ENHANCING OUTPUT ORIENTED LIVESTOCK IMPROVEMENT STRATEGIES IN THE SOUTHERN DRYLANDS OF KENYA

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Abstract

Farmers in the drylands practice mixed crop and livestock production systems. Both production systems have mutual relationships and understanding of target outputs in each system is important. With increasing demand for livestock products, livestock production is expected to be the major driving enterprise during a predicted food revolution. Targeting the most valued livestock species and the premium products or services from that species will improves the farmers' interest and adoption of recommended production technologies. In this cross sectional survey carried out in Kibwezi District, Kenya, this research team aimed at identifying the most valued livestock species and the premium products or services targeted. Systematic sampling method using road transects was used to select farmers to be involved in the survey. The pair wise ranking method was used in importance ranking during the survey and a Focused Group Discussion held to discuss the survey results. The farmers' importance ranking of the livestock species was topped by the goat followed by chicken, cattle and sheep. Draft power was ranked most important followed by beef, cash, milk and then manure. To produce the top ranked product (draft power) the most valued livestock age/sex class is the entire bulls followed by the heifers, mature females, castrated and lastly the calves. Therefore to improve livestock production in Kibwezi District, we recommend that farmers focus on improving the performance of entire bulls for draft power and mature females for milk production.

Key words: Mixed production systems, livestock products, cattle, draft power, milk.

Introduction

Farmers in drylands practice mixed crop and livestock production systems. In these systems, there are mutual relationships with each system benefiting from products or by-products of the other. Understanding of the target outputs of each system is important in developing and promoting their improvement strategies. Increasing climate variability (climate change) and decreasing household land size holdings are major factors affecting production within the crop and livestock production systems drylands. Decreasing moisture availability due to increasing evapotranspiration rates (IPCC, 2007) are changing the environments under which both plants and animals are being produced in drylands. In addition, decreasing land sizes available for production demand modifications in production technologies and re-orienting of the farmers' production goals. Livestock production is predicted to become a major driver in next food revolution due to increasing demand for livestock products as urbanization and human economic wellbeing improves (Delgado *et al.* 1999). There is need to direct more efforts towards the livestock production system to assist farmers to take maximum advantage of this predicted revolution. In the drylands, farmers are keeping each livestock species to produce differing products and services that they value differently. The major products and services from livestock are milk, beef, mutton, draft power, manure, hides, skins and eggs. There is need to understand the value attached to each product or service by the farmers. To improve adoption of livestock improvement technologies in the drylands, extension agents should target the most valued products from the livestock species kept. Targeting the most valued livestock species and the premium product or service given by a particular livestock species improves the farmers' interest and adoption of recommended production technologies. However, due to predicted climate change effects, there is need to focus more efforts on livestock species that is likely to be more adversely affected by this change. In dry lands, woody plant species (shrubs) are expected to increase while herbaceous species (grasses) are expected to decrease. Therefore, grazers will be more adversely affected than browsers.Involving the farmer in the research process has been emphasized as an efficient way to improve technology adoption and adaptation (Martin and Sherington, 1997; Babu and Hazell, 1999; Defoer and Budelman, 2000) and reducing the cost of extension. This team of scientist conducted a cross-sectional survey to identify the reasons why farmers keep livestock in the South Eastern drylands of Kenya. The aim of the survey was to understand the target outputs from the livestock production systems and their ranking with the aim of laying strategies for advocating the promoting the top ranked outputs. This survey was conducted in Kibwezi District, Kenya.

Materials and Methods

Kibwezi District is one of the dryland Districts in South Eastern Kenya. The District comprises of Kibwezi and Mtito Andei Divisions on the southern tip of the former larger Makueni District. The District covers an area of approximately 3,400km^2 (CBS 2000). The average annual rainfall is between 600mm and 700mm that comes in a bimodal regime. The more reliable short rains come in the months of November to December while the less reliable long rains come in the months of March to May. The average temperatures are 23^{0}C with a potential evapotranspiration rate of 2000mm (Michieka and van der Pouw, 1977). The altitude of the District varies from 600m near the Athi River belt to the eastern to high grounds of 1100m along the Chyulu hills to the western side of the District (GoK, 2002). The major Agro-Ecological Zones (AEZs) are LM5, LM4 and IL6 (Jaetzold and Schmidt, 1983) while the average human population density is 85 persons per km^2 (GoK, 2002).

To get a representative sample of the District, a systematic sampling method using road transects was used. A road transect was placed in each of the three major AEZs in the District. The survey covered both Mtito Andei and Kibwezi Divisions of the District. A Land Rover was used to drive along each of the road transects and a trained interviewer was drop after every one Mile (1.609 Kms). The Land Rover odometer reading was in miles hence the use of the mile as our distance units.

A semi-structured questionnaire was administered to the nearest willing farming household on either side of the road, if a farmer was not willing, the next nearest household to this one was interviewed. The ranking of importance livestock species kept by the farmers was done using the pair wise method as describe in Participatory Learning and Action Research (PLAR) (Defoer and Budelman, 2000). A total of 120 willing farming households were interviewed within the three AEZs. Data and information collected during the survey was analyzed using the frequencies procedures of descriptive statistics as described in Statistical Package for Social Sciences (SPSS) (Norman *et al.* 1975) and rankings were weighted using the Likert scale method. Results from data analysis process were later presented to a Focused Group Discussion (FGD) for consensus building, adjustments and capturing information that may have been missed by the interviewing team.

Results

The major livestock species kept by farmers in Kibwezi District are cattle, goats, chicken, sheep and donkeys. Other livestock species kept are pigs, ducks and turkeys. The average animal holdings per household in the District were 4.4 ± 0.9 (n = 70), 10.5 ± 2.0 (n = 110), 12.1 ± 2.1 (n = 104) and 6.0 ± 2.0 (n =28) for cattle, goats, chicken and sheep respectively. On the importance placed by farmers on the livestock on livestock species kept, goats were ranked highest followed by chicken, cattle and sheep (Table 1). Turkeys, pigs and ducks were kept by few farmers in the wetter LM4 and LM 5 zones.

Table 1. Livestock species ranking in Kibwezi District Kenya

Livestock species	Ranking frequencies					Weighted Score	Rank
	1	**2**	**3**	**4**	**5**		
Goats	56	48	6	0	0	490	1
Chicken	16	30	40	15	3	353	2
Cattle	42	21	7	0	0	315	3
Sheep	2	5	17	4	0	89	4

n = 117

The cattle are likely to be more adversely affected due to them being grazers and their big size. This study therefore focused on the cattle as the study livestock species. The major products farmers from Kibwezi District get from cattle are cash, draft power, milk, beef and manure. The farmers ranked provision of draft power the most important followed by beef, cash income, milk and mature respectively (Table 2). During the FGD, it was agreed that cash may be generated from the three other major products or from their by-products. Therefore, they felt that the ranking of products from cattle should be topped by beef followed by milk and then draft power. Draft power is only needed during the land preparation and weeding periods and that takes a short period of the year.

Table 2. Cattle outputs/ services ranking in Kibwezi District Kenya

Output/ Services	Ranking frequencies				Weighted Score	Rank
	1	**2**	**3**	**4**		
Draft power	12	6	5	1	77	1
Beef	10	3	1	2	53	2

Cash	5	8	1	2	48	3
Milk	6	3	5	1	44	4
Manure	2	7	2	2	35	5

n = 41

The major products farmers from Kibwezi District get from cattle are cash, draft power, milk and beef. Cash returns from cattle were ranked the most important while among the products and services, draft power was ranked higher although mentioned by fewer farmers. The average rankings given by the farmers for each product was 1.8 ± 0.8 (n = 21), 3.1 ± 0.8 (n = 6), 5.1 ± 2.3 (n=20) and 7.1 ± 3.0 (n = 16) for cash, draft power, milk, and beef respectively. During the FGD, it was agreed that cash may be generated from the three other major products or from their by-products. Therefore the FGD felt that the ranking of products from cattle should be topped by beef followed by milk then draft power. Draft power is only needed during the land preparation and weeding periods that take a short period of the year.

To produce different top ranked output the farmers value the cattle age/sex classes differently. For generating draft power or beef, the entire males are the most valued followed by the heifers, the mature females, the castrates and lastly the calves (Table 3).

Table 3. Cattle age/ sex class ranking in Kibwezi District Kenya

Age/ Sex Class	Ranking frequencies					Weighted Score	Rank
	1	2	3	4	5		
Entire males	23	7	1	1	0	148	1
Heifers	3	8	4	13	0	85	2
Mature cows	4	5	11	1	0	75	3
Castrate males	5	9	2	1	0	69	4
Calves	0	0	3	2	16	29	5

n = 34

Discussion

The five major livestock species (cattle, goats, chicken, sheep and donkeys) kept by the farmers serve differing purposes. The numbers of livestock kept by a farmer are determined by the resources available to the farmers and may determine the target outputs for the farmer. Decreasing moisture availability due to climate change may favour annual grasses, trees and shrubs and not perennial grasses. This will most likely make the ASALs more unfavourable for cattle production. Cattle production will therefore need to be given more support to be sustainable under increasing climate variability.

The four major outputs farmers in Kibwezi District get from cattle (draft power, beef, cash and milk) are all important and farming households may target any of them as the major output. The high ranking of beef production agrees with another forum that has indicated that cattle in the drylands are kept for beef production (Kibet et al 2006). However, the cattle numbers kept by each farming households in Kibwezi District may be too few to support a viable beef production enterprise. Draft power production may have had a major contribution to the high ranking of male animals in cash generation. Culled draft power animals are slaughtered to produce beef. The FGD stressed that beef and milk were the major outputs in cattle production systems in Kibwezi District. However, we feel that draft power is still important in the agro-pastoral systems practiced in the District. Efforts should be directed towards breeding animals that will produce draft power and milk. Beef can be produced from culled animals. Livestock feed improvement programme should also focus on improving draft power, milk and beef. A dual purpose cattle for draft power and milk production should be the most preferred animal for farmers in Kibwezi District, Kenya.

Conclusion

To improve cattle production in Kibwezi District, extension agents should focus on improving the performance of entire bulls for draft power provision and beef and mature cows for milk production.

Recommendations

We recommend that more efforts be focused towards promoting livestock breeding and feed provision strategies that will improve production of powerful animals that can produce enough draft power and beef and still produce adequate milk quantities for an improved household economy.

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