle from April to November, feed their own crop residues between December and February and then a mixture of pasture re-growth and browse trees. The most commonly used supplements to the rangelands were browses, salt and crop residues principally because browses and crop residues are readily available after harvesting at no cost while salt is relatively very cheap. Olanite *et al*. (2003) earlier reported that traditionally managed cattle in the derived savanna area of Southwestern Nigeria are only supplemented with common salt pounded with the bark of some forest species, usually *Alfzelia africana*. Supplementation was commonly practised in early and late dry seasons obviously due to low quantity and poor quality of available pastures during these periods. The agropastoralists reported the use of lopped browse trees, mainly *Pterocarpus erinaceus*, *Alfzelia africana* and *Daniella oliveri*, as supplements during the dry season. However, crop residues (cowpea vines, maize and sorghum straw) were the most regularly used feed supplements in early dry season, which coincided with harvesting time. Vast majority of the agropastoralists engaged in supplementation of all classes of their cattle. The implication of this is that as the feeding pattern is intensified, sustainable beef and milk production is ensured. This does not only guarantee faster and increased returns but can also activate further investment into the production system by the farmers. All these will go a long way in increasing the local production of beef and dairy products.

The major diseases of cattle in the study area, as shown in Table 4, are soil-eating (geophagy)and diarrhoea . Few respondents, however, reported low incidence of foot and mouth diseases. Common to the cattle in wet and dry seasons was the problem of soil-eating, which the agropastoralists perceived as the major overwhelming constraint to their cattle productivity. The exact cause of soil-eating is not known but the deficiency of iron in the body could lead to deprived appetite also called “pica” in which cattle eat wood, soil and other objects around. It is not impossible that the mineral content of the grazed native pasture is much lower than the minimum requirements for cattle nutrition. The major infectious disease reported among the cattle was foot and mouth disease, a viral and zoonotic disease with remarkable negative impact on milk production and persistency of lactation.

Table 2. Cattle herd size and structure of agropastoralists in the study area

Item	Breeds of cattle		
	Bunaji	N’Dama	Keteku
Adult cattle			
Bull	1.31	-	-
Lactating cows	3.39	1.07	0.50
Dry cows	4.40	1.53	0.60
Heifer	2.90	0.60	0.40
Young cattle			
Suckling male	1.90	0.50	0.10
Weaned male	1.10	0.40	-
Suckling female	2.10	0.50	0.53
Weaned female	3.00	0.60	0.40

Table 3. Feeding methods, season of supplementation and classes of animals supplemented

Parameter	Frequency	% of farmers
Feeding methods		
Grazing + crop residue	6	12
Grazing + browsing	11	22
Grazing + browsing + crop residue	33	66
Grazing + browsing + concentrate supplement	2	4
Commonly used supplement		
Cassava peel	6	12
Browse	50	100
Salt	50	100
Crop residue	40	80
Concentrate	5	10
No of farmers feeding supplement	50	100
Season of supplementation		
Early wet season	30	60
Early dry season	50	100
Late wet season	10	20
Late dry season	50	100
Classes of animals supplemented		
Lactating cows only	3	6
Pregnant cows only	2	4
Sick cattle only	1	2
All	44	88

Table 4. Seasonal occurrence of major diseases of cattle in the study area

Diseases	Agropastoralists reporting diseases	
	Frequency	% of farmers
Wet Season		
Soil eating	39	78
Diarrhoea	35	70
Foot and mouth diseases	5	10
Dry season		
Soil eating	46	92
Foot and mouth disease	9	18
Low milk production	50	100

A higher proportion of the agropastoralists owned their stock compared with few managing or taking care of stock belonging to other people (Table 5). Virtually all the agropastoralists inherited their stock while few acquired their stock through purchase, care-taking and gifts in that order. Majority (84%) of the agropastoralists depended on the use of local herbs and self medication of their animals and only 6% engaged the services of the veterinarian. The care-taking of cattle belonging to other people by the agropastoralists is in line with the observation of Jabbar *et al*. (1995) and Agyemang *et al*. (1997). The result suggests that indigenous local farmers, who cultivate crops mainly in the study area, have developed interest in cattle husbandry and management and usually give their animals to the Fulani pastoralists to cater for them. Iyayi *et al*. (2003) reported that the local farmers sometimes hire sedentary pastoralists to manage their herds and take up management themselves after gaining enough experience. In confirmation of the age-long method of acquisition of stock by the Fulani agropastoralists, all the respondents inherited their stock. This tends to suggest the unwillingness of the agropastoralists to invest which makes the system a smallholder dairy production. The extremely low percentage of the agropastoralists engaging the services of the veterinarians or animal health personnel to treat their stock is possibly an indication of poor veterinary services at the sedentary cattle farmers' disposal. Okoruwa (1994) earlier reported poor veterinary service for smallholder cattle producers in the peri-urban areas of the derived savanna.

Labour allocation (Table 6) showed that various activities involved in cattle production and labour allocation is based on sex. There were more tasks assigned to male than female members of the household. While herding, milking and kraal cleaning were exclusively male jobs, processing and sales of milk were mainly for females. Allocation to work is based on sex simply because there were predominantly male and female tasks in the household. Despite the fact that the tasks were allocated based on sex, the tediousness or nature of the tasks determines those being assigned to the young ones and adults. Okoruwa (1994) observed a hierarchical structure in which children are in training under the adults until they are mature enough to cope with the production chores. The observation is consistent with that of lyayi *et al*. (2003) who equally noted that labour allocation is based on sex, with more male jobs than females among sedentarized pastoralists.

Table 5. Cattle ownership system and herd health management of agropastoralists

Stock ownership system	Frequency	% of farmers
Stock being care taking	8	26
Stock owned by pastoralists	23	74
Total cattle stock	31	100
Methods of stock acquisition		
Inheritance	50	100
Purchase	4	8
Care taking	12	24
Gifts	6	12
Means of treatment		
Veterinary services	8	16
Local herbs + self medication	42	84

Table 6. Labour allocation pattern of agropastoral farmers

Task	% of agropastoral farmers
Herding	
Adult male	78
Male child	22
Milking	
Adult male	60
Male child	40
Kraal cleaning	
Adult male	52
Male child	48
Milk processing	
Adult female	54
Female child	46
Sales of milk	
Adult female	40
Female child	60

CONCLUSIONS

The present livestock management and production system is traditional and the overwhelming

preponderance of females over the males vividly typifies a dairy based production system, which is a smallholder dairy production with little or no input. However, poor feeding, housing and health management of the animals are the major factors affecting the agropastoral stock in the studied area It is thus envisaged that establishment of fodder or provision of subsidized supplementary feeds, housing and veterinary services for animals would impact immensely on the performance of the grazing animals.

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