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Research Article

Livestock Husbandry and Smallholder Response to Shocks in Southern Zambia

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Abstract: This study aims to provide information on smallholder farmer access to livestock inputs and services and their husbandry practices in normal and shock years. A combination of qualitative techniques (community mapping with cards; scoring; etc) and a set of carefully designed semi-structured questionnaires were used to elicit information about the underlying livelihoods. The survey areas were purposively selected bearing in mind the geographical variations in levels of vulnerability and the intra-district variations in production potential and market access. Inter-household variations within each sampled community were taken care of by categorizing the households into three poverty groups (non-poor, poor and extremely poor) and implementing a sampling strategy that ensured adequate representation of each. The results suggest a strong need to improve not only public service delivery to the livestock sector but also to devise a multi-faceted system for enhancing productivity and market participation. This is especially critical during shock times.

Keywords: Livestock inputs, mixed methods, services, smallholder farmers, Zambia

INTRODUCTION

In many low-income countries, chronic vulnerability and poverty are entrenched and exacerbated by the risk of extreme climatic, economic and policy shocks. Often the resultant food insecurity has been perceived mainly in terms of food crop availability and accessibility. The role of livestock, which affects the livelihoods of approximately 60% of the people in southern Africa, is much less appreciated (see, for example, Zambia National Assembly, 2012; MAL 2003 for Zambia). This narrow view of food security grossly undermines the mitigatory role that these other strategies do or could potentially play. The inadequate appreciation of the role of livestock in rural livelihoods is partly due to a dearth of evidence-based knowledge about the sub-sector. In a more-recent study, the Government of Zambia also through the Committee on Agriculture of the National Assembly has also noted the prominence that is given to crops instead of livestock. As a result, very low productivity has characterized the livestock sector in Zambia. In Zambia, Livestock husbandry is characterized by four main sectors which include: the state, the commercial, small scale sector and the mixed crop-livestock production systems (Aregheore, 2006). Currently, the mixed crop-livestock production system has been identified as a system with diversified risk options and allows for the efficient use of inputs and provides sufficient cash for those who engage in it. However, small-scale livestock systems are the most prevalent in Zambaia. These tend to be characterized by poor access to livestock inputs and services coupled with high risk to weather shocks (MAL 2003).

A key feature of the smallholder livestock sub-sector is that not only does it help to smoothen consumption during times of shock but it also can get adversely affected by the same risk factors. The extent to which this can be mitigated depends, to a large extent, on the farmer's wealth levels and access to the requisite inputs and services. This identifies the need to understand not only the sub-sector's contribution to livelihoods but also its ability to cope with shocks such as drought and floods. Understanding the response to these shocks by different categories of smallholder farmers, as they strive to sustain their livestock enterprises, is key in efforts to devise interventions that could potentially sustain and improve the sector's role as an insurance against shocks. To the best of our knowledge, no study has comprehensively looked at these issues in Zambia. While other studies are centered at “systems thinking” (Lai, 2007) and “critical triangle1” of development and land management (Kitalyi *et al*., 2006), we narrow our focus on livestock husbandry practices with regard to livestock

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inputs/services and their importance to help mitigat shocks in rural households of southern Zambia.

The research reported in this study aims to provide information on smallholder farmers' access to livestock inputs and services and their husbandry practices in normal and shock years. The idea is to understand how husbandry practices respond to shocks among different classes of smallholder livestock farmers. This information is important for devising and implementing livestock interventions in emergency situations. Data and information obtained from this study should help to implement relevant and effective livelihood interventions that aim to strengthen livestock-based livelihood systems. Livestock interventions have been identified within the broader context of livelihood interventions.

MATERIALS AND METHODS

Data: This study uses data from a mixed-methods survey of livestock-rearing communities in three districts of the Southern Province of Zambia, conducted during 2006 through 2007. 2Southern Province has been experiencing a number of shocks like floods and droughts during much of the last two decades, often prompting food assistance to vulnerable populations. Of the country's nine provinces, Southern Province also stands out as one with the largest and most diversified smallholder livestock sector. The province is comprised of 11 districts, half of which are located in the low-rainfall (less than 800 mm annual rainfall) region, Agro-Ecological Region (AER) I. This group can be further sub-divided into valley districts and those that are located in the sandy plateau in the south-western region of the province. We call both these sub-categories of districts 'hot-spot' districts, owing to their high poverty and vulnerability levels. The other six districts belong to medium-rainfall (800-1, 200 mm) region, AER II, here referred to as non-hotspot districts.

One district was randomly selected from each of these strata-one from each of the hot-spot sub-categories (Sinazongwe from the valley stratum; and Kazungula from the Kalahari-sand-covered stratum) and one from the non-hot-spot stratum (Namwala) (Table 1). Within each selected district and prior to primary data collection, all the agricultural camps or communities were stratified into four distinct groups based on relative productive potential (high or low) and market access (high or low). This was accomplished in close consultation with knowledgeable key informants such as government agricultural and veterinary staff. One community was randomly selected from each of the four camp/community strata (Table 1).

In each selected community, a number of complementary quantitative and qualitative research techniques were used to collect the required data and information. The community participatory assessment process begun with a social mapping exercise to characterize the community's institutional, resource and asset context as well as to categorize the individual households based on their degree of vulnerability to food insecurity. Then within each food security stratum, focus groups were convened, each comprising a random selection of 8-10 individuals. In addition to being a powerful tool for collecting data that is enriched by purposeful use of interaction (Kitzinger 1994; McLafferty, 2004; Merton *et al*., 1990 and Morgan 1996), FGDs also offer considerable advantages in terms of cost per informant, because in a two hour FGD, the researcher is in direct contact with between six and eight informants. The number of participants per FGD was determined in conformity with recommendations of some sections of the literature. 3Krueger (1994), for example, suggests an optimal number of FGDs of 4-12 while Millward (1995) contends that data generated after about 10 FGDs are likely to be largely redundant.

The information gathered through these focus group discussions (FGDs) was complemented by community censuses, during which a very short questionnaire/listing form was administered to all the households represented at the community meeting and a few in-depth household interviews using a semi-structured questionnaire. The in-depth household interviews were based on a sample drawn from a household sampling frame generated through the listing that took place during participatory community discussions and mapping. At that stage, data on basic characteristics of each household in the community

Table 1: Stratification variables, August 2006

Variable	How selected	Code	Code description
District type	Purposively, with the help of provincial level key informants (e.g., agricultural personnel)	1	Hot-spot; i.e., poor and prone to weather shocks. The sample for this study includes - Sinazongwe District from the valley stratum - Kazungula District from the sandy plateau stratum
		2	Non-hotspot. These are relatively better off and more productive parts of the province. In this study, Namwala was selected to represent this type of districts
Community type	Purposively, with the help of district level key informants; most from the office of the District Agricultural Coordinator (DACO)	1	Low productivity, low market access
		2	Low productivity, high market access
		3	High productivity, low market access
		4	High productivity, high market access
Household poverty classification	Determined collectively by the community members during the participatory wealth ranking exercises	1	Non-poor
		2	Poor
		3	Extremely poor

were collected using a structured listing form. A total of 309 households were listed and interviewed across all the communities in the three districts and. Using the listing information gathered, in each community, households were grouped into three strata-i.e., Non-Poor (NP), Poor (P) or Extremely Poor (EP). For operational purposes, a household was categorized as NP if it had enough to eat throughout the year, i.e., from harvest to harvest; as P if it normally had enough food to last from harvest up to Christmas but not between Christmas and the next harvest; and as EP if it had a longer period of food shortages, often experiencing severe food shortages even before Christmas. Care was taken to ensure representation of each of these food security strata in the household case studies to which a semi-structured questionnaire was administered. A total of 56 household interviews were completed using a semi-structured questionnaire.

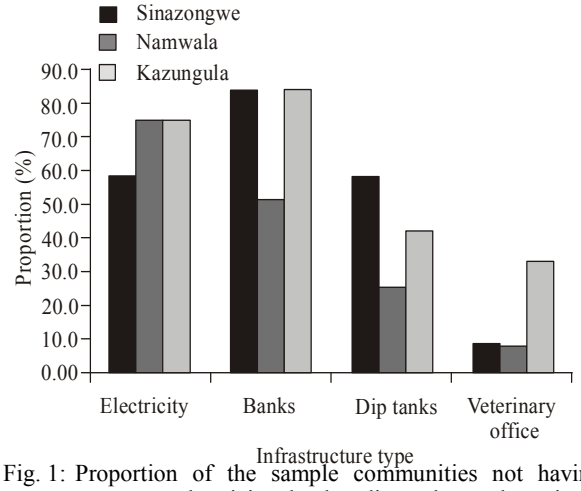

Fig. 1: Proportion of the sample communities not having access to electricity, banks, dip tanks, and vetrinary offices

Analytical framework: Data collected through the wide spectrum of methods and instruments discussed above were analyzed using a wide range of techniques. These included post-interview brainstorming and collation of notes (for qualitative information) and quantitative analysis of rank/score data collected through the PRA exercises and factual information collected using pre-designed tables and semi-structured questionnaires. The quantitative analyses were accomplished using Microsoft Excel and the Statistical Package for Social Sciences (SPSS). One-way Analysis of Variance (ANOVA) was used to test for the statistical significance of the differences in household characteristics across the various types of households.

RESULTS AND DISCUSSION

Socio-economic characteristics of sample households: Table 1 presents and compares some basic demographic and access characteristics and asset ownership across the food security and district strata. As expected, households in hotspot districts had much less desirable attributes and indicators of wealth than their counterparts in the non-hotspot district. For example, households in the non-hotspot district, on average, were 19% more likely to be male-headed and had at least six times as many cattle, twice as many oxen, six times as many pigs, three times as many poultry and more than twice as many ox-drawn implements as their counterparts in the two hotspot districts (Table 2).

Within each district stratum (hotspot or non-hotspot), household characteristics and asset ownership were significantly better the more non-poor the household was. One-way Analysis of Variance (ANOVA) shows that these differences were statistically significant for most of the variables, regardless of the district stratum. However, a few differences are worth noting. In the hotspot districts, for example, poor households were significantly more likely to be female headed than their relatively less poor counterparts whereas in non-hotspot districts all households were generally more likely to be male-headed regardless of their relative poverty status. On the other hand, the disparity in households' membership to social groups among food security groups was significant only in the non-hotspot district.

Table 2 also shows that the magnitudes of the group differences were much more pronounced in the non-hotspot district than in the hotspot districts. This is not because the poor in the non-hotspot district were poorer but because the non-poor were significantly richer than their counterparts in the hot spot districts. In some cases, the extremely poor in the non-hotspot district exhibited better attributes and higher asset ownership than did the extremely poor households in the hotspot districts (Table 2). This calls for caution in interpreting the food security classes and clearly identifies the need to appreciate the relative nature of the rankings.

Access to livestock inputs and services: All communities indicated having access to road networks and transport facilities in one form or another. However, communities in hotspot districts (Kazungula and Sinazongwe) were more likely to miss on some of the key infrastructure (Fig. 1). For example, 45-60% of the communities in hotspot districts did not have dip tanks, compared to 25% in the non-hotspot district. More than 30% of the communities in Kazungula, a hotspot district, did not have a veterinary office, compared to less than 10% in the other districts.

The question of access to infrastructure within each of the three districts yielded the most mixed responses with respect to electricity, banking facilities, dip tanks and veterinary offices. Thus, all the districts, hotspot or non-hotspot, have mixtures of communities with and communities without access to these facilities. Figure 1 presents the proportions of the sample communities that indicated not having access to each of

Table 2: Basic household demographic characteristics and asset base across household food security and district strata, August 2006

	Hot spot districts				Non-hotspot district			
	All (1)	Food secure (2)	Food insecure (3)	Extremely food insecure (4)	All (5)	Food secure (6)	Food insecure (7)	Extremely food insecure (8)
Number of households	213	69	69	74	96	25	33	38
	Proportion of households with							
Male heads	0.79	0.91	0.86	0.61***	1.00	0.94	0.89	
Modern houses	0.21	0.38	0.19	0.07***	0.19	0.54	0.12	0.03***
Membership to groups	0.36	0.43	0.38	0.28	0.38	0.58	0.36	0.27**
	Mean number of							
Household members	7.08	9.04	6.59	5.70***	11.06	17.50	10.24	7.71***
Hammer mills	0.02	0.04	0.01	0.00	0.04	0.04	0.09	0.00
Hand mills	0.02	0.04	0.01	0.01	0.17	0.42	0.15	0.03***
Bicycles	0.43	0.62	0.51	0.19***	0,79	1.50	0.76	0.37***
Radios	0.53	0.64	0.67	0.31**	0.94	1.71	0.73	0.63***
Television (TV) sets	0.07	0.13	0.07	0.00**	0.17	0.54	0.09	0.00***
Ox-drawn implements	0.72	1.07	0.77	0.36***	1.45	2.88	1.45	0.55***
Livestock								
Cattle	4.46	7.94	4.20	1.45***	26.96	80.75	16.24	2.29***
Oxen	0.73	1.36	0.72	0.15***	2.15	5.52	1.84	0.32***
Sheep	0.46	0.64	0.77	0.00	0.35	1.17	0.15	0.00**
Goats	2.81	4.30	2.46	1.73**	3.39	5.46	4.21	1.37
Pigs	0.20	0.35	0.25	0.03	1.25	2.46	0.73	0.95
Donkeys	0.12	0.28	0.10	0.00**	0.05	0.00	0.12	0.03
Poultry	7.39	11.48	7.77	3.23***	23.60	50.79	19.21	10.24***

Mean difference tests across the three food security strata were performed with one-way ANOVA; Significance (based on ANOVA tests): * = 10%; ** = 5%; *** = 1%; Community censuses conducted during community mapping (September 2006)

Table 3: Community perception about the state of the infrastructure in Sinazongwe, Namwala, and Kazungula Districts, September 2006

	Sinazongwe		Namwala		Kazungula	
Type of infrastructure	Fair to very good (1)	Poor to very poor (2)	Fair to very good (3)	Poor to very poor (4)	Fair to very good (5)	Poor to very Poor (6)
	Proportion of communities (Row %)					
Roads	25.0	75.0	14.3	85.7		100.0
Transport	20.0	80.0	16.7	83.3	20.0	80.0
Markets	33.3	66.7	18.2	81.8	12.5	87.5
Electricity	50.0	50.0	66.7	33.3		100.0
Schools	25.0	75.0	45.5	54.5	20.0	80.0
Banks			66.7	33.3		100.0
Dip tanks			28.6	71.4	14.3	85.7
Crush pen	20.0	80.0	37.5	62.5	40.0	60.0
Veterinary office	18.2	81.8	50.0	50.0	57.1	42.9
Total	24.5	75.5	34.7	65.3	20.9	79.1

these facilities, differentiated by district. Electricity and banks were the least prevalent. As much as 83% of the communities in the hotspot districts of Sinazongwe and Kazungula indicated not having access to banking facilities. The DACO's annual report for Livingstone and Kazungula (GRZ, 2004, 2006) makes a similar observation about Kazungula District, arguing that the district has the highest proportion of the population not having access to banks and credit facilities as the area had just been turned into a district.

In all the three districts, more than 60% of the population perceived most of the infrastructure to be poor to very poor (Table 3). In Kazungula all the communities indicated that the road was in a very poor state. Most of the roads in these communities were gravel roads which had not been graded in a long time. In most instances, the roads were so bad that in the rainy season they become totally impassable by motor vehicles. Due to the state of the roads, a limited number of vehicles go to these areas, making transportation and access to market very difficult.

In Sinazongwe district all the communities visited did not have dip tanks in their locality. However, in both the hotspot districts (Kazungula and Sinazongwe) and the nonhotspot district (Namwala), more than 70% of the communities felt that their dip tanks were in very poor state (Table 3, column 4). In Namwala the public-owned dip tanks were in poor state while the privately owned were better maintained by the owners. Most farmers who had small herds of cattle and did not own their own dip tanks depended more on the privately owned dip tanks where they would pay a nominal fee or pay in form of labour to use those dip tanks. This is because most of the public owned dip tanks would be non-operation due to dilapidation and/or lack of acaricides. The poor state of veterinary infrastructure affect these communities negatively as preventive measures of disease control like dipping can not be effectively carried out leading to sporadic outbreaks of tick borne diseasess.

Table 4 shows the variations in availability of water, markets and dip tanks across districts (columns

Table 4: Availability of water, markets, and dip tanks before and during major shocks

Attributes/Variable	District: Sinazongwe (1)	Namwala (2)	Kazungula (3)	All districts (4)
Distances (kilometres)				
Nearest water source in normal years	0.83	1.81	1.04	1.38
Nearest water source during shock years	0.60	2.19	3.96	2.76
Nearest livestock market	126.38	28.06	48.43	67.60
Proportion of livestock farmers using dip tanks	0.45	0.82	0.52	0.67
Proportion of farmers selling livestock at market	0.56	0.79	0.13	0.51

Table 5: Access to and utilization of livestock markets, veterinary services and extension services by food security status

Item/Variable	Food security category: Food secure (1)	Food insecure (2)	Extremely food insecure (3)	All households (4)
Number of households interviewed	22	18	16	56
Distance to the nearest livestock market (km)	73.9	58.8	66.2	67.6
% of farmers selling livestock at market	71.4	40.0	33.3	51.0
Access to and utilization of veterinary and extension services				
----------	% of livestock farmers			----------
Veterinary services				
Requiring veterinary services	77.1	86.8	79.8	81.0
Accessing veterinary services	63.3	77.3	71.8	69.8
Utilizing veterinary technical advice	40.8	60.4	37.6	46.6
Extension services				
Requiring extension services	75.2	69.6	82.5	74.9
Accessing extension services	55.3	49.5	60.7	54.5
Utilizing extension advice	30.7	28.2	33.6	30.5

1, 2 and 3). Sinazongwe has the nearest sources of water with average distances of 0.8 and 0.6 km away in normal and shock years, respectively. However, the average distance to the source of water during normal years among the three districts is 1.4 km, increasing to 2.8 km during major shocks. This is due to the trend livestock farmers employ in shock situations where cattle are taken to the plains/river shores for greener pastures and cleaner water. In shock situations like drought, water in the usual water sources (ponds, dambos, wells and streams) dries up or become muddy. Farmers generally move an average of 67.6 km to the nearest livestock market to sell their produce, with Namwala having the nearest markets at 28.1 km. Not surprisingly, Namwala has the largest proprotion of farmers selling their livestock (82%). The district also boasts of the largest proportion (79%) of farmers using dip tanks. This is qualified because Namwala, according to the findings is a large scale livestock (cattle) district with ready market and resources to use especially the more food secure households.

Table 5 presents information on access to livestock markets and access to and utilization of veterinary and extension services by the households at the time of the study. Although demand for veterinary and extension services is generally high, these supply-side constraints, among other things, seem to have substantial adverse effects on farmers' access to such services. While more than three quarters of the interviewed households indicated desire, more than 14% of those expressing interest did not have access. The access problem is even greater with respect to extension services, where more than 26% of the interested households do not have access to such services. Moreover, only 56 and 67% of those with access to extension and veterinary services, respective actually utilize the new knowledge. All these results indicate challenges along the entire chain, from supply through access to technology uptake.

There does not seem to be any convincing evidence, contrary to what is expected, that non-poor households are any better in this regard. With livestock markets located 68 km away, on average, just about half (51%) of the interviewed households sold at least some of their livestock in those markets.

It looks somewhat paradoxical that the non-poor households, whose homesteads are located 26% further from the market places than their poorer counterparts, have at least 78% more access to the market. However, given their large livestock enterprises, it makes sense that they would want to be located far enough from urban centers so as to have access to enough land that would support their livestock enterprises. Most of the interviewed households feel that access to livestock inputs and services is generally poor. More than 86%, for example, complained that the quality of pasture is poor, (Table 6, column 4). Availability of water, access to veterinary services and access to pasture where also regarded poor, indicated as such by 85, 79 and 74% of the respondents, respectively. However, much less proportions felt that these inputs were worse at the time of the survey than they were one year or 10 years before, which seems to suggest the existence of a stable low-level equilibrium.

Table 6: Households' perceptions about current status and trends in access to and quality of livestock inputs and services

Attribute	District: Sinazongwe (1)	Namwala (2)	Kazungula (3)	All districts (4)
Number of households interviewed	19	21	16	56
	% of households			
Access to pasture				
Poor now	64.7	80.0	87.5	77.4
Worse than a year before	47.1	55.0	6.3	37.7
Worse than 10 years before	23.5	33.3	12.5	23.5
Quality of pasture				
Poor now	76.5	94.7	87.5	86.5
Worse than a year before	52.9	42.1	6.3	34.6
Worse than 10 years before	17.6	22.2	0.0	13.7
Availability of water				
Poor now	70.6	85.0	100.0	84.9
Worse than a year before	58.8	45.0	0.0	35.8
Worse than 10 years before	23.5	33.3	6.3	21.6
Access to markets for animals				
Poor now	52.9	75.0	56.3	62.3
Worse than a year before	5.9	20.0	0.0	9.4
Worse than 10 years before	5.9	38.9	6.3	17.6
Access to veterinary services				
Poor now	64.7	85.0	87.5	79.2
Worse than a year before	5.9	5.0	0.0	3.8
Worse than 10 years before	29.4	11.1	31.3	23.5
Access to drugs for livestock				
Poor now	41.2	85.0	81.3	69.8
Worse than a year before	17.6	10.0	0.0	9.4
Worse than 10 years before	35.3	22.2	31.3	29.4
Access to livestock credit				
Poor now	0.0	10.5	12.5	7.7
Worse than a year before	0.0	5.3	6.3	3.8
Worse than 10 years before	0.0	5.9	0.0	2.0

Household interviews (September 2006)

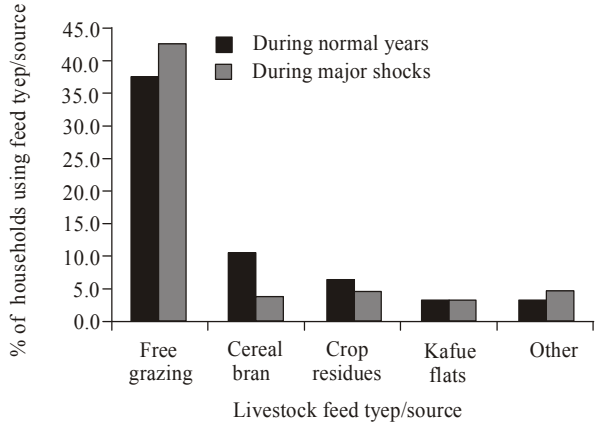

Fig. 2: Livestock feed types/sources and proportion of households using them, [a]Other: Wild fruits, bushes and fodder

Animal husbandry and farmer adaptation to shocks: Figure 2 presents the proportion of households using particular livestock feed types and sources during normal and shock years. Free grazing is by far the most important source of livestock feed. More than a third (36%) of the interviewed households indicated that this natural method is very important during normal years. It becomes even more important during times of shock, with about 42% of the respondents arguing it is important during such times. Free grazing areas are available to every livestock farmer any time of the year, hence almost every livestock owner uses the method.

Other relatively minor sources of livestock feed include cereal bran, crop residuals and the natural flood plains more than 70 km away from the closest village, the Kafue flats. Proportionately, cereal bran usage is the most affected by weather shocks, reducing by 60% (from 10 to 4%) in response to shocks. This makes sense as bran is most available during times of good harvest. While usage of cereal bran and crop residues decline in response to shocks, usage of free grazing, wild fruits bushes and fodder increase.

During the dry seasons of both normal and shock years, some farmers (less than 5.0%) take their livestock to the plains (Kafue flats). The proportion of households taking their animals to the Kafue flats also increases though the increase is negligible. Usage of the flats is constrained largely by long distances and statutory stock movement restrictions. While at the plains, farmers are advised to dip/vaccinate their animals frequently against tick-borne diseases, a need that is obviously enhanced by the fact that animals from various origins meet and interact in the plains.

Summary of Constraints to livestock rearing: Table 7 and 8 presents a summary of the constraints to livestock rearing and their rankings (1 = most important) as identified by the communities. Among the

Table 7: Constraints to livestock production and their relative importance as perceived by focus groups in the various food security categories in Sinazongwe, Namwala, and Kazungula

	Sinazongwe			Namwala			Kazungula			
Constraints to livestock rearing	FS (1)	FI (2)	EFI (3)	FS (4)	FI (5)	EFI (6)	FS (7)	FI (8)	EFI (9)	Total (10)
Median ranks (1 = Most important)										
Disease	1.0	1.0	1.0	1.0	1.0	1.0	1.5	1.0	1.0	1.0
Inadequate water	2.5	3.0	1.0	3.0	3.0	3.0	2.0	4.0	2.0	2.0
Expensive vet drugs	.	1.5	2.5	2.5	2.0	.	2.0	.	.	2.0
Inadequate grazing areas	4.0	2.5	3.0	4.0	3.5	2.0	3.5	2.0	5.0	3.0
Poor infrastructure	2.0	5.0	.	3.5	2.0	4.0	3.0	2.5	8.0	3.0
Inadequate vet services	3.0	2.5	.	.	3.5	3.0	4.0	2.0	.	3.0
Low livestock prices	.	.	.	.	3.0	.	.	.	.	3.0
Ecto Parasites	.	.	1.0	.	.	5.0	.	.	.	3.0
Theft	5.0	.	.	2.0	5.0	4.0	5.0	.	4.0	4.5

Table 8: Constraints to livestock production asnd their relative importance as perceived by focus groups in the various food security categories in Sinazongwe, Namwala, and Kazungula

	Sinazongwe			Namwala			Kazungula			
Constraints to livestock rearing	FS (1)	FI (2)	EFI (3)	FS (4)	FI (5)	EFI (6)	FS (7)	FI (8)	EFI (9)	Total (10)
Median ranks (1 = Most important)										
Disease	1.0	1.0	1.0	1.0	1.0	1.0	1.5	1.0	1.0	1.0
Inadequate water	2.5	3.0	1.0	3.0	3.0	3.0	2.0	4.0	2.0	2.0
Expensive vet drugs	.	1.5	2.5	2.5	2.0	.	2.0	.	.	2.0
Inadequate grazing areas	4.0	2.5	3.0	4.0	3.5	2.0	3.5	2.0	5.0	3.0
Poor infrastructure	2.0	5.0	.	3.5	2.0	4.0	3.0	2.5	8.0	3.0
Inadequate vet services	3.0	2.5	.	.	3.5	3.0	4.0	2.0	.	3.0
Low livestock prices	.	.	.	.	3.0	.	.	.	.	3.0
Ecto Parasites	.	.	1.0	.	.	5.0	.	.	.	3.0
Theft	5.0	.	.	2.0	5.0	4.0	5.0	.	4.0	4.5

livestock-related constraints, livestock diseases were singled out as the most important by all the communities, most of whom assigned it a rank of one (Table 7 and 8). Diseases were considered important and major causes of death in cattle, goats and chickens. Haemorrhagic septicaenia (H.S), a disease in cattle, was more prevalent in Kazungula especially along the Zambezi River (GRZ, 2005 a to d). Expensive veterinary drugs and inadequate water were ranked jointly as the second most important constraints, followed by inadequate grazing land, poor infrastructure, inadequate veterinary services and low livestock prices in the third position.

Disease, inadequate water, inadequate grazing land and poor infrastructure were not only ranked highly but also highly prevalent as perceived by most to all the focus groups. Inadequacy in grazing land is due to communal grazing since animals are kept under the traditional husbandry system. Livestock theft, though mentioned by at least one of the wealth groups in each of the three districts, was not considered very important, receiving a median rank of 4.5.

Figure 3 presents constraints related to dip tanks and livestock production and marketing based on data from the in-depth household interviews. The results are perfectly consistent with those obtained from FGDs. The most important reason for farmers' limited access to dip tanks, for example, was identified to be limited availability (Fig. 3a). Half (50%) of the interviewed households cited non-availability of dip tanks as the main reason for their not dipping their animals. The problem was more acute in Sinazongwe, one of the hot-spot districts. However, Sinazongwe is also one of the most diversified districts in terms of livestock species in which small livestock (goats, poultry) form a significant proportion of the livestock population. Unlike cattle, such small livestock have virtually no use for dip tanks. Therefore, dip tanks are irrelevant in some of the communities, which do not have large enough cattle populations. Even where dip tanks exist, usage is not as high as it should be. Other reasons cited by the communities for low dip tank usage include the poor state of available dip tanks due to poor maintenance (35%), water shortages and private ownership of the tanks although the former is not so important in Kazungula and among the food insecure in general.

Compared to other districts, farmers in the non-hotspot district are more commercial and rear more livestock (cattle mainly). As cattle are prone to tick-borne and other diseases, these farmers have greater incentives to acquire and maintain functional dip tanks. However, it appears such individual efforts have not been adequate and many point to the need for government or NGO-supported communal dip tank rehabilitation projects.

Reduction in livestock numbers due to deaths resulting from disease outbreak in the recent past has been a big blow to the farmers. Therefore, most farmers have hoped to join the restocking exercise in order to rebuild their stocks. However, a number of constraints have been identified following this exercise, including disease, lack of liquidity and the slow nature of the restocking process (Fig. 3b). Lack of liquidity and the slow nature of the restocking process are considered the

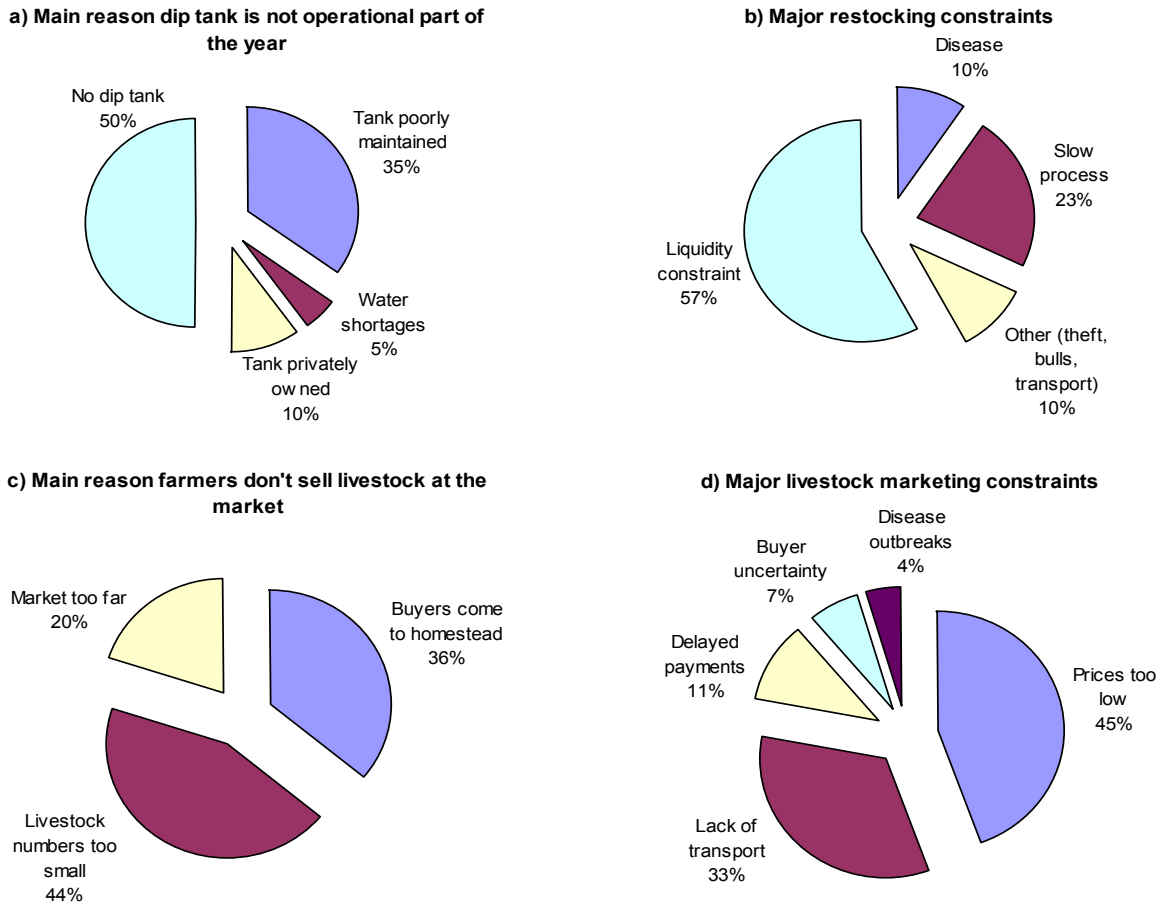

Fig. 3: Dip tank, livestock restocking, and marketing constraints

most important restraint to stock rebuilding, cited by 57 and 23% of the respondents, respectively. The commercial route is preferred because the closest (government-supported, NGO implemented) alternative in which one animal is given to the village headman who in turn is expected to pass on its off springs to the other households, is slow and grossly unrealistic.

Due to the desire to maintain the prestigious status of being proud owners of large herds of cattle, most smallholder livestock farmers do not rear livestock for commercial purposes. The reduction in livestock numbers that have taken place in recent years have not helped matters. More than 44% of the households that do not sell their livestock at the market cited the small numbers of livestock as the main reason for their non participation in the market (Fig. 3c). Other reasons cited for not taking advantage of livestock market establishment included the fact that livestock buyers do from time to time follow the animals in the villages and homes (36%) and the long distances to the markets (20%). Distances, though considered the least important reason, discourage some farmers especially the poorer ones.

Farmers also encounter a number of livestock marketing constraints, including low prices, lack of transport, delayed payments, buyer uncertainty and disease outbreak (Fig. 3d). 'Low prices' is the most important constraint, indicated by 45.0% of the farmers and most prevalent among the poor households in Namwala. Because the non-poor lack the means to transport their livestock to the market, they tend to wait for buyers from their homesteads. Such long distance buyers tend to offer low prices, considering their transaction costs and apparent desperation among the sellers. Lack of transport was the second most important constraint, mentioned by one-third of the interviewed farmers (Fig. 3d). The extremely poor were the most constrained in terms of transport (scarcity and high hire rates) due to limited income sources. Furthermore, when livestock are sold at the market (e.g., to the Zambia Beef Company-ZAMBEEF) and payments are made through banks, the period it takes for the money to be released is rather long. Small-scale farmers sell livestock mostly in desperate situations where waiting for a long time does not help them take care of immediate needs. 'Delayed payments' were, therefore, sighted as the third most important constraint. Farmers also complained of inadequate buyers at the market.

CONCLUSION

This study sought to provide information on smallholder farmers' access to livestock inputs and services and their husbandry practices in normal and shock years. A combination of PRA techniques (community mapping with cards; scoring; etc) and a set of carefully designed semi-structured questionnaires were used to elicit information about the underlying livelihoods and the significance of livestock to these livelihood systems. To ensure representativeness and capturing of as diverse the target population's conditions and circumstances as possible, the survey areas were purposively selected bearing in mind the geographical variations in levels of vulnerability and the intra-district variations in production potential and market access. 4Inter-household variations within each sampled community were taken care of by categorizing the households into three poverty groups (non-poor, poor and extremely poor) and conducting focus household interviews and group discussions with each.

The study makes four significant and unique findings being; the most important source of risks/shocks in the three districts were; drought, diseases and floods; lack of feed and poor quality of feed in lean period; lack of the necessary and adequate facilities, materials and infrastructure which had crippled farmer's response to shocks and low prices were exhibited by farmers thereby posing a challenge to livestock marketing and response to shocks.

The results indicate that the major sources of risk to the livelihood systems include drought, livestock disease outbreak, floods, pollution, crop pests, HIV/AIDS and wild fires. Drought, livestock diseases and floods are the most important sources of risk. While drought and livestock diseases were prevalent in all the study districts especially Namwala and Sinazongwe, floods were more frequent in Sinazongwe district. Shifting animals to the plains during times of drought is more common in Namwala especially by the non-poor households that are believed to own larger herds of cattle.

In the meantime, it is a well-known fact that, with a more productive livestock enterprise, it is very easy for the households to improve their food security standing. By the same tokenHowever, poor management and failure to anticipate and prepare for livestock-related shocks could be very devastating as has been demonstrated in the last decade by the multiple disease outbreaksto livelihoods. A number of households dropped down the ladder from very comfortable positions to extremely poor. All these point to the need for enhanced knowledge about animal husbandry in the communities. Farmers need to be made to appreciate the fact that they and not the government, are responsible for maintaining a health herd. Although a movement in this direction is becoming progressively apparent, there is still need for more awareness creation and retooling with recommended husbandry practices.

Feed is one of the challenges faced by livestock farmers, especially during the lean periods of the year. Livestock farmers should be taught on the indigenous trees and shrubs which can be used as feed for ruminants in the dry season. Zambia has a great diversity of such trees and shrubs with high content of proteins, minerals and vitamins and also available in the dry season. According to Aregheore (2006), wood fodders have the capacity to complement crop residues and natural pastures.

The veterinary offices need to be equipped with all the necessary facilities and materials for them to be effective. Top on the list are drugs, syringes and other equipment and transport facilities. The latter are especially important given the expanse of the veterinary camps, which are on average more than double the size of the extension camp. The inability to move limits the veterinary assistants' ability to reach and comprehensively enhance the farmers' technical abilities (Tembo, 2006). Livestock infrastructure also need to be rehabilitated. Infrastructure include dip tanks and crush pens. As much as 60, 40 and 20% of the sample communities do not have access to functional dip tanks in Sinazongwe, Namwala and Kazungula, respectively.

The government needs to pay more attention to the challenges associated with livestock marketing. It can be argued that the low prices that the farmers are complaining about are due to monopsonistic behaviour exhibited by a few large buyers of meat. However, given that most of the infrastructure (roads, etc) are rated as poor to very poor, the low prices offered to smallholder farmers by the meat firms could as well be a reflection of the high marketing costs. Moreover, since most livestock are sold during lean periods, the high supply that is not matched with demand drives the prices down. It is important that all the underlying issues are fully understood. Therefore, there is both the need to understand the structure, conduct and performance of the meat industry as well as the need to develop the dilapidated and, in most instances, virtually non-existent infrastructure.

Interventions that could help the farmers to delay their crop sales might benefit crop and livestock marketing. By so doing, the lean periods are likely not to be as severe as they are when almost all the crop is sold at or immediately after harvest. Selling most of the crops at harvest drives crop prices down in addition to deepening the food shortfalls during the lean months of September through March. The more severe food shortages in turn force the affected households to sell more of their livestock during the lean periods, which drives livestock prices down. Thus, the poorer segments of the community get lower prices for both their crops and livestock. The net effect is an ever widening gap between the rich and the poor.

In as much as it is not the mandate of the veterinary department to provide clinical services to the public,

livestock farmers still go there for technical services. The veterinary department is only mandated to pay attention to monitoring and regulation and also attend to Diseases of National Economic Importance (DNEI) for rural districts. Farmers don't seem to understand this policy because most of them depend on the department for vaccinations, diagnosis, treatment of diseases, etc. Meanwhile most of them are well informed that the policy implemented by the Government of the Republic of Zambia does not allow this office to provide clinical services. The policy should therefore be reconsidered and/or widely disseminated, because, clearly, the responses from the farmers and their communities reflect incomplete appreciation.

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End note:

1: The "critical triangle" of development consists of food security, poverty and environmental protection (Kitalyi *et al*., 2006).

2: Southern Province is home to 12.7% of Zambia's 13 million people. The province consists of the valley along the river Zambezi and lake Kariba (300,000 ha), the escarpment (1,074,500 ha), the plateau (5.9 million ha), the Kafue flats (1 million ha) and a little stretch of the Barotse plains to the west of Livingstone. Southern province receives rainfall of about 800 mm and below. It has very poor rainfall distribution especially during periods of shocks like drought. For example, during the 2004/05 drought season, Namwala received about 553 mm of rainfall, leading to a 61% reduction in maize production (GRZ, 2005a). Sinazong we, a hotspot district, received about 273.2 mm as of 31st March, 2005 based on the Sinazeze Station rainfall data and resulted in food grain deficits of above 80% of the total population in the district (GRZ, 2005b). Kazungula another hotspot study district received rainfall of about 423.8 mm (GRZ, 2006). On the contrary, the highest rainfall region in Zambia receives about 1200 mm of rainfall.

3: Krueger (1994) argues that, on average, 4-12 FGDs are optimal while Millward (1995) contends that data generated after about 10 FGDs are likely to be largely redundant.

4: The study was conducted in two districts that were considered to be highly vulnerable, or hotspot districts (Sinazongwe and Kazungula) and one not so vulnerable district, or non-hotspot district (Namwala). The latter was regarded as a comparison district.